Remedial Investigation Work Plan

Former Mill No. 2
Norampac Industries
4001 Packard Road
Niagara Falls, New York

Site No C932150

Prepared by

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April 2010
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FORMER MILL NO. 2
REMEDIAL INVESTIGATION WORK PLAN

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SECTION 1 INTRODUCTION

1.1 General

This work plan, prepared by C&S Engineers, Inc., (C&S) was revised in August 2010 to be consistent with comments received from NYSDEC Region 9 Conditional Approval letter dated June 30, 2010 and, identifies activities and tasks associated with a Brownfield Remedial Investigation (RI) to be conducted at the former Mill No. 2 located at 4001 Packard Road, Niagara Falls, New York. The project is being conducted consistent with the New York State Brownfield Cleanup Program (BCP). Figure 1 shows the location of the facility. This work plan addresses elements, as appropriate, established within the New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation (DER) Program Policy draft guidance manual *Technical Guidance for Site Investigation and Remediation* (DER-10, May 2010). Development of this work plan is based on previously completed assessment and investigation work at the site as documented in *Brownfield Application Former Mill No. 2 Section VII Property Environmental History*, submitted to NYSDEC on January 28, 2010.

Appendices to this work plan include the following:

- Appendix A - Sampling and Analysis Plan
- Appendix B - Health and Safety Plan
- Appendix C - Investigation Personnel and Qualifications
- Appendix D - Project Schedule
- Appendix E - Citizens' Participation Plan

1.2 Site Description and History

Site Description

The project site referred to as former Mill No. 2 (as shown on Figures 1, 2, and 3) is located on approximately 10.3 acres of land and has a street address of 4001 Packard Road. The site is within a highly industrialized urban area of Niagara Falls, Niagara County, New York. Adjoining properties include an active paper mill (Mill No. 1) operated by Norampac Industries, Inc. to the north; Franks Vacuum Service and the former Frontier Chemical Site to the south and west; and a National Grid (Niagara Mohawk) and New York Power Authority right-of-way to the east. Further to the northeast of the site are other commercial properties and a little league baseball diamond.

Site History

This former mill, encompassing approximately 661,980 square feet, historically housed paper manufacturing, finishing, and packaging operations of completed goods. The former mill consists of several interconnected two story or five story concrete and masonry buildings which were constructed during various time frames, with the earliest being 1923 and the latest reported date of 1974. The former mill was taken out service several years ago and has fallen into

disrepair to the extent that certain portions of structures have collapsed and others exhibit evidence of structural distress.

Based on existing reports and accounts, asbestos containing building materials are present in and on the building. Also, given the age of the facility PCBs may be present in those areas where electrical equipment had been located including the active transformer yard located near the northwest corner of the former mill.

Relative to historical operations, the use of chemical and petroleum products would have been common. The types of products apparently used at the site included solvents for de-inking (which reportedly occurred on the first floor of Buildings 13 and14), bleaches, caustics, petroleum based de-foamers, low pH "Felt Cleaner", aluminum sulfate (50%) solution, Kymene (polyamide-polyamine epichlorohydrin resin), and mineral spirits. Review of historic plant drawings revealed the following areas of environmental interest:

- Hydraulic power packs in Buildings 1 an 4 to drive equipment;
- An "Electricians Shop";
- A"Machine Shop";
- Oil storage areas; and
- Oil circulating pumps and color mixing tanks.

The locations of these buildings are indicated on Figure 3, which is an aerial photograph with an overlay of the former mill floor plan.

The eastern end of former Mill No. 2 (Building No.11) is where a tire fire previously occurred. That event reportedly consumed hundred of tires and resulted in obvious structural damage such as cracking and heaving of the concrete floor and ceiling.

Based upon the information gathered during the preparation of the BCP Application, and included in that document, other contaminants which could potentially be present in soil or ground water at the site include volatile organic compounds, semivolatile organic compounds, metals, and pesticides.

Site Geology and Geographical Features

The site is located within the Ontario Lowland physiographic province which was affected by the retreat of the last Pleistocene ice sheet approximately 10,000 to 12,000 years ago.

The bedrock geology in the area is the Lockport Group which is dominated by Lockport Dolomite. Lockport Dolomite forms the bedrock surface in the northern part of the province (including the City of Niagara Falls) and consists mainly of fine to coarse grained dolomite. Gypsum is present as nodules along some bedding plane surfaces. The maximum thickness of the Lockport Dolomite is about 150 feet. Near the base of the Lockport Dolomite, the formation is divided into the Decew Dolomite Member and the overlying Gasport Limestone Member.The surficial geology includes deposits of lacustrine silt and clay and till.

The land, surrounding the former Mill No. 2 is topographically level. The areas of the site not occupied by the building are generally covered with asphalt that is typically in poor condition. However, the transformer yard (northwest corner of former Mill No. 2) and, the northern, eastern, and southern perimeter of the property are unpaved.

Information from previous soil borings made at the location of former Mill No. 2 in 2008 and 2009 (as documented in Section VII Property Environmental History of the January 2010 BCP Application), indicates that soil below asphalt paved areas consists of fill material characterized by crushed stone or gravel, concrete, slag, and brick fragments intermixed with coarse to fine sand to a depth of approximately three feet. Underlying the veneer of fill material are apparent native soils which consist of tan to brown sandy silt. Below that strata and extending to depths of approximately 10.0 feet to 13.5 feet (where top of rock is encountered) is a reddish brown and sometimes pink silt with an appreciable percentage of clay; in some locations, trace to some sand was found intermixed with the clay.

In the subsurface explorations previously made on exterior grounds, wet conditions were documented within the overburden at depths ranging from approximately 4 feet to 10 feet below ground surface. Top of ground water, in the one-inch diameter monitoring wells at the site, ranges from 4.5 feet to 6.5 feet below ground surface. Overburden groundwater is expected to migrate in a southerly direction. However, the presence of storm and sanitary sewers that served the No. 2 site may have some local affect on shallow groundwater migration.

SECTION 2 SCOPE OF WORK

2.1 Introduction

Consistent with the NYSDEC requirements for BCP RI projects, this work plan was developed to meet the following goals:

- Define the nature and extent of contamination.
- Identify contaminant source areas.
- Produce data of sufficient quantity and quality to support the development of an acceptable Remedial Work Plan.

2.2 Grid Layout and Monitoring Wells

Figure 2 is an aerial photo of the site with labels identifying specific surface features, previously made soil borings, and monitoring wells, as well as the location of sewers that were documented on historical site plans of the former mill. This figure is complemented by Table 1, which is a summary of sample locations, sampling rationale, and laboratory analysis to be performed. The Sampling and Analysis Plan for this investigation is provided in Appendix A.

Shown on Figure 2 is a 100-foot by 100-foot grid overlay. The nodes of that overlay on the BCP site (outside of the existing building footprint) are the proposed locations where direct push soil explorations will be placed, unless underground utilities or other site features dictate otherwise. Also shown on Figure 2 are the locations of additional explorations requested by NYSDEC in

the Department's June 30, 2010 correspondence providing conditional approval of the draft work plan.

The intent of the exploration grid and additional explorations requested by NYSDEC is to assess the presence of absence of contaminants in the surficial fill material and, if evidence of contaminants is present in the fill, have the underlying native soils been affected. To accomplish this assessment, it is expected that samples of fill material and underlying native soil from the same boring location will be submitted for laboratory analysis consistent with Table 2.

In addition to the grid node locations and explorations requested by NYSDEC, direct push explorations are proposed along the alignment of the north-south trending 30-inch and 36-inch diameter sewers. That series of explorations will be made to assess if there is evidence of contaminants that may have migrated along the exterior of the sewer lines. It should be noted that historical drawings from 1920 indicate the crown (top) of the 36 inch diameter sewer is approximately 16 feet below ground surface and is shown to be in bedrock. The depth to the crown (top) of the 30 inch sewer has been measured to be approximately 11 feet below ground surface. Depending on actual line and grade of that sewer, it may be in bedrock as well.

Figure 2 also shows the proposed location of eight groundwater monitoring wells, that will be constructed of two-inch diameter PVC pipe and installed using conventional hollow stem augers. Based on previous subsurface investigation work, as documented in the BCP Application dated January 2010 and as described earlier in this work plan, those proposed monitoring wells will extend to the top of local bedrock, which is anticipated to be approximately 10 feet to 13.5 feet below ground surface. During the making of the boring to accommodate the installation of the monitoring well, soil samples will be assessed in the field using the same procedures implemented at 100 ft x 100ft grid nodes. Additionally, more than one soil sample from each borehole may be submitted to the analytical laboratory to assess physical evidence of contaminants in fill material and its affect on the underlying native soil.

Investigation Schedule -100 x 100 ft Grid,NYSDEC requested explorations and Monitoring Wells

It is anticipated that a majority of direct push explorations shown on Figure 2 will be made prior to and possibly concurrent with demolition of former Mill No. 2. Due to the nature of demolition work, the eight groundwater monitoring wells will be installed after demolition is complete. However, changes to this expected number of soil borings that can be made prior to demolition may be required once the schedule for demolition activities is established. Prior to performing these soil borings, Dig Safely New York will be notified and requested to mark-out public utilities. Additionally, Norampac personnel at Mill No. 1 will be requested to identify underground utilities associated with plant operations. An independent underground utility locating service may be required to further "clear" the proposed borehole locations prior to commencement of exploration work.

Supplemental Explorations - Frank's Vacuum Service

Figure 2 also shows the proposed locations of direct push explorations, including those additional boreholes and groundwater monitoring wells requested by NYSDEC, that may be made on land occupied by Frank's Vacuum Service. Those supplemental explorations and

groundwater monitoring wells may be made in the event that the land occupied by Frank's Vacuum Service is added to the current BCP property. However, no decision has been made with respect to expanding the limits of BCP property. If the current BCP property is expanded to include the Frank's Vacuum Service Property, identification of underground utilities and implementation of the subsurface investigation will employ the same procedures identified above.

2.3 Other Areas of Investigation

Figure 3 is an aerial photo of the site with an overlay of an image of the 1964 plant layout, along with sewer locations (from historic plant drawings) and labels identifying various features. Also shown on this figure is a summary of historic functions which are of interest and will be a part of the site investigation. This figure illustrates the approximate location of explorations to be made as identified on Table 2 of this work plan, which is a summary of sample locations and sampling rationale as well as the laboratory analysis to be performed.

Ground Floor Slab Visual Assessment

The demolition of former Mill No. 2 will be phased to allow visual assessment of the intact ground floor slab. The objective of this visual assessment will be to identify areas such as pits, sumps, and drains that may contain fluids or solids that will be physically examined in the field. That examination may consist of conventional field screening for volatile organic vapors utilizing a photoinization detector (PID) equipped with a 10.0 eV lamp, visual analysis (color, appearance) or a sheen test (i.e., placing a representative sample into a zip seal bag and adding water to see if a petroleum-like sheen is created). Depending on the outcome of the field assessment, selected samples will be collected for laboratory analysis identified on Table 2. Additionally, the location of other features of interest will be recorded using GPS so that those locations can be recovered for subsequent subsurface investigation efforts.

Buildings 1, 2, 4, 13, and 14

Concurrent with the visual assessment of the ground floor slab, a series of locations will be marked on the slab for the demolition contractor to break up to facilitate the making of direct push boreholes. Those explorations will be on a 75 foot grid, with adjustments made depending on observed field conditions and underground utilities. The terminal depth of these explorations will be adjusted to assess subslab materials and underlying native soils. Soil samples will be evaluated in the field and selected samples (depending on field assessment) will be submitted to a laboratory for analysis consistent with Table 2. If evidence of contamination of subslab materials is present, then additional samples may be required to assess the effect on underlying native soils.

Building 11- Tire Fire Area

Similar to the procedures summarized above, the area of the tire fire will be visually assessed to identify evidence that may warrant further investigation. Concurrent with the visual assessment, four locations will be marked on the slab for the demolition contractor to break up to facilitate the excavation of test pit trenches. These trenches will be terminated once native soils are

encountered, unless field conditions indicate otherwise. Soil samples will be evaluated in the field and selected samples (depending on field assessment) will be submitted to a laboratory for analysis consistent with Table 2.

Yard Drain

As noted on Table 2, features identified as "Yard Drain" are shown on Figure 3. These "Yard Drains" appear to have captured storm water from the northwest loading dock area and the transformer yard. Visual and, to the extent practicable, geophysical means will be implemented to identify these apparent surface drainage structures. If they can be found and opened and, if sediment is present, samples will be obtained for the suite of laboratory analyses shown on Table 2.

Transformer Yard

The active transformer yard located at the northwest corner of former Mill No. 2 also provides power to active Mill No. 1, which is situated to the north of the BCP property. Given the active status of the transformer yard, the ability of obtain soil samples (below crushed stone) may be limited or not possible due to safety concerns. Sampling within and at the perimeter of the transformer yard will focus on those areas where staining is evident. If staining is found, the depth interval of those samples and laboratory analysis will be consistent with Table 2.

Rubbish House and Northwest Loading Dock

These areas will be investigated as part of the 100 foot grid spacing described in Section 2.2 of this work plan. Field evaluation of soil samples and laboratory analysis will be consistent with Table 1.

Former Caustic Unloading Area and Sump Discharge Line

During the walkover of the site in March 2010, signage posted on the western exterior wall of Building 14 indicated that off-loading of caustic occurred in this location. Additionally, the historic plant drawing that is the overlay on Figure 3 labels a line, apparently originating from Building 14, as "Sump Discharge". Investigation of these areas will be via test pit explorations terminated once native soil is encountered, unless field conditions indicate otherwise. Soil samples will be evaluated in the field and selected samples (depending on field assessment) will be submitted to an analytical laboratory for analysis consistent with Table 2.

Former Garage

The historic fire insurance map made a part of the BCP Application indicates that this garage structure had an earthen floor. During a site visit in March 2010, the location of that former garage is where a concrete slab was found. Investigation of the soil beneath this concrete slab will be accomplished by excavating a test trench after the slab is fractured by the demolition contractor. The terminal depth of this test trench will be upon encountering native soil, unless field conditions indicate otherwise. Soil samples will be evaluated in the field and selected samples (depending on field assessment) will be submitted to an analytical laboratory for

analysis consistent with Table 2.

Southeast Corner Building 11, Borehole B-6 area

During a preliminary subsurface investigation monitored by C&S and documented in a December 2009 report evidence of aromatic volatile organic vapors was detected at approximately 10 feet below ground surface. However, at the time of the investigation the field PID failed to operate correctly. Additionally, laboratory analysis of the composite soil sample (which encompassed the entire depth of the borehole) did not detect volatile organic compounds above Part 375-6 Soil Clean-up Objectives for Protection of Public Health, Industrial Use. Further investigation of this area will be performed to confirm the previous findings via direct push sampling as summarized on Table 2.

Former Boreholes SB-11/SB-12

These boreholes were made in 2008 as part of a Phase II Environmental Site Assessment. The boreholes were located adjacent to sewer manholes reputedly used for waste disposal by former employees of Frontier Chemical. The Frontier Chemical site is located to the east of these manholes. In borehole SB-11 mercury was detected in the 16 foot to 20 foot interval at a concentration that exceeded Part 375-6 Soil Clean-up Objectives for the Protection of Groundwater and Protection of Public Health-Industrial Use. Given the previous data, two supplemental direct push explorations will be made in this area. Samples will be obtained from the 16 foot to 20 foot interval and other intervals depending on field conditions as summarized in Table 2.

Eastside Building 11

Access doors (identified on Figure 3 as D-10 and Double Doors) were observed at the exterior eastside of Building 11 at the time of the site walkover in March 2010. The strip of land between the exterior side of the building and the western fence line of the former Frontier Chemical site is grass covered, with no evidence of pavement. Given the timeframe that former Mill No. 2 operated, the presence of secluded doors may have invited unauthorized waste disposal. These areas will be investigated via test pit explorations which will be terminated once native soil is encountered unless field conditions indicate otherwise. Soil samples will be evaluated in the field and selected samples (depending on field assessment) will be submitted to a laboratory for analysis consistent with Table 2.

Schedule - Investigation of Other Areas

It is anticipated that a majority of the investigation work described in Section 2.3 and shown on Figure 3 will be made after the demolition of former Mill No. 2. However, depending on the demolition schedule, it may be possible to implement the investigation of the *"Former Caustic Unloading Area,"* "Former Garage," and "*Former Boreholes SB-11/SB-12."* prior to deconstruction activities. Prior to performing these subsurface explorations, Dig Safely New York will be notified and requested to mark-out public utilities. Additionally, Norampac personnel at Mill No. 1 will be requested to identify underground utilities associated with plant operations. Additionally, an independent underground utility locating service may be required to further "clear" the proposed borehole locations prior to commencement of exploration work.

2.4 Subsurface Soil Investigations

It is expected that each borehole will be advanced using direct push methods unless field conditions indicate that rotary drilling techniques and hollow stem augers are required. However, the installation of the 2-inch diameter PVC groundwater monitoring wells will be via conventional hollow stem augers. Air or drilling fluids will not be used. Depending on site accessibility and location of a particular boring, the drilling equipment may be mounted on a truck, an all-terrain vehicle.

Consistent with DER-10, investigation derived wastes will be disposed within the borehole of origin unless free product, NAPL or gross contamination is present. If those conditions are evident or the borehole will be completed as a groundwater monitoring well, then excess spoils will be containerized in 55-gallon drums for future characterization and disposal. Those containers will be then moved into another protected structure on the Norampac property until characterized and disposed. Note that disposal may be accomplished by emptying the drums on-site subsequent to the receipt of analytical results for the borings. If off-site disposal is needed, it will be accomplished within 90 days of the accumulation date.

During the field effort, each borehole for the contaminant investigation will be sampled continuously using GeoProbe™ Macro Core tool, standard split spoon sampler, or equivalent device, with or without the aid of hollow stem augers, depending on field conditions. Retrieved soil samples will be visually examined to assess subsurface conditions and physical properties of the strata. These properties include: color, moisture content, and visual evidence of discoloration or sheens. Additionally, all soil samples will be field screened for evidence of volatile organic vapors via conventional headspace analysis techniques using a photoionization detector equipped with a 10.0 eV lamp. Since the volume of soil retrieved in a Macro Core tool may not be sufficient for the suite of analysis required, companion explorations will be made in close proximity to the original sample location to obtain sufficient sample volume from selected depth intervals. These field observations will be documented on logs that will be appended to the Remedial Investigation Report.

As indicated earlier, eight boreholes will be completed as groundwater monitoring wells. Presently, it is anticipated that these monitoring wells will be completed once refusal (anticipated top of bedrock) is encountered, which is anticipated to be approximately 10 feet to 13.5 feet below ground surface. However, the actual depth of the well screen will be determined in the field, depending on subsurface conditions. Each well will be constructed using 2-inch diameter PVC flush joint screen and riser. Given the anticipated fine grained soils, 10 slot screen and '0' quartz sand will be used. Depending on the location of a particular well, the protective casing will either be terminated flush with the ground surface or will stick up above the ground surface. Regardless, each well will have a cover and locking caps or J-plugs. Construction of the monitoring wells will be documented on logs that will be appended to the Remedial Investigation Report.

Upon completion of the drilling program, each borehole and completed well will be surveyed to establish horizontal locations. Additionally, the measuring point of each completed groundwater monitoring well will be surveyed. This information will be used to identify local

groundwater flow direction and to create a groundwater contour map.

2.5 Groundwater Sampling

To assess the existence of potential shallow groundwater quality impacts at the site, eight monitoring wells will be installed in the borings discussed above. When it is determined that a boring has reached an appropriate depth for well screening that will straddle the water table within the shallow aquifer, the well will be constructed. Subsequent to well construction, at least 24 hours will be allowed to elapse prior to development of each well. Given the shallow depth of the wells, it is expected that well development will be performed via manual bailing or pumping. The objective of well development will be to remove gross fines from the well and surrounding sand pack. All development water will be containerized. Those containers will be then moved into another protected structure on the Norampac property until characterized and disposed. Note that disposal may be accomplished by emptying the drums on-site subsequent to the receipt of analytical results for the borings. If off-site disposal is needed, it will be accomplished within 90 days of the accumulation date.

In the event more than 24 hours elapse between well development and sampling, three to five well volumes will be purged prior to sampling, unless the well is bailed dry. Purged water generated from the monitoring wells will be containerized as noted above. Groundwater samples will be collected from the wells once the water level reaches 95% of pre-purge levels. Analysis of the groundwater samples will be consistent with those shown on Table 1.

2.6 Soil Vapor Investigation

If the VOCs results for the RI subsurface soil and groundwater sampling indicate the potential for the migration of volatile soil vapors into future site indoor environments, this potential will need to be fully characterized to select the appropriate remedial alternative for the site. Since this analysis depends on both the levels of volatile contaminants and the locations of the future indoor environments, a work plan for these investigations will be developed when the summary site data and site physical condition (i.e., removal of present structures) have been developed. NYSDEC and NYSDOH will be consulted regarding the appropriate timing for initiating these plans and activities.

2.7 Sample Analyses

The analysis of samples will be performed by a New York State approved laboratory via Analytical Services Protocol. Reports will include ASP Category B deliverables to allow for a third-party data usability review.

2.8 Data Usability

A Data Usability Summary Report (DUSR) will be prepared by Alpha Geoscience (679 Plank Road, Clifton Park, NY 12065). The DUSR will be prepared consistent with the NYSDEC's *Guidance for the Development of Quality Assurance Plans and Data Usability Summary Reports* as given in Appendix 2B of DER-10.

2.9 Qualitative Exposure Assessment

To assess potential site impacts on human health, a qualitative human health exposure assessment will be completed consistent with the NYSDOH guidance in Appendix 3B of DER-10. This assessment consists of characterizing the exposure setting (including the physical environment and potentially exposed human populations), identifying exposure pathways, and evaluating contaminant fate and transport. Site contaminants will be selected for further evaluation based on consideration of the following factors:

- Concentrations of contaminants in environmental media both on-site and off-site;
- Field data quality, laboratory data quality, and sampling design; and
- Comparison of on-site and off-site contaminant concentrations in environmental media with typical background levels.

A Fish and Wildlife exposure assessment will not be conducted because the site is an intensively developed industrial/urban area with little or no fish or wildlife habitat.

2.10 Site Survey

A New York State licensed surveyor will be retained to complete an ALTA property survey of the project site. This will include a metes and bounds description and location and elevation of key site landmarks. Sample locations and monitoring well location / elevations will be included. The final survey will be provided in AutoCAD compatible format.

2.11 Additional Sampling and Analysis

The specific type and number of samples to be collected as part of a follow-up investigation, if needed, to complete the characterization of primary areas of environmental concern will be detailed after completion of the site characterization efforts covered by this scope of work.

2.12 Report Preparation

Upon completion of the previously mentioned tasks, C&S will prepare a Draft RI Report that will be consistent with the general requirements for RI reports set forth in Section 3.14 of DER *Technical Guidance for Site Investigation and Remediation* dated May 2010. The report will include information to address the following:

- Identify and characterize the sources of contamination
- Describe the amount, concentration, environmental fate and transport (as necessary), location, and other significant characteristics of the substances present
- Define hydrogeological factors as needed
- Identify routes of exposure and human populations at risk

Upon completion of the Draft RI Report, a meeting with NYSDEC and NYSDOH personnel can be held to discuss the results of the RI as well as recommended preliminary remedial action measures.

SECTION 3 INTERIM REMEDIAL MEASURE

3.1 Planning and Design

If deemed appropriate or expedient following the initial phase of site investigation, a plan and design for implementation of Interim Remedial Measures (IRM) will be prepared for this site. For the purpose of developing this work plan, it has been assumed that IRMs could consist of the following:

- Possible removal and off-site disposal of petroleum-contaminated soils.
- Removal of other contaminated waste or soil.
- Removal of oily water and/or sediments in on-site manholes and sewer systems.

SECTION 4 ADDITIONAL INFORMATION

4.1 Health and Safety Plan

The site-specific Specific Health and Safety Plan for this project is provided in Appendix B.

4.2 Investigation Personnel and Qualifications

Individuals assigned to the execution of the RI Work Plan include:

- Steven M. Vinci, CPG- Project Manager
- Thomas A. Barba- Technical Manager

Field Investigation Personnel:

- Rory Woodmansee
- Thomas Wirickx
- Wayne Randall
- Amanda Atwell

Resumes for these individuals are provided in Appendix C.

4.2 Citizen Participation Plan

The Citizen Participation (CP) Plan for Norampac Industries, Former Mill No. 2 is provided in Appendix D and was revised to satisfy the June 14, 2010 Conditional Approval of the *Interim Remedial Measure Work Plan for Demolition of Former Mill No. 2*. The CP Plan is consistent with the requirements of 6 NYCRR Part 375 and the applicable guidance set forth in the May 2004 draft version of the *Brownfield Cleanup Program Guide*.

4.3 Project Schedule

The planned project schedule is provided in Appendix E.

TABLE 1

SAMPLING AND ANALYSIS MATRIX FOR GRID LAYOUT AND MONITORING WELLS

TABLE 1
SAMPLING & ANALYSIS SUMMARY
SOIL BORING GRID, ADDITIONAL EXPLORATIONS REQUESTED BY NYSDEC AND MONITORING WELLS
REFER TO FIGURE 2

LOCATION BCP PARCEL	MEDIA	SAMPLING METHOD	FIELD ANALYSIS	SAMPLE DEPTH	LABORATORY ANALYSIS
100 ft. x 100 ft. Grid – Nodes and Fifteen (15) additional locations as requested by NYSDEC June 30,2010.	Soil	Continuous Sampling, Direct Push. Terminal depth will be field adjusted to identify native soil	PID/Visual	Based upon field characteristics.	TCL VOC + 10 TICS TCL SVOC + 20 TICS TAL Metals TCL Pesticide/Herbicides PCBs
North-South Alignment of 30-inch and 36-inch diameter sewer lines. Potential migration pathway assessment	Soil	Continuous Sampling, Direct Push or Hollow Stem Auger. Terminal depth will be determined, based on field conditions.	PID/Visual	Based upon field characteristics	TCL VOC + 10 TICS TCL SVOC + 20 TICS TAL Metals TCL Pesticide/Herbicides PCBs
Eight (8) Groundwater Monitoring Wells 2-inch PVC	Soil	Continuous Sampling Hollow stem Auger to refusal or first confining strata	PID/Visual	Top of saturated zone and bottom of boring	TCL VOC + 10 TICS TCL SVOC + 20 TICS TAL Metals TCL Pesticide/Herbicides PCBs
	Groundwater	Manual Bailing	ORP Temperature DO, pH, conductivity	Dependent on well screen position.	TCL VOC + 10 TICS TCL SVOC + 20 TICS TAL Metals TCL Pesticide/Herbicides PCBs
Supplemental Borings, including four (4) additional explorations requested by NYSDEC at Frank's Vacuum Service, if parcel is added to current BCP. Two (2) Groundwater Monitoring Wells 2-inch PVC, requested by NYSDEC	Soil	Continuous Sampling, Direct Push. Terminal depth will be field adjusted to identify native soil	PID/Visual	Based upon field characteristics	TCL VOC + 10 TICS TCL SVOC + 20 TICS TAL Metals TCL Pesticide/Herbicides PCBs
	Soil	Continuous Sampling Hollow stem Auger to refusal or first confining strata	PID/Visual	Top of saturated zone and bottom of boring	TCL VOC + 10 TICS TCL SVOC + 20 TICS TAL Metals TCL Pesticide/Herbicides PCBs
	Groundwater	Manual Bailing	ORP Temperature DO, pH, conductivity	Dependent on well screen position.	TCL VOC + 10 TICS TCL SVOC + 20 TICS TAL Metals TCL Pesticide/Herbicides PCBs

TABLE 2

SAMPLING AND ANALYSIS MATRIX FOR OTHER AREAS OF INVESTIGATION

TABLE 2
SAMPLING & ANALYSIS SUMMARY - OTHER AREAS OF INVESTIGATION
REFER TO FIGURE 3

LOCATION BCP PARCEL	MEDIA	SAMPLING METHOD	FIELD ANALYSIS	SAMPLE DEPTH	LABORATORY ANALYSIS
Visual Assessment of Floor Slab after demolition to identify, pits, drains, including "sump discharge" at westside of Building 14.	Solids or Fluids	Manual	PID/Visual	Based on field characterization	TCL VOC + 10 TICS TCL SVOC + 20 TICS TAL Metals TCL Pesticide/Herbicides PCBs
Buildings 1, 2, 4, 13, 14. Approximately 20 Test trench or direct push exploration at approximately 75 ft. intervals unless physical features indicate otherwise.	Subgrade materials (soil) beneath slab.	Backhoe and/or Direct Push. Terminal depth will be field adjusted to identify native soils.	PID/Visual	Based on field characterization	TCL VOC + 10 TICS TCL SVOC + 20 TICS TAL Metals TCL Pesticide/Herbicides PCBs
Building 11 Tire Fire – Four Test Trench Excavations	Soil	Backhoe Test Trenches Terminal depth will be field adjusted to identify native soils.	PID/Visual	Based on field characterization	TCL VOC + 10 TICS TCL SVOC + 20 TICS TAL Metals TCL Pesticide/Herbicides PCBs
"Yard drain" as shown on historic drawing connected to storm sewer at west side of Building 13, north west loading dock. and transformer yard.	Sediment in drainage structures	Manual	PID/Visual	Based on field characterization	TCL VOC + 10 TICS TCL SVOC + 20 TICS TAL Metals TCL Pesticide/Herbicides PCBs
Transformer Yard Inside/Outside Fenced Perimeter. Visual assessment to identify evidence of staining, as access allows.	Soil	Manual or Direct Push	PID/Visual	0-6 inches 6-12 inches Below Bottom of Stone, at stained areas	PCBs
Rubbish House and Northwest Loading Dock – Waste Building 1	Soil	These areas to be sampled as part of 100 ft. x 100 ft. grid program. Sampling and laboratory analysis will be consistent with 100 ft. x 100 ft. grid sampling.			
Former Caustic Unloading Area and sump discharge line at westside Building 14	Soil	Backhoe Test Trench Terminal depth will be will be field adjusted to identify native soils.	PID/Visual	Based on field characterization	TCL VOC + 10 TICS TCL SVOC + 20 TICS TAL Metals TCL Pesticide/Herbicides PCBs

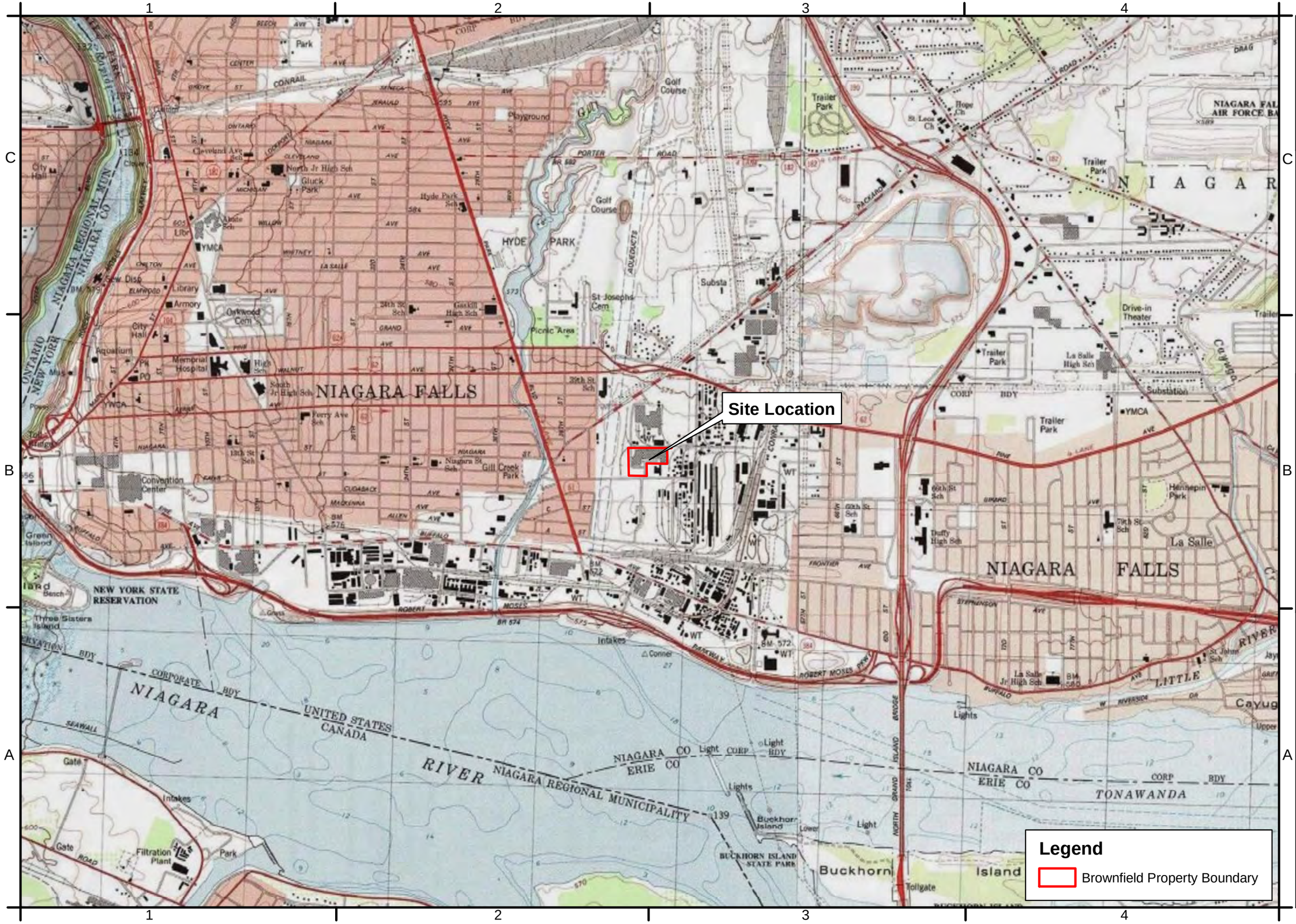
TABLE 2
SAMPLING & ANALYSIS SUMMARY - OTHER AREAS OF INVESTIGATION
REFER TO FIGURE 3

LOCATION BCP PARCEL	MEDIA	SAMPLING METHOD	FIELD ANALYSIS	SAMPLE DEPTH	LABORATORY ANALYSIS
Former Garage – Structure was located south of Building 5. Historical plant drawings show garage had earthen floor.	Soil	Backhoe Test Pit below bottom of concrete slab Terminal depth will be field adjusted to identify native soils.	PID/Visual	Based on field characterization	TCL VOC + 10 TICS TCL SVOC + 20 TICS TAL Metals TCL Pesticide/Herbicides PCBs
Southeast Corner Building 11 C&S Borehole B-6 - December 2009 investigation documented evidence of volatile aromatic odor	Soil	Direct Push Continuous Sampling to Refusal	PID/Visual	Based on field characterization. Minimally one sample will be obtained from 8 ft. to 10 ft. interval.	TCL VOC + 10 TICS TCL SVOC + 20 TICS TAL Metals TCL Pesticide/Herbicides PCBs
LaBella Boreholes SB-11/SB-12 2008 investigation detected mercury in B-11 at 16 to 20 ft. below ground surface	Soil	Two Explorations Direct Push Continuous Sampling to 25 ft. Unless Refusal is Met	PID/Visual	Based on field characterization. Minimally one sample will be obtained from 16 to 20 ft. interval.	TCL VOC + 10 TICS TCL SVOC + 20 TICS TAL Metals TCL Pesticide/Herbicides PCBs
Eastside Building 11 - Double Doors and Door D-10. Assessment of “Out the Door” Disposal	Soil	Backhoe Test Trenches. Terminal depth will be field adjusted to identify native soils.	PID/Visual	Based on field characterization.	TCL VOC + 10 TICS TCL SVOC + 20 TICS TAL Metals TCL Pesticide/Herbicides PCBs

FIGURES

FIGURE 1

SITE LOCATION MAP



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0 2,000 Feet

Remedial Investigation Work Plan
Former Mill No. 2 Site ID # C932150
Norampac Industries
4001 Packard Road
Niagara Falls, New York

PROJECT NO:	I11.005.001
DATE:	April 1, 2010
SCALE:	AS SHOWN
DRAWN BY:	WNR
DESIGNED BY:	WNR
CHECKED BY:	SMV

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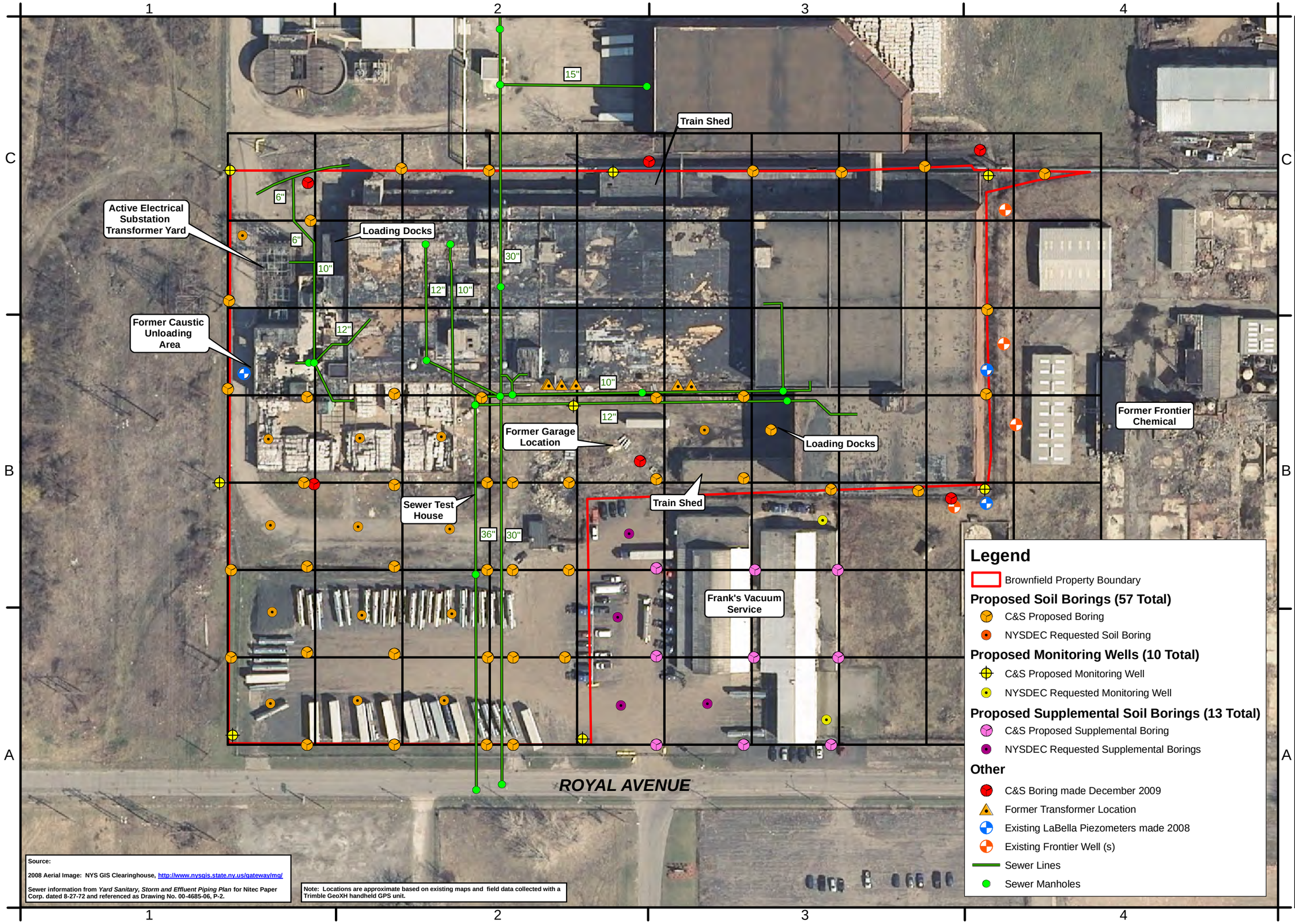
Site Location Map

FIGURE 1

FIGURE 2

SOIL BORING GRID LAYOUT AND MONITORING WELL LOCATIONS



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Remedial Investigation Work Plan
Former Mill No. 2 Site ID # C932150
Norampac Industries
4001 Packard Road
Niagara Falls, New York

PROJECT NO:	I11.005.001
DATE:	August 9, 2010
SCALE:	AS SHOWN
DRAWN BY:	WNR
DESIGNED BY:	WNR
CHECKED BY:	SMV

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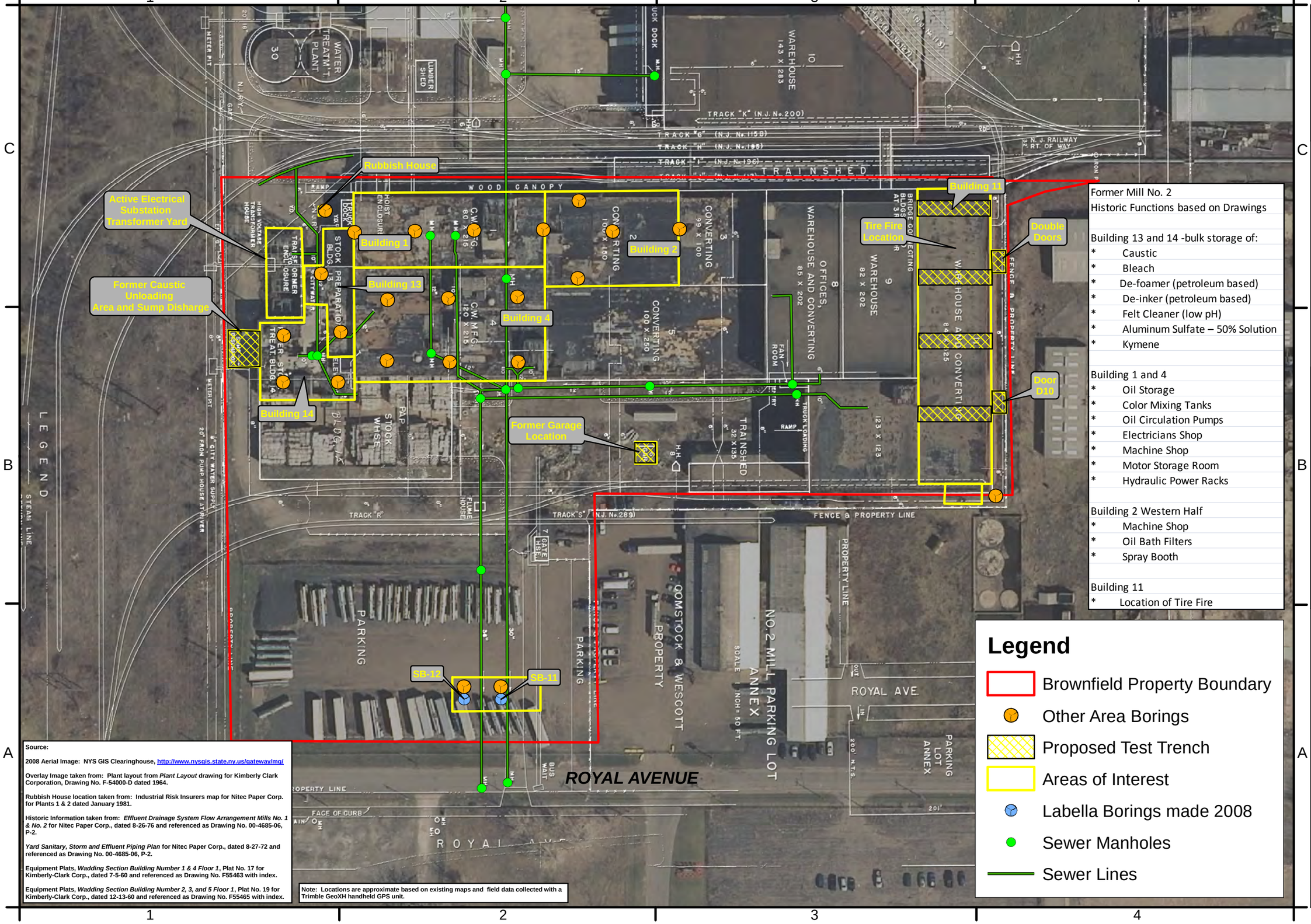
Proposed Soil Boring and Monitoring Well Location Plan with 100 ft x 100 ft Grid

FIGURE 2

FIGURE 3

OTHER AREAS OF INVESTIGATION



Former Mill No. 2
Historic Functions based on Drawings

Building 13 and 14 -bulk storage of:
* Caustic
* Bleach
* De-foamer (petroleum based)
* De-inker (petroleum based)
* Felt Cleaner (low pH)
* Aluminum Sulfate – 50% Solution
* Kymene

Building 1 and 4
* Oil Storage
* Color Mixing Tanks
* Oil Circulation Pumps
* Electricians Shop
* Machine Shop
* Motor Storage Room
* Hydraulic Power Racks

Building 2 Western Half
* Machine Shop
* Oil Bath Filters
* Spray Booth

Building 11
* Location of Tire Fire

Legend

- Brownfield Property Boundary
- Other Area Borings
- Proposed Test Trench
- Areas of Interest
- Labella Borings made 2008
- Sewer Manholes
- Sewer Lines

Source:

2008 Aerial Image: NYS GIS Clearinghouse, http://www.nysgis.state.ny.us/gateway/mg/

Overlay Image taken from: Plant layout from *Plant Layout* drawing for Kimberly Clark Corporation, Drawing No. F-54000-D dated 1964.

Rubbish House location taken from: Industrial Risk Insurers map for Nitec Paper Corp. for Plants 1 & 2 dated January 1981.

Historic Information taken from: *Effluent Drainage System Flow Arrangement Mills No. 1 & No. 2* for Nitec Paper Corp., dated 8-26-76 and referenced as Drawing No. 00-4685-06, P-2.

Yard Sanitary, Storm and Effluent Piping Plan for Nitec Paper Corp., dated 8-27-72 and referenced as Drawing No. 00-4685-06, P-2.

Equipment Plats, *Wadding Section Building Number 1 & 4 Floor 1*, Plat No. 17 for Kimberly-Clark Corp., dated 7-5-60 and referenced as Drawing No. F55463 with index.

Equipment Plats, *Wadding Section Building Number 2, 3, and 5 Floor 1*, Plat No. 19 for Kimberly-Clark Corp., dated 12-13-60 and referenced as Drawing No. F55465 with index.

Note: Locations are approximate based on existing maps and field data collected with a Trimble GeoXH handheld GPS unit.

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Map of Other Areas of Investigation

FIGURE 3

APPENDIX A

Sampling and Analysis Plan

Sampling and Analysis Plan

for

Brownfield Remedial Investigation

Former Mill No.2
Norampac
4001 Packard Road
Niagara Falls, New York

Site ID # C932150

Prepared by

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April 2010

Revised August 2010

SAMPLING AND ANALYSIS PLAN

TABLE OF CONTENTS

SECTION 1 INTRODUCTION

This Sampling and Analysis Plan is for the Norampac Brownfield Project in the City of Niagara Falls, Niagara County, New York. The project involves a Remedial Investigation (RI) to further define contamination at the Site and an Alternatives Analysis to determine if further actions are need to reduce the risk that the site contamination poses.

Note that this plan describes procedures for a variety of sampling situations. Not all of these situations may exist at the Norampac site. The Work Plan for the RI details the specific sampling and analyses for the Norampac Brownfield project.

SECTION 2 QUALITY ASSURANCE PROJECT PLAN (QAPP)

2.1 Project Description

This Sampling and Analysis Plan includes identification of sampling locations and media; methods for collection, handling, and preservation; and the protocols to be used for sample analysis. Environmental media to be sampled include soils, groundwater, and miscellaneous materials (e.g., sewer sediments). The data will be utilized to form conclusions as to the presence, transport, and fate of site specific contaminants.

2.2 Project Organization and Responsibilities

The sampling and analysis plan will utilize the following project organization and the associated responsibilities:

Project Manager	Steven M. Vinci
Technical Manager	Thomas Barba
Quality Assurance/Quality Control (QA/QC)	Thomas Barba
Laboratory Coordinator	Rory Woodmansee
Field Investigations	Rory Woodmansee

2.3 Data Quality Objectives

Data Quality Objectives (DQOs) are statements which describe the desired quality of data necessary to meet the objectives of the sampling program. The DQOs for the Norampac Brownfield site sampling program were formulated during the scoping effort and developed as part of this Sample and Analysis Plan. The general steps followed in preparation of the DQOs were as follows:

- *Identification of the media to be sampled* - Identifies the media being investigated (e.g., ground water, surface soil).
- *Identification of the data uses* - Identifies the intended use of the data according to the following:
  - Site Characterization - Data are used to determine the composition, nature, and extent of contamination.
  - Risk Assessment - Data are used to evaluate the actual or potential risks posed by contaminants determined to be present on-site. Particular attention is given to sampling at locations where human exposure is possible.
  - Health and Safety Plan (HSP) - Data are used to establish the level of protection needed for on-site workers during site characterization activities.
  - Monitoring - Data are used during the monitoring of a remedial action to access the effectiveness of such action.
  - Evaluation of Alternatives - Data are used to evaluate various proposed remedial technologies and assist in proper design of alternatives.
- *Identification of the data types* - Identifies what types of analyses are to be performed.
- *Sample Collected* - Describes the sample types to be collected.
  - Environmental - Refers to a specific media sampled such as water, soil, air, or biological.
  - Source - Refers to sampling an actual contamination source.
  - Grab - A discrete sample representative of a specific location.
  - Composite - A sample that represents a mixture of a number of grab samples that represents the average properties over the extent of areas sampled.

- Biased - Sampling that focuses on a specific area of expected contamination or uncontaminated area (background).

► *Identification of the data quality needs* - Identifies the analytical options available to support data collection activities and are identified as follows:

- Level I: *Field Screening* - portable type instruments which provide real-time data.
- Level II: *Field Analysis* - portable analytical instruments in an on-site lab or transported to the site.
- Level III: *Standard Analytical Protocols* - standard analytical protocols or without the New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocol (ASP) (2005) deliverables/reportables documentation.
- Level IV: *NYSDEC ASP Reportables/Deliverables* - rigorous QA/QC protocols and reportables/deliverables documentation; NYSDEC ASP (2005) Category B deliverables.
- Level V: *Non-Standard* - methods which have been modified to meet specific site study or remediation needs or by use of some other specialized analytical methods that cannot be obtained through standard or typical avenues of analytical support.

► *Identification of Data Quality Factors* - Describes factors which influence the quality or quantity of data to be collected. Primary contaminants and associated levels of concern are identified concerning Applicable or Relevant and Appropriate Requirements (ARARs) or potential risks. Required detection limits are also given or referenced.

► *Identification of QA/QC Samples* - Specifies additional samples to be collected to support QA/QC procedures. Additional samples to be collected could include:

- *Matrix Spike/Matrix Spike Duplicates* - Matrix spike and matrix spike duplicate samples are collected as a duplicate sample to which the analytical laboratory will add known amounts of target analytes. These QA/QC samples are intended to assess the extraction procedure used by the laboratory.
- *Field Blanks* - Field (equipment) blanks are samples which are obtained by running analyte-free water through the sample collection equipment in a way that is identical to the sample collection procedures. Field blanks may be used during QA/QC

procedures to evaluate if sampling equipment has contributed contaminants to the samples.

- *Trip Blanks* - Trip blanks are samples which are prepared prior to the sampling event in the same type of sample container and are kept with the collected samples throughout the sampling event unit analysis. Trip blank vials are not opened in the field and are analyzed for volatile organics only.

2.4 Sampling Procedures

All sampling objectives, locations, and procedures have been included as the Field Sampling Plan and described in Section 3.0 of this Sampling and Analysis Plan. Items including Field Measurement Techniques, General Field Decontamination, and Sample Management have also been included within the Field Sampling Plan.

2.5 Laboratory Certification and Coordination

All chemical analyses for samples from the site will be completed by a CLP laboratory capable of performing project specific analyses as indicated in this QA/QC plan. The project QA/QC Officer will also be responsible for all project related laboratory coordination.

2.6 Analytical Methodologies

Analysis of samples collected during the RI will be consistent with the NYSDEC ASP 2005, Category B requirements. Sampling and analysis will be performed for the Superfund Target Compound List (TCL) parameters including volatiles, semivolatiles, PCBs/pesticides, and inorganics. The specific analyses will be conducted according to the following methodologies:

Parameter Group	Analysis Method
Volatiles	USEPA 8260
Semivolatiles	USEPA 8270
PCBs/Pesticides	USEPA 8081/8082
Metals	CLP-M-Series/USEPA 6010B (TAL List)
Mercury	CLP M-245.1/USEPA 7470
Cyanide	CLP M-335.2/USEPA 9012

Trip blanks will accompany each shipment of aqueous samples for volatile organic compounds (VOC) analysis. Trip blanks are not necessary for soil samples. If several samples are collected for VOC analysis on any one day, all VOC samples will be packed in the same cooler with the trip blank. All trip blanks will be analyzed according to NYSDEC ASP (2005) protocol for volatile organics. All data will be presented in Category B reportables/deliverables format.

Duplicate samples will be obtained from surface water or groundwater (aqueous) and soil samples (solids). One matrix spike (MS) and one matrix spike duplicate (MSD) sample will be collected and analyzed for each twenty field samples collected for each matrix. MS and MSD samples must be referenced to a specific field sample. The ASP provides the following definitions for MS and MSD samples:

- Matrix spike - An aliquot of a sample (water or soil) spiked with known quantities of specific compounds (target analytes) and subjected to the entire analytical procedure in order to indicate the appropriateness of the method for the matrix by measuring recovery. The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.
- Matrix spike duplicate - A second aliquot of the same matrix as the Matrix Spike that is spiked with identical concentrations of target analytes as the Matrix Spike, in order to document the precision and bias of the method in a given sample matrix.

With the present sampling schedule and sample quantities, one set of MS/MSD samples will be collected from a water sampling location and two sets of MS/MSD samples will be collected from soil sampling locations.

2.7 Analytical Quality Control

Analytical quality control for this Project will be consistent with the methodology and quality assurance/quality control requirements in the NYSDEC ASP 2005. The following holding times calculated from the verified time of sample receipt (VTSR) at the laboratory will be required from the contracted analytical laboratory, regardless of sample matrix:

Parameter	Task	Holding Time
Volatiles	Analysis	7 days from VTSR
Semivolatiles	Extraction	5 days from VTSR
	Sample clean-up	5 days from VTSR
	Analysis	40 days from VTSR
Pesticides/PCBs	Extraction	5 days from VTSR
	Sample clean-up	5 days from VTSR
	Analysis	40 days from VTSR
Mercury	Analysis	26 days from VTSR
Cyanide	Analysis	12 days from VTSR
Metals	Analysis	180 days from VTSR

2.8 Reportables and Deliverables Documentation

The Remedial Investigation analytical data which will be subjected to data usability review will be presented in NYSDEC ASP (2005) Category B reportables/deliverables format. The RI report will be a stand-alone document that will include the results and an interpretation of the RI sampling, as well as the summary data from previous sampling activities.

2.9 Data Usability Summary Report

A Data Usability Summary Report (DUSR) will be prepared by a certified data validator. The DUSR will be prepared in a manner consistent with the NYSDEC's *Guidance for Data Deliverables and Development of Data Usability Summary Reports* as given in Appendix 2B of the draft DER-10. The main objective of the DUSR is to determine whether the data presented meets the project-specific needs for data quality and data use.

SECTION 3 FIELD SAMPLING PLAN

3.1 Sampling Objectives

Field sampling at the former Mill No. 2 site has been designed to obtain representative samples of environmental media to assess the impact that the site may have upon human health and the environment. The field sampling plan includes media sampling for groundwater, subsurface soils, and sediments.

3.2 Sampling Locations

Subsurface Soil

As discussed and illustrated on Figure 2 and Figure 3 in the RI Work Plan, soil borings will be located based on the following criteria:

- Approximately 42 soil borings will be located based on a 100 foot square grid covering the majority of the property;
- An additional 15 locations in between grid nodes as requested by NYSDEC in June 2010
- Eight borings will be placed at pre-determined monitoring well locations;
- Thirteen borings and two ground water monitoring wells on the "Frank's Vacuum Service Property" only in the event that parcel is added to the current limits of the BCP parcel.
- Additional borings and or test trenches will be placed to assess the areas shown on Figure 3 of the RI work plan. Those locations will be adjusted based on inspection of surface features (pipelines, sumps, etc.) or on research into past uses of the property, are determined to be of greater probability of exhibiting impacts.

Subsurface borings will be implemented using either direct push subsurface investigation techniques or conventional rotary drilling with continuous split spoon sampling in accordance with ASTM D-1586-99. Conventional borings will be advanced using hollow-stem auger without the use of air or drilling fluids. Drilling cuttings will be visually inspected and screened with a photoionization detector (PID) and will be managed consistent with DER-10 May 3, 2010 as described in Section 2.4 of the RI Work Plan. Direct push or continuous split-spoon sampling will be conducted to define the unconsolidated geology. During the continuous sampling process, all soil samples will be field screened for the presence of volatile organic compounds using a PID. Soil samples for laboratory analysis will be selected in the field based on visual/olfactory examination of the samples and the results of PID screening.

When conditions are encountered that indicate excavation would be a more effective way to investigate and sample the subsurface, the Work Plan allows for field decisions to be made to substitute test pitting for the soil borings discussed above.

Groundwater

Eight of the above described boring locations have been pre-selected to be completed as monitoring wells. Section 2.4 of the RI Work Plan describes the manner in which the groundwater monitoring wells will be constructed. One sample of groundwater, plus appropriate QA/QC samples, will be collected from each well. Section 2.4 of the RI Work Plan provides the groundwater monitoring well sampling protocol.

Miscellaneous Media

These samples include surface soil samples from the electrical transformer yard, as well as solid or liquid materials from sumps, pipelines, or catchbasins. These samples will be collected from where they are encountered; specific locations and physical descriptions of the materials will be documented so that any location can be identified via permanent landmarks, measurements, or GPS coordinates.

3.3 Sampling Procedures

The following sections provide procedures for collecting a variety of samples, not all of which will be needed at this site.

3.3.1 Preparation for Sampling

The sample collection technique is of prime importance to assure the integrity of the collected sample. The following techniques include provisions so that:

- A representative sample is obtained;
- Contamination of the sample is minimized;
- The sample is properly preserved; and
- An acceptable Chain-of-Custody record is maintained.

The QA/QC Sampling Component of the Plan includes:

- Incorporation of accepted sampling techniques referenced in the sampling plan;
- Procedures for documenting any field actions contrary to the QA/QC Plan;
- Documentation of all preliminary activities such as equipment check-out, calibrations, and container storage and preparation;

- Documentation of field measurement quality control data (quality control procedures for such measurements shall be equivalent to corresponding QC procedures);
- Documentation of field activities;
- Documentation of post-field activities including sample shipment and receipt, field team debriefing, and equipment check-in;
- Generation of quality control samples including duplicate samples, field blanks, equipment blanks, and trip blanks; and
- The use of these samples in the context of data evaluation with details of the methods employed (including statistical methods) and of the criteria upon which the information generated will be judged.

The personnel responsible for collection of groundwater, soil, and miscellaneous media samples will be familiar with standard sampling procedures and follow the appropriate protocol. Field records will be maintained in bound notebooks with numbered pages to document daily instrument calibration, locations sampled, field observations, and weather conditions. Each page will be dated and signed by the sampler. Each notebook will be numbered and a log of notebooks will be maintained by the project manager.

Prior to sampling, all equipment must be procured and accommodations for sample container delivery, and sample shipment must be made. The following is a list of general equipment that would be on hand for sampling events. Special equipment for each sampling event is presented in the section describing that specific sampling event.

General Field Sampling Equipment

- Field Data Sheets
- Chain-of-Custody forms
- Engineers tape and folding ruler with 0.01 foot intervals
- Field Record Sheets
- Nitrile gloves
- Face-safety shield
- Tyvek coveralls
- Respirators
- Photoionization detector
- Bio-degradable phosphate free detergent
- Coolers (with ice)
- 55 gallon drums
- Sample bottles
- Aluminum foil
- Duct and filament tape
- Tap water

- Distilled water
- Laboratory grade methanol and hexane
- 5 gallon wash buckets
- Decontamination cloths
- Large disposal containers
- Large plastic sheets

3.3.2 Groundwater Sample Collection

Groundwater samples will be collected using dedicated, disposable HDPE bailers following evacuation of three borehole volumes or complete purging of the well. All other related sampling equipment will be properly decontaminated in the field. The following equipment will be available for sampling of monitoring wells in addition to the general sampling equipment list:

- Well Data Sheets
- Bailers
- Electronic water level indicator
- pH meter
- Thermometer
- Photoionization detector (PID)
- ORP Meter
- DO Meter
- Conductivity Meter
- Sample preservatives
- Nitrile gloves

The following activities will be completed before going into the field every day before the start of sampling:

1. Fill out appropriate section on Well Data Sheet for the wells to be sampled;
2. Obtain the sampling schedule for each well to be sampled;
3. Calibrate the Photoionization Detector (PID) with the calibration gas;
4. Determine the amount of sampling to be done for the day and prepare the necessary number of coolers;
5. Each well to be sampled will have designated coolers containing the pre-labeled, certified clean, sample bottles. The groundwater samples will be placed in the cooler labeled for the well from which they were taken. The bottle shall be labeled with large distinguishable letters, so that the groundwater samples will be placed in the proper cooler; and
6. Select the appropriate sample containers for the day's sampling. The containers shall be pre-marked with a sample parameter and preservatives. Reusable glass bottles will have been cleaned and prepared at the laboratory. The containers for the various parameters to be analyzed from each well location will then be placed in a cooler.

The following steps describe the sample collection of groundwater:

1. Unlock and remove the well cap;
2. Test the air at the wellhead with the calibrated PID. If the gases from the well have caused the air in the breathing zone to read greater than 5 ppm, stop work and refer to the Health and Safety Plan. Record the reading on the Well Data Sheet;
3. In order to obtain a representative sample of the formation water, the well must be purged of the static water within the well. Prior to purging, the static water level within the well must be measured and the measurement recorded on the Well Data Sheet. To determine the amount of water necessary to purge, find the liquid column height in the well to determine the total volume (three liquid column borehole volumes) of liquid to be purged;
4. Attach the polypropylene rope to the sample bailer. A different dedicated rope will be used for each well.
5. Purge the well; lower bailer slowly into the well until it is below the water surface. Consistent with NYSDEC Guidance, purge waters will be containerized.
6. Record the amount of water purged in the field logbook and on the Well Data Sheet.
9. If the well goes dry during bailing, allow for full recovery (measure the water level) and then sample. If recovery takes more than twenty minutes, proceed to next well but return to sample within 24 hours.
10. Fill the appropriate sample bottles according to the sampling schedule for each well. While filling the sample bottles, record the well number, type, volume of container, and the preservatives used on the Ground Water Sampling Analyses form.
11. Commence sample collection with the following sample collection order: volatiles, semi-volatiles, PCBs/pesticides, cyanide, mercury, and metals. If the well should go dry during sampling and the well needs to be re-sampled the next day, the second attempt to sample the well will proceed in the following order: volatiles, metals, semi-volatiles, PCBs/pesticides, cyanide, and mercury.

12. The preservatives for the various sampling parameters were previously added to the clean sample bottles by the laboratory. Some parameters may require additional special handling.
    - Volatile organics analyses samples must be free of air bubbles. When a bubble-free sample has been obtained, it must be immediately chilled.
    - All samples collected for metals analysis will be preserved with nitric acid to a pH less than 2.
13. Collect the matrix spike duplicates and trip blanks. Take samples according to sampling schedule presented in the Work Plan. Duplicate samples will include the field splitting of at least one groundwater sample for each sampling visit. This may require the extraction of twice the amount of water needed for duplication purposes. The creation of trip/field blanks and duplicates shall be performed at least once with each field batch with a minimum of once every twenty samples.
14. Record all pertinent information in field logbook and on the Well Data Sheet (include color, odor, sediment content of sample, etc.). Any situations at the site that have the potential to interfere with the analytical results should also be recorded here.
15. Lock well, inspect well site, and note any maintenance required.
16. Dispose of potentially contaminated materials in designated container for contaminated solids.

3.3.3 Soil Sampling

Soil samples from test pit locations will be collected using disposable or dedicated stainless steel spoons or hand trowels from those areas investigated via test pit excavations, or shallow sampling locations and sumps/drains as indicated in the sampling and analysis tables in the RI Work Plan. The use of disposable or dedicated sampling equipment will eliminate the need for collection of field (equipment) blanks. The retrieved soil sample will be placed directly into parameter specific glass containers. Each sample container will be appropriately labeled and transported to the contracted laboratory in appropriate coolers. The following equipment will be required for the sampling of soil samples, in addition to the general sampling equipment list:

- Dedicated or disposable stainless steel spoons or hand trowels; and
- PID instrument.

The following activities will be completed prior to field sampling everyday:

- Fill out appropriate section on Soil Sample Sheet for the sites/trenches to be sampled;
- Determine the amount of sampling to be done for the day and prepare the necessary number of coolers;
- Select the appropriate sample bottles for the day's sampling. Soil samples will be collected within unpreserved glass, parameter specific, containers.

Sampling for matrix spike/matrix spike duplicates shall be performed at least once with each field batch with a minimum of one for each twenty samples.

3.3.4 Miscellaneous Media Samples

Drain, sump, and/or pit sludge/solid residue media samples will be collected using disposable or dedicated stainless steel spoons or hand trowels. The use of disposable or dedicated sampling equipment will eliminate the need for collection of field (equipment) blanks. The retrieved solid/sludge sample will be placed directly into parameter specific glass containers. Each sample container will be appropriately labeled and transported to the contracted laboratory in appropriate coolers. If applicable, liquid miscellaneous media samples will be sampled using an intermediate, disposable, certified clean, glass-pint sampling container. Parameter specific liquid media sample containers will then be filled. Upon filling parameter specific containers, each container will be capped, with a minimum amount of head-space, and placed within specific sample coolers for delivery to the laboratory. Upon completing miscellaneous media sampling, each parameter and location specific sample will be logged within the appropriate sampler's field book and chain-of-custody sheet. Prior to field sampling of miscellaneous media samples, the following activities will be completed:

- Locate each miscellaneous (sump, pit, and/or drain) location within the field using a facility site map and site markers;
- Flag and/or mark, with identification, each sampling location;
- Locate, identify and photograph each sampling location and record such information on field data sheets and field map;
- Plan sampling schedule;

- Calibrate PID instrument (if used for screening); and
- Collect, label, and organize appropriate disposable trowels, spoons, intermediate sample containers, and final laboratory containers.
- Fill out appropriate section on Miscellaneous Media Sample Sheet for the site area/location to be sampled;
- Determine the amount of sampling to be done for the day and prepare the necessary number of coolers;
- Select the appropriate sample bottles for the day's sampling.

The following activities will be completed during the Miscellaneous Media sampling process:

- Collect appropriate media sample from predesignated location at each sampling location using dedicated or disposable spoons/trowels (solids) or certified clean, intermediate sampling containers (liquids);
- For liquid media, transfer each sample to the appropriately labeled container noting observed characteristics on field data sheet;
- Where possible, analyze a subsample of each sample for organic vapors using a PID;
- Cap container and complete proper chain-of-custody sheets and field data sheet; and
- Transport containers and chain-of-custody sheets to laboratory.

3.3.5 IRM Confirmation Samples

If a soil IRM is deemed to be warranted and appropriate, IRM confirmation soil samples from remedial excavations will be collected using disposable or dedicated stainless steel spoons or hand trowels from excavation walls/floor where evidence of potential contaminants were previously removed. To minimize volatilization, confirmation samples will be collected from the soils located two to four inches inside the walls or floor of the excavation. The use of disposable or dedicated sampling equipment will eliminate the need for collection of field (equipment) blanks. The retrieved soil sample will be placed directly into parameter specific glass containers. Each sample container will be appropriately labeled and transported to the contracted laboratory in appropriate coolers. The following equipment will be required for the sampling of soil samples, in addition to the general sampling equipment list:

- dedicated or disposable stainless steel spoons or hand trowels; and
- PID instrument.

The following activities will be completed prior to field sampling everyday:

- Fill out appropriate section on Confirmation Soil Sample Sheet for the excavation wall or floor locations to be sampled;
- Determine the amount of sampling to be done for the day and prepare the necessary number of coolers;
- Select the appropriate sample bottles for the day's sampling. Soil samples will be collected within unpreserved glass, parameter specific, containers.

Duplicate samples shall be collected at least once with each field batch with a minimum of one for each twenty samples. The on-site NYSDEC representative will be allowed the opportunity to split any sample taken.

3.3.6 Background Samples

Based on the industrial nature of the site environs, and on the complexity of on-site and off-site conditions that might affect groundwater and contaminant migration in the area, soil and groundwater samples have not been pre-designated as likely to characterize site background conditions. Instead, monitoring wells will be installed in all cardinal directions on the site perimeter, as well as within the interior of the site, and will be used to determine local groundwater flow directions and should indicate which specific samples might be indicative of background conditions.

3.3.7 QA/QC Samples

Matrix Spike/Matrix Spike Duplicates

Additional samples from each of the following environmental sampling media will be collected as matrix spike/matrix spike duplicates: groundwater, subsurface soils. Matrix spike and matrix spike duplicate samples will be collected at a frequency of one set per twenty samples of each media.

Trip Blanks

Separate trip blanks will be carried into the field on each of the sampling days. The trip blank vials will be prepared by the contracted laboratory and handled in the field similar to the other sampling containers with the exception that the vials will not be opened.

3.4 Field Measurement Techniques

Water Level Measurement - Water elevations will be taken on all wells prior to purging and sampling. All measurements will be taken within a 24-hour period to obtain consistent elevations and recorded on well data sheets. The procedure for measuring water levels in the monitoring wells is:

- Unlock and remove well cap;
- Test the atmosphere of the well with the calibrated PID instrument. If the gases from the well have caused the air in the breathing zone to read greater than 5 ppm, stop work and refer to the Health and Safety Plan
- Measure water level to nearest 0.01 foot with a water level indicator (electronic).
- Water level indicators will be decontaminated before moving to next well. The tape and cable are decontaminated by washing in a bucket of distilled water-biodegradable phosphate free-detergent solution, followed by a rinse with distilled water.

Specific Conductance Measurement - A specific conductance meter will be field calibrated daily, using a 1M KCl reference solution, to 1413 μmhos/cm at 25 degrees centigrade. Sample aliquots for specific conductance and temperature will be obtained directly from the sampling point in 100 ml disposable beakers.

Photoionization Detector (PID) - The PID will be calibrated daily (and more often as required by the manufacturer's data) prior to use in the field, using calibration test gases.

3.5 General Decontamination

The following procedures will be performed for the decontamination of exploration equipment, sampling equipment, and personnel after each drilling/sampling event:

Drill rig, backhoe, and excavator - The drill rig, direct-push rig, backhoe, and/or excavator will be cleaned prior to their entrance and exit of the site. Greases and oils will not be used on any down hole equipment during drilling or exploration activities.

Exploration equipment - To avoid cross contamination, use of a PID meter and cleaning between each sampling site will be employed on backhoe arms, buckets, hollow stem augers, casing drill rods, down-hole tools, and appurtenant equipment.

Split spoon and Direct Push samplers – Sampler tools will be scrubbed, cleaned, and put through a series of rinses between each sampling event. A number of split spoon samplers will be used so that one can be utilized for sampling while the others are being cleaned. Acetate sleeves are expected to be used in direct push samplers. Those sleeves are single use and will be containerized and disposed.

Reusable equipment - The following steps will be employed to decontaminate reusable equipment:

- Rinse equipment of soil or foreign material with potable water;
- Immerse and scrub equipment with bio-degradable phosphate-free detergent and potable water;
- Immerse and scrub in a potable water rinse without detergent;
- Immerse and scrub in deionized/distilled water;
- Air dry and wrap cleaned equipment in foil to carry to next monitoring site to prevent contamination of equipment during transfer; and
- The decontamination wash and rinse water will not be considered hazardous unless visual inspection or monitoring by the PID and other equipment indicate that contaminants may be present. The rinse waters can be discharged on-site if they are not contaminated. If contaminants are expected to be present, the rinsate waters should be placed in 55 gallon drums and stored on-site.

Sample containers - Upon filling and capping sample bottles, the outside of the bottle will be wiped off with a clean paper towel. These towels will be disposed of in a dedicated container for contaminated solids.

Personnel decontamination - The following procedures will be used to decontaminate sampling personnel.

- After each sampling event chemical resistant gloves will be disposed of in a dedicated container for contaminated solids;
- At the end of each sampling day, Tyvek™ coveralls will be disposed of in a dedicated container for contaminated solids;
- Boots will be rinsed off with water to remove mud, clay, or any other contaminants; and
- Personnel will be required to follow procedures outlined in the Health and Safety Plan.

3.6 Sample Management Plan

3.6.1 Sample Management

The Sample Management Plan provides procedures to document and track samples and results obtained during this work effort. A series of pre-printed forms with the appropriate information serves as a vehicle for documentation and tracking. In order to accomplish this task, the documentation materials will include sample labels, sample characterization and Chain-of-Custody sheets, daily field reports, and a sample log.

Sample Label - A sample label will be completed for each sample obtained and will be affixed to the sample container. The label is configured in a way to address various types of mediums. Information on the label includes, at a minimum, client name, location, sample description, sample number, date, time, grab sample, composite sample, notes, and sampler's name.

Sample Characterization & Chain-of-Custody Sheet - All pertinent field information will be entered onto the sample characterization and chain-of-custody sheets including client name, sample ID, sample description, location of sample, sampling method, number of containers, container type, analysis required, and preservation. The monitoring well form has space allotted

for entering information regarding the well including depth to water, well volume, sample pH, temperature, color, etc. The Chain-of-Custody section of the form will document the sample's pathway of sample shipment which will include names of persons delivering/receiving, dates, and times. The reverse side of this form will be used by the laboratory to document analysis performed on the sample. Copies of the completed forms will be retained by the Engineer and the analytical laboratory. The original sample characterization and Chain-of-Custody sheets will be submitted in the Remedial Investigation report along with the laboratory results.

Daily Field Reports - Daily activities will be recorded on the Inspection Report form. The purpose of this form will be to summarize the work performed on the site each day. The completed forms will be submitted to the Project Manager on a daily basis for short term site activity and on a weekly basis for site activities of a longer duration.

Sample Log - The sample log will be utilized to track each individual sample obtained at the site. The upper portion, "Field Identification" will be completed the day the sample is taken. The form will accompany the sample characterization and Chain-of-Custody form to the laboratory. Personnel at the laboratory will complete the middle section of this form and return it to the Engineer, who will use the document to track incoming results. The bottom of the sheet has space allocated to enter "Recommended Actions" based on laboratory results.

3.6.2 Sample Designation

Each sample will have a unique sample code that will include, where appropriate, the sample media, and the sample location. The following codes will be used in the sample designation:

Sample Media	Code	Sample Location	Example
Groundwater	MW	Monitoring well	MW-1, MW-2, etc.
Subsurface Soil	B or TP	Soil Borings or Test trenches	B-1; TP-1, B-2, etc.
Miscellaneous Media			
Liquid	IL	Pit/sump/drain	IL-1, IL-2, etc.
Solid/Residue	SL	Pit/sump/drain, residues, surface soils	SL-1, SL-2, etc.
Field Blank	FB	Any	FB1, FB2, etc.

Sample Media	Code	Sample Location	Example
Matrix Spike, and Matrix Spike Duplicate	MS MSD	Any	MW-1 MS, B-2 MSD, etc.
Trip Blanks	TB	-	TB-1, TB-2, etc.

As an example of a sample designation, sample MW-3 represents a groundwater sample obtained from monitoring well MW-3.

3.6.3 Sample Handling

Each collected sample will be dispensed into the appropriate sample containers for the type of analysis to be performed. Appropriate sample preservatives will be added to the sample containers by the contracted analytical laboratory prior to the delivery into the field, except in cases where the sample preservative must be added after sample collection. All samples that require cool storage will be immediately placed in coolers with appropriate packaging materials so as to protect the breakage of sample containers during shipment. The sample coolers will be filled with cubed ice (no "Blue Ice") prior to leaving the sample collection location. In the instance that a local analytical laboratory is contracted, the samples will be hand delivered to the laboratory each sampling day. The chain-of-custody forms will be signed by the laboratory personnel picking up the samples and placed within the coolers. In the instance that an analytical laboratory is contracted which is not based locally and a common carrier is used for sample shipment, the chain-of-custody forms will be signed by the sampler and the carrier personnel and placed inside of the coolers. Careful packaging techniques will be used to prevent sample containers from breakage during shipment. Materials such as cardboard, foam wrap, or Styrofoam may be used as packaging materials. All samples will be delivered to the contracted analytical laboratory on the day they were collected and will be received by the laboratory within 24 hours of sample collection. The samples will be collected with sufficient time allowed at the end of the day for the analytical laboratory to properly process the sample chain-of-custody form.

APPENDIX B

Health and Safety Plan

Health and Safety Plan for Brownfield Site Investigation

Former Mill No.2
Norampac Industries
4001 Packard Road
Niagara Falls, New York

Site ID # C932150

Prepared by

C&S Engineers, Inc.
499 Colonel Eileen Collins Blvd.
Syracuse, New York 13212

April 2010

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APPENDICES

SECTION 1 – GENERAL INFORMATION

The Health and Safety Plan (HASP) described in this document will address health and safety considerations for all those activities that personnel employed by C&S Engineers, Inc., that may be engaged during site investigation work at the Former Mill No. 2 Brownfield Site located at 4001 Packard Road, Niagara Falls, Niagara County, New York. . The site is within a highly industrialized urban area. Figure 1 shows the approximate location of the site. This HASP will be implemented by the Health and Safety Officer (HSO) during site work.

Compliance with this HASP is required of all C&S personnel who enter this site. The content of a HASP may change or undergo revision based upon additional information made available to health, safety, and training (H&S) committee, monitoring results or changes in the technical scope of work. Any changes proposed must be reviewed by the H&S committee. This HASP was written specifically for those employees of C&S Engineers, Inc., and is not intended for use by others.

Responsibilities

Project Manager:	Steven Vinci	Work Phone: (315) 455-2000
		Cell Phone: (315) 427-8364
Site Health and Safety Officer:	Rory Woodmansee	Work Phone: (315) 455-2000
Emergency Coordinator:	Steven Vinci	Work Phone: (315) 455-2000
Health & Safety Manager:	Mike Casler	Work Phone: (315) 455-2000
		Cell Phone: (315) 374-3623

Emergency Phone Numbers

Fire Department: 911

Ambulance: 911

Police: 911

Hospital: (Hospital Route Included as Attachment A)

Poison Control Center:.....800-252-5655

Oil Spills and Hazardous Material Spills:.....1-800-457-7362

1.0 Written Directions from the Site to Mount Saint Mary's Hospital of Niagara Falls

Head northeast on Packard Road – go 0.1 miles.
Take a slight right towards Niagara Falls Blvd., then a sharp left onto Niagara Falls Blvd. - go 0.3 miles.
Turn right onto Pine Avenue – go 1.3 miles
Turn right onto E Market Street – Hospital is on the left
The hospital is approximately 1.8 miles from the site.

Attachment A of this HASP contains a route map to the hospital that was obtained from Pictometry®.

SECTION 2 — HEALTH AND SAFETY PERSONNEL

2.0 Health and Safety Personnel Designations

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

2.1 Project Manager (PM)

The PM is responsible for the overall project including the implementation of the HASP. Specifically, this includes allocating adequate manpower, equipment, and time resources to conduct site activities safely.

2.2 Health and Safety Officer (HSO)

The HSO is the person on-site responsible for assuring those personnel under direction comply with the requirements of the HASP and that personnel protective equipment needed for site work is available.

2.3 Emergency Coordinator

The Emergency Coordinator is responsible for implementation of the Emergency Response Procedures as presented in Section 13 of this HASP.

2.4 Health and Safety Manager

The Health and Safety Manager has overall responsibilities for implementing Health and Safety Programs for all C&S Companies.

SECTION 3 — PERTINENT SITE INFORMATION

3.1 Site Location and General History

The Former Mill No. 2 Brownfield Site is located on approximately 10.3 acres of land and has a street address of 4001 Packard Road. The site is within a highly industrialized urban area of Niagara Falls, Niagara County, New York. Adjoining properties include: the active paper mill (Mill No. 1) operated by Norampac Industries, Inc. to the north; "Franks Vacuum Service and the former Frontier Chemical Site to the south and west; National Grid (Niagara Mohawk) and New York Power Authority right- of- way to the east. Further to the northeast of the site are other commercial properties and a little league baseball diamond.

This former mill, encompassing approximately 661,980 square feet, historically housed paper manufacturing, finishing and packaging operations of completed goods. The former mill consists of several interconnected two story and five story concrete and masonry buildings which were constructed during various time frames, with the earliest being 1923 and the latest reported date of 1974. The former mill was taken out service several years ago and has fallen into disrepair to the point where certain areas have collapsed and while others exhibit evidence of structural distress.

Given the age of construction, asbestos containing building materials are present in and on the building. Also, PCBs may be present in those areas where electrical equipment had been located including the active transformer yard located in the vicinity of the northwest corner of the former mill.

Relative to historical operations, the use of hazardous substances and petroleum products would have been common. The types of products apparently used at the site included solvents for de-inking (which reportedly occurred on the first floor of Buildings 13 and14), bleaches, caustics, petroleum based de-foamers, low pH "Felt Cleaner", aluminum sulfate (50%) solution and Kymene (polyamide-polyamine epichlorohydrin resin) and mineral spirits. Review of historic plant drawings

show that Buildings 1 and 4 were the location of hydraulic power packs to drive equipment, "Electricians Shop", "Machine Shop", oil storage areas, oil circulating pumps and color mixing tanks.

Information obtained from laboratory analysis of groundwater and soil samples from subsurface investigations completed in 2008 and 2009 shown in Appendix A of this HASP, revealed a variety of contaminants ranging from pesticides to chlorinated solvents which were found in concentrations that did not exceed NYCRR Part 375 Soil Cleanup Objectives-Industrial Use.

SECTION 4 — HAZARD ASSESSMENT AND HAZARD COMMUNICATION

The most likely routes of exposure during Site Investigation tasks include skin adsorption and inhalation due to exposure to contaminated materials. During warm weather, contact with vectors such as bees or wasps are also a concern.

It is difficult to draw a correlation between the concentrations of contaminants found in one media and the potential for exposure to these contaminants to site workers. However, their presence may indicate that some potential for exposure to these compounds exist, and the requirements for protective measures and monitoring of exposure is based on this potential. Pertinent information, including Material Safety Data Sheets(MSDS), regarding chemicals known to have been used at the site or suspected to be potentially present at the site, are provided in Appendix B. Appendix C contains those MSDS of contaminants detected at the site as a result of investigation work completed in 2008 and 2009.

SECTION 5 — TRAINING

5.1 Basic Training Required

Completion of the 40-hour Health and Safety Training for Hazardous Waste Operations and three days on the job training under the supervision of a qualified person is required for C&S employees who will perform work in areas where the potential for a toxic exposure exists.

5.2 Advanced Training

Advanced training, as necessary, will be provided to any personnel who will be expected to perform site work utilizing Level A protection or other specialized operation to be undertaken at the site.

5.3 Site-Specific Training

Training will be provided that specifically addresses the activities, procedures, monitoring, and equipment for the site operations prior to going on site. Training will include familiarization with site and facility layout, known and potential hazards, and emergency services at the site, and details all provisions contained within this HASP. This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity.

5.4 Safety Briefings

C&S project personnel will be given briefings by the HSO on a daily or as needed basis to further assist site personnel in conducting their activities safely. Pertinent information will be provided when new operations are to be conducted. Changes in work practices must be implemented due to new information made available, or if site or environmental conditions change. Briefings will also be given to facilitate conformance with prescribed safety practices. When conformance with these practices is not occurring or if deficiencies are identified during safety audits, the project manager will be notified.

5.5 First Aid and CPR

C&S employees performing field investigation efforts are trained in basic first aid and CPR by the American Red Cross as part of annual 8 hour refresher courses required under 29 CFR Part 1910.120.

SECTION 6 — ZONES

6.1 Site Zones

Three types of site activity zones are identified for the Brownfield investigation activities, including the Exclusion Zone, Contamination Reduction Zone, and the Support Zone. Prior to commencement of field work a further definition of where these zones will be set up will be established.

6.1.1 Exclusion Zone

The Exclusion Zone is the area where contamination is known to be or likely to be present or where activity is being conducted which has the potential to cause harm. The Exclusion Zone will be any area in the general vicinity of active site work or intrusive activities. It is anticipated that the location of the Exclusion Zone will change as various investigation activities change. No one may enter the Exclusion Zone without the necessary protective equipment and without permission from the HSO.

6.1.2 Contamination Reduction Zone

This is the transition area between the Exclusion Zone and the Support Zone. It is the area where the decontamination of equipment and personnel takes place. Its purpose is to keep the Support Zone free of contamination.

6.1.3 Support Zone

The Support Zone is considered the uncontaminated area. This area may include a field office, trailer, command post, or pre-work area/personnel vehicles which will provide for communications and emergency response. Appropriate safety and support equipment also will be located in this zone.

SECTION 7 — PERSONAL PROTECTIVE EQUIPMENT

7.1 General

The level of protection to be worn by field personnel will be defined and controlled by the HSO. Depending upon the type and levels of waste material present or anticipated at the site, varying degrees of protective equipment will be needed. If the possible hazards are unknown, a reasonable level of protection will be taken until sampling and monitoring results can ascertain potential risks. The levels of protection listed below are based on USEPA Guidelines. A list of the appropriate clothing for each level is also provided.

Level A protection must be worn when a reasonable determination has been made that the highest available level of respiratory, skin, eye, and mucous membrane protection is needed. It should be noted that while Level A provides maximum available protection, it does not protect against all possible hazards. Consideration of the heat stress that can arise from wearing Level A protection should also enter into the decision making process. Level A protection includes:

- Open circuit, pressure-demand self-contained breathing apparatus (SCBA)
- Totally encapsulated chemical resistant suit
- Gloves, inner (surgical type)
- Gloves, outer, chemical protective
- Boots, chemical protective

Level B protection must be used when the highest level of respiratory protection is needed, but hazardous material exposure to the few unprotected areas of the body (e.g., the back of the neck) is unlikely. Level B protection includes:

- Open circuit, pressure-demand SCBA or pressure airline with escape air bottle
- Chemical protective clothing: Overalls and long sleeved jacket; disposal chemical resistant coveralls; coveralls; one or two piece chemical splash suit with hood
- Gloves, inner (surgical type)
- Gloves, outer, chemical protective
- Boots, chemical protective

Level C must be used when the required level of respiratory protection is known, or reasonably assumed to be, not greater than the level of protection afforded by air purifying respirators; and hazardous materials exposure to the few unprotected areas of the body (e.g.., the back of the neck) is unlikely. Level C protection includes:

- Full or half face air-purifying respirator
- Chemical protective clothing: Overalls and long-sleeve jacket; disposable chemical resistant coveralls; coveralls; one or two piece chemical splash suit
- Gloves, inner (surgical type)
- Gloves, outer, chemical protective
- Boots, chemical protective

Level D is the basic work uniform. It cannot be worn on any site where respiratory or skin hazards exist. Level D protection includes:

- Safety boots/shoes
- Safety glasses
- Hard hat with optional face shield

Note that the use of SCBA and airline equipment is contingent upon the user receiving special training in the proper use and maintenance of such equipment.

7.2 Personal Protective Equipment – Site Specific

Level D with some modification will be required when working in the work zone on this site. In addition to the basic work uniform specified by Level D protection, Nitrile gloves will be required when contact with soil or ground water is likely. Hearing protection, consistent with the Hearing Conservation Plan shown in Appendix D will be worn when power equipment is used to perform subsurface investigation work. In those areas where PCBs are suspected, protective outer boots and disposable coveralls will be worn. An upgrade to a higher level (Level C) of protection may occur if determined necessary by the HSO.

SECTION 8 — MONITORING PROCEDURES

8.1 Monitoring During Site Operations

All site environmental monitoring should be accompanied by periodic meteorological monitoring of appropriate climatic conditions.

8.1.1 Drilling Operations (Monitoring Well Installation and Subsurface Borings) and Test Pit Excavations

Monitoring will be performed by the HSO or drilling observer during the conduct of work. A photoionization detector (PID) equipped with a 10.0 eV lamp will be utilized to monitor for the presence of volatile organic vapors within the breathing zone, the borehole, and subsurface samples upon their retrieval. Drill cuttings and excavation spoils will also be monitored by use of the PID. If subsurface conditions warrant, a combustible gas indicator (CGI) with oxygen alarm may also be used to monitor the borehole for the presence of combustible gases. Similar monitoring of fluids produced during well development will also be conducted.

8.1.2 Interim Remedial Measures

If future Interim Remedial Measures (IRM) occurs, monitoring will be performed during excavation and sampling operations when C&S personnel are within the work zone. Although historical information previously obtained at the site indicates low level of volatile organic vapors and compounds, a photoionization detector (PID) will be used during subsurface activities. If an IRM is performed, the, the remedial contractor will be required to employ dust control practices during work.

8.2 Action Levels

If readings on the PID exceed 10 ppm for more than fifteen minutes consecutively, then personal protective equipment should be upgraded to Level C. The air purifying respirator used with Level C protective equipment must be equipped with organic vapor cartridges. If readings on the explosive gas meter are within a range of 10%–25% of the LEL then continuous monitoring will be implemented. Readings above 25% of the LEL indicate the potential for an explosive condition. Sources of ignition should be removed and the site should be evacuated.

8.3 Personal Monitoring Procedures

Personal monitoring shall be performed as a contingency measure in the event that VOC concentrations are consistently above the 10 ppm action level as detected by the PID. If the concentration of VOCs is above this action level, then amendments to the HASP must be made before work can continue at the site.

8.4 Medical Surveillance Procedures for Evidence of Personal Exposure

All C&S Engineers Inc. personnel who will be performing field work at the Site must be medically qualified. Additional medical testing may be required by the HSO in consultation with the company physician and corporate Health & Safety Manager if an overt exposure or accident occurs, or if other site conditions warrant further medical surveillance.

SECTION 9 — COMMUNICATIONS

A cell phone will be located on site to be utilized by C&S personnel conducting investigation and IRM efforts. Cell phones will be the primary means of communicating with emergency support services/facilities. If cell phone service is not available or fails, then land line communication available in facilities associated with Mill No 1 can be accessed. Prior to commencing field activities, the location of back-up land lines will be identified and communicated to C&S employees on the site.

SECTION 10 — SAFETY CONSIDERATIONS FOR SITE OPERATIONS

10.1 General

Standard safe work practices that will be followed include:

- Do not climb over/under drums, or other obstacles.
- Do not enter the work zone alone.
- Practice contamination avoidance, on and off-site.
- Plan activities ahead of time, use caution when conducting concurrently running activities.
- No eating, drinking, chewing or smoking is permitted in work zones.
- Due to the unknown nature of waste placement at the site, extreme caution should be practiced during excavation activities.
- Apply immediate first aid to any and all cuts, scratches, abrasions, etc.

- Be alert to your own physical condition. Watch your buddy for signs of fatigue, exposure, etc.
- A work/rest regimen will be initiated when ambient temperatures and protective clothing create a potential heat stress situation.
- No work will be conducted without adequate natural light or without appropriate supervision.
- Task safety briefings will be held prior to onset of task work.
- Ignition of flammable liquids within or through improvised heating devices (barrels, etc.) or space heaters is forbidden.
- Entry into areas of spaces where toxic or explosive concentrations of gases or dust may exist without proper equipment is prohibited.
- Any injury or unusual health effect must be reported to the site health and safety officer.
- Prevent splashing or spilling of potentially contaminated materials.
- Use of contact lenses is prohibited while on site.
- Beards and other facial hair that would impair the effectiveness of respiratory protection are prohibited if respiratory protection is necessary.
- Field crew members should be familiar with the physical characteristics of investigations, including:
  - Wind direction in relation to potential sources
  - Accessibility to co-workers, equipment, and vehicles
  - Communication
  - Hot zones (areas of known or suspected contamination)
  - Site access
  - Nearest water sources
- The number of personnel and equipment in potentially contaminated areas should be minimized consistent with site operations.

10.2 Field Operations

10.2.1 Intrusive Operations

The HSO or designee will be present on-site during all intrusive work, e.g., drilling operations, excavations, trenching, and will provide monitoring to oversee that appropriate levels of protection and safety procedures are utilized by C&S Engineers, Inc., personnel. The use of salamanders or other equipment with an open flame is prohibited and the use of protective clothing, especially hard hats and boots, will be required during drilling or other heavy equipment operations.

10.2.2 Excavations and Excavation Trenching

Guidance relating to safe work practices for C&S employees regarding excavations and excavating/trenching operation is presented in Appendix E of this HASP.

SECTION 11 — DECONTAMINATION PROCEDURES

Decontamination involves physically removing contaminants and/or converting them chemically into innocuous substances. Only general guidance can be given on methods and techniques for decontamination. Decontamination procedures are designed to:

- Remove contaminant(s).
- Avoid spreading the contamination from the work zone.
- Avoid exposing unprotected personnel outside of the work zone to contaminants.

Contamination avoidance is the first and best method for preventing spread of contamination from a hazardous site. Each person involved in site operations must practice the basic methods of contamination avoidance listed below. Additional precautions may be required in the HASP.

- Know the limitations of all protective equipment being used.
- Do not enter a contaminated area unless it is necessary to carry out a specific objective.
- When in a contaminated area, avoid touching anything unnecessarily.
- Walk around pools of liquids, discolored areas, or any area that shows evidence of possible contamination.
- Walk upwind of contamination, if possible.
- Do not sit or lean against anything in a contaminated area. If you must kneel (e.g., to take samples), use a plastic ground sheet.
- If at all possible, do not set sampling equipment directly on contaminated areas. Place equipment on a protective cover such as a ground cloth.
- Use the proper tools necessary to safely conduct the work.

Specific methods that may reduce the chance of contamination are:

- Use of remote sampling techniques.
- Opening containers by non-manual means.
- Bagging monitoring instruments.

- Use of drum grapplers.
- Watering down dusty areas.

Equipment which will need to be decontaminated includes tools, monitoring equipment, and personal protective equipment. Items to be decontaminated will be brushed off, rinsed, and dropped into a plastic container supplied for that purpose. They will then be washed with a detergent solution and rinsed with clean water. Monitoring instruments will be wrapped in plastic bags prior to entering the field in order to reduce the potential for contamination. Instrumentation that is contaminated during field operations will be carefully wiped down. Heavy equipment, if utilized for operations where it may be contaminated, will have prescribed decontamination procedures to prevent hazardous materials from potentially leaving the site. The on-site contractor will be responsible for decontaminating all construction equipment prior to demobilization.

SECTION 12 – DISPOSAL PROCEDURES

All discarded materials, waste materials, or other objects shall be handled in such a way as to reduce or eliminate the potential for spreading contamination, creating a sanitary hazard, or causing litter to be left on-site. All potentially contaminated materials, e.g., clothing, gloves, etc., will be bagged or drummed as necessary and segregated for proper disposal. All contaminated waste materials shall be disposed of as required by the provisions included in the contract and consistent with regulatory provisions. All non-contaminated materials shall be collected and bagged for appropriate disposal. Investigation derived waste will be managed consistent with the work plan for this site and Draft DER-10 Technical Guidance for Site Investigation and Remediation dated November 2009

SECTION 13 – EMERGENCY RESPONSE PROCEDURES

As a result of the hazards at the site, and the conditions under which operations are conducted, there is the possibility of emergency situations. This section has established procedures for the implementation of an emergency plan.

13.1 Emergency Coordinator

Emergency Coordinator: .....Steven Vinci.....Work Phone: (315) 455-2000

The Emergency Coordinator or his on-site designee will, in concert with Norampac plant management, implement the emergency response procedures whenever conditions at the site warrant such action. The Emergency Coordinator or his on-site designee will be responsible for assuring the evacuation, emergency treatment, emergency transport of C&S personnel as necessary, and notification of emergency response units (refer to phone listing in the beginning of this HASP) and the appropriate management staff.

13.2 Evacuation

In the event of an emergency situation, such as fire, explosion, significant release of toxic gases, etc., all C&S personnel will evacuate and assemble in a designated assembly area. The Emergency Coordinator or his on-site designee will have authority to contact outside services as required. Under no circumstances will incoming personnel or visitors be allowed to proceed into the area once the emergency signal has been given. The Emergency Coordinator or his on-site designee must see that access for emergency equipment is provided and that all ignition sources have been shut down once the alarm has been sounded. Once the safety of all personnel is established, the Fire Department and other emergency response groups will be notified by telephone of the emergency.

13.3 Potential or Actual Fire or Explosion

Immediately evacuate the site and notify local fire and police departments, and other appropriate emergency response groups, if LEL values are above 25% in the work zone or if an actual fire or explosion has taken place.

13.4 Environmental Incident (spread or release of contamination)

Control or stop the spread of contamination if possible. Notify the Emergency Coordinator and the Project Manager. Other appropriate response groups will be notified as appropriate.

13.5 Personnel Injury

Emergency first aid shall be applied on-site as necessary. Then, decontaminate (en route if necessary) and transport the individual to nearest medical facility if needed. The ambulance/rescue squad shall be contacted for transport as necessary in an emergency. The directions to the hospital are shown in Section 1 of this HASP and a map is shown in Attachment A.

13.6 Personnel Exposure

- *Skin Contact*: Use copious amounts of soap and water. Wash/rinse affected area thoroughly, and then provide appropriate medical attention. Eyes should be thoroughly rinsed with water for at least 15 minutes.
- *Inhalation*: Move to fresh air and/or, if necessary, decontaminate and transport to emergency medical facility.
- *Ingestion*: Decontaminate and transport to emergency medical facility.
- *Puncture Wound/Laceration*: Decontaminate, if possible, and transport to emergency medical facility.

13.7 Adverse Weather Conditions

In the event of adverse weather conditions, the HSO will determine if work can continue without sacrificing the health and safety of C&S field workers.

13.8 Incident Investigation and Reporting

In the event of an incident, procedures discussed in the C&S Medical Emergency/Incident Response Protocol is presented in Appendix D of this HASP, shall be followed.

SECTION 14 — COMMUNITY RELATIONS

14.1 Community Relations

Community relations may be a sensitive matter. All C&S employees should be aware of issues associated with this specific site. Conversations with community members not involved in activities at the site should be limited. Conversations between site workers off the site, in restaurants, etc., should not include discussions of the potential hazards on the site nor should negative statements be

made regarding the site. The Owner and the New York State Department of Environmental Conservation are the designated spokespersons for the Former Mill No. 2 Brownfield Project.

14.2 Community Health and Safety Plan

14.2.1 Site Access

In general, the majority of active and/or intrusive efforts to be completed as part of the Site Investigation will occur during the completion of soil borings, installation of monitoring wells borings and test pit excavations completed for purposes of subsurface assessment relative to the nature and extent of contamination.. Community residences are located adjacent to the site. During completion of the Site Investigation activities, site access will be limited to only those personnel (field sampling technicians, geologists, engineers, and subcontractors) who are scheduled to be involved with site specific investigation.

14.2.2 Community Health and Safety Monitoring

As part of the Site Investigation, three general types of efforts are scheduled, including, non-intrusive reconnaissance tasks, sampling or monitoring tasks (monitoring point sampling), and intrusive tasks (test trenching, subsurface borings, monitoring well installation). During completion of general reconnaissance and sampling or monitoring tasks, potential for health and safety risks to off-site landowners or the local community are not anticipated.

During completion of intrusive efforts at or adjacent to the site, health and safety monitoring efforts will be concentrated on the area or areas in which intrusive efforts are being completed. Since the air pathway is the most available and likely avenue for the release of potential contaminants to the atmosphere at or near the site, in addition to limiting public or community access to the areas in which intrusive efforts are completed, health and safety measures will primarily consist of monitoring the air pathway for worker exposure.

14.2.3 Community Air Monitoring Plan

During completion of site investigation activities, efforts will be taken to complete field work in a manner which will minimize the creation of airborne dust or particulates. Under dry conditions, work areas may be wetted to control dust. During periods of extreme wind, intrusive field work may be

halted until such time as the potential for creating airborne dust or particulate matter as a result of investigation activities is limited. Periodic monitoring following the guidelines of the NYSDOH's Generic Community Air Monitoring Plan (see Appendix G) will be implemented during all non-intrusive site investigation activities, including surface soil and sediment sampling, and collection of groundwater samples from groundwater monitoring wells.

During completion of site investigation, a community air monitoring plan meeting the requirements of the NYSDOH's Generic Community Air Monitoring Plan (see Appendix G) will be implemented for the duration of intrusive activities. These additional air monitoring activities will include establishment of background conditions, continuous monitoring for volatile organic compounds and/or particulates at the downwind work area (exclusion zone) perimeter, recording of monitoring data, and institution and documentation of Response Levels and appropriate actions in accordance with NYSDOH guidance.

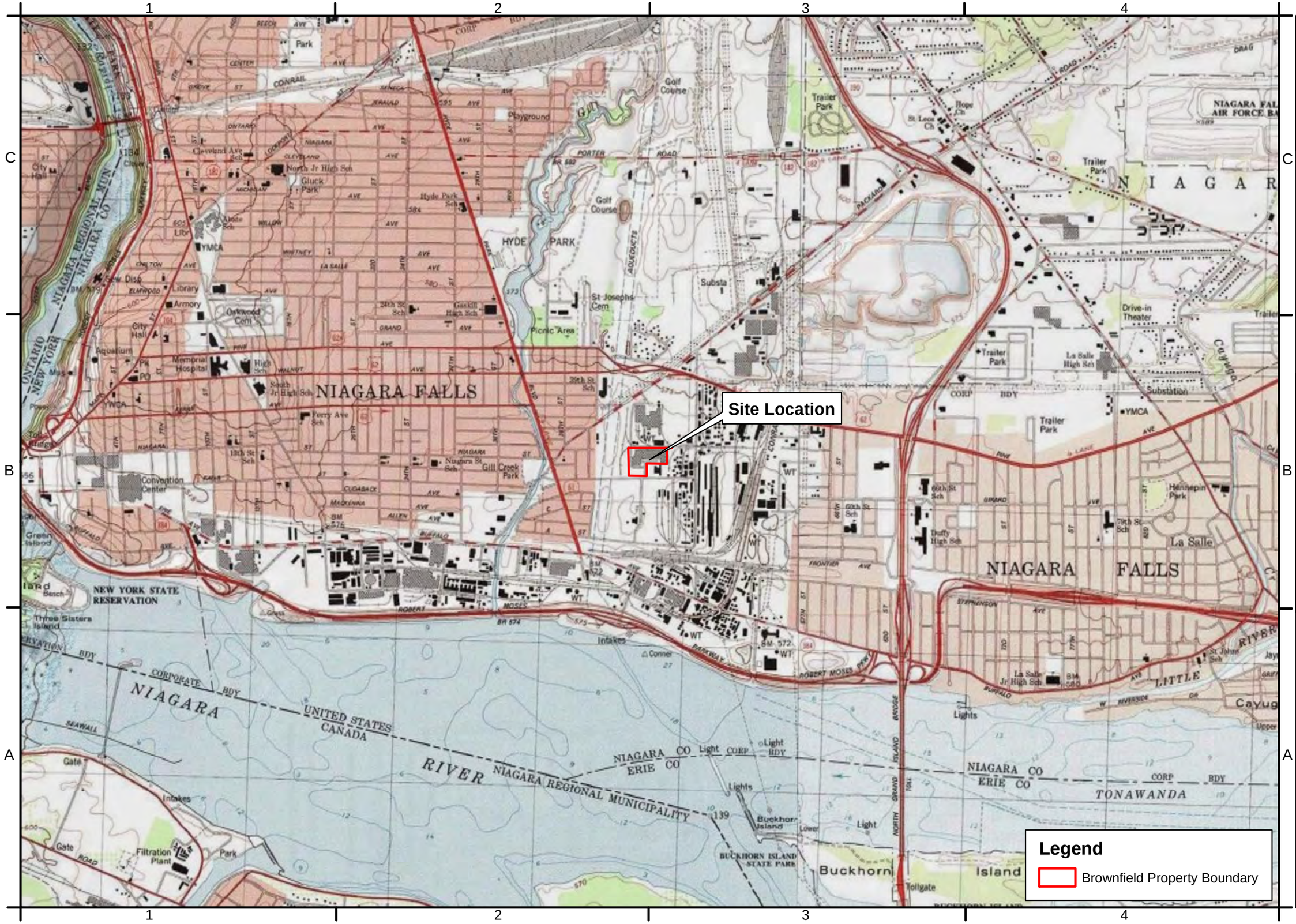
SECTION 15 — AUTHORIZATIONS

C&S personnel authorized to enter the Site while operations are being conducted must be approved by the HSO. Authorization will involve completion of appropriate training courses, medical examination requirements, and review and sign-off of this HASP. No C&S personnel should enter the work zone alone. Each C&S employee should check in with the HSO or Project Manager prior to entering the work zones.

FIGURE 1

SITE LOCATION

C&S ENGINEERS



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0 2,000 Feet

Remedial Investigation Work Plan
Former Mill No. 2 Site ID # C932150
Norampac Industries
4001 Packard Road
Niagara Falls, New York

PROJECT NO:	I11.005.001
DATE:	April 1, 2010
SCALE:	AS SHOWN
DRAWN BY:	WNR
DESIGNED BY:	WNR
CHECKED BY:	SMV

03/30/10 - F:\Projects\I11-Minimill Technologies\I11.005.001 -RI and Demo Workplans\GIS\Projects\figure_1_workplan.mxd

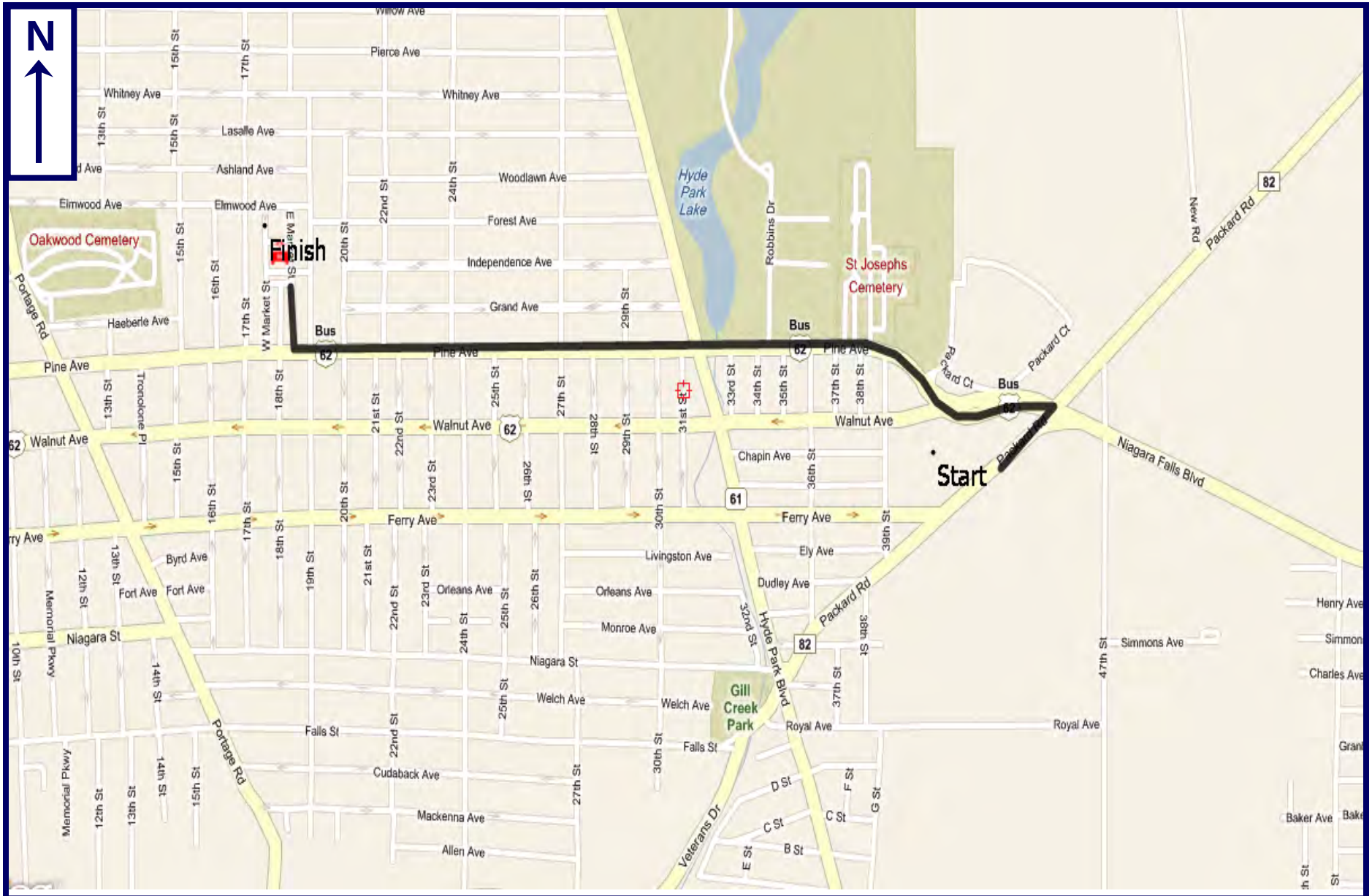
Site Location Map

FIGURE 1

ATTACHMENT A

MAP TO HOSPITAL

C&S ENGINEERS



ENGINEERS
DESIGN BUILD
TECHNICAL RESOURCES
OPERATIONS

Source: Pictometry

Map to St. Mary's Hospital of Niagara Falls

Appendix A

HISTORICAL SITE INVESTIGATION DATA

SUMMARY TABLES

C&S ENGINEERS

Table 1
Preliminary Subsurface Assessment of Soil
Norampac Industries, Inc.
4001 Packard Road, Niagara Falls, New York

Summary of Detected Volatile Organic Compounds (VOCs) in Soil
Test Results in Micrograms per Kilogram (µg/Kg) or Parts Per Billion (ppb)

Analyte	SB-5	SB-8	SB-8 (Dilution)	SB-9	SB-9 (Dilution)	SB-10	SB-10 (Dilution)	SPILL AREA	SPILL AREA (Re-Run)	SB-11	SB-13	SB-17	SB-18	SB-19	NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives for the Protection of Groundwater	NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives for the Protection of Public Health: Industrial Use
Interval	(0.0-4.0')	(8.0-11.4')	(8.0-11.4')	(8.0-11.3')	(8.0-11.3')	(8.0-10.6')	(8.0-10.6')	(surface)	(surface)	(16-20')	(0.0-4.0')	(4.0-8.0')	(4.0-8.0')	(0.0-4.0')		
Date	4/14/2008	4/14/2008	4/14/2008	4/14/2008	4/14/2008	4/14/2008	4/14/2008	4/14/2008	4/14/2008	5/27/2008	5/27/2008	5/27/2008	5/27/2008	5/27/2008		
Petroleum-Related Volatile Organic Compounds																
2-Hexanone	ND<28 U	ND<140 U	ND<750 U	27	ND<690 U	ND<2 U	ND<700 U	ND<120 U	ND<130 U	ND<30 U	ND<34 U	ND<29 U	ND<30 U	ND<28 U	Not Listed	Not Listed
1,2,4-trimethylbenzene	ND<6 U	ND<29 U	87 DJ	ND<5 U	ND<140 U	ND<6 U	ND<140 U	8 J	14 J	ND<6 U	ND<7 U	ND<6 U	ND<6 U	ND<6 U	3,600	380,000
Ethylbenzene	ND<6 U	ND<29 U	ND<150 U	1 J	ND<140 U	ND<6 U	ND<140 U	ND<23 U	ND<25 U	ND<6 U	ND<7 U	ND<6 U	ND<6 U	ND<6 U	1,000	780,000
Naphthalene	ND<6 U	ND<29 U	ND<150 U	ND<5 U	ND<140 U	2 J	ND<140 U	60	140	ND<6 U	ND<7 U	ND<6 U	ND<6 U	ND<6 U	12,000	1,000,000
Toluene	ND<6 U	ND<29 U	ND<150 U	7 U	ND<140 U	ND<6 U	ND<140 U	ND<23 U	ND<25 U	ND<6 U	ND<7 U	ND<6 U	ND<6 U	ND<6 U	700	1,000,000
Total xylenes	ND<17 U	ND<87 U	ND<450 U	13 J	ND<410 U	8 J	ND<420 U	ND<70 U	ND<76 U	ND<18 U	ND<20 U	ND<17 U	ND<18 U	ND<17 U	1,600	1,000,000
Solvent-Related Volatile Organic Compounds																
2-Butanone	ND<28 U	ND<140 U	**230** BDJ	ND<27 U	**240** BDJ	ND<28 U	**190** BDJ	34 **J**	ND<130 U	ND<30 U	57	ND<29 U	13 **J**	ND<28 U	120	1,000,000
1,1,1-Trichloroethane	ND<6 U	ND<29 U	ND<150 U	ND<5 U	ND<140 U	ND<6 U	ND<140 U	ND<23 U	ND<25 U	ND<6 U	ND<7 U	ND<6 U	3 **J**	ND<6 U	680	1,000,000
1,2-Dichlorobenzene	ND<6 U	**1,300** E	**1,100** D	**2,000** E	**4,200** E	840 E	**1,800** D	29	ND<25 U	ND<6 U	ND<7 U	ND<6 U	ND<6 U	ND<6 U	1,100	1,000,000
1,3-Dichlorobenzene	ND<6 U	1,400 E	1,100 D	1,400 E	**2,900** E	500 E	1,200 D	21 **J**	6 J	ND<6 U	ND<7 U	ND<6 U	ND<6 U	ND<6 U	2,400	560,000
1,4-Dichlorobenzene	ND<6 U	1,400 E	1,100 D	**2,500** E	**4,700** E	870 E	1,700 D	41	10 J	ND<6 U	ND<7 U	ND<6 U	ND<6 U	ND<6 U	1,800	250,000
cis-1,2-Dichloroethene	ND<6 U	ND<29 U	ND<150 U	14	ND<140 U	1 **J**	ND<140 U	ND<23 U	ND<25 U	ND<6 U	ND<7 U	ND<6 U	ND<6 U	ND<6 U	250	1,000,000
Acetone	ND<28 U	ND<140 U	ND<750 U	9 J	ND<690 U	7 **J**	ND<700 U	**120**	**72** J	ND<30 U	**310**	ND<29 U	**59**	ND<28 U	50	1,000,000
Cholorobenzene	ND<6 U	48	ND<150 U	760 E	ND<740 U	120	84 DJ	ND<23 U	ND<25 U	ND<6 U	ND<7 U	ND<6 U	ND<6 U	ND<6 U	1,100	1,000,000
Choloroform	4 J	ND<29 U	ND<150 U	ND<5 U	ND<140 U	ND<6 U	ND<140 U	ND<23 U	ND<25 U	ND<6 U	ND<7 U	ND<6 U	ND<6 U	ND<6 U	370	700,000
Cyclohexane	ND<6 U	ND<29 U	ND<150 U	1 J	ND<140 U	ND<6 U	ND<140 U	ND<23 U	ND<25 U	ND<6 U	ND<7 U	ND<6 U	ND<6 U	ND<6 U	Not Listed	Not Listed
Methylene chloride	ND<6 U	25 J	ND<150 U	ND<5 U	ND<140 U	3 **J**	ND<140 U	ND<23 U	15 **J**	10	5 **J**	6	6	6	50	1,000,000
Tetrachloroethene	ND<6 U	9 J	ND<150 U	230 E	280 D	38	ND<140 U	ND<23 U	ND<25 U	ND<6 U	ND<7 U	ND<6 U	ND<6 U	ND<6 U	1,300	300,000
Trichloroethene	ND<6 U	ND<29 U	ND<150 U	18	ND<140 U	ND<6 U	ND<140 U	ND<23 U	ND<25 U	ND<6 U	ND<7 U	ND<6 U	ND<6 U	ND<6 U	470	400,000
Vinyl chloride	ND<11 U	ND<58 U	ND<300 U	2 J	ND<280 U	ND<11 U	ND<280 U	ND<46 U	ND<51 U	ND<12 U	ND<14 U	ND<12 U	ND<12 U	ND<11 U	20	27,000
Total VOCs	4	4,182	3,617	6,982	12,320	2,389	4,974	313	257	475	372	6	81	6		
Total VOC TICs	None Detected	87 J	400 J	54 J	3,600 J	44 J	None Detected	175 J	2,290 JN	None Detected	None Detected	None Detected	None Detected	None Detected	Not Applicable	Not Applicable
Total VOCs and VOC TICs	4	4,269	4,017	7,036	15,920	2,433	4,974	488	2,547	475	372	6	81	6		

Notes:

TCL & STARS-list VOCs Analysis by USEPA Method 8260B.

Bold Type denotes that the detected value exceeds its associated NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives for the Protection of Groundwater

"ND<5 U" denotes compound not detected above the laboratory method detection limits shown.

Laboratory Data Qualifiers:

"D" denotes a compound indentified in an analysis at the secondary dilution factor.

"J" Estimated value – The analyte was positively identified; but the associated numerical value is the approximte concentration of the analyte in the sample.

"E" denotes the reported value is estimated because of the presence of an interference.

"B" denotes the reported value was obtained from an instrument reading that was less than the sample quantitation limit (SQL).

Table 2
Preliminary Subsurface Assessment of Soil
Norampac Industries, Inc.
4001 Packard Road, Niagara Falls, New York

Summary of Detected Semi-Volatile Organic Compounds (SVOCs) in Soil
Test Results in Micrograms per Kilogram (µg/Kg) or Parts Per Billion (ppb)

Analyte	SB-2	SPILL AREA	SB-11	SB-13	SB-19	NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives for the Protection of Groundwater	NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives for the Protection of Public Health: Industrial Use
Interval	(0.0-4.0')	(surface)	(16.0-20.0')	(0.0-4.0')	(0.0-4.0')		
Date	4/14/2008	4/14/2008	5/27/2008	5/27/2008	5/27/2008		
Petroleum-Related Semi-Volatile Organic Compounds							
2-Methylnaphthalene	190 J	970 J	ND<990 U	ND<460 U	80 J	Not Listed	Not Listed
Acenaphthene	190 J	3,700 J	ND<990 U	35 J	30 J	98,000	1,000,000
Acenaphthylene	ND<180 U	ND<19,000 U	ND<990 U	ND<460 U	98 J	107,000	1,000,000
Acetophenone	ND<180 U	ND<19,000 U	ND<990 U	ND<460 U	ND<190 U	Not Listed	Not Listed
Anthracene	490 J	11,000 J	ND<990 U	50 J	130 J	1,000,000	100,000
Benzo (a) anthracene	2,300 J	**43,000**	160 J	140 J	480	1,000	11,000
Benzo (b) fluoranthene	2,900 J	**70,000**	160 J	170 J	1,000	1,700	11,000
Benzo (k) fluoranthene	1,200 J	ND<19,000 U	46 J	ND<460 U	350	1,700	110,000
Benzo (g,h,i) perylene	2,000 J	23,000	73 J	66 J	320	1,000,000	1,000,000
Benzo (a) pyrene	2,100 J	**36,000**	110 J	110 J	650	1,100	22,000
Bis(2-ethylhexyl) phtalate	ND<180 U	ND<19,000 U	ND<990 U	ND<460 U	ND<190 U	Not Listed	Not Listed
Carbazole	400 J	11,000 J	ND<990 U	ND<460 U	52 J	Not Listed	Not Listed
Chrysene	2,800 J	47,000	130 J	160 J	640	1,000	110,000
Dibenzo (a,h) anthracene	500 J	6,600 J	ND<990 U	ND<460 U	110 J	Not Listed	Not Listed
Dibenzofuran	ND<180 U	2,200 J	ND<990 U	ND<460 U	36 J	210,000	1,000,000
Di-n-octyl phthalate	4,000 U	ND<19,000 U	ND<990 U	ND<460 U	ND<190 U	Not Listed	Not Listed
Fluoranthene	5,900	120,000	260 J	360 J	670	1,000,000	1,000,000
Fluorene	160 J	4,500 J	ND<990 U	ND<460 U	29 J	386,000	1,000,000
Indeno(1,2,3-cd) pyrene	1,800 J	**22,000**	ND<990 U	ND<460 U	300	8,200	11,000
Naphthalene	ND<180 U	2,100 J	ND<990 U	ND<460 U	71 J	12,000	1,000,000
Phenanthrene	3,100 J	69,000	150 J	430 J	380	1,000,000	1,000,000
Phenol	ND<180 U	2,000 J	ND<990 U	ND<460 U	ND<190 U	330	1,000,000
Pyrene	4,500 J	79,000	210 J	330 J	640	1,000,000	1,000,000
Total SVOCs	34,530	553,070	1,299	1,851	6,066		
Total SVOC TICs	1,407,900 J,N	10,755,000	990	None Detected	None Detected	Not Applicable	Not Applicable
Total SVOCs and SVOC TICs	34,530	11,308,070	2,289	1,851	6,066		

Notes:
TCL & STARS-list VOCs Analysis by USEPA Method 8270C.
Bold Type denotes that the detected value exceeds its associated NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives for the Protection of Groundwater
Bold Type and Underlined denotes that the detected value exceeds its associated NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives for the Protection of Public Health: Industrial Use
"ND<5 U" denotes compound not detected above the method detection limits.
Laboratory Data Qualifiers:
"N" Denotes the inorganic analysis is associated with a spike sample not within control limits.
"J"Estimated value – The analyte was positively identified; but the associated numerical value is the approximate concentration of the analyte in the sample.

Table 3
Preliminary Subsurface Assessment of Soil
Norampac Industries, Inc.
4001 Packard Road, Niagara Falls, New York

Summary of Detected Poly-Chlorinated Biphenyls (PCBs) in Soil
Test Results in Micrograms per Kilogram (µg/Kg) or Parts Per Billion (ppb)

Analyte	SB-2	SB-5	SPILL AREA	SB-11	SB-17	SB-19	NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives for the Protection of Groundwater	NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives for the Protection of Public Health: Industrial Use
Interval	(0.0-4.0')	(0.0-4.0')	(surface)	(16.0-20.0')	(4.0-8.0')	(0.0-4.0')		
Date	4/14/2008	4/14/2008	4/14/2008	5/27/2008	5/27/2008	5/27/2008		
Aroclor 1254	22	30	450	890	ND<20 U	360	3,200	25,000
Aroclor 1260	14 J	ND<18 U	110 J	1,400	4.8 J	250	3,200	25,000
Total PCBs	36	30	560	2,290	4.8	610	3,200	25,000

Notes:
PCBs analysis by USEPA Method 8082A.
Laboratory Data Qualifiers
"ND<5 U" denotes compound not detected above the method detection limits.
"J" Estimated value (bias undetermined) – The analyte was positively identified; but the associated numerical value is the approximate concentration of the analyte in the sample.

Table 4
Preliminary Subsurface Assessment of Soil
Norampac Industries, Inc.
4001 Packard Road, Niagara Falls, New York

Summary of Detected Metals In Soil
Test Results in Milligrams per Kilogram (mg/Kg) or Parts Per Million (ppm)

Analyte	SB-6	SB-7	SB-11	SB-13	SB-17	SB-19	NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives for the Protection of Groundwater	NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives for the Protection of Public Health: Industrial Use
Interval	(0.0-4.0')	(0.0-4.0')	(16-20')	(0.0-4.0')	(4.0-8.0)	(0.0-4.0')		
Date	4/14/2008	4/14/2008	5/27/2008	5/27/2008	5/27/2008	5/27/2008		
Aluminum	6,610	4,820	5,090	11,000	6,650	5,080	Not Listed	
Antimony	18.3 U	17.8 U	16.7 U	21.6 U	19.9 U	15.5 U	Not Listed	
Arsenic	7.6	**21.3**	5.4	3.5	5.3	6.7	16	16
Barium	65.6	108	110	79.2	49.6	47.9	820	10,000
Beryllium	0.40	0.44	0.22	0.37	0.27 U	0.23	47	2,700
Cadmium	0.26	0.66	1.1	0.29 U	0.30	0.48	7.5	60
Calcium	13,500	8,410	109,000	7,460	67,500	41,500	Not Listed	
Chromium	**86.4**	10.3	**34.5**	**21.3**	11.7	**130**	19	800
Cobalt	7.8	6.3	7.7	6.8	7.8	6.4	Not Listed	
Copper	83.5	31.1	102	16.6	18.3	45.8	1,720	10,000
Iron	20,100	7,070	11,700	14,900	15,200	12,900	Not Listed	
Lead	48.7	28.6	72.1	20.7	7.9	56.4	450	3,900
Magnesium	9,570	2,070	36,900	2,880	12,300	16,500	Not Listed	
Manganese	387	249	479	259	303	351	2,000	10,000
Mercury	0.162	0.119	**0.4**	0.224	0.027	0.473	0.73	5.7
Nickel	17.3	11.2	19.4	15.9	15.0	14.8	130	10,000
Potassium	989	242	753	991	905	904	Not Listed	
Selenium	4.9 U	4.7 U	4.5 U	5.8 U	5.3 U	4.1 U	4	6,800
Silver	0.61 U	0.59 U	0.56 U	0.72 U	0.66 U	0.52 U	8.3	6,800
Sodium	171 U	245	245	202 U	186 U	145 U	Not Listed	
Thallium	7.3 U	7.1 U	6.7 U	8.7 U	8.0 U	6.2 U	Not Listed	
Vanadium	11.6	11.9	17.6	18.4	17.3	14.7	Not Listed	
Zinc	168	723	633	92.8	79.5	188	2,480	10,000

Notes:
TAL Metals analysis by United States Environmental Protection Agency (USEPA) Methods 6010 and 7471 (Mercury)
Bold type denotes concentration that exceeds its associated NYCRR Subpart 375-6 Restricted Use Soil Cleanup Objective for the Protection of Groundwater.
Underlined and Bold type denotes concentration that exceeds its associated NYCRR Subpart 375-6 Restricted Use Soil Cleanup Objective for the Protection of Public Health - Industrial Use
Laboratory Data Qualifiers
"U" denotes Not Detected at a concentration greater than the laboratory method detection limit.

Table 5
Preliminary Subsurface Assessment of Groundwater
Norampac Industries, Inc.
4001 Packard Road, Niagara Falls, New York

Summary of Detected Volatile Organic Compounds (VOCs) in Groundwater
Test Results in Micrograms per Liter (µg/L) or Parts Per Billion (ppb)

Analyte	MW-1	MW-2	MW-3	NYSDEC Division of Water TOGS 1.1.1 Groundwater Standards and Guidance Values
Petroleum-Related Volatile Organic Compounds				
Toluene	ND<5 U	ND<5 U	0.6 J	5
Solvent-Related Volatile Organic Compounds				
1,1-Dichloroethane	ND<5 U	ND<5 U	1 J	5
1,2-Dichloroethane	ND<5 U	ND<5 U	**0.7** J	0.6
1,2-Dichlorobenzene	ND<5 U	1 J	**21**	3
1,3-Dichlorobenzene	ND<5 U	1 J	**34**	3
1,4-Dichlorobenzene	ND<5 U	1 J	**25**	3
cis-1,2-Dichloroethene	ND<5 U	ND<5 U	**13**	5
Acetone	3 J	6 J	3 J	50
Cholorobenzene	ND<5 U	ND<5 U	**6**	5
Choloroform	2 J	ND<5 U	4 J	7
Methyl acetate	ND<5 U	2 J	ND<5 U	NR
Tetrachloroethene	ND<5 U	ND<5 U	4 J	5
1,2,4-Trichlorobenzene	ND<5 U	ND<5 U	3 J	5
Trichloroethene	ND<5 U	ND<5 U	**5**	5
Total VOCs	5	11	120	Not Available
Total VOC TICs	None Detected	None Detected	13 J	
Total VOCs and VOC TICs	5	11	133	

Notes:
TCL & STARS-list VOCs Analysis by USEPA Method 8260B.
Bold Type denotes that the detected value exceeds its associated NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1) for the Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limtations dated June 1998 (Amended April 2000 and June 2004).
Total VOC TICs denotes total VOC Tentatively Identified Compounds
NR denotes Not Reported
ND<5 U - denotes compound not detected above the laboratory method detection limit shown.
Laboratory Data Qualifiers
"J" Estimated value (bias undetermined) – The analyte was positively identified; but the associated numerical value is the approximate concentration of the analyte in the sample.

Table 6
Preliminary Subsurface Assessment of Groundwater
Norampac
4001 Packard Road, Niagara Falls, New York

Summary of Detected Semi-Volatile Organic Compounds (SVOCs) in Groundwater
Test Results in Micrograms per Liter (µg/L) or Parts Per Billion (ppb)

Analyte	MW-1	MW-2	MW-3	NYSDEC Division of Water TOGS 1.1.1 Groundwater Standards and Guidance Values
Acetophenone	ND<5 U	0.5 J	ND<5 U	None Listed
Di-n-Octyl Phthalate	2 BJ	2 BJ	2 BJ	50
Fluoranthene	ND<5 U	ND<5 U	0.9 J	50
Phenol	ND<5 U	1 J	ND<5 U	1
Total SVOCs	2 BJ	14.5 BJ	2.9 BJ	Not Available
Total SVOC TICs	149 BJ	186 BJN	288 BJN	
Total SVOCs & SVOC TICs	151 BJ	200.5 BJN	290.9 BJN	

Notes:
STARS-list SVOCs Analysis by USEPA Method 8270C.
Bold Type denotes that the detected value exceeds its associated NYSDEC Part 703 Groundwater Standar
ND<5 U - denotes compound not detected above the laboratroy method detection limit shown.
Laboratory Data Qualifiers
"J" Estimated value (bias undetermined) – The analyte was positively identified; but the associated numerical value is the approximate concentration of the analyte in the sample.
"B" denotes the reported value was obtained from an instrument reading that was less than the sample quantitation limit (SQL).
"N" denotes the analysis is associated with a spike sample not within control limits

MiniMill Technologies, Inc.
Niagara Falls, New York Site

DRAFT

Soil Sample Analytical Data Summary - *VOC Compounds by Method 8260B and STARS (ug/kg)*

Compound	B-1 (0-2',6-8',10-12')	B-2 (0-10')	B-4 (2-4, 6-8, 10-11.5)	B-6 (0-10.6')	NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives for the Protection of Public Health - Industrial Use
Date Sampled	**12/3/09**	**12/3/09**	**12/4/09**	**12/4/09**	
1,1,1-Trichloroethane	**0.59 J**	0.44 U	0.42 U	0.38	1,000,000
1,1,2,2-Tetrachloroethane	0.96 U	0.98 U	0.94 U	0.84	Not Listed
1,1,2-Trichloro-1,2,2-trifluoroethane	2.9 U	3 U	2.9 U	2.6	Not Listed
1,1-Dichloroethane	0.29 U	0.3 U	0.29 U	0.26	480,000
1,1-Dichloroethene	0.72 U	0.74 U	0.71 U	0.64	1,000,000
1,2,3-Trichloropropane	0.6 U	0.61 U	0.59 U	0.53	Not Listed
1,2,4-Trichlorobenzene	0.36 U	0.37 U	0.35 U	0.32	Not Listed
1,2,4-Trimethylbenzene	0.43 U	0.44 U	0.42 U	0.38	380,000
1,2-Dichlorobenzene	0.46 U	0.47 U	0.45 U	**2.9 J**	1,000,000
1,2-Dichloroethane	0.3 U	0.3 U	0.29 U	0.26	60,000
1,3,5-Trimethylbenzene	0.38 U	0.39 U	0.37 U	0.34	380,000
1,3-Dichlorobenzene	0.3 U	0.31 U	0.3 U	**3.0 J**	560,000
1,3-Dichloropropane	0.35 U	0.36 U	0.35 U	0.31	Not Listed
1,4-Dichlorobenzene	0.83 U	0.84 U	0.81 U	**2.4 J**	250,000
1,4-Dioxane	28 U	29 U	28 U	25	250,000
2-Butanone	2.2 U	2.2 U	2.1 U	1.9	1,000,000
4-Isopropyltoluene	0.47 U	0.48 U	0.46 U	0.42	Not Listed
4-Methyl-2-pentanone	1.9 U	2 U	1.9 U	1.7	Not Listed
Acetone	**7.6 J**	1.3 U	1.3 U	1.1	1,000,000
Benzene	**0.92 J, B**	**0.79 J, B**	0.28 U	0.26	89,000
Carbon disulfide	0.51 U	0.52 U	0.5 U	0.45	Not Listed
Carbon Tetrachloride	0.57 U	0.58 U	0.56 U	0.5	44,000
Chlorobenzene	0.78 U	0.79 U	0.76 U	0.69	1,000,000
Chloroethane	2.5 U	2.5 U	2.4 U	2.2	Not Listed
Chloroform	0.36 U	0.37 U	0.36 U	0.32	700,000
Dibromochloromethane	0.33 U	0.33 U	0.32 U	0.29	Not Listed
Ethylbenzene	0.41 U	0.41 U	0.4 U	0.36	780,000
Isopropylbenzene	0.89 U	0.91 U	0.87 U	0.79	Not Listed
Methylene Chloride	**11 B**	**8.3 B**	**6.3 B**	**4.7 J, B**	1,000,000
Methyl-t-Butyl Ether (MTBE)	0.58 U	0.59 U	0.57 U	0.51	1,000,000
Naphthalene	0.36 U	0.36 U	0.35 U	0.31	1,000,000
n-Butylbenzene	0.51 U	0.52 U	0.5 U	0.45	1,000,000
n-Propylbenzene	0.47 U	0.48 U	0.46 U	0.42	1,000,000
sec-Butylbenzene	0.51 U	0.52 U	0.5 U	0.45	1,000,000
tert-Butylbenzene	0.61 U	0.63 U	0.6 U	0.54	1,000,000
Tetrachloroethene	0.79 U	0.81 U	0.77 U	0.7	3,000,000
Toluene	**2.1 J,B**	**2 J, B**	0.44 U	0.39	1,000,000
trans-1,2-Dichloroethene	0.61 U	0.62 U	0.6 U	0.54	1,000,000
Trichloroethene	0.41 U	0.41 U	0.4 U	**3.9 J**	400,000
Vinyl chloride	0.72 U	0.73 U	0.7 U	0.64	27,000
Xylenes, total	0.99 U	1 U	0.97 U	0.87	1,000,000

Notes: Detected Compounds are in **BOLD**
Data Qualifiers: U = compound not detected;
J = estimated concentration, B = Analyte was detected in the associated Method Blank

MiniMill Technologies, Inc.

Niagara Falls, New York Site **DRAFT**

Soil Sample Analytical Data Summary - *Total Metals by SW 846 Series Methods (mg/kg)*

Compound	B-1 (0-2',6-8',10-12')		B-2 (0-10')		B-4 (2-4, 6-8, 10-11.5)		B-6 (0-10.6')		NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives for the Protection of Public Health - Industrial Use	Eastern USA Background
Date Sampled	12/3/09		12/3/09		12/4/09		12/4/09			
Aluminum	**11,300**		**11,500**		**9,040**		**6,000**			33,000
Antimony	**0.6**		0.6	U	**0.7**	U	0.5	U		
Arsenic	**4.4**		**14.1**		**3.7**		**2.6**		16	3 - 12
Barium	**135**		**97.3**		**74**		**52.7**		10,000	15 - 600
Beryllium	**0.615**	B	**0.641**	B	**0.607**	B	**0.37**	B	2,700	0 - 1.75
Cadmium	**0.186**	J	**0.558**		**0.401**		**0.408**		60	0.1 - 1
Calcium	**49,600**		**39,900**		**90,900**	D08	**106,000**	D08		130 - 35,000
Chromium	**18.2**		**22.2**		**25.6**		**10.8**		800	
Cobalt	**9.72**		**11.1**		**7.67**		**6.1**			2.5 - 60
Copper	**20.7**		**81.9**		**20.5**		**25.9**		10,000	1 - 50
Iron	**18,200**		**42,600**		**12,400**		**12,600**			2,000 - 550,000
Lead	**16.3**		**34.3**		**24.7**		**22.5**		3,900	200 - 500
Magnesium	**12,000**	B	**12,300**	B	**22,100**	B	**20,900**	B		100 - 5,000
Manganese	**541**	B	**546**	B	**475**	B	**492**	B	10,000	50 - 5,000
Mercury	**0.191**		**0.156**		**0.15**		0.0079	U	5.7	0.5 - 25
Nickel	**21.4**		**24.7**		**16.7**		**11.9**		10,000	8,500 - 43,000
Potassium	**2250**		**2120**	J	**1840**	U	**2720**			0.1 - 3.9
Selenium	0.7	U	**1**	J	0.7	U	0.6	U	6,800	
Silver	**0.174**		**0.083**		0.087	U	0.068	U	6,800	0.001 - 0.2
Sodium	**213**		**214**	J	**189**	U	**123**	J		6,000 - 8,000
Thallium	0.3	U	**0.4**		0.4	U	0.3	U		
Vanadium	**23.6**	B	**23.4**	B	**18**	B	**13.3**			1 - 300
Zinc	**86.2**		**184**		**142**		**118**	B	10,000	9 - 50
Cyanide	0.5	U	0.5	U	0.4	U	0.5	U	10,000	

Notes: Detected Compounds are in **BOLD**

Data Qualifiers: U = compound not detected;

J = estimated concentration, B = Analyte was detected in the associated Method Blank

D08 = Dilution required due to high concentration of target analyte(s)

MiniMill Technologies, Inc.

Niagara Falls, New York Site **DRAFT**

Soil Sample Analytical Data Summary - *SVOC Compounds by Method 8270C (ug/kg)*

Compound	B-1 (0-2',6-8',10-12')	B-2 (0-10')	B-4 (2-4, 6-8, 10-11.5)	B-6 (0-10.6')	NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives for the Protection of Public Health - Industrial Use
Date Sampled	**12/3/09**	**12/3/09**	**12/4/09**	**12/4/09**	
2,4,5-Trichlorophenol	440 U, D10	900 U	420 U, D10	39 U	Not Listed
2,4,6-Trichlorophenol	130 U, D10	270 U	130 U, D10	12 U	Not Listed
2,4-Dichlorophenol	100 U, D10	220 U	100 U, D10	9.3 U	Not Listed
2,4-Dimethylphenol	540 U, D10	1100 U	520 U, D10	48 U	Not Listed
2,4-Dinitrophenol	700 U, D10	1400 U	680 U, D10	62 U	Not Listed
2,4-Dinitrotoluene	310 U, D10	640 U	300 U, D10	28 U	Not Listed
2,6-Dinitrotoluene	490 U, D10	1000 U	480 U, D10	43 U	Not Listed
2-Chloronaphthalene	130 U, D10	280 U	130 U, D10	12 U	Not Listed
2-Chlorophenol	100 U, D10	210 U	99 U, D10	9 U	Not Listed
2-Methylnaphthalene	24 U, D10	50 U	24 U, D10	2.2 U	Not Listed
2-Methylphenol	61 U, D10	130 U	60 U, D10	5.5 U	1,000,000
2-Nitroaniline	640 U, D10	1300 U	620 U, D10	57 U	Not Listed
2-Nitrophenol	91 U, D10	190 U	89 U, D10	8.1 U	Not Listed
3,3'-Dichlorobenzidine	1700 U, D10	3600 U	1700 U, D10	160 U	Not Listed
3-Nitroaniline	460 U, D10	950 U	450 U, D10	41 U	Not Listed
4,6-Dinitro-2-methylphenol	690 U, D10	1400 U	670 U, D10	61 U	Not Listed
4-Bromophenyl phenyl ether	630 U, D10	1300 U	620 U, D10	57 U	Not Listed
4-Chloro-3-methylphenol	82 U, D10	170 U	80 U, D10	7.3 U	Not Listed
4-Chloroaniline	590 U, D10	1200 U	570 U, D10	52 U	Not Listed
4-Chlorophenyl phenyl ether	43 U, D10	88 U	41 U, D10	3.8 U	Not Listed
4-Methylphenol	110 U, D10	230 U	110 U, D10	9.9 U	1,000,000
4-Nitroaniline	220 U, D10	460 U	220 U, D10	20 U	Not Listed
4-Nitrophenol	480 U, D10	1000 U	470 U, D10	43 U	Not Listed
Acenaphthene	**450 J**	49 U	23 U, D10	**18 J**	1,000,000
Acenaphthylene	16 U, D10	34 U	16 U, D10	1.5 U	1,000,000
Acetophenone	100 U, D10	210 U	100 U, D10	9.1 U	Not Listed
Aniline	1100 U, D10	2300 U	1100 U, D10	97 U	Not Listed
Anthracene	**910 J**	110 U	50 U, D10	**45 J**	1,000,000
Atrazine	89 U, D10	180 U	86 U, D10	7.9 U	Not Listed
Benzaldehyde	220 U, D10	450 U	210 U, D10	19 U	Not Listed
Benzo[a]anthracene	**2700**	**770 J, D12**	34 U, D10	**100 J**	11,000
Benzo[a]pyrene	**2700**	**830 J, D12**	47 U, D10	**81 J**	1,100
Benzo[b]fluoranthene	**3200**	**1300 J, D12**	38 U, D10	**100 J**	11,000
Benzo[g,h,i]perylene	**2100**	**750 J, D12**	23 U, D10	**52 J**	1,000,000
Benzo[k]fluoranthene	**1100 J**	**430 J, D12**	21 U, D10	**41 J**	110,000
Biphenyl	120 U, D10	260 U	120 U, D10	11 U	Not Listed
Bis(2-chloroethoxy)methane	110 U, D10	230 U	110 U, D10	9.7 U	Not Listed
Bis(2-chloroethyl)ether	170 U, D10	360 U	170 U, D10	15 U	Not Listed
Bis(2-chloroisopropyl) ether	210 U, D10	430 U	200 U, D10	19 U	Not Listed
Bis(2-ethylhexyl) phthalate	640 U, D10	1300 U	630 U, D10	57 U	Not Listed
Butyl benzyl phthalate	540 U, D10	1100 U	520 U, D10	48 U	Not Listed
Caprolactam	860 U, D10	1800 U	840 U, D10	77 U	Not Listed
Carbazole	**540 J**	48 U	22 U, D10	**27 J**	Not Listed
Chrysene	**2900**	**910 J, D12**	19 U, D10	**98 J**	110,000
Dibenz[a,h]anthracene	**460 J**	49 U	23 U, D10	2.1 U	1,100
Dibenzofuran	21 U, D10	43 U	20 U, D10	1.8 U	1,000,000
Diethyl phthalate	60 U, D10	130 U	59 U, D10	5.4 U	Not Listed
Dimethyl phthalate	52 U, D10	110 U	51 U, D10	4.6 U	Not Listed
Di-n-butyl phthalate	690 U, D10	1400 U	670 U, D10	61 U	Not Listed
Di-n-octyl phthalate	47 U, D10	97 U	45 U, D10	4.2 U	Not Listed
Fluoranthene	**7500**	**970 J, D12**	28 U, D10	**240**	1,000,000
Fluorene	**370 J**	95 U	45 U, D10	**19 J**	1,000,000
Hexachlorobenzene	99 U, D10	210 U	96 U, D10	8.8 U	12,000
Hexachlorobutadiene	100 U, D10	210 U	99 U, D10	9.1 U	Not Listed
Hexachlorocyclopentadiene	600 U, D10	1300 U	590 U, D10	54 U	Not Listed
Hexachloroethane	150 U, D10	320 U	150 U, D10	14 U	Not Listed
Indeno[1,2,3-cd]pyrene	**1800 J**	**700 J, D12**	54 U, D10	**45 J**	11,000
Isophorone	100 U, D10	210 U	97 U, D10	8.9 U	Not Listed
Naphthalene	33 U, D10	69 U	32 U, D10	3 U	1,000,000
Nitrobenzene	88 U, D10	180 U	86 U, D10	7.9 U	Not Listed
N-Nitrosodi-n-propylamine	160 U, D10	330 U	150 U, D10	14 U	Not Listed
N-Nitrosodiphenylamine	110 U, D10	230 U	110 U, D10	9.7 U	Not Listed
Pentachloroethane	35 U, D10	72 U	34 U, D10	3.1 U	Not Listed
Pentachlorophenol	680 U, D10	1400 U	670 U, D10	61 U	55,000
Phenanthrene	**5700**	**540 J, D12**	41 U, D10	**180**	1,000,000
Phenol	210 U, D10	440 U	200 U, D10	19 U	1,000,000
Pyrene	**6000**	**1100 J, D12**	13 U, D10	**180**	1,000,000

Values in **BOLD** indicate detected values

Detections greater than cleanup objectives are **BOLD** and shaded

Data Qualifiers: U = compound not detected; D10 = Dilution required due to sample color

J = estimated concentration; D12 = Dilution required due to sample viscosity

MiniMill Technologies, Inc.

Niagara Falls, New York Site **DRAFT**

Soil Sample Analytical Data Summary - *Polychlorinated Biphenyls by EPA Method 8082 (ug/kg)*

Compound	B-1 (0-2',6-8',10-12')	B-2 (0-10')	B-4 (2-4, 6-8, 10-11.5)	B-6 (0 10.6')	NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives for the Protection of Public Health - Industrial Use
Date Sampled	**12/3/09**	**12/3/09**	**12/4/09**	**12/4/09**	
Aroclor 1016	3.9 U	4 U, QSU	3.7 U	14 U	25,000
Aroclor 1221	3.9 U	4 U, QSU	3.7 U	14 U	25,000
Aroclor 1232	3.9 U	4 U, QSU	3.7 U	14 U	25,000
Aroclor 1242	4.3 U	4.4 U, QSU	4.1 U	15 U	25,000
Aroclor 1248	3.9 U	4 U, QSU	3.7 U	14 U	25,000
Aroclor 1254	**14 J**	**35**	**280**	15 U	25,000
Aroclor 1260	4.2 U	4.3 U, QSU	4 U	15 U	25,000
Aroclor 1262	4.2 U	4.3 U, QSU	4 U	15 U	25,000
Aroclor 1268	4.2 U	4.3 U, QSU	4 U	15 U	25,000

Notes: Detected Compounds are in **BOLD**
Data Qualifiers: U = compound not detected;
J = estimated concentration;
QSU = Sulfur (EPA 3660) clean-up performed on extract

Soil Sample Analytical Data Summary - *Organochlorine Pesticides by EPA Method 8081A (ug/kg)*

Compound	B-1 (0-2',6-8',10-12')	B-2 (0-10')	B-4 (2-4, 6-8, 10-11.5)	B-6 (0 10.6')	NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives for the Protection of Public Health - Industrial Use
Date Sampled	**12/3/09**	**12/3/09**	**12/4/09**	**12/4/09**	
alpha-BHC	3.5 U, QFL, D10	3.6 U, QFL, D10	**6.5 D10, J**	**0.91 J**	6,800
alpha-Chlordane	9.8 U, QFL, D10	10 U, QFL, D10	4.8 U	0.86 U	47,000
beta-BHC	14 U, QFL, D10	15 U, QFL, D10	6.9 U	**4.4**	14,000
Chlordane	44 U, QFL, D10	45 U, QFL, D10	21 U	3.8	47,000
delta-BHC	2.6 U, QFL, D10	2.7 U, QFL, D10	**5.3 D10, J**	0.23	1,000,000
Dieldrin	4.7 U, QFL, D10	4.9 U, QFL, D10	2.3 U	**1.1 J**	2,800
Endosulfan I	4.2 U, QFL, D10	**7.3 J, QFL, D10**	2 U	**0.8 J**	920,000
Endosulfan II	3.5 U, QFL, D10	**10 J, QFL, D10**	**3 D10, J**	**0.63 J**	920,000
Endosulfan sulfate	3.7 U, QFL, D10	3.8 U, QFL, D10	1.8 U	0.32	920,000
Endrin	6.4 U, QFL, D10	6.6 U, QFL, D10	3.1 U	**1.4 J**	410,000
Endrin aldehyde	5 U, QFL, D10	5.2 U, QFL, D10	2.4 U	**1.5 J**	Not Listed
Endrin ketone	4.8 U, QFL, D10	5 U, QFL, D10	2.3 U	0.42	Not Listed
gamma-BHC (Lindane)	3.4 U, QFL, D10	3.5 U, QFL, D10	**4.1 D10, J**	0.3	23,000
gamma-Chlordane	2.7 U, QFL, D10	2.8 U, QFL, D10	1.3 U	0.24	Not Listed
Heptachlor	3.1 U, QFL, D10	3.2 U, QFL, D10	1.5 U	**1.5 J**	29,000
Heptachlor epoxide	5.1 U, QFL, D10	5.2 U, QFL, D10	**3.1 D10, J**	0.45	Not Listed
Methoxychlor	5.3 U, QFL, D10	5.4 U, QFL, D10	**8.9 D10, J**	0.46	Not Listed
Toxaphene	110 U, QFL, D10	120 U, QFL, D10	56 U	10	Not Listed
4,4'-DDD	3.8 U, QFL, D10	3.9 U, QFL, D10	1.9 U	0.34	180,000
4,4'-DDE	5.7 U, QFL, D10	5.8 U, QFL, D10	**20 D10, J**	0.5	120,000
4,4'-DDT	4.5 U, QFL, D10	**25 QFL, D10**	**22 D10, J**	**2**	94,000
Aldrin	2 U, QFL, D10	2.1 U, QFL, D10	0.97 U	0.18 U	1,400

Notes: Detected Compounds are in **BOLD**
Data Qualifiers: U = compound not detected;
J = estimated concentration; D10 = dilution required due to sample color
QFL = Florisil (EPA 3620) clean-up performed on extract

Soil Sample Analytical Data Summary - *Herbicides by EPA Method 8151A (ug/kg)*

Compound	B-1 (0-2',6-8',10-12')	B-2 (0-10')	B-4 (2-4, 6-8, 10-11.5)	B-6 (0 10.6')	NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives for the Protection of Public Health - Industrial Use
Date Sampled	**12/3/09**	**12/3/09**	**12/4/09**	**12/4/09**	
2,4,5-T	2.5 U	2.6 U	2.5 U	2.3 U	Not Listed
2,4-D	5.2 U	5.4 U	5.2 U	4.7 U	Not Listed
Dalapon	11 U	11 U	11 U	9.6 U	Not Listed
Dichlorprop	6.4 U	6.6 U	6.3 U	5.8 U	Not Listed
Dinoseb	6.2 U	6.4 U	6.1 U	5.6 U	Not Listed
Pentachlorophenol	6.4 U	6.6 U	6.3 U	5.7 U	55,000
Picloram	8.4 U	8.7 U	8.3 U	7.6 U	Not Listed
Silvex (2,4,5-TP)	2.2 U	2.2 U	2.1 U	2 U	1,000,000

Data Qualifiers: U = compound not detected

Appendix B

MSDS HISTORICAL PRODUCTS

USED AT FORMER MILL NO. 2

C&S ENGINEERS

Kymene® 557H Wet-Strength Resin
® Registered Trademark, Ashland or its subsidiaries
411620

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Ashland P.O. Box 2219 Columbus, OH 43216	Regulatory Information Number Telephone Emergency telephone	1-800-325-3751 614-790-3333 1-800-ASHLAND (1-800-274-5263)

Product name	Kymene® 557H Wet-Strength Resin ® Registered Trademark, Ashland or its subsidiaries
Product code	411620
Product Use Description	No data

2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance: liquid, amber

WARNING! CAUSES EYE IRRITATION. HARMFUL IF ABSORBED THROUGH THE SKIN. HARMFUL IF INHALED.

Potential Health Effects

Exposure routes

Inhalation, Skin absorption, Skin contact, Eye Contact, Ingestion

Eye contact

Can cause severe eye irritation. Symptoms include stinging, tearing, redness, and swelling of eyes. Can injure eye tissue.

Skin contact

Passage of this material into the body through the skin is possible, and skin contact may be harmful.

Ingestion

Swallowing small amounts of this material during normal handling is not likely to cause harmful effects. Swallowing large amounts may be harmful.

Inhalation

It is possible to breathe this material under certain conditions of handling and use (for example, during heating, spraying, or stirring). Symptoms are not expected at air concentrations below the recommended exposure limits, if applicable (see Section 8.).

Aggravated Medical Condition

Preexisting disorders of the following organs (or organ systems) may be aggravated by exposure to this material:, Skin, lung (for example, asthma-like conditions), Liver

Symptoms

allergic skin reaction (delayed skin rash which may be followed by blistering, scaling and other skin effects)Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through the skin may include:, stomach or intestinal upset (nausea, vomiting, diarrhea), irritation (nose, throat, airways)

Target Organs

Overexposure to this material (or its components) has been suggested as a cause of the following effects in laboratory animals:, kidney damage, liver damage, Overexposure to this material (or its components) has been suggested as a cause of the following effects in humans:, liver damage

Carcinogenicity

1,3-Dichloropropan-2-ol has been shown to cause cancer in laboratory animals. The relevance of this finding to humans is uncertain.

Reproductive hazard

There are no data available for assessing risk to the fetus from maternal exposure to this material.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Components	CAS-No.	Concentration
POLYMER	25212-19-5	>=10-<15%
DICHLORO-2-PROPANOL-1,3	96-23-1	>=1-<1.5%

4. FIRST AID MEASURES

Eyes

If symptoms develop, immediately move individual away from exposure and into fresh air. Flush eyes gently with water for at least 15 minutes while holding eyelids apart; seek immediate medical attention.

Skin

Immediately flush skin with water for at least 15 minutes while removing contaminated clothing and shoes. Seek immediate medical attention. Wash clothing before reuse and decontaminate or discard contaminated shoes.

Ingestion

Seek medical attention. If individual is drowsy or unconscious, do not give anything by mouth; place individual on the left side with the head down. Contact a physician, medical facility, or poison control center for advice about whether to induce vomiting. If possible, do not leave individual unattended.

Inhalation

If symptoms develop, immediately move individual away from exposure and into fresh air. Seek immediate medical attention; keep person warm and quiet. If person is not breathing, begin artificial respiration. If breathing is difficult, administer oxygen.

Notes to physician

Hazards: No information available.
Treatment: No information available.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Carbon dioxide (CO2), Dry chemical, Water, regular foam (such as AFFF)

Hazardous combustion products

hydrogen chloride, Phosgene, carbon dioxide and carbon monoxide

Precautions for fire-fighting

Wear full firefighting turn-out gear (full Bunker gear), and respiratory protection (SCBA). Use water spray to cool fire exposed containers and structures until fire is out if it can be done with minimal risk. Avoid spreading burning material with water used for cooling purposes.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

For personal protection see section 8. Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed.

Environmental precautions

Prevent spreading over a wide area (e.g. by containment or oil barriers). Do not let product enter drains. Do not flush into surface water or sanitary sewer system.

Methods for cleaning up

Keep in suitable, closed containers for disposal. Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust).

Other information

Comply with all applicable federal, state, and local regulations.

7. HANDLING AND STORAGE

Handling

Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed.

Storage

Store in a cool, dry, ventilated area, away from incompatible substances.Keep from freezing.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

General advice

These recommendations provide general guidance for handling this product. Personal protective equipment should be selected for individual applications and should consider factors which affect exposure potential, such as handling practices, chemical concentrations and ventilation. It is ultimately the responsibility of the employer to follow regulatory guidelines established by local authorities.

Exposure controls

Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below exposure guidelines (if applicable) or below levels that cause known, suspected or apparent adverse effects.

Eye protection

Wear chemical splash goggles when there is the potential for exposure of the eyes to liquid, vapor or mist. Maintain eye wash station near work area.

Skin and body protection

Wear normal work clothing including long pants, long-sleeved shirts and foot covering to prevent direct contact of the product with the skin. Launder clothing before reuse. If skin irritation develops, contact your facility health and safety professional or your local safety equipment supplier to determine the proper personal protective equipment for your use.
Wear resistant gloves (consult your safety equipment supplier).

Respiratory protection

A NIOSH-approved air-purifying respirator with an appropriate cartridge and/or filter may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits (if applicable) or if overexposure has otherwise been determined. Protection provided by air-purifying respirators is limited. Use a positive pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are not known or any other circumstances where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	liquid
Form	no data available
Colour	amber
Odour	odourless
Boiling point/boiling range	> 212 °F / > 100 °C
Melting point/range	< 32 °F / < 0 °C

Sublimation point	no data available
pH	(ca.) 4.8
Flash point	not applicable
Ignition temperature	no data available
Evaporation rate	similar to water
Lower explosion limit/Upper explosion limit	no data available
Particle size	no data available
Vapour pressure	similar to water
Relative vapour density	(<)1 AIR=1
Density	1.03 g/cm3
Bulk density	no data available
Water solubility	completely soluble
Solubility	no data available
Partition coefficient: n-octanol/water	no data available
log Pow	no data available
Autoignition temperature	not applicable
Viscosity, dynamic	< 100 mPa.s
Viscosity, kinematic	no data available
Solids in Solution	12 - 13 %(m)
Decomposition temperature	no data available
Burning number	no data available
Dust explosion constant	no data available
Minimum ignition energy	no data available

10. STABILITY AND REACTIVITY

Stability

Stable under recommended storage conditions.

Conditions to avoid

excessive heat

Incompatible products

Oxidizing agents, Strong acids, strong alkalis

Hazardous decomposition products

hydrogen chloride, Phosgene, carbon dioxide and carbon monoxide

Hazardous reactions

Product will not undergo hazardous polymerization.

Thermal decomposition

No data

11. TOXICOLOGICAL INFORMATION

Acute oral toxicity	:	LD 50 Rat : > 2,000 mg/kg Method: OECD Test Guideline 401
Acute inhalation toxicity		
POLYMER	:	LC 50 Rat: > 11.2 mg/L; 4 h
DICHLORO-2-PROPANOL-1,3	:	LC 50 Rat: 0.66 mg/L; 4 h
Acute dermal toxicity	:	LD 50 Rat: (Expected) > 2,000 mg/kg

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

Biodegradability	:	< 70 % Exposure time: 28 d Method: OECD Test Guideline 301D Not readily biodegradable.

Bioaccumulation

POLYMER	:	no data available
DICHLORO-2-PROPANOL-1,3	:	no data available

Ecotoxicity effects

Toxicity to fish	:	LC 50 Fish: (Expected) > 10.00 - 100.00 mg/L
Toxicity to daphnia and other aquatic invertebrates.	:	EC 50 Daphnia magna (Water flea): (Expected) > 10.00 - 100.00 mg/L
Toxicity to algae		
POLYMER	:	no data available
DICHLORO-2-PROPANOL-1,3	:	no data available
Toxicity to bacteria	:	EC10 Pseudomonas putida: 7.00 mg/L Method: DIN 38412
Biochemical Oxygen Demand (BOD)	:	Biochemical oxygen demand within 5 days: (ca.) 16 g/L
Chemical Oxygen Demand (COD)	:	ca. 241 g/L
Additional ecological information		
POLYMER	:	no data available
DICHLORO-2-PROPANOL-1,3	:	no data available

13. DISPOSAL CONSIDERATIONS

Waste disposal methods

For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact Ashland Distribution's Environmental Services Group at 800-637-7922.

14. TRANSPORT INFORMATION

REGULATION

ID NUMBER	PROPER SHIPPING NAME	*HAZARD CLASS	SUBSIDIARY HAZARDS	PACKING GROUP	MARINE POLLUTANT / LTD. QTY.

U.S. DOT - ROAD

Not dangerous goods

U.S. DOT - RAIL

Not dangerous goods

U.S. DOT - INLAND WATERWAYS

Not dangerous goods

TRANSPORT CANADA - ROAD

Not dangerous goods

TRANSPORT CANADA - RAIL

Not dangerous goods

TRANSPORT CANADA - INLAND WATERWAYS

Not dangerous goods

INTERNATIONAL MARITIME DANGEROUS GOODS

Not dangerous goods

INTERNATIONAL AIR TRANSPORT ASSOCIATION - CARGO

Not dangerous goods

INTERNATIONAL AIR TRANSPORT ASSOCIATION - PASSENGER

Not dangerous goods

MEXICAN REGULATION FOR THE LAND TRANSPORT OF HAZARDOUS MATERIALS AND WASTES

Not dangerous goods

***ORM = ORM-D, CBL = COMBUSTIBLE LIQUID**

Dangerous goods descriptions (if indicated above) may not reflect quantity, end-use or region-specific exceptions that can be applied. Consult shipping documents for descriptions that are specific to the shipment.

15. REGULATORY INFORMATION

California Prop. 65

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.	

SARA Hazard Classification
Acute Health Hazard
Chronic Health Hazard

New Jersey RTK Label Information

WATER	7732-18-5
POLYMER	25212-19-5
DICHLORO-2-PROPANOL-1,3	96-23-1

Pennsylvania RTK Label Information

WATER	7732-18-5
POLYMER	25212-19-5
DICHLORO-2-PROPANOL-1,3	96-23-1

Notification status

US. Toxic Substances Control Act	y (positive listing)
Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL). (Can. Gaz. Part II, Vol. 133)	q (quantity restricted)
Australia. Industrial Chemical (Notification and Assessment) Act	y (positive listing)
New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand	y (positive listing)
Japan. Kashin-Hou Law List	n (Negative listing)
Korea. Toxic Chemical Control Law (TCCL) List	n (Negative listing)
Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act	y (positive listing)
China. Inventory of Existing Chemical Substances	y (positive listing)

	HMIS	NFPA
Health	2*	2
Flammability	0	0
Physical hazards	0	
Instability		0
Specific Hazard	--	--

16. OTHER INFORMATION

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. This MSDS has been prepared by Ashland's Environmental Health and Safety Department (1-800-325-3751).

MATERIAL SAFETY DATA SHEET

PRODUCT

NALCON® 7620-WB

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **NALCON® 7620-WB**

APPLICATION : MICROORGANISM CONTROL CHEMICAL

COMPANY IDENTIFICATION : Nalco Energy Services, L.P.
180 - 3553 31 Street, N.W.
Calgary, Ontario
T2L 2K7

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 2 / 2 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous.

Hazardous Substance(s)	CAS NO	% (w/w)
Ethoxylated alcohol	41928-09-0	5.0 - 10.0
Ethylene Glycol	107-21-1	5.0 - 10.0
Methylenebisthiocyanate	6317-18-6	10.0 - 30.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

DANGER
CORROSIVE. MAY BE HARMFUL OR FATAL IF SWALLOWED OR ABSORBED THROUGH THE SKIN.
CAUSES SEVERE SKIN AND EYE DAMAGE. May cause sensitization by skin contact.
Do not get in eyes, on skin, or on clothing. Wear goggles or face shield and rubber gloves when handling. Keep container closed when not in use.
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin, Inhalation

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Corrosive. Will cause eye burns and permanent tissue damage.

SKIN CONTACT :
May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered.

INGESTION :
Not a likely route of exposure. Corrosive; causes chemical burns to the mouth, throat and stomach. May be harmful or fatal if swallowed. Excessive exposure may cause central nervous system effects, nausea, vomiting, anesthetic or narcotic effects. Large quantities may cause kidney damage.

INHALATION :
Not a likely route of exposure. Irritating, in high concentrations, to the eyes, nose, throat and lungs.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

4. FIRST AID MEASURES

EYE CONTACT :
PROMPT ACTION IS ESSENTIAL IN CASE OF CONTACT. Immediately flush eye with water for at least 15 minutes while holding eyelids open. Get immediate medical attention.

SKIN CONTACT :
Immediately flush with plenty of water for at least 15 minutes. For a large splash, flood body under a shower. Remove contaminated clothing. Wash off affected area immediately with plenty of water. Get immediate medical attention. Contaminated clothing, shoes, and leather goods must be discarded or cleaned before re-use.

INGESTION :
DO NOT INDUCE VOMITING. If conscious, washout mouth and give water to drink. Get immediate medical attention.

INHALATION :
Remove to fresh air, treat symptomatically. Get medical attention.

IF SWALLOWED: Feed gruel, or bread soaked in milk. Follow with milk or milk of magnesia or beaten eggs. CALL A PHYSICIAN.

IN CASE OF PERSONAL CONTACT: Remove excess material and flush skin or eyes with cold water for at least 15 minutes.

NOTE TO PHYSICIAN :
Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsions may be needed. Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : > 212 °F / > 100 °C (PMCC)

EXTINGUISHING MEDIA :
Dry powder, Foam, Carbon dioxide, Other extinguishing agent suitable for Class B fires
This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable.

FIRE AND EXPLOSION HAZARD :
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
This product is toxic to fish and other water organisms. Do not discharge directly into lakes, ponds, streams, waterways or public water supplies.

7. HANDLING AND STORAGE

HANDLING :
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Avoid generating aerosols and mists. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available.

STORAGE CONDITIONS :
Store the containers tightly closed. Store separately from oxidizers. Store in suitable labelled containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

ACGIH/TLV :
Substance(s)

Ethylene Glycol	CEILING: 100 mg/m3

OSHA/PEL :
Substance(s)

Ethylene Glycol	CEILING: 50 ppm , 125 mg/m3

ENGINEERING MEASURES :
General ventilation is recommended. Use local exhaust ventilation if necessary to control airborne mist and vapor.

RESPIRATORY PROTECTION :
If significant mists, vapors or aerosols are generated an approved respirator is recommended. A dust, mist, fume cartridge may be used. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :
Impervious gloves

SKIN PROTECTION :
Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots. A full slicker suit is recommended if gross exposure is possible.

EYE PROTECTION :
Wear a face shield with chemical splash goggles.

HYGIENE RECOMMENDATIONS :
Eye wash station and safety shower are necessary. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

HUMAN EXPOSURE CHARACTERIZATION :
Based on our recommended product application and personal protective equipment, the potential human exposure is: Moderate

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Viscous liquid
APPEARANCE	White

ODOR	Pine
SPECIFIC GRAVITY	0.95 - 1.06
DENSITY	7.9 - 8.8 lb/gal
SOLUBILITY IN WATER	Partial
pH (100 %)	3.1 - 4.7
VISCOSITY	1,680 - 5,000 cps @ 75 °F /
FREEZING POINT	28 °F / -2 °C
POUR POINT	28 °F / -2 °C
VOC CONTENT	11.78 % EPA Method 24

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Freezing temperatures.

MATERIALS TO AVOID :
Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon, Oxides of nitrogen, Oxides of sulfur

11. TOXICOLOGICAL INFORMATION

The following results are for the product.

ACUTE ORAL TOXICITY :

Species	LD50	Test Descriptor
Rat	900 mg/kg	Product

Rating : Non-Hazardous

ACUTE DERMAL TOXICITY :

Species	LD50	Test Descriptor
Rabbit	> 3,000 mg/kg	Product

Rating : Non-Hazardous

ACUTE INHALATION TOXICITY :

Species	LC50	Test Descriptor
Rat	2.30 mg/l (4 hrs)	Product

PRIMARY SKIN IRRITATION :
Draize Score Test Descriptor
8.0 / 8.0 Product
Rating : Extremely irritating (Corrosive)

PRIMARY EYE IRRITATION :
Draize Score Test Descriptor
110.0 / 110.0 Product
Rating : Extremely irritating (Corrosive)

CARCINOGENICITY :
Two chronic feeding studies, using rats and mice, have not produced any evidence that ethylene glycol causes dose-related increases in tumor incidence, or a different pattern of tumors when compared to untreated controls. The absence of a carcinogenic potential for ethylene glycol has been supported by numerous in vitro genotoxicity studies showing that it does not produce chromosomal breakage or mutagenic effects.

TERATOGENICITY :
Ethylene glycol has been shown to produce dose-related teratogenic effects in rats and mice when given by gavage or in drinking water at high concentrations. A mouse inhalation study of 1000 mg/m3 and 2500 mg/m3 showed malformations in the offspring.

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: High

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Bluegill Sunfish	96 hrs	2.2 mg/l	Product
Rainbow Trout	96 hrs	1.7 mg/l	Product

Rating : Toxic

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	0.570 mg/l		Product

Rating : Very toxic

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION
Based on our hazard characterization, the potential environmental hazard is: High
Based on our recommended product application and the product's characteristics, the potential environmental exposure is: High

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

Do not contaminate water, food or feed by storage or disposal. Improper disposal of excess pesticide, spray mixture or rinsate is a violation of Federal law.

METAL CONTAINER: Triple rinse (or equivalent), then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities. ^PLASTIC CONTAINER: Triple rinse (or equivalent), then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name :	PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Ethoxylated alcohol : Eye irritant
Ethylene Glycol : Target Organ Effect - Kidney
Methylenebisthiocyanate : Irritant, Toxic

CERCLA/SUPERFUND, 40 CFR 117, 302 :
This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product.

RQ Substance	RQ
Ethylene Glycol	71,400 lbs

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X	Immediate (Acute) Health Hazard
X	Delayed (Chronic) Health Hazard
-	Fire Hazard
-	Sudden Release of Pressure Hazard
-	Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product contains the following substance(s), (with CAS # and % range) which appear(s) on the List of Toxic Chemicals

Hazardous Substance(s)	CAS NO	% (w/w)
Ethylene Glycol	107-21-1	5.0 - 10.0

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
This product is exempted under TSCA and regulated under FIFRA. The inerts are on the Inventory List.

FEDERAL INSECTICIDE, FUNGICIDE AND RODENTICIDE ACT (FIFRA) :
EPA Reg. No. 1706-112
In all cases follow instructions on the product label.

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
This product contains the following substances listed in the regulation:

Substance(s)	Citations
• Ethylene Glycol	Sec. 111, Sec. 112

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
This product is a registered biocide and is exempt from State Right to Know Labelling Laws.

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :
Pesticide controlled products are not regulated under WHMIS.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Moderate

* The environmental risk is: High

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the

recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 02/23/2004
Version Number : 1.6

MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO(R) 7463

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **NALCO(R) 7463**

APPLICATION : ANTIFOAM

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 1 / 1 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Paraffin Wax	8002-74-2	5.0 - 10.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

CAUTION
May cause irritation with prolonged contact.
Do not get in eyes, on skin, on clothing. Do not take internally. Keep container tightly closed. Flush affected area with water. Protect product from freezing.
Wear suitable protective clothing.
May evolve oxides of carbon (COx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
May cause irritation with prolonged contact.

SKIN CONTACT :
May cause irritation with prolonged contact.

INGESTION :
Not a likely route of exposure. No adverse effects expected.

INHALATION :
Not a likely route of exposure. No adverse effects expected.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

4. FIRST AID MEASURES

EYE CONTACT :
Flush affected area with water. If symptoms develop, seek medical advice.

SKIN CONTACT :
Flush affected area with water. If symptoms develop, seek medical advice.

INGESTION :
Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. If symptoms develop, seek medical advice.

INHALATION :
Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : > 212 °F / > 100 °C (PMCC)

EXTINGUISHING MEDIA :
This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :
May evolve oxides of carbon (COx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Stop or reduce any leaks if it is safe to do so. Do not touch spilled material. Ventilate spill area if possible. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection).

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :
Avoid eye and skin contact. Do not take internally. Ensure all containers are labeled. Keep the containers closed when not in use.

STORAGE CONDITIONS :
Store the containers tightly closed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

ACGIH/TLV :
Substance(s)

Paraffin Wax Fume	TWA: 2 mg/m3

OSHA/PEL :
Substance(s)

Paraffin Wax Fume	TWA: 2 mg/m3

ENGINEERING MEASURES :
The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fumehood. Provide mechanical ventilation of confined spaces.

RESPIRATORY PROTECTION :
Where concentrations in air may exceed the limits given in this section, the use of a half face filter mask or air supplied breathing apparatus is recommended. A suitable filter material depends on the amount and type of

chemicals being handled. Consider the use of filter type: Organic vapor cartridge. with a Particulate pre-filter. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :
When handling this product, the use of chemical gauntlets is recommended., The choice of work glove depends on work conditions and what chemicals are handled. Please contact the PPE manufacturer for advice on what type of glove material may be suitable., Gloves should be replaced immediately if signs of degradation are observed.

SKIN PROTECTION :
Wear standard protective clothing.

EYE PROTECTION :
When handling this product, the use of safety glasses with side shields is recommended.

HYGIENE RECOMMENDATIONS :
Use good work and personal hygiene practices to avoid exposure. Consider the provision in the work area of a safety shower and eyewash. If clothing is contaminated, remove clothing and thoroughly was the affected area. Dispose of contaminated clothing as hazardous waste. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

HUMAN EXPOSURE CHARACTERIZATION :
Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	White Opaque
ODOR	Organic

SPECIFIC GRAVITY	0.95
DENSITY	7.9 lb/gal
SOLUBILITY IN WATER	Dispersible
pH (100 %)	4.0 - 5.3
FREEZING POINT	32 °F / 0 °C
EVAPORATION RATE	Same as water
VOC CONTENT	0.00 % EPA Method 24

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Avoid extremes of temperature.

MATERIALS TO AVOID :
Bases Contact with strong alkalies (e.g. ammonia and its solutions, carbonates, sodium hydroxide (caustic), potassium hydroxide, calcium hydroxide (lime), cyanide, sulfide, hypochlorites, chlorites) may generate heat, splattering or boiling and toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon

11. TOXICOLOGICAL INFORMATION

The following results are for the product.

ACUTE ORAL TOXICITY :

Species	LD50	Test Descriptor
Rat	> 5 mg/kg	Product

Rating : Non-Hazardous

ACUTE DERMAL TOXICITY :

Species	LD50	Test Descriptor
Rabbit	> 2 mg/kg	Product

Rating : Non-Hazardous

PRIMARY SKIN IRRITATION :

Draize Score	Test Descriptor
1.2 / 8.0	Product

Rating : Slightly irritating

PRIMARY EYE IRRITATION :

Draize Score	Test Descriptor
0.0 / 110.0	Product

Rating : Practically non-irritating

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: Low

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Bluegill Sunfish	96 hrs	> 1,000 mg/l	Product
Rainbow Trout	96 hrs	420 mg/l	Product

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	> 1,000 mg/l		Product

PERSISTENCY AND DEGRADATION :

Chemical Oxygen Demand (COD) : 1,100,000 mg/l

Biological Oxygen Demand (BOD) :

Incubation Period	Value	Test Descriptor
	210,000 mg/l	

MOBILITY :
The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.
If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION
Based on our hazard characterization, the potential environmental hazard is: Low
Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Paraffin Wax : Exposure Limit

CERCLA/SUPERFUND, 40 CFR 117, 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

- Immediate (Acute) Health Hazard
- Delayed (Chronic) Health Hazard
- Fire Hazard
- Sudden Release of Pressure Hazard
- Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
This product may contain trace levels (<0.1% for carcinogens, <1% all other substances) of the following substance(s) listed under the regulation:

Substance(s)	Citations
• Sulfuric Acid	Sec. 311

CLEAN AIR ACT, Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
This product may contain trace levels (<0.1% for carcinogens, <1% all other substances) of the following substance(s) listed under the regulation:

Substance(s)	Citations
• Ethylene Glycol	Sec. 112

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
The following substances are disclosed for compliance with State Right to Know Laws:

Paraffin Wax 8002-74-2

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :
Not considered a WHMIS controlled product.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 07/16/2008
Version Number : 1.9

MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO(R) 7463

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **NALCO(R) 7463**

APPLICATION : ANTIFOAM

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 1 / 1 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Paraffin Wax	8002-74-2	5.0 - 10.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

CAUTION
May cause irritation with prolonged contact.
Do not get in eyes, on skin, on clothing. Do not take internally. Keep container tightly closed. Flush affected area with water. Protect product from freezing.
Wear suitable protective clothing.
May evolve oxides of carbon (COx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
May cause irritation with prolonged contact.

SKIN CONTACT :
May cause irritation with prolonged contact.

INGESTION :
Not a likely route of exposure. No adverse effects expected.

INHALATION :
Not a likely route of exposure. No adverse effects expected.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

4. FIRST AID MEASURES

EYE CONTACT :
Flush affected area with water. If symptoms develop, seek medical advice.

SKIN CONTACT :
Flush affected area with water. If symptoms develop, seek medical advice.

INGESTION :
Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. If symptoms develop, seek medical advice.

INHALATION :
Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : > 212 °F / > 100 °C (PMCC)

EXTINGUISHING MEDIA :
This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :
May evolve oxides of carbon (COx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Stop or reduce any leaks if it is safe to do so. Do not touch spilled material. Ventilate spill area if possible. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection).

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :
Avoid eye and skin contact. Do not take internally. Ensure all containers are labeled. Keep the containers closed when not in use.

STORAGE CONDITIONS :
Store the containers tightly closed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

ACGIH/TLV :
Substance(s)

Paraffin Wax Fume	TWA: 2 mg/m3

OSHA/PEL :
Substance(s)

Paraffin Wax Fume	TWA: 2 mg/m3

ENGINEERING MEASURES :
The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fumehood. Provide mechanical ventilation of confined spaces.

RESPIRATORY PROTECTION :
Where concentrations in air may exceed the limits given in this section, the use of a half face filter mask or air supplied breathing apparatus is recommended. A suitable filter material depends on the amount and type of

chemicals being handled. Consider the use of filter type: Organic vapor cartridge. with a Particulate pre-filter. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :
When handling this product, the use of chemical gauntlets is recommended., The choice of work glove depends on work conditions and what chemicals are handled. Please contact the PPE manufacturer for advice on what type of glove material may be suitable., Gloves should be replaced immediately if signs of degradation are observed.

SKIN PROTECTION :
Wear standard protective clothing.

EYE PROTECTION :
When handling this product, the use of safety glasses with side shields is recommended.

HYGIENE RECOMMENDATIONS :
Use good work and personal hygiene practices to avoid exposure. Consider the provision in the work area of a safety shower and eyewash. If clothing is contaminated, remove clothing and thoroughly was the affected area. Dispose of contaminated clothing as hazardous waste. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

HUMAN EXPOSURE CHARACTERIZATION :
Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	White Opaque
ODOR	Organic

SPECIFIC GRAVITY	0.95
DENSITY	7.9 lb/gal
SOLUBILITY IN WATER	Dispersible
pH (100 %)	4.0 - 5.3
FREEZING POINT	32 °F / 0 °C
EVAPORATION RATE	Same as water
VOC CONTENT	0.00 % EPA Method 24

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Avoid extremes of temperature.

MATERIALS TO AVOID :
Bases Contact with strong alkalies (e.g. ammonia and its solutions, carbonates, sodium hydroxide (caustic), potassium hydroxide, calcium hydroxide (lime), cyanide, sulfide, hypochlorites, chlorites) may generate heat, splattering or boiling and toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon

11. TOXICOLOGICAL INFORMATION

The following results are for the product.

ACUTE ORAL TOXICITY :

Species	LD50	Test Descriptor
Rat	> 5 mg/kg	Product

Rating : Non-Hazardous

ACUTE DERMAL TOXICITY :

Species	LD50	Test Descriptor
Rabbit	> 2 mg/kg	Product

Rating : Non-Hazardous

PRIMARY SKIN IRRITATION :

Draize Score	Test Descriptor
1.2 / 8.0	Product

Rating : Slightly irritating

PRIMARY EYE IRRITATION :

Draize Score	Test Descriptor
0.0 / 110.0	Product

Rating : Practically non-irritating

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: Low

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Bluegill Sunfish	96 hrs	> 1,000 mg/l	Product
Rainbow Trout	96 hrs	420 mg/l	Product

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	> 1,000 mg/l		Product

PERSISTENCY AND DEGRADATION :

Chemical Oxygen Demand (COD) : 1,100,000 mg/l

Biological Oxygen Demand (BOD) :

Incubation Period	Value	Test Descriptor
	210,000 mg/l	

MOBILITY :
The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.
If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION
Based on our hazard characterization, the potential environmental hazard is: Low
Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Paraffin Wax : Exposure Limit

CERCLA/SUPERFUND, 40 CFR 117, 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

- Immediate (Acute) Health Hazard
- Delayed (Chronic) Health Hazard
- Fire Hazard
- Sudden Release of Pressure Hazard
- Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
This product may contain trace levels (<0.1% for carcinogens, <1% all other substances) of the following substance(s) listed under the regulation:

Substance(s)	Citations
• Sulfuric Acid	Sec. 311

CLEAN AIR ACT, Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
This product may contain trace levels (<0.1% for carcinogens, <1% all other substances) of the following substance(s) listed under the regulation:

Substance(s)	Citations
• Ethylene Glycol	Sec. 112

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
The following substances are disclosed for compliance with State Right to Know Laws:

Paraffin Wax 8002-74-2

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :
Not considered a WHMIS controlled product.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 07/16/2008
Version Number : 1.9

MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO(R) 7463

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **NALCO(R) 7463**

APPLICATION : ANTIFOAM

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 1 / 1 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Paraffin Wax	8002-74-2	5.0 - 10.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

CAUTION
May cause irritation with prolonged contact.
Do not get in eyes, on skin, on clothing. Do not take internally. Keep container tightly closed. Flush affected area with water. Protect product from freezing.
Wear suitable protective clothing.
May evolve oxides of carbon (COx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
May cause irritation with prolonged contact.

SKIN CONTACT :
May cause irritation with prolonged contact.

INGESTION :
Not a likely route of exposure. No adverse effects expected.

INHALATION :
Not a likely route of exposure. No adverse effects expected.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

4. FIRST AID MEASURES

EYE CONTACT :
Flush affected area with water. If symptoms develop, seek medical advice.

SKIN CONTACT :
Flush affected area with water. If symptoms develop, seek medical advice.

INGESTION :
Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. If symptoms develop, seek medical advice.

INHALATION :
Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : > 212 °F / > 100 °C (PMCC)

EXTINGUISHING MEDIA :
This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :
May evolve oxides of carbon (COx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Stop or reduce any leaks if it is safe to do so. Do not touch spilled material. Ventilate spill area if possible. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection).

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :
Avoid eye and skin contact. Do not take internally. Ensure all containers are labeled. Keep the containers closed when not in use.

STORAGE CONDITIONS :
Store the containers tightly closed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

ACGIH/TLV :
Substance(s)

Paraffin Wax Fume	TWA: 2 mg/m3

OSHA/PEL :
Substance(s)

Paraffin Wax Fume	TWA: 2 mg/m3

ENGINEERING MEASURES :
The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fumehood. Provide mechanical ventilation of confined spaces.

RESPIRATORY PROTECTION :
Where concentrations in air may exceed the limits given in this section, the use of a half face filter mask or air supplied breathing apparatus is recommended. A suitable filter material depends on the amount and type of

chemicals being handled. Consider the use of filter type: Organic vapor cartridge. with a Particulate pre-filter. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :
When handling this product, the use of chemical gauntlets is recommended., The choice of work glove depends on work conditions and what chemicals are handled. Please contact the PPE manufacturer for advice on what type of glove material may be suitable., Gloves should be replaced immediately if signs of degradation are observed.

SKIN PROTECTION :
Wear standard protective clothing.

EYE PROTECTION :
When handling this product, the use of safety glasses with side shields is recommended.

HYGIENE RECOMMENDATIONS :
Use good work and personal hygiene practices to avoid exposure. Consider the provision in the work area of a safety shower and eyewash. If clothing is contaminated, remove clothing and thoroughly was the affected area. Dispose of contaminated clothing as hazardous waste. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

HUMAN EXPOSURE CHARACTERIZATION :
Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	White Opaque
ODOR	Organic

SPECIFIC GRAVITY	0.95
DENSITY	7.9 lb/gal
SOLUBILITY IN WATER	Dispersible
pH (100 %)	4.0 - 5.3
FREEZING POINT	32 °F / 0 °C
EVAPORATION RATE	Same as water
VOC CONTENT	0.00 % EPA Method 24

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Avoid extremes of temperature.

MATERIALS TO AVOID :
Bases Contact with strong alkalies (e.g. ammonia and its solutions, carbonates, sodium hydroxide (caustic), potassium hydroxide, calcium hydroxide (lime), cyanide, sulfide, hypochlorites, chlorites) may generate heat, splattering or boiling and toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon

11. TOXICOLOGICAL INFORMATION

The following results are for the product.

ACUTE ORAL TOXICITY :

Species	LD50	Test Descriptor
Rat	> 5 mg/kg	Product

Rating : Non-Hazardous

ACUTE DERMAL TOXICITY :

Species	LD50	Test Descriptor
Rabbit	> 2 mg/kg	Product

Rating : Non-Hazardous

PRIMARY SKIN IRRITATION :

Draize Score	Test Descriptor
1.2 / 8.0	Product

Rating : Slightly irritating

PRIMARY EYE IRRITATION :

Draize Score	Test Descriptor
0.0 / 110.0	Product

Rating : Practically non-irritating

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: Low

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Bluegill Sunfish	96 hrs	> 1,000 mg/l	Product
Rainbow Trout	96 hrs	420 mg/l	Product

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	> 1,000 mg/l		Product

PERSISTENCY AND DEGRADATION :

Chemical Oxygen Demand (COD) : 1,100,000 mg/l

Biological Oxygen Demand (BOD) :

Incubation Period	Value	Test Descriptor
	210,000 mg/l	

MOBILITY :
The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.
If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION
Based on our hazard characterization, the potential environmental hazard is: Low
Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Paraffin Wax : Exposure Limit

CERCLA/SUPERFUND, 40 CFR 117, 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

- Immediate (Acute) Health Hazard
- Delayed (Chronic) Health Hazard
- Fire Hazard
- Sudden Release of Pressure Hazard
- Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
This product may contain trace levels (<0.1% for carcinogens, <1% all other substances) of the following substance(s) listed under the regulation:

Substance(s)	Citations
• Sulfuric Acid	Sec. 311

CLEAN AIR ACT, Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
This product may contain trace levels (<0.1% for carcinogens, <1% all other substances) of the following substance(s) listed under the regulation:

Substance(s)	Citations
• Ethylene Glycol	Sec. 112

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
The following substances are disclosed for compliance with State Right to Know Laws:

Paraffin Wax 8002-74-2

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :
Not considered a WHMIS controlled product.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 07/16/2008
Version Number : 1.9

MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 8632

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **NALCO 8632**

APPLICATION : FOAM CONTROL CHEMICAL

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 1 / 1 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Straight Run Middle Distillate	64741-44-2	30.0 - 60.0
Ethoxylated Tall Oil	61791-00-2	5.0 - 10.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

CAUTION
Irritating to skin.
Do not get in eyes, on skin, on clothing. Avoid breathing vapor. Use with adequate ventilation. Do not take internally. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of soap and water. Protect product from freezing.
Wear suitable protective clothing, gloves and eye/face protection.
Low Fire Hazard; liquids may burn upon heating to temperatures at or above the flash point. May evolve oxides of carbon (COx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Can cause mild, short-lasting irritation.

SKIN CONTACT :
Can cause mild to moderate irritation.

INGESTION :
Not a likely route of exposure. Can cause chemical pneumonia if aspirated into lungs following ingestion.

INHALATION :
Repeated or prolonged exposure may irritate the respiratory tract.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
Frequent or prolonged contact with product may defat and dry the skin, leading to discomfort and dermatitis.

AGGRAVATION OF EXISTING CONDITIONS :
Skin contact may aggravate an existing dermatitis condition.

4. FIRST AID MEASURES

EYE CONTACT :
Immediately flush with plenty of water for at least 15 minutes. If symptoms develop, seek medical advice.

SKIN CONTACT :
Immediately wash with plenty of soap and water. If symptoms develop, seek medical advice.

INGESTION :
Do not induce vomiting: contains petroleum distillates and/or aromatic solvents. If conscious, washout mouth and give water to drink. Get medical attention.

INHALATION :
Remove to fresh air, treat symptomatically. Get medical attention.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : > 212 °F / > 100 °C (PMCC)

EXTINGUISHING MEDIA :
Alcohol foam, Carbon dioxide, Foam, Dry powder, Other extinguishing agent suitable for Class B fires, For large fires, use water spray or fog, thoroughly drenching the burning material.
Water mist may be used to cool closed containers.

UNSUITABLE EXTINGUISHING MEDIA :
Do not use water unless flooding amounts are available.

FIRE AND EXPLOSION HAZARD :
Low Fire Hazard; liquids may burn upon heating to temperatures at or above the flash point. May evolve oxides of carbon (COx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible. Do not touch spilled material. Remove sources of ignition. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :
Use with adequate ventilation. Keep the containers closed when not in use. Do not take internally. Do not get in eyes, on skin, on clothing. Have emergency equipment (for fires, spills, leaks, etc.) readily available.

STORAGE CONDITIONS :
Store away from heat and sources of ignition. Store separately from oxidizers. Store the containers tightly closed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

ACGIH/TLV :

Substance(s)	
Oil Mist	TWA: 5 mg/m3 STEL: 10 mg/m3

OSHA/PEL :

Substance(s)

Oil Mist	TWA: 5 mg/m3
	STEL: 10 mg/m3

ENGINEERING MEASURES :
General ventilation is recommended.

RESPIRATORY PROTECTION :
If significant mists, vapors or aerosols are generated an approved respirator is recommended. An organic vapor cartridge with dust/mist prefilter or supplied air may be used.

HAND PROTECTION :
Nitrile gloves, PVC gloves, Viton# gloves

SKIN PROTECTION :
Wear standard protective clothing.

EYE PROTECTION :
Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :
Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

HUMAN EXPOSURE CHARACTERIZATION :
Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Clear Hazy Amber
ODOR	Hydrocarbon
SPECIFIC GRAVITY	0.915 @ 77 °F / 25 °C
DENSITY	7.6 lb/gal
SOLUBILITY IN WATER	Insoluble
VISCOSITY	36 cps @ 70 °F / 21.1 °C
POUR POINT	5 °F / -14.9 °C
VOC CONTENT	48.4 % EPA Method 24

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
None known

MATERIALS TO AVOID :
Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

SENSITIZATION :
This product is not expected to be a sensitizer.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: Low

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

No toxicity studies have been conducted on this product.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION
Based on our hazard characterization, the potential environmental hazard is: Low
Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Straight Run Middle Distillate : Irritant, Combustible.
Ethoxylated Tall Oil : Non-Hazardous

CERCLA/SUPERFUND, 40 CFR 117, 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X	Immediate (Acute) Health Hazard
-	Delayed (Chronic) Health Hazard
-	Fire Hazard
-	Sudden Release of Pressure Hazard
-	Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
The following substances are disclosed for compliance with State Right to Know Laws:

Straight Run Middle Distillate	64741-44-2

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :
D2B - Materials Causing Other Toxic Effects - Toxic Material

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

INTERNATIONAL CHEMICAL CONTROL LAWS

AUSTRALIA
All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS) and are listed on the Australian Inventory of Chemical Substances (AICS).

EUROPE
The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

KOREA
All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

THE PHILIPPINES
All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippine Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 02/23/2004
Version Number : 1.4

DELTA CHEMICALS INC -- ALUMINUM SULFATE LIQUID -- 6810-00F024381

========== Product Identification ==========

Product ID:ALUMINUM SULFATE LIQUID
MSDS Date:01/01/1987
FSC:6810
NIIN:00F024381
MSDS Number: BNXMJ
=== Responsible Party ===
Company Name:DELTA CHEMICALS INC
City:SEARSPORT
State:ME
ZIP:04974
Country:US
Info Phone Num:(207) 548-2525
Emergency Phone Num:(207) 548-2525
CAGE:GO133
=== Contractor Identification ===
Company Name:DELTA CHEMICALS INC
City:SEARSPORT
State:ME
ZIP:04974
Country:US
Phone:(207) 548-2525
CAGE:GO133

========== Composition/Information on Ingredients ==========

Ingred Name:ALUMINUM SULFATE
CAS:10043-01-3
RTECS #:BD1700000
Fraction by Wt: 48.8%
ACGIH TLV:2 MG/CUM
EPA Rpt Qty:5000 LBS
DOT Rpt Qty:5000 LBS

========== Hazards Identification ==========

Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:EYES: IRRITATION. INHALATION: OPEN
WOUNDS, MUCOUS MEMBRANE, RESPIRATORY & LUNG IRRITATION. SKIN:

IRRITATION, & DERMATITIS. INGESTION: DIGESTIVE TRACT IRRITATION.
Explanation of Carcinogenicity:NONE
Effects of Overexposure:EYES: IRRITATION. INHALATION: OPEN WOUND, MUCOUS MEMBRANE, RESPIRATORY, & LUNG IRRITATION. SKIN: IRRITATION, & DERMATITIS. INGESTION: DIGESTIVE TRACT IRRITATION.

========== First Aid Measures ==========

First Aid:INHALATION: REMOVE TO FRESH AIR. KEEP VICTIM BREATHING. EYES/SKIN: FLUSH W/PLENTY OF WATER FOR AT LEAST 15 MINS. INGESTION: DILUTE W/WATER OR MILK, NOT MORE THAN 8 OZ. DON'T INDUCE VOMITING. DON'T GIV E BICARBONATE. OBTAIN MEDICAL ATTENTIONIN ALL CASES.

========== Fire Fighting Measures ==========

Flash Point:NON-FLAMMABLE
Extinguishing Media:USE MEDIA APPROPRIATE FOR SURROUNDING FIRE.
Fire Fighting Procedures:AS SULFUR OXIDES MAY BE PRESENT AT HIGH TEMPERATURES, RESPIRATORY PROTECTION APPROVED BY NIOSH MAY BE NECESSARY.

========== Accidental Release Measures ==========

Spill Release Procedures:PROVIDE VENTILATION. WEAR PROTECTIVE EQUIPMENT. LIQUID SPILLS CAN CAUSE EXTREMELY SLIPPERY FOOTING. COVER W/LIME OR SODA ASH TO NEUTRALIZE & PICK UP FOR DISPOSAL. ADEQUATE VENTILATION IS REQUIRED FOR SODA ASH OR LIMESTONE DUE TO RELEASE OFC02 GAS.
Neutralizing Agent:SODA ASH OR LIME

========== Handling and Storage ==========

Handling and Storage Precautions:STORE IN CLOSED CONTAINERS IN COOL, DRY, WELL-VENTILATED AREA AWAY FROM SOURCES OF HEAT. PROTECT CONTAINERS FROM PHYSICAL DAMAGE.
Other Precautions:AVOID CONTACT W/SKIN & EYES. LIQUID ALUM IS CORROSIVE TO FERROUS METALS/MILD STEEL. USE ACID RESISTANT TANKS FOR STORAGE & PIPING (PLASTIC RUBBER LINED/PLASTIC LINES/STAINLESS STEEL).

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:WEAR AN ACTIVATED CARBON FILTER RESPIRATOR SUITABLE FOR SULFURIC ACID MISTS

Ventilation:GENERAL EXHAUST OR LOCAL EXHAUST IF MISTING CONDITIONS EXIST
Protective Gloves:RUBBER OR PLASTIC
Eye Protection:CHEMICAL SAFETY GOGGLES, FACESHIELD
Other Protective Equipment:EYE WASH STATION, WASHING FACILITIES, ADDITIONAL ACID RESISTANT CLOTHING
Work Hygienic Practices:REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE REUSE.
Supplemental Safety and Health
AT >1418F, ANHYDROUS ALUMINUM SULFATE DECOMPOSES TO THE OXIDE, LIBERATING SULFUR OXIDES. EVAPORATION OF WATER PRODUCES HYDRATES. HEATING DRY ALUM >187.7F ELIMINATES WATER OF HYDRATION.

========== Physical/Chemical Properties ==========

Boiling Pt:B.P. Text:214F
Spec Gravity:1.33
Solubility in Water:COMPLETE
Appearance and Odor:LIQUID

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
ALKALIES MILDLY ACIDIC LIQUID
Hazardous Decomposition Products:DRY ALUM CAN EVOLVE SULFURE TRIOXIDE, & SULFURE DIOXIDES GAS WHEN EXPOSED >1400F. SEE SUPP.

========== Disposal Considerations ==========

Waste Disposal Methods:BURY NEUTRALIZED WASTE IN APPROVED LANDFILL IN ACCORDANCE W/FEDERAL, STATE, & LOCAL REGULATIONS.

========== Product Identification ==========

Product ID:EP074-0015,ACTISOL
MSDS Date:04/12/1995
FSC:6640
NIIN:01-410-9072
MSDS Number: CGLHV
=== Responsible Party ===
Company Name:PREDICT TECHNOLOGIES (PREDICTOLI)
Address:9555 ROCKSIDE ROAD,SUITE 350
City:CLEVELAND
State:OH
ZIP:44125-6231
Country:US
Info Phone Num:800-543-8786
Emergency Phone Num:800-543-8786,800-424-9300(CHEMTREC)
CAGE:0MTU5
=== Contractor Identification ===
Company Name:PREDICT TECHNOLOGIES
Address:9555 ROCKSIDE RD SUITE 350
City:CLEVELAND
State:OH
ZIP:44125-6231
Country:US
Phone:800-543-8786
CAGE:0MTU5

========== Composition/Information on Ingredients ==========

Ingred Name:ALPHATIC PETROLEUM DISTILLATE. (STODDARD SOLVENT)
CAS:8052-41-3
RTECS #:WJ8925000
Other REC Limits:C 1800 MG/M3 15 MIN.
OSHA PEL:500 PPM
ACGIH TLV:100 PPM; 9596

Ingred Name:ALPHA-PINENE, (PINENE RESIN)
CAS:80-56-8
RTECS #:DT7000000
Other REC Limits:ACGIH VAL TURBENTINE

ACGIH TLV:100 PPM (STEL150PPM)

========== Hazards Identification ==========

LD50 LC50 Mixture:NONE SPECIFIED BY MANUFACTURER.
Routes of Entry: Inhalation:YES Skin:YES Ingestion:NO
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:EYES:CONTACT WITH LIQUID OR VAPOR MAY CAUSE IRRITATION. SKIN: REPEATED/PROLONGED CONTACT MAY CAUSE IRRITATION, DERMATITIS, SENSITIZATION. INHALATION: OVEREXPOSURE TO VAPOR MAY CAUSE IRRITATION AND CNS DEPRESSION. ACUTE ORAL POISONING AND REPEATED DERMAL OR CHRONIC INHALATION MAY PRODUCE KIDNEY OR BLADDER DAMAGE.
Explanation of Carcinogenicity:NO COMPONENT WAS FOUND TO BE CARCINOGENIC IN NTP, IARC, OR OSHA.
Effects of Overexposure:EYES: IRRITATION. SKIN: IRRITATION, DERMATITIS, SKIN SENSITIZATION. INHALATION: IRRITATION, CNS DEPRESSION, KIDNEY OR BLADDER DAMAGE. ACUTE ORAL POISONING AND REPEATED DERMAL, OR CHRONIC INHALATION OV EREXPOSURE MAY PRODUCE KIDNEY OR BLADDERDAMAGE.
Medical Cond Aggravated by Exposure:NONE FOUND.

========== First Aid Measures ==========

First Aid:EYES: FLUSH WITH LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION. SKIN: REMOVE CONTAMINATED CLOTHING. WASH SKIN AREA WITH SOAP AND WATER. IF IRRITATION PERSISTS, GET MEDICAL ATTENTION. INHALATION: MOVE TO FRESH AIR. AID IN BREATHING IF NECESSARY. GET MEDICAL ATTENTION. INGESTION: DO NOT INDUCE VOMITING. DRINK LARGE QUANTITIES OF WATER AND/OR MILK. GET MEDICAL ATTENTION.

========== Fire Fighting Measures ==========

Flash Point Method:TCC
Flash Point:79.0F,26.1C
Lower Limits:0.80 %
Extinguishing Media:CARBON DIOXIDE, DRY CHEMICAL.
Fire Fighting Procedures:A STRAIGHT WATER STREAM WOULD SPREAD FIRES. IF EXPOSED TO HEAT, PRESSURE WILL BUILD UP IN CONTAINER
Unusual Fire/Explosion Hazard:STATIC ELECTRICITY COULD CAUSE IGNITION.

========== Accidental Release Measures ==========

Spill Release Procedures:WEAR APPROPRIATE PROTECTIVE EQUIPMENT. REMOVE IGNITION SOURCES. CONTAIN SPILL BY ABSORBING WITH INERT MATERIAL AND DISPOSE PROPERLY.
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

========== Handling and Storage ==========

Handling and Storage Precautions:DO NOT STORE OR USE NEAR HEAT, SPARKS, OR FLAME. DO NOT STORE NEAR COMBUSTIBLE MATERIAL. DO NOT STORE IN DIRECT SUNLIGHT.
Other Precautions:WHEN SANDING DRY FILM, USE NIOSH APPROVED DUST MASK. KEEP CONTAINER CLOSED WHEN NOT IN USE.

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:USE NIOSH APPROVED EQUIPMENT WHEN AIRBORNE EXPOSURE LIMITS ARE EXCEEDED.
Ventilation:ADEQUATE VENTILATION TO MAINTAIN EXPOSURE BELOW TLV IS RECOMMENDED.
Protective Gloves:NEOPRENE RUBBER RECOMMENDED.
Eye Protection:SPLASH GOGGLES OR FACE SHIELD.
Other Protective Equipment:PROTECTIVE CLOTHING SUFFICIENT TO PREVENT SKIN CONTACT. PROVIDE EYE WASH STATION AND SAFETY SHOWER.
Work Hygienic Practices:WASH AFTER HANDLING AND BEFORE EATING, DRINKING, OR SMOKING. LAUNDER CONTAMINATED CLOTHING BEFORE REUSE.
Supplemental Safety and Health
NONE

========== Physical/Chemical Properties ==========

HCC:F2
Boiling Pt:=115.6C, 240.F
Vapor Density:>1 AIR=1.0
Spec Gravity:0.848
Evaporation Rate & Reference:SLOWER THAN WATER.
Solubility in Water:NOT SOLUBLE
Appearance and Odor:LIQUID. SOLVENT ODOR.
Percent Volatiles by Volume:100

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
STRONG OXIDIZERS.

Stability Condition to Avoid:AVOID PROLONGED STORAGE AT ELEVATED TEMPERATURES.
Hazardous Decomposition Products:OXIDES OF CARBON.
Conditions to Avoid Polymerization:MAY OCCUR. AVOID CONTAMINATION WITH STRONG ACIDS.

========== Disposal Considerations ==========

Waste Disposal Methods:DISPOSE IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

Appendix C

MSDS FOR SITE INVESTIGATION CONTAMINANTS

C&S ENGINEERS

International Chemical Safety Cards

TRICHLOROETHYLENE

ICSC: 0081

TRICHLOROETHYLENE
1,1,2-Trichloroethylene
Trichloroethene
Ethylene trichloride
C_2HCl_3/ClCH=CCl_2
Molecular mass: 131.4

CAS # 79-01-6
RTECS # KX4550000
ICSC # 0081
UN # 1710
EC # 602-027-00-9

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible under specific conditions. See Notes.		In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION	Risk of fire and explosion (see Chemical Dangers).		In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE			
• **INHALATION**	Dizziness. Drowsiness. Headache. Weakness. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
• **SKIN**	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• **EYES**	Redness. Pain.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• **INGESTION**	Abdominal pain (further see Inhalation).	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Do NOT induce vomiting. Give plenty of water to drink. Rest.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place (extra personal protection: self-contained breathing apparatus).	Separated from metals (see Chemical Dangers), strong bases, food and feedstuffs. Dry. Keep in the dark. Ventilation along the floor.	Do not transport with food and feedstuffs. IMO: Marine Pollutant Xn symbol R: 40 S: 23-36/37 UN Hazard Class: 6.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0081

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993

International Chemical Safety Cards

TRICHLOROETHYLENE

ICSC: 0081

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.

PHYSICAL DANGERS:
The vapour is heavier than air. As a result of flow, agitation, etc., electrostatic charges can be generated.

CHEMICAL DANGERS:
On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes (phosgene, hydrogen chloride, chlorine). The substance decomposes on contact with strong alkali producing dichloroacetylene , which increases fire hazard. Reacts violently with metals such as lithium, magnesium aluminium, titanium, barium and sodium. Slowly decomposed by light in presence of moisture, with formulation of corrosive hydrochloric acid.

OCCUPATIONAL EXPOSURE LIMITS (OELs):
TLV: 50 ppm; 269 mg/m^3 (STEL): 200 ppm; 1070 mg/m^3 (ACGIH 1992-1993).

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

INHALATION RISK:
A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance irritates the eyes and the skin. Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. The substance may cause effects on the central nervous system. Exposure could cause lowering of consciousness.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the liver and kidney (see notes).

PHYSICAL PROPERTIES

Boiling point: 87°C
Melting point: -73°C
Relative density (water = 1): 1.5
Solubility in water, g/100 ml at 20°C: 0.1
Vapour pressure, kPa at 20°C: 7.8
Relative vapour density (air = 1): 4.5
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.3
Auto-ignition temperature: 410°C
Explosive limits, vol% in air: 8-10.5
Octanol/water partition coefficient as log Pow: 2.42

ENVIRONMENTAL DATA

This substance may be hazardous to the environment; special attention should be given to water organisms.

NOTES

Combustible vapour/air mixtures difficult to ignite, may be developed under certain conditions. Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is indicated. The odour warning when the exposure limit value is exceeded is insufficient. Do NOT use in the vicinity of a fire or a hot surface, or during welding. Technical grades may contain small amounts of carcinogenic stabilizers.

Transport Emergency Card: TEC (R)-723
NFPA Code: H2; F1; R0;

ADDITIONAL INFORMATION

International Chemical Safety Cards

TETRACHLOROETHYLENE

ICSC: 0076

TETRACHLOROETHYLENE
1,1,2,2-Tetrachloroethylene
Perchloroethylene
Tetrachloroethene
$C_2Cl_4/Cl_2C=CCl_2$
Molecular mass: 165.8

CAS # 127-18-4
RTECS # KX3850000
ICSC # 0076
UN # 1897
EC # 602-028-00-4

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION			
EXPOSURE		STRICT HYGIENE!	
• **INHALATION**	Incoordination. Exhilaration. Dizziness. Drowsiness. Headache. Nausea. Weakness. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
• **SKIN**	Dry skin. Redness. Skin burns. Blisters.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• **EYES**	Redness. Pain.	Safety goggles, face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• **INGESTION**	Abdominal pain (further see Inhalation).	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Do NOT induce vomiting. Give plenty of water to drink. Rest.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place.	Separated from metals (see Chemical Dangers), food and feedstuffs. Keep in the dark. Ventilation along the floor.	Do not transport with food and feedstuffs. IMO: Marine Pollutant Xn symbol R: 40 S: 23-36/37 UN Hazard Class: 6.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

International Chemical Safety Cards

TETRACHLOROETHYLENE

ICSC: 0076

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.

PHYSICAL DANGERS:
The vapour is heavier than air.

CHEMICAL DANGERS:
On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes (hydrogen chloride, phosgene, chlorine). The substance decomposes slowly on contact with moisture producing trichloroacetic acid and hydrochloric acid. Reacts with metals such as aluminium, lithium, barium, berrylium.

OCCUPATIONAL EXPOSURE LIMITS (OELs):
TLV: 50 ppm; 339 mg/m^3 (STEL): 200 ppm; 1357 mg/m^3 (ACGIH 1992-1993).

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

INHALATION RISK:
A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance irritates the eyes, the skin and the respiratory tract. Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. The substance may cause effects on the central nervous system.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the liver and kidney. Tumours have been detected in experimental animals but may not be relevant to humans (see Notes).

PHYSICAL PROPERTIES

Boiling point: 121°C
Melting point: -22°C
Relative density (water = 1): 1.6
Solubility in water, g/100 ml at 20°C: 0.015

Vapour pressure, kPa at 20°C: 1.9
Relative vapour density (air = 1): 5.8
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.09
Octanol/water partition coefficient as log Pow: 2.6

ENVIRONMENTAL DATA

This substance may be hazardous to the environment; special attention should be given to indoor air and water.

NOTES

Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is indicated. The odour warning when the exposure limit value is exceeded is insufficient. Do NOT use in the vicinity of a fire or a hot surface, or during welding. Technical grades may contain small amounts of carcinogenic stabilizers.

Transport Emergency Card: TEC (R)-722
NFPA Code: H2; F0; R0;

ADDITIONAL INFORMATION

ICSC: 0076 **TETRACHLOROETHYLENE**

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

POLYCHLORINATED BIPHENYLS

Division of Toxicology ToxFAQs™ February 2001

This fact sheet answers the most frequently asked health questions (FAQs) about polychlorinated biphenyls. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Polychlorinated biphenyls (PCBs) are a mixture of individual chemicals which are no longer produced in the United States, but are still found in the environment. Health effects that have been associated with exposure to PCBs include acne-like skin conditions in adults and neurobehavioral and immunological changes in children. PCBs are known to cause cancer in animals. PCBs have been found in at least 500 of the 1,598 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are polychlorinated biphenyls?

Polychlorinated biphenyls are mixtures of up to 209 individual chlorinated compounds (known as congeners). There are no known natural sources of PCBs. PCBs are either oily liquids or solids that are colorless to light yellow. Some PCBs can exist as a vapor in air. PCBs have no known smell or taste. Many commercial PCB mixtures are known in the U.S. by the trade name Aroclor.

PCBs have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. The manufacture of PCBs was stopped in the U.S. in 1977 because of evidence they build up in the environment and can cause harmful health effects. Products made before 1977 that may contain PCBs include old fluorescent lighting fixtures and electrical devices containing PCB capacitors, and old microscope and hydraulic oils.

What happens to PCBs when they enter the environment?

❑ PCBs entered the air, water, and soil during their manufacture, use, and disposal; from accidental spills and leaks during their transport; and from leaks or fires in products containing PCBs.

❑ PCBs can still be released to the environment from hazardous waste sites; illegal or improper disposal of industrial wastes and consumer products; leaks from old electrical transformers containing PCBs; and burning of some wastes in incinerators.

❑ PCBs do not readily break down in the environment and thus may remain there for very long periods of time. PCBs can travel long distances in the air and be deposited in areas far away from where they were released. In water, a small amount of PCBs may remain dissolved, but most stick to organic particles and bottom sediments. PCBs also bind strongly to soil.

❑ PCBs are taken up by small organisms and fish in water. They are also taken up by other animals that eat these aquatic animals as food. PCBs accumulate in fish and marine mammals, reaching levels that may be many thousands of times higher than in water.

How might I be exposed to PCBs?

❑ Using old fluorescent lighting fixtures and electrical devices and appliances, such as television sets and refrigerators, that were made 30 or more years ago. These items may leak small amounts of PCBs into the air when they get hot during operation, and could be a source of skin exposure.

❑ Eating contaminated food. The main dietary sources of PCBs are fish (especially sportfish caught in contaminated lakes or rivers), meat, and dairy products.

❑ Breathing air near hazardous waste sites and drinking contaminated well water.

❑ In the workplace during repair and maintenance of PCB transformers; accidents, fires or spills involving transformers, fluorescent lights, and other old electrical devices; and disposal of PCB materials.

How can PCBs affect my health?

The most commonly observed health effects in people exposed to large amounts of PCBs are skin conditions such as acne and rashes. Studies in exposed workers have shown changes in blood and urine that may indicate liver damage. PCB exposures in the general population are not likely to result in skin and liver effects. Most of the studies of health effects of PCBs in the general population examined children of mothers who were exposed to PCBs.

Animals that ate food containing large amounts of PCBs for short periods of time had mild liver damage and some died. Animals that ate smaller amounts of PCBs in food over several weeks or months developed various kinds of health effects, including anemia; acne-like skin conditions; and liver, stomach, and thyroid gland injuries. Other effects

of PCBs in animals include changes in the immune system, behavioral alterations, and impaired reproduction. PCBs are not known to cause birth defects.

How likely are PCBs to cause cancer?

Few studies of workers indicate that PCBs were associated with certain kinds of cancer in humans, such as cancer of the liver and biliary tract. Rats that ate food containing high levels of PCBs for two years developed liver cancer. The Department of Health and Human Services (DHHS) has concluded that PCBs may reasonably be anticipated to be carcinogens. The EPA and the International Agency for Research on Cancer (IARC) have determined that PCBs are probably carcinogenic to humans.

How can PCBs affect children?

Women who were exposed to relatively high levels of PCBs in the workplace or ate large amounts of fish contaminated with PCBs had babies that weighed slightly less than babies from women who did not have these exposures. Babies born to women who ate PCB-contaminated fish also showed abnormal responses in tests of infant behavior. Some of these behaviors, such as problems with motor skills and a decrease in short-term memory, lasted for several years. Other studies suggest that the immune system was affected in children born to and nursed by mothers exposed to increased levels of PCBs. There are no reports of structural birth defects caused by exposure to PCBs or of health effects of PCBs in older children. The most likely way infants will be exposed to PCBs is from breast milk. Transplacental transfers of PCBs were also reported In most cases, the benefits of breast-feeding outweigh any risks from exposure to PCBs in mother's milk.

How can families reduce the risk of exposure to PCBs?

❑ You and your children may be exposed to PCBs by eating fish or wildlife caught from contaminated locations. Certain states, Native American tribes, and U.S. territories have issued advisories to warn people about PCB-contaminated fish and fish-eating wildlife. You can reduce your family's exposure to PCBs by obeying these advisories.

❑ Children should be told not play with old appliances, electrical equipment, or transformers, since they may contain PCBs.

❑ Children should be discouraged from playing in the dirt near hazardous waste sites and in areas where there was a transformer fire. Children should also be discouraged from eating dirt and putting dirty hands, toys or other objects in their mouths, and should wash hands frequently.

❑ If you are exposed to PCBs in the workplace it is possible to carry them home on your clothes, body, or tools. If this is the case, you should shower and change clothing before leaving work, and your work clothes should be kept separate from other clothes and laundered separately.

Is there a medical test to show whether I've been exposed to PCBs?

Tests exist to measure levels of PCBs in your blood, body fat, and breast milk, but these are not routinely conducted. Most people normally have low levels of PCBs in their body because nearly everyone has been environmentally exposed to PCBs. The tests can show if your PCB levels are elevated, which would indicate past exposure to above-normal levels of PCBs, but cannot determine when or how long you were exposed or whether you will develop health effects.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 0.0005 milligrams of PCBs per liter of drinking water (0.0005 mg/L). Discharges, spills or accidental releases of 1 pound or more of PCBs into the environment must be reported to the EPA. The Food and Drug Administration (FDA) requires that infant foods, eggs, milk and other dairy products, fish and shellfish, poultry and red meat contain no more than 0.2-3 parts of PCBs per million parts (0.2-3 ppm) of food. Many states have established fish and wildlife consumption advisories for PCBs.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological profile for polychlorinated biphenyls (PCBs). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html . ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

PUBLIC HEALTH STATEMENT
POLYCHLORINATED BIPHENYLS (PCBS)

Division of Toxicology **November 2000**

This Public Health Statement is the summary chapter from the Toxicological Profile for Polychlorinated Biphenyls (PCBs). It is one in a series of Public Health Statements about hazardous substances and their health effects. A shorter version, the ToxFAQs™, is also available. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present. For more information, call the ATSDR Information Center at 1-888-422-8737.

This public health statement tells you about polychlorinated biphenyls (PCBs) and the effects of exposure.

The Environmental Protection Agency (EPA) identifies the most serious hazardous waste sites in the nation. These sites make up the National Priorities List (NPL) and are the sites targeted for long-term federal cleanup activities. PCBs have been found in at least 500 of the 1,598 current or former NPL sites. However, the total number of NPL sites evaluated for PCBs is not known. As more sites are evaluated, the sites at which PCBs are found may increase. This information is important because exposure to PCBs may harm you and because these sites may be sources of exposure.

When a substance is released from a large area, such as an industrial plant, or from a container, such as a drum or bottle, it enters the environment. This release does not always lead to exposure. You are exposed to a substance only when you come in contact with it. You may be exposed by breathing, eating, or drinking the substance, or by skin contact. If you are exposed to PCBs, many factors determine whether you'll be harmed. These factors include the dose (how much), the duration (how long), and how you come in contact with them. You must also consider the other chemicals you're exposed to and your age, sex, diet, family traits, lifestyle, and state of health.

1.1 WHAT ARE POLYCHLORINATED BIPHENYLS (PCBs)?

PCBs are a group of synthetic organic chemicals that can cause a number of different harmful effects. There are no known natural sources of PCBs in the environment. PCBs are either oily liquids or solids and are colorless to light yellow. Some PCBs are volatile and may exist as a vapor in air. They have no known smell or taste. PCBs enter the environment as mixtures containing a variety of individual chlorinated biphenyl components, known as congeners, as well as impurities. Because the health effects of environmental mixtures of PCBs are difficult to evaluate, most of the information in this toxicological profile is about seven types of PCB mixtures that were commercially produced. These seven kinds of PCB mixtures include 35% of all the PCBs commercially produced and 98% of PCBs sold in the United States since 1970. Some commercial PCB mixtures are known in the United States by their industrial trade name, Aroclor. For example, the name Aroclor 1254 means that the mixture contains approximately 54% chlorine by weight, as indicated by the second two digits in the name. Because they don't burn easily and are good insulating materials, PCBs were used widely as coolants and lubricants in transformers, capacitors, and other electrical equipment. The manufacture of

PCBs stopped in the United States in August 1977 because there was evidence that PCBs build up in the environment and may cause harmful effects. Consumer products that may contain PCBs include old fluorescent lighting fixtures, electrical devices or appliances containing PCB capacitors made before PCB use was stopped, old microscope oil, and old hydraulic oil.

1.2 WHAT HAPPENS TO POLYCHLORINATED BIPHENYLS (PCBs) WHEN THEY ENTER THE ENVIRONMENT?

Before 1977, PCBs entered the air, water, and soil during their manufacture and use in the United States. Wastes that contained PCBs were generated at that time, and these wastes were often placed in landfills. PCBs also entered the environment from accidental spills and leaks during the transport of the chemicals, or from leaks or fires in transformers, capacitors, or other products containing PCBs. Today, PCBs can still be released into the environment from poorly maintained hazardous waste sites that contain PCBs; illegal or improper dumping of PCB wastes, such as old transformer fluids; leaks or releases from electrical transformers containing PCBs; and disposal of PCB-containing consumer products into municipal or other landfills not designed to handle hazardous waste. PCBs may be released into the environment by the burning of some wastes in municipal and industrial incinerators.

Once in the environment, PCBs do not readily break down and therefore may remain for very long periods of time. They can easily cycle between air, water, and soil. For example, PCBs can enter the air by evaporation from both soil and water. In air, PCBs can be carried long distances and have been found in snow and sea water in areas far away from where they were released into the environment, such as in the arctic. As a consequence, PCBs are found all over the world. In general, the lighter the type of PCBs, the further they may be transported from the source of contamination. PCBs are present as solid particles or as a vapor in the atmosphere. They will eventually return to land and water by settling as dust or in rain and snow. In water, PCBs may be transported by currents, attach to bottom sediment or particles in the water, and evaporate into air. Heavy kinds of PCBs are more likely to settle into sediments while lighter PCBs are more likely to evaporate to air. Sediments that contain PCBs can also release the PCBs into the surrounding water. PCBs stick strongly to soil and will not usually be carried deep into the soil with rainwater. They do not readily break down in soil and may stay in the soil for months or years; generally, the more chlorine atoms that the PCBs contain, the more slowly they break down. Evaporation appears to be an important way by which the lighter PCBs leave soil. As a gas, PCBs can accumulate in the leaves and above-ground parts of plants and food crops.

PCBs are taken up into the bodies of small organisms and fish in water. They are also taken up by other animals that eat these aquatic animals as food. PCBs especially accumulate in fish and marine mammals (such as seals and whales) reaching levels that may be many thousands of times higher than in water. PCB levels are highest in animals high up in the food chain.

1.3 HOW MIGHT I BE EXPOSED TO POLYCHLORINATED BIPHENYLS (PCBs)?

Although PCBs are no longer made in the United States, people can still be exposed to them. Many older transformers and capacitors may still contain PCBs, and this equipment can be used for 30 years or more. Old fluorescent lighting fixtures and old electrical devices and appliances, such as television sets and refrigerators, therefore may contain PCBs if they were made before PCB use was stopped. When these electric devices get hot during operation, small amounts of PCBs may get into the air and raise the level of PCBs in indoor air. Because devices that contain PCBs can leak with age, they could also be a source of skin exposure to PCBs.

Small amounts of PCBs can be found in almost all outdoor and indoor air, soil, sediments, surface water, and animals. However, PCB levels have generally decreased since PCB production stopped in 1977. People are exposed to PCBs primarily from contaminated food and breathing contaminated air. The major dietary sources of PCBs are fish (especially sportfish that were caught in contaminated lakes or rivers), meat, and dairy products. Between 1978 and 1991, the estimated daily intake of PCBs in adults from dietary sources declined from about 1.9 nanograms (a nanogram is a billionth part of a gram) to less than 0.7 nanograms. PCB levels in sportfish are still high enough so that eating PCB-contaminated fish may be an important source of exposure for some people. Recent studies on fish indicate maximum concentrations of PCBs are a few parts of PCBs in a million parts (ppm) of fish, with higher levels found in bottom-feeders such as carp. Meat and dairy products are other important sources of PCBs in food, with PCB levels in meat and dairy products usually ranging from less than 1 part in a billion parts (ppb) of food to a few ppb.
Concentrations of PCBs in subsurface soil at a Superfund site have been as high as 750 ppm. People who live near hazardous waste sites may be exposed to PCBs by consuming PCB-contaminated sportfish and game animals, by breathing PCBs in air, or by drinking PCB-contaminated well water. Adults and children may come into contact with PCBs when swimming in contaminated water and by accidentally swallowing water during swimming. However, both of these exposures are far less serious than exposures from ingesting PCB-contaminated food (particularly sportfish and wildlife) or from breathing PCB-contaminated air.

Workplace exposure to PCBs can occur during repair and maintenance of PCB transformers; accidents, fires, or spills involving PCB transformers and older computers and instruments; and disposal of PCB materials. In addition to older electrical instruments and fluorescent lights that contain PCB-filled capacitors, caulking materials, elastic sealants, and heat insulation have also been known to contain PCBs. Contact with PCBs at hazardous waste sites can happen when workers breathe air and touch soil containing PCBs. Exposure in the contaminated workplace occurs mostly by breathing air containing PCBs and by touching substances that contain PCBs.

1.4 HOW CAN POLYCHLORINATED BIPHENYLS (PCBs) ENTER AND LEAVE MY BODY?

If you breathe air that contains PCBs, they can enter your body through your lungs and pass into the bloodstream. We do not know how fast or how much of the PCBs that are breathed will pass into the blood. A common way for PCBs to enter your body is by eating meat or fish products or other foods that contain PCBs. Exposure from drinking water is less than from food. It is also possible that PCBs can enter your body by breathing indoor air or by skin contact in buildings that have the kinds of old electrical devices that contain and can leak PCBs. For people living near waste sites or processing or storage facilities, and for people who work with or around PCBs, the most likely ways that PCBs will enter their bodies are from skin contact with contaminated soil and from breathing PCB vapors. Once PCBs are in your body, some may be changed by your body into other related chemicals called metabolites. Some metabolites of PCBs may have the potential to be as harmful as some unchanged PCBs. Some of the metabolites may leave your body in the feces in a few days, but others may remain in your body fat for months. Unchanged PCBs may also remain in your body and be stored for years mainly in the fat and liver, but smaller amounts can be found in other organs as well. PCBs collect in milk fat and can enter the bodies of infants through breast-feeding.

1.5 HOW CAN POLYCHLORINATED BIPHENYLS (PCBs) AFFECT MY HEALTH?

Many studies have looked at how PCBs can affect human health. Some of these studies investigated people exposed in the workplace, and others have examined members of the general population. Skin conditions, such as acne and rashes, may occur in people exposed to high levels of PCBs. These effects on the skin are well documented, but are not likely to result from exposures in the general population. Most of the human studies have many shortcomings, which make it difficult for scientists to establish a clear association between PCB exposure levels and health effects. Some studies in workers suggest that exposure to PCBs may also cause irritation of the nose and lungs, gastrointestinal discomfort, changes in the blood and liver, and depression and fatigue. Workplace concentrations of PCBs, such as those in areas where PCB transformers are repaired and maintained, are higher than levels in other places, such as air in buildings that have electrical devices containing PCBs or in outdoor air, including air at hazardous waste sites. Most of the studies of health effects of PCBs in the general population examined children of mothers who were exposed to PCBs. The possible health effects of PCBs in children are discussed in Section 1.6.

To protect the public from the harmful effects of toxic chemicals and to find ways to treat people who have been harmed, scientists use many tests.

One way to see if a chemical will hurt people is to learn how the chemical is absorbed, used, and released by the body; for some chemicals, animal testing may be necessary. Animal testing may also be used to identify health effects such as cancer or birth defects. Without laboratory animals, scientists would lose a basic method to get information needed to make wise decisions to protect public health. Scientists have the responsibility to treat

research animals with care and compassion. Laws today protect the welfare of research animals, and scientists must comply with strict animal care guidelines.

Rats that ate food containing large amounts of PCBs for short periods of time had mild liver damage, and some died. Rats, mice, or monkeys that ate smaller amounts of PCBs in food over several weeks or months developed various kinds of health effects, including anemia, acne-like skin conditions, and liver, stomach, and thyroid gland injuries. Other effects caused by PCBs in animals include reductions in the immune system function, behavioral alterations, and impaired reproduction. Some PCBs can mimic or block the action of hormones from the thyroid and other endocrine glands. Because hormones influence the normal functioning of many organs, some of the effects of PCBs may result from endocrine changes. PCBs are not known to cause birth defects. Only a small amount of information exists on health effects in animals exposed to PCBs by skin contact or breathing. This information indicates that liver, kidney, and skin damage occurred in rabbits following repeated skin exposures, and that a single exposure to a large amount of PCBs on the skin caused death in rabbits and mice. Breathing PCBs over several months also caused liver and kidney damage in rats and other animals, but the levels necessary to produce these effects were very high.

Studies of workers provide evidence that PCBs were associated with certain types of cancer in humans, such as cancer of the liver and biliary tract. Rats that ate commercial PCB mixtures throughout their lives developed liver cancer. Based on the evidence for cancer in animals, the Department of Health and Human Services (DHHS) has stated that PCBs may reasonably be anticipated to be carcinogens. Both EPA and the International Agency for Research on Cancer (IARC) have determined that PCBs are probably carcinogenic to humans.

1.6 HOW CAN POLYCHLORINATED BIPHENYLS (PCBs) AFFECT CHILDREN?

This section discusses potential health effects from exposures during the period from conception to maturity at 18 years of age in humans.

Children are exposed to PCBs in the same way as are adults: by eating contaminated food, breathing indoor air in buildings that have electrical devices containing PCBs, and drinking contaminated water. Because of their smaller weight, children's intake of PCBs per kilogram of body weight may be greater than that of adults. In addition, a child's diet often differs from that of adults. A Food and Drug Administration (FDA) study in 1991 estimated dietary intakes of PCBs for infants (6 months) and toddlers (2 years) of less than 0.001 and 0.002 µg/kg/day. Children who live near hazardous waste sites may accidentally eat some PCBs through hand-to-mouth behavior, such as by putting dirty hands or other soil/dirt covered objects in their mouths, or eating without washing their hands. Some children also eat dirt on purpose; this behavior is called pica. Children could also be exposed by playing with old appliances or electrical devices that contain PCBs.

It is possible that children could be exposed to PCBs following transport of the chemical on clothing from the parent's workplace to the home.

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House dust in homes of workers exposed to PCBs contained higher than average levels of PCBs. PCBs have also been found on the clothing of firefighters following transformer fires. The most likely way infants will be exposed is from breast milk that contains PCBs. Fetuses in the womb are also exposed from the exposed mother.

In one study of women exposed to relatively high concentrations of PCBs in the workplace during pregnancy, their babies weighed slightly less at birth than babies born to women exposed to lower concentrations of PCBs. Studies of women who consumed high amounts of fish contaminated with PCBs and other chemicals also had babies that weighed less than babies from women who did not eat fish. Similar observations have been made in some studies of women with no known high exposure to PCBs, but not all studies have confirmed these findings. Babies born to women who ate fish contaminated with PCBs before and during pregnancy showed abnormal responses to tests of infant behavior. Some of these behaviors, such as problems with motor skills and a decrease in short-term memory, persisted for several years. However, in these studies, the women may have been exposed to other chemicals. Other studies suggest that the immune system may be affected in children born to and nursed by mothers exposed to increased levels of PCBs. There are no reports of structural birth defects in humans caused by exposure to PCBs or of health effects of PCBs in older children. It is not known whether PCB exposure can cause in skin acne and rashes in children as occurs in some adults, although it is likely that the same effects would occur at very high PCB exposure levels.

Animal studies have shown harmful effects in the behavior of very young animals when their mothers were exposed to PCBs and they were exposed in the womb or by nursing. In addition, some animal studies suggest that exposure to PCBs causes an increased incidence of prenatal death and changes in the immune system, thyroid, and reproductive organs. Studies in monkeys showed that young animals developed skin effects from nursing after their mothers were exposed to PCBs. Some studies indicate that very high doses of PCBs may cause structural birth defects in animals.

Children can be exposed to PCBs both prenatally and from breast milk. PCBs are stored in the mother's body and can be released during pregnancy, cross the placenta, and enter fetal tissues. Because PCBs dissolve readily in fat, they can accumulate in breast milk fat and be transferred to babies and young children. PCBs have been measured in umbilical cord blood and in breast milk. Some studies have estimated that an infant who is breast fed for 6 months may accumulate in this period 6–12% of the total PCBs that will accumulate during its lifetime. However, in most cases, the benefits of breast-feeding outweigh any risks from exposure to PCBs in mother's milk. You should consult your health care provider if you have any concerns about PCBs and breast feeding. Because the brain, nervous system, immune system, thyroid, and reproductive organs are still developing in the fetus and child, the effects of PCBs on these target systems may be more profound after exposure during the prenatal and neonatal periods, making fetuses and children more susceptible to PCBs than adults.

1.7 HOW CAN FAMILIES REDUCE THEIR RISK OF EXPSOURE TO POLYCHLORINATED BIPHENYLS (PCBs)?

If your doctor finds that you have been exposed to significant amounts of polychlorinated biphenyls, ask whether your children might also be exposed. Your doctor might need to ask your state health department to investigate.

You and your children may be exposed to PCBs by eating fish or wildlife caught from contaminated locations. Certain states, Native American tribes, and U.S. territories have issued fish and wildlife advisories to warn people about PCB-contaminated fish and fish-eating wildlife. These advisories will tell you what types and sizes of fish and game animals are of concern. An advisory may completely ban eating fish or game or tell you to limit your meals of a certain fish or game type. For example, an advisory may tell you not to eat a certain type of fish or game more than once a month. The advisory may tell you only to eat certain parts of the fish or game and how to prepare or cook the fish or game to decrease your exposure to PCBs. The fish or wildlife advisory may have special restrictions to protect pregnant women, nursing mothers, and young children. To reduce your children's exposure to PCBs, obey these advisories. Additional information on fish and wildlife advisories for PCBs, including states that have advisories, is provided in Chapter 6 (Section 6.7) and Chapter 8 of the toxicological profile. You can consult your local and state health departments or state natural resources department on how to obtain PCB advisories, as well as other important information, such as types of fish and wildlife and the locations that the advisories apply to.

Children should be told that they should not play with old appliances, electrical equipment, or transformers, since they may contain PCBs. Children who live near hazardous waste sites should be discouraged from playing in the dirt near these sites and should not play in areas where there was a transformer fire. In addition, children should be discouraged from eating dirt, and careful handwashing practices should be followed.

As mentioned in Section 1.3 of the profile, workplace exposure to PCBs can still occur during repair and maintenance of old PCB transformers; accidents, fires, or spills involving these transformers or other PCB-containing items; and disposal of PCB materials. If you are exposed to PCBs in the workplace, it may be possible to carry them home from work. Your occupational health and safety officer at work can tell you whether the chemicals you work with may contain PCBs and are likely to be carried home on your clothes, body, or tools. If this is the case, you should shower and change clothing before leaving work, and your work clothes should be kept separate from other clothes and laundered separately.

1.8 IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO POLYCHLORINATED BIPHENYLS (PCBs)?

Levels of PCBs in the environment were zero before PCBs were manufactured. Now, all people in industrial countries have some PCBs in their bodies. There are tests to determine whether PCBs are in the blood, body fat, and breast milk. These are not regular or routine clinical tests, such as the one for

cholesterol, but could be ordered by a doctor to detect PCBs in people exposed to them in the environment and at work. If your PCB levels are higher than the background levels, this will show that you have been exposed to high levels of PCBs. However, these measurements cannot determine the exact amount or type of PCBs that you have been exposed to, or how long you have been exposed. Although these tests can indicate whether you have been exposed to PCBs to a greater extent than the general population, they do not predict whether you will develop harmful health effects. Blood tests are the easiest, safest, and probably the best method for detecting recent exposures to large amounts of PCBs. Results of such tests should be reviewed and carefully interpreted by physicians with a background in environmental and occupational medicine. Nearly everyone has been exposed to PCBs because they are found throughout the environment, and people are likely to have detectable amounts of PCBs in their blood, fat, and breast milk. Recent studies have shown that PCB levels in tissues from United States population are now declining.

1.9 WHAT RECOMMENDATIONS HAS THE FEDERAL GOVERNMENT MADE TO PROTECT HUMAN HEALTH?

The federal government develops regulations and recommendations to protect public health . Regulations can be enforced by law. Federal agencies that develop regulations for toxic substances include the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), and the Food and Drug Administration (FDA). Recommendations provide valuable guidelines to protect public health but cannot be enforced by law. Federal organizations that develop recommendations for toxic substances include the Agency for Toxic Substances and Disease Registry (ATSDR) and the National Institute for Occupational Safety and Health (NIOSH).

Regulations and recommendations can be expressed in not-to-exceed levels in air, water, soil, or food that are usually based on levels that affect animals; then they are adjusted to help protect people. Sometimes these not-to-exceed levels differ among federal organizations because of different exposure times (an 8-hour workday or a 24-hour day), the use of different animal studies, or other factors. Recommendations and regulations are periodically updated as more information becomes available. For the most current information, check with the federal agency or organization that provides it. Some regulations and recommendations for PCBs include the following:
The EPA standard for PCBs in drinking water is 0.5 parts of PCBs per billion parts (ppb) of water. For the protection of human health from the possible effects of drinking the water or eating the fish or shellfish from lakes and streams that are contaminated with PCBs, the EPA regulates that the level of PCBs in these waters be no greater than 0.17 parts of PCBs per trillion parts (ppt) of water. States with fish and wildlife consumption advisories for PCBs are identified in Chapter 6 (Section 6.7) and Chapter 8 of the toxicological profile.

The FDA has set residue limits for PCBs in various foods to protect from harmful health effects. FDA required limits include 0.2 parts of PCBs per million parts (ppm) in infant and junior foods, 0.3 ppm in eggs, 1.5 ppm in milk and other dairy

products (fat basis), 2 ppm in fish and shellfish (edible portions), and 3 ppm in poultry and red meat (fat basis).

OSHA regulates that workers not be exposed by inhalation over a period of 8 hours for 5 days per week to more than 1 milligram per cubic meter of air (mg/m^3) for 42% chlorine PCBs, or to 0.5 mg/m^3 for 54% chlorine PCBs.

NIOSH recommends that workers not breathe air containing 42 or 54% chlorine PCB levels higher than 1 microgram per cubic meter of air (µg/m^3) for a 10-hour workday, 40-hour workweek.

EPA requires that companies that transport, store, or dispose of PCBs follow the rules and regulations of the federal hazardous waste management program. EPA also limits the amount of PCBs put into publicly owned waste water treatment plants. To minimize exposure of people to PCBs, EPA requires that industry tell the National Response Center each time 1 pound or more of PCBs have been released to the environment.

1.10 WHERE CAN I GET MORE INFORMATION?

If you have any more questions or concerns, please contact your community or state health or environmental quality department or:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road NE, Mailstop F-32
Atlanta, GA 30333

Information line and technical assistance:
Phone: 888-422-8737
FAX: (770)-488-4178

ATSDR can also tell you the location of occupational and environmental health clinics. These clinics specialize in recognizing, evaluating, and treating illnesses resulting from exposure to hazardous substances.

To order toxicological profiles, contact:

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
Phone: 800-553-6847 or 703-605-6000

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological profile for polychlorinated biphenyls (PCBs). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

OSHA/EPA Occupational Chemical Database

Chemical Identification

Chemical Name: CHLORODIPHENYL (42% CHLORINE)
CAS #: 53469-21-9 **UN No:** 2315 **Formula:** C6H4ClC6H3Cl
Synonyms: Aroclor®1242; PCB; Polychlorinated biphenyl

Physical Properties

Physical Description: Colorless to light-colored, viscous liquid with a mild, hydrocarbon odor.

BP: 617-691°F	**MW:** 258 (approx)	**LEL:** NA	**NFPA Fire Rating:** 1
FRZ/MLT: FRZ: -2°F	**VP:** 0.001 mmHg	**UEL:** NA	**NFPA Health Rating:** 2
FP: NA	**VD:** NA		**NFPA Reactivity Rating:** 0
Sp. GR: (77°F): 1.39	**IP:** NA		**NFPA Sp. Inst.:** NA

Exposure Limits

OSHA	NIOSH	Related Information
PEL-TWA ppm: NA	**REL-TWA ppm:** NA	**AIHA Emergency Response Pl Guidelines - ERPG-1/ERPG-2/** NA
PEL-TWA mg/m3: 1	**REL-TWA mg/m3:** 0.001	
PEL-STEL ppm: NA	**REL-STEL ppm:** NA	
PEL-STEL mg/m3: NA	**REL-STEL mg/m3:** NA	
PEL-C ppm: NA	**REL-C ppm:** NA	
PEL-C mg/m3: NA	**REL-C mg/m3:** NA	**Carcinogen Classifications:** IA NIOSH-Ca, NTP-R
Skin Notation: Yes	**Skin Notation:** No	
Notes: NA	**Notes:** CARCINOGEN (Ca); TWA applies to other PCBs	
	IDLH ppm: NA	
	IDLH mg/m3: 5	
	IDLH Notes: Ca	

NIOSH Pocket Guide to Chemical Hazards (Current through June 2006)

Chlorodiphenyl (42% chlorine)	CAS: 53469-21-9
Formula: C6H4ClC6H3Cl2 (approx)	RTECS: TQ1356(
Synonyms & Trade Names: Aroclor 1242, PCB, Polychlorinated biphenyl	DOT ID & Guide:

Exposure Limits

NIOSH REL*: Ca TWA 0.001 mg/m3 See Appendix A [*Note: The REL also applies to other PCBs.]	OSHA PEL: TWA 1 mg/m3 [skin]

IDLH: Ca [5 mg/m3]		Conversion: NA	
Physical Description			
Colorless to light-colored, viscous liquid with a mild, hydrocarbon odor.			
MW: 258 (approx)	BP: 617-691F	FRZ: -2F	Sol: Insoluble
VP: 0.001 mmHg	IP: ?	RGasD: NA	Sp.Gr(77F): 1.3
Fl.P: NA	UEL: NA	LEL: NA	MEC: NA
Nonflammable Liquid, but exposure in a fire results in the formation of a black soot containing PCBs, polyc dibenzofurans & chlorinated dibenzo-p-dioxins. (See flammable and combustible liquid classes)			
Incompatibilities & Reactivities			
Strong oxidizers			
Measurement Methods			
NIOSH 5503; OSHA PV2089			

Personal Protection & Sanitation	**First Aid**
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed (See procedures)

NIOSH Respirator Recommendations
NIOSH : SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE (See symbols and codes)
Exposure Routes
Inh Abs Ing Con
Symptoms
Irrit eyes; chloracne; liver damage; repro effects; [carc] (See abbreviations)
Target Organs
Skin, eyes, liver, repro sys (See abbreviations)

DOT Emergency Response Guidebook (ERG 2004)

Guide Number: 171

171 Substances (Low to Moderate Hazard)
POTENTIAL HAZARDS
FIRE OR EXPLOSION
* Some may burn but none ignite readily.
* Those substances designated with a P may polymerize explosively when heated or involved in a fire.
* Containers may explode when heated.
* Some may be transported hot.

HEALTH
* Inhalation of material may be harmful.
* Contact may cause burns to skin and eyes.
* Inhalation of Asbestos dust may have a damaging effect on the lungs.
* Fire may produce irritating, corrosive and/or toxic gases.
* Runoff from fire control may cause pollution.

PUBLIC SAFETY

* CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
* Isolate spill or leak area immediately for at least 10 to 25 meters (30 to 80 feet) in all directions.
* Keep unauthorized personnel away.
* Stay upwind.

PROTECTIVE CLOTHING

* Wear positive pressure self-contained breathing apparatus (SCBA).
* Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Fire

* If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fires

* Dry chemical, CO2, water spray or regular foam.

Large Fires

* Water spray, fog or regular foam.
* Move containers from fire area if you can do it without risk.
* Do not scatter spilled material with high pressure water streams.
* Dike fire-control water for later disposal.

Fire involving Tanks

* Cool containers with flooding quantities of water until well after fire is out.
* Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
* ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

* Do not touch or walk through spilled material.
* Stop leak if you can do it without risk.
* Prevent dust cloud.
* Avoid inhalation of asbestos dust.

Small Dry Spills

* With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.

Small Spills

* Take up with sand or other noncombustible absorbent material and place into containers for later disposal.

Large Spills

* Dike far ahead of liquid spill for later disposal.
* Cover powder spill with plastic sheet or tarp to minimize spreading.
* Prevent entry into waterways, sewers, basements or confined areas.

FIRST AID

* Move victim to fresh air.
* Call 911 or emergency medical service.
* Apply artificial respiration if victim is not breathing.
* Administer oxygen if breathing is difficult.
* Remove and isolate contaminated clothing and shoes.
* In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
* Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

Additional Emergency Response Information (CAMEO Data)

Non-fire Spill Response: Keep material out of water sources and sewers. Build dikes to contain flow as i Attempt to stop leak if without undue personnel hazard. Apply water spray or mist to knock down vapors. a pit, pond, lagoon, holding area to contain liquid or solid material. Dike surface flow using soil, sand bags polyurethane, or foamed concrete. Absorb bulk liquid with fly ash, cement powder, or commercial sorbent Use natural barriers or oil spill control booms to limit spill travel. Remove trapped material with suction hc 1999)

Firefighting: Use foam, dry chemical, or carbon dioxide. Keep run-off water out of sewers and water sou affected containers with flooding quantities of water. Apply water from as far a distance as possible. (AAR

Reactivity: This compound is incompatible with the following:Strong oxidizers (NIOSH, 1997)

First Aid: Eye: If this chemical contacts the eyes, immediately wash the eyes with large amounts of wate lifting the lower and upper lids. Get medical attention immediately. Contact lenses should not be worn wh with this chemical. Skin: If this chemical contacts the skin, immediately wash the contaminated skin with water. If this chemical penetrates the clothing immediately remove the clothing and wash the skin with so Get medical attention promptly. Breathing: If a person breathes large amounts of this chemical, move the person to fresh air at once. If breathing has stopped, perform mouth-to-mouth resuscitation. Keep the aff warm and at rest. Get medical attention as soon as possible. Swallow: If this chemical has been swallowe attention immediately. (NIOSH, 1997)

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Occupational Safety & Health Administration
200 Constitution Avenue, NW
Washington, DC 20210

OSHA/EPA Occupational Chemical Database

Chemical Identification

Chemical Name: CHLORODIPHENYL (54% CHLORINE)
CAS #: 11097-69-1 **UN No:** 2315 **Formula:** C6H3Cl2C6H2(
Synonyms: Aroclor®1254; PCB; Polychlorinated biphenyl

Physical Properties

Physical Description: Colorless to pale-yellow, viscous liquid or solid (below 50°F) with a mild, hydrocar

BP: 689-734°F	**MW:** 326 (approx)	**LEL:** NA	**NFPA Fire Rating:** 1
FRZ/MLT: FRZ: 50°F	**VP:** 0.00006 mmHg	**UEL:** NA	**NFPA Health Rating:** 2
FP: NA	**VD:** NA		**NFPA Reactivity Rating:** 0
Sp. GR: (77°F): 1.38	**IP:** NA		**NFPA Sp. Inst.:** NA

Exposure Limits

OSHA	NIOSH	Related Information
PEL-TWA ppm: NA	**REL-TWA ppm:** NA	**AIHA Emergency Response Pl**
PEL-TWA mg/m3: 0.5	**REL-TWA mg/m3:** 0.001	**Guidelines - ERPG-1/ERPG-2/** NA
PEL-STEL ppm: NA	**REL-STEL ppm:** NA	
PEL-STEL mg/m3: NA	**REL-STEL mg/m3:** NA	
PEL-C ppm: NA	**REL-C ppm:** NA	
PEL-C mg/m3: NA	**REL-C mg/m3:** NA	**Carcinogen Classifications:** IA
Skin Notation: Yes	**Skin Notation:** No	NIOSH-Ca, NTP-R, TLV-A3
Notes: NA	**Notes:** CARCINOGEN (Ca), REL ALSO APPLIES TO OTHER PCBs	
	IDLH ppm: NA	
	IDLH mg/m3: 5	
	IDLH Notes: Ca	

NIOSH Pocket Guide to Chemical Hazards (Current through June 2006)

Chlorodiphenyl (54% chlorine)	CAS: 11097-69-1
Formula: C6H3Cl2C6H2Cl3 (approx)	RTECS: TQ1360(
Synonyms & Trade Names: Aroclor 1254, PCB, Polychlorinated biphenyl	DOT ID & Guide:

Exposure Limits

NIOSH REL*: Ca TWA 0.001 mg/m3 See Appendix A [*Note: The REL also applies to other PCBs.]	OSHA PEL: TWA 0.5 mg/m3 [skin]

IDLH: Ca [5 mg/m3]	Conversion: NA

Physical Description

Colorless to pale-yellow, viscous liquid or solid (below 50F) with a mild, hydrocarbon odor.

MW: 326 (approx)	BP: 689-734F	FRZ: 50F	Sol: Insoluble
VP: 0.00006 mmHg	IP: ?	RGasD: NA	Sp.Gr(77F): 1.38
Fl.P: NA	UEL: NA	LEL: NA	MEC: NA

Nonflammable Liquid, but exposure in a fire results in the formation of a black soot containing PCBs, polyc dibenzofurans, and chlorinated dibenzo-p-dioxins. (See flammable and combustible liquid classes)

Incompatibilities & Reactivities

Strong oxidizers

Measurement Methods

NIOSH 5503; OSHA PV2088

Personal Protection & Sanitation	First Aid
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed (See procedures)

NIOSH Respirator Recommendations

NIOSH : SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE
(See symbols and codes)

Exposure Routes

Inh Abs Ing Con

Symptoms

Irrit eyes, chloracne; liver damage; repro effects; [carc]
(See abbreviations)

Target Organs

Skin, eyes, liver, repro sys
(See abbreviations)

DOT Emergency Response Guidebook (ERG 2004)

Guide Number: 171

171 Substances (Low to Moderate Hazard)
POTENTIAL HAZARDS
FIRE OR EXPLOSION
* Some may burn but none ignite readily.
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HEALTH
* Inhalation of material may be harmful.
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Small Fires

* Dry chemical, CO2, water spray or regular foam.

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* Prevent dust cloud.
* Avoid inhalation of asbestos dust.

Small Dry Spills

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Small Spills

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* Prevent entry into waterways, sewers, basements or confined areas.

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* Call 911 or emergency medical service.
* Apply artificial respiration if victim is not breathing.
* Administer oxygen if breathing is difficult.
* Remove and isolate contaminated clothing and shoes.
* In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
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Additional Emergency Response Information (CAMEO Data)

Non-fire Spill Response: Keep material out of water sources and sewers. Build dikes to contain flow as i Attempt to stop leak if without undue personnel hazard. Apply water spray or mist to knock down vapors. a pit, pond, lagoon, holding area to contain liquid or solid material. Dike surface flow using soil, sand bags polyurethane, or foamed concrete. Absorb bulk liquid with fly ash, cement powder, or commercial sorbent Use natural barriers or oil spill control booms to limit spill travel. Remove trapped material with suction hc 1999)

Firefighting: Use foam, dry chemical, or carbon dioxide. Keep run-off water out of sewers and water sou affected containers with flooding quantities of water. Apply water from as far a distance as possible. (AAR

Reactivity: This compound is incompatible with the following:Strong oxidizers (NIOSH, 1997)

First Aid: Eye: If this chemical contacts the eyes, immediately wash the eyes with large amounts of wate lifting the lower and upper lids. Get medical attention immediately. Contact lenses should not be worn wh with this chemical. Skin: If this chemical contacts the skin, immediately wash the contaminated skin with water. If this chemical penetrates the clothing immediately remove the clothing and wash the skin with so Get medical attention promptly. Breathing: If a person breathes large amounts of this chemical, move the person to fresh air at once. If breathing has stopped, perform mouth-to-mouth resuscitation. Keep the aff warm and at rest. Get medical attention as soon as possible. Swallow: If this chemical has been swallowe attention immediately. (NIOSH, 1997)

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Occupational Safety & Health Administration
200 Constitution Avenue, NW
Washington, DC 20210

MATERIAL SAFETY DATA SHEET

EQUILON MSDS: 52500E-06 01/04/99

SH/CG4 HEAVY DUTY MOTOR OIL 15W-40

TELEPHONE NUMBER:

24 HOUR EMERGENCY ASSISTANCE
EQUIVA SERVICES: 877-276-7283
CHEMTREC: 800-424-9300

GENERAL MSDS ASSISTANCE
877-276-7285

NAME AND ADDRESS
EQUILON ENTERPRISES LLC
PRODUCT STEWARDSHIP
P.O. BOX 674414
HOUSTON, TX 77267-4414

SECTION I NAME

PRODUCT: SH/CG4 HEAVY DUTY MOTOR OIL 15W-40
CHEM NAME: MIXTURE (SEE SECTION II-A)
CHEM FAMILY: PETROLEUM HYDROCARBON: MOTOR OIL
SHELL CODE: 50019
HEALTH HAZARD: 1 FIRE HAZARD: 1 REACTIVITY: 0

SECTION II-A PRODUCT/INGREDIENT

NO.	COMPOSITION	CAS NO.	PERCENT
P	SH/CG4 HEAVY DUTY MOTOR OIL 15W-40		
1	HYDROTREATED HEAVY PARAFFINIC DISTILLATE	64742-54-7	40-95
2	SOLVENT DEWAXED, HEAVY PARAFFINIC DISTILLATE	64742-65-7	0-55
3	HYDROTREATED RESIDUAL OIL	64742-57-0	5-15
4	HYDROTREATED SPENT LUBRICATING OIL	64742-58-1	5-10
5	SOLVENT DEWAXED RESIDUAL OILS	64742-62-7	5-10
6	ADDITIVES CONTAINING	MIXTURE	2-3
6A	ZINC COMPOUND		1-2

NFPA HAZARD RATING: HEALTH 0 FIRE 1 REACTIVITY 0

SECTION II-B ACUTE TOXICITY DATA

NO.	ACUTE ORAL LD50	ACUTE DERMAL LD50	ACUTE INHALATION LC50
P	NOT AVAILABLE		
1	>5.0 G/KG, RAT*	>5.0 G/KG, RABBIT*	

SECTION III HEALTH INFORMATION

THE HEALTH EFFECTS NOTED BELOW ARE CONSISTENT WITH REQUIREMENTS UNDER THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200).

EYE CONTACT: LUBRICATING BASE OILS ARE GENERALLY CONSIDERED NO MORE THAN MINIMALLY IRRITATING TO THE EYES.

SKIN CONTACT: LUBRICATING BASE OILS ARE GENERALLY CONSIDERED NO MORE THAN MILDLY IRRITATING TO THE SKIN. PROLONGED OR REPEATED CONTACT MAY CAUSE VARIOUS SKIN DISORDERS SUCH AS DERMATITIS, FOLLICULITIS OR OIL ACNE.

INHALATION: INHALATION OF VAPORS (GENERATED AT HIGH TEMERATURES ONLY) OR OIL MIST OF THIS PODUCT MAY RESULT IN MILD IRRITATION TO THE NOSE, THROAT AND RESPIRATORY TRACT.

INGESTION: LUBRICATING BASE OILS ARE GENERALLY CONSIDERED NO MORE THAN SLIGHTLY TOXIC IF SWALLOWED.

SIGNS AND SYMPTOMS: IRRITATION AS NOTED ABOVE.

AGGRAVATED MEDICAL CONDITIONS:

PREEXISTING SKIN AND RESPIRATORY DISORDERS MAY BE AGGRAVATED BY EXPOSURE TO THIS PRODUCT.

OTHER HEALTH EFFECTS:

THIS PRODUCT AND ITS COMPONENTS ARE NOT CLASSIFIED AS CARCINOGENS BY

INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC), NATIONAL TOXICOLOGY PROGRAM (NTP) OR OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA). THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER HAS DETERMINED THAT THERE IS SUFFICIENT EVIDENCE FOR THE CARCINOGENICITY IN EXPERIMENTAL ANIMALS OF USED MOTOR OILS. HANDLING PROCEDURES AND SAFETY PRECAUTIONS IN THE MSDS SHOULD BE FOLLOWED TO MINIMIZE EMPLOYEE'S EXPOSURE.

SECTION IV OCCUPATIONAL EXPOSURE LIMITS

COMP NO.	OSHA PEL/TWA	PEL/CEILING	ACGIH TLV/TWA	TLV/STEL	OTHER
P	5 MG/M3*		5 MG/M3*	10 MG/M3*	

*OIL MIST, MINERAL

SECTION V EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT: FLUSH EYES WITH PLENTY OF WATER FOR 15 MINUTES WHILE HOLDING EYELIDS OPEN. GET MEDICAL ATTENTION.

SKIN CONTACT: REMOVE CONTAMINATED CLOTHING/SHOES AND WIPE EXCESS FROM SKIN. FLUSH SKIN WITH WATER. FOLLOW BY WASHING WITH SOAP AND WATER. IF IRRITATION OCCURS, GET MEDICAL ATTENTION. DO NOT REUSE CLOTHING UNTIL CLEANED.

INHALATION: REMOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GET MEDICAL ATTENTION.

INGESTION: DO NOT INDUCE VOMITING. IF VOMITING OCCURS SPONTANEOUSLY, KEEP HEAD BELOW HIPS TO PREVENT ASPIRATION OF LIQUID INTO THE LUNGS. GET MEDICAL ATTENTION.*

NOTE TO PHYSICIAN: *IF MORE THAN 2.0 ML PER KG HAS BEEN INGESTED AND VOMITING HAS NOT OCCURRED, EMESIS SHOULD BE INDUCED WITH SUPERVISION. KEEP VICTIM'S HEAD BELOW HIPS TO PREVENT ASPIRATION. IF SYMPTOMS SUCH AS LOSS OF GAG REFLEX, CONVULSIONS OR UNCONSCIOUSNESS OCCUR BEFORE EMESIS, GASTRIC LAVAGE USING A CUFFED ENDOTRACHEAL TUBE SHOULD BE CONSIDERED.

SECTION VI SUPPLEMENTAL HEALTH INFORMATION

NONE IDENTIFIED

SECTION VII PHYSICAL DATA

BOILING POINT (DEG F):	SPECFIC GRAVITY (H2O = 1):	VAPOR PRESSURE (MM HG):
NOT APPLICABLE	0.8844	<0.1
MELTING POINT (DEG F):	SOLUBILITY IN WATER:	VAPOR DENSITY (AIR = 1):
-20 (POUR POINT)	NEGLIGIBLE	NOT AVAILABLE
		VISCOSITY: 101 (CS @ 104 DEG F)

EVAPORATION RATE (NORMAL BUTYL ACETATE = 1):NOT AVAILABLE
APPEARANCE AND ODOR:DARK RED LIQUID; STRONG HYDROCARBON ODOR
PHYS/CHEM PROPERTIES: SEE ABOVE FOR DETAILS

SECTION VIII FIRE AND EXPLOSION HAZARDS

FLASH POINT AND METHOD: 415 DEG. F. (PMCC)
FLAMMABLE LIMITS/PERCENT VOLUME IN AIR: LOWER: N/AV HIGHER: N/AV
EXTINGUISHING MEDIA:
USE WATER FOG, FOAM, DRY CHEMICAL OR CO2. DO NOT USE A DIRECT STREAM OF WATER. PRODUCT WILL FLOAT AND CAN BE REIGNITED ON SURFACE OF WATER.
SPECIAL FIRE FIGHTING PROCEDURES AND PRECAUTIONS:
MATERIAL WILL NOT BURN UNLESS PREHEATED. DO NOT ENTER CONFINED FIRE SPACE WITHOUT FULL BUNKER GEAR (HELMET WITH FACE SHIELD, BUNKER COATS, GLOVES AND RUBBER BOOTS), INCLUDING A POSITIVE PRESSURE NIOSH APPROVED SELF-CONTAINED

BREATHING APPARATUS. COOL FIRE EXPOSED CONTAINERS WITH WATER.
UNUSUAL FIRE AND EXPLOSION HAZARDS:
NONE IDENTIFIED

SECTION IX REACTIVITY

STABLITY: STABLE HAZARDOUS POLYMERIZATION WILL NOT OCCUR
CONDITIONS AND MATERIALS TO AVOID:
AVOID HEAT, FLAME AND CONTACT WITH STRONG OXIDIZING AGENTS.
HAZARDOUS DECOMPOSITION PRODUCTS:
THERMAL DECOMPOSITION PRODUCTS ARE HIGHLY DEPENDENT ON THE COMBUSTION CONDITIONS. A COMPLEX MIXTURE OF AIRBORNE SOLID, LIQUID, PARTICULATES AND GASES WILL EVOLVE WHEN THIS MATERIAL UNDERGOES PYROLYSIS OR COMBUSTION. CARBON MONOXIDE AND OTHER UNIDENTIFIED ORGANIC COMPOUNDS MAY BE FORMED UPON COMBUSTION.

SECTION X EMPLOYEE PROTECTION

RESPIRATORY PROTECTION:
IF EXPOSURE MAY OR DOES EXCEED OCCUPATIONAL EXPOSURE LIMITS (SEC. IV) USE A NIOSH-APPROVED RESPIRATOR TO PREVENT OVEREXPOSURE. IN ACCORD WITH 29 CFR 1910.134 USE EITHER AN ATMOSPHERE-SUPPLYING RESPIRATOR OR AN AIR-PURIFYING RESPIRATOR FOR ORGANIC VAPORS AND PARTICULATES.
PROTECTIVE CLOTHING
AVOID PROLONGED OR REPEATED CONTACT WITH SKIN. WEAR GLOVES AND OTHER CLOTHING AS REQUIRED TO MINIMIZE CONTACT. AVOID CONTACT WITH EYES. WEAR SAFETY GLASSES OR GOGGLES AS APPROPRIATE. TEST DATA FROM PUBLISHED LITERATURE AND/OR GLOVE AND CLOTHING MANUFACTURERS INDICATE THE BEST PROTECTION IS PROVIDED BY NITRILE GLOVES.
ADDITIONAL PROTECTIVE MEASURES:
NONE IDENTIFIED

SECTION XI ENVIRONMENTAL PROTECTION

SPILL OR LEAK PROCEDURES:
MAY BURN ALTHOUGH NOT READILY IGNITABLE. USE CAUTIOUS JUDGMENT WHEN CLEANING UP LARGE SPILLS. *** LARGE SPILLS *** WEAR RESPIRATOR AND PROTECTIVE CLOTHING AS APPROPRIATE. SHUT OFF SOURCE OF LEAK IF SAFE TO DO SO. DIKE AND CONTAIN. REMOVE WITH VACUUM TRUCKS OR PUMP TO STORAGE/SALVAGE VESSELS. SOAK UP RESIDUE WITH AN ABSORBENT SUCH AS CLAY, SAND OR OTHER SUITABLE MATERIAL; DISPOSE OF PROPERLY. FLUSH AREA WITH WATER TO REMOVE TRACE RESIDUE. *** SMALL SPILLS *** TAKE UP WITH AN ABSORBENT MATERIAL AND DISPOSE OF PROPERLY.

SECTION XII SPECIAL PRECAUTIONS

STORE IN A COOL, DRY PLACE WITH ADEQUATE VENTILATION. KEEP AWAY FROM OPEN FLAMES AND HIGH TEMPERATURES. WASH WITH SOAP AND WATER BEFORE EATING, DRINKING, SMOKING, APPLYING COSMETICS, OR USING TOILET FACILITIES. LAUNDER CONTAMINATED CLOTHING BEFORE REUSE. CONTAMINATED LEATHER ARTICLES INCLUDING SHOES CANNOT BE DECONTAMINATED AND SHOULD BE DESTROYED TO PREVENT REUSE.

SECTION XIII TRANSPORTATION REQUIREMENTS

DEPARTMENT OF TRANSPORTATION CLASSIFICATION:
NOT HAZARDOUS BY D.O.T. REGULATIONS.
DOT PROPER SHIPPING NAME: NOT APPLICABLE
OTHER REQUIREMENTS: NOT APPLICABLE

SECTION XIV OTHER REGULATORY CONTROLS

THIS PRODUCT IS LISTED ON THE EPA/TSCA INVENTORY OF CHEMICAL SUBSTANCES.
PROTECTION OF STRATOSPHERIC OZONE (PURSUANT TO SECTION 611 OF THE CLEAN AIR ACT AMENDMENTS OF 1990): PER 40 CFR PART 82, THIS PRODUCT DOES NOT CONTAIN NOR WAS

IT DIRECTLY MANUFACTURED WITH ANY CLASS I OR CLASS II OZONE DEPLETING SUBSTANCES.
IN ACCORDANCE WITH SARA TITLE III, SECTION 313, THE ATTACHED ENVIRONMENTAL DATA SHEET (EDS) SHOULD ALWAYS BE COPIED AND SENT WITH THE MSDS.

SECTION XV STATE REGULATORY INFORMATION

THE FOLLOWING CHEMICALS ARE SPECIFICALLY LISTED BY INDIVIDUAL STATES; OTHER PROD UCT SPECIFIC HEALTH AND SAFETY DATA IN OTHER SECTIONS OF THE MSDS MAY ALSO BE AP PLICABLE FOR STATE REQUIREMENTS. FOR DETAILS ON YOUR REGULATORY REQUIREMENTS YO U SHOULD CONTACT THE APPROPRIATE AGENCY IN YOUR STATE.

STATE LISTED COMPONENT	CAS NO	PERCENT	STATE CODE
ZINC COMPOUND	NONE	1-2	MA, NJ

CA = CALIFORNIA HAZ. SUBST. LIST; CA65C, CA65R, CA65C/R = CALIFORNIA SAFE DRINKING WATER AND TOXICS ENFORCEMENT ACT OF 1986 OR PROPOSITION 65 LIST; CT = CONNECTICUT TOXIC. SUBST. LIST; FL = FLORIDA SUBST. LIST; IL = ILLINOIS TOX. SUBST. LIST; LA = LOUISIANA HAZ. SUBST. LIST; MA = MASSACHUSETTS SUBST. LIST; ME = MAINE HAZ. SUBST. LIST; MN = MINNESOTA HAZ. SUBST. LIST; NJ = NEW JERSEY HAZ. SUBST. LIST; PA = PENNSYLVANIA HAZ. SUBST. LIST; RI = RHODE ISLAND HAZ. SUBST. LIST.

SECTION XVI SPECIAL NOTES

PRODUCT NAME CHANGED; FORMERLY 'HEAVY DUTY II MOTOR OIL 15W-40'.
ADDITIONAL CHANGES WERE MADE TO THE EDS IN SECTIONS III AND IV.

THE INFORMATION CONTAINED IN THIS DATA SHEET IS BASED ON THE DATA AVAILABLE TO US AT THIS TIME, AND IS BELIEVED TO BE ACCURATE BASED UPON THAT DATA. IT IS PROVIDED INDEPENDENTLY OF ANY SALE OF THE PRODUCT, FOR PURPOSE OF HAZARD COMMUNICATION. IT IS NOT INTENDED TO CONSTITUTE PRODUCT PERFORMANCE INFORMATION, AND NO EXPRESS OR IMPLIED WARRANTY OF ANY KIND IS MADE WITH RESPECT TO THE PRODUCT, UNDERLYING DATA OR THE INFORMATION CONTAINED HEREIN. YOU ARE URGED TO OBTAIN DATA SHEETS FOR ALL PRODUCTS YOU BUY, PROCESS, USE OR DISTRIBUTE, AND ARE ENCOURAGED TO ADVISE THOSE WHO MAY COME IN CONTACT WITH SUCH PRODUCTS OF THE INFORMATION CONTAINED HEREIN.

TO DETERMINE THE APPLICABILITY OR EFFECT OF ANY LAW OR REGULATION WITH RESPECT TO THE PRODUCT, YOU SHOULD CONSULT WITH YOUR LEGAL ADVISOR OR THE APPROPRIATE GOVERNMENT AGENCY. WE WILL NOT PROVIDE ADVICE ON SUCH MATTERS, OR BE RESPONSIBLE FOR ANY INJURY FROM THE USE OF THE PRODUCT DESCRIBED HEREIN. THE UNDERLYING DATA, AND THE INFORMATION PROVIDED HEREIN AS A RESULT OF THAT DATA, IS THE PROPERTY OF EQUIVA SERVICES, LLC AND IS NOT TO BE THE SUBJECT OF SALE OR EXCHANGE WITHOUT THE EXPRESS WRITTEN CONSENT OF EQUIVA SERVICES, LLC.

ENVIRONMENTAL DATA SHEET
EQUILON EDS: 52500E

SH/CG4 HEAVY DUTY MOTOR OIL 15W-40
TELEPHONE NUMBER:
24 HOUR EMERGENCY ASSISTANCE
EQUIVA SERVICES: 877-276-7283
CHEMTREC: 800-424-9300
GENERAL MSDS ASSISTANCE
877-276-7285
NAME AND ADDRESS
EQUILON ENTERPRISES
PRODUCT STEWARDSHIP
P.O. BOX 674414
HOUSTON, TX 77267-4414
PRODUCT CODE: 50019

SECTION I PRODUCT COMPOSITION

NO.	COMPOSITION	CAS	PERCENT

P	SH/CG4 HEAVY DUTY MOTOR OIL 15W-40	MIXTURE	100
1	HYDROTREATED HEAVY PARAFFINIC DISTILLATE	64742-54-7	40-95
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4	HYDROTREATED SPENT LUBRICATING OIL	64742-58-1	5-10
5	SOLVENT DEWAXED RESIDUAL OILS	64742-62-7	5-10
6	ADDITIVES CONTAINING	MIXTURE	2-3
6A	ZINC COMPOUND		1-2

SECTION II SARA TITLE III INFORMATION

NO.	EHS RQ (*1)	EHS TPQ (*2)	SEC-313 (*3)	313 CATEGORY (*4)	311/312 CATEGORY (*5)
6A			YES	ZINC COMPOUND	

*1 = REPORTABLE QUANTITY OF EXTREMELY HAZARDOUS SUBSTANCE, SEC 302
*2 = THRESHOLD PLANNING QUANTITY, EXTREMELY HAZARDOUS SUBSTANCE, SEC 302
*3 = TOXIC CHEMICAL, SEC 313
*4 = CATEGORY AS REQUIRED BY SEC 313 (40 CFR 372.65 C), MUST BE USED ON TOXIC RELEASE INVENTORY FORM
*5 = CATEGORY (FOR AGGREGATE REPORTING REQUIREMENTS UNDER SARA 311, 312)
HEALTH: H-1 = IMMEDIATE (ACUTE) HEALTH HAZARD
H-2 = DELAYED (CHRONIC) HEALTH HAZARD
PHYSICAL: P-3 = FIRE HAZARD
P-4 = SUDDEN RELEASE OF PRESSURE HAZARD
P-5 = REACTIVE HAZARD

SECTION III ENVIRONMENTAL RELEASE INFORMATION

THIS PRODUCT IS COVERED BY EPA'S COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA) PETROLEUM EXCLUSION. THEREFORE, RELEASES TO AIR, LAND, OR WATER ARE NOT REPORTABLE UNDER CERCLA ("SUPERFUND"). HOWEVER, UNDER SECTION 311 OF EPA'S CLEAN WATER ACT (CWA), THIS PRODUCT IS CONSIDERED AN OIL. AS SUCH, SPILLS INTO OR LEADING TO SURFACE WATERS THAT CAUSE A SHEEN MUST BE REPORTED TO THE NATIONAL RESPONSE CENTER, 800-424-8802.
THIS PRODUCT IS AN OIL UNDER 49 CFR (DOT) PART 130. IF SHIPPED BY RAIL OR HIGHWAY IN A TANK WITH A CAPACITY OF 3,500 GALLONS OR MORE, IT IS SUBJECT TO THE REQUIREMENTS OF PART 130. MIXTURE SOLUTIONS IN WHICH THIS PRODUCT IS PRESENT AT 10% OR MORE MAY ALSO BE SUBJECT TO THIS RULE.

SECTION IV RCRA INFORMATION

IF THIS PRODUCT BECOMES A WASTE, IT WOULD NOT BE A HAZARDOUS WASTE BY RCRA CRITERIA (40 CFR 261). PLACE IN AN APPROPRIATE DISPOSAL FACILITY IN COMPLIANCE WITH LOCAL REGULATIONS.

MATTERS, OR BE RESPONSIBLE FOR ANY INJURY FROM THE USE OF THE PRODUCT DESCRIBED HEREIN. THE UNDERLYING DATA, AND THE INFORMATION PROVIDED HEREIN AS A RESULT OF THAT DATA, IS THE PROPERTY OF EQUIVA SERVICES, LLC AND IS NOT TO BE THE SUBJECT OF SALE OR EXCHANGE WITHOUT THE EXPRESS WRITTEN CONSENT OF EQUIVA SERVICES, LLC.

KAREN G. HAYNES

EQUIVA SERVICES LLC
P.O. BOX 674414
HOUSTON, TX 77267-4414

FOR ADDITIONAL INFORMATION ON THIS ENVIRONMENTAL DATA PLEASE CALL
(877) 276-7285
FOR EMERGENCY ASSISTANCE PLEASE CALL
EQUIVA SERVICES LLC: (877) 276-7283
CHEMTREC: (800) 424-9300
}

========== Product Identification ==========

Product ID:F910 METHOXYCHLOR
MSDS Date:01/25/1995
FSC:6550
NIIN:00F051063
MSDS Number: CCDMW
=== Responsible Party ===
Company Name:CHEM SERVICE INC
Address:660 TOWER LN
Box:3108
City:WEST CHESTER
State:PA
ZIP:19381-3108
Country:US
Info Phone Num:215-692-3026/800-452-9994
Emergency Phone Num:215-386-2100/215-692-3026
CAGE:84898
=== Contractor Identification ===
Company Name:CHEM SERVICE INC
Box:3108
City:WEST CHESTER
State:PA
ZIP:19381
Country:US
Phone:215-692-3026
CAGE:84898
Company Name:CHEM SERVICE, INC
Address:660 TOWER LN
Box:599
City:WEST CHESTER
State:PA
ZIP:19301-9650
Country:US
Phone:610-692-3026
CAGE:8Y898

========== Composition/Information on Ingredients ==========

Ingred Name:METHOXYCHLOR (IARC CARCINOGEN - GROUP 3) *96-3*
CAS:72-43-5
RTECS #:KJ3675000
OSHA PEL:15 MG/CUM
ACGIH TLV:10 MG/CUM
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

========== Hazards Identification ==========

LD50 LC50 Mixture:ORAL LD50(RAT): 6000 MG/KG
Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:SKIN/EYES: CAN CAUSE IRRITATION. CAN
BE IRRITATING TO MUCOUS MEMBRANES. MAY BE HARMFUL IF ABSORBED
THROUGH THE SKIN, INHALED/IF SWALLOWED. EXPOSURE CAN CAUSE
KIDNEY/LIVER DAMAGE.
Explanation of Carcinogenicity:NONE
Effects of Overexposure:IRRITATION

========== First Aid Measures ==========

First Aid:EYES/SKIN: FLUSH W/WATER FOR 15-20 MINS. SKIN: IF NO BURNS HAVE OCCURRED, CLEANSE W/SOAP & WATER. INHALATION: REMOVE TO FRESH AIR. GIVE OXYGEN/CPR IF NEEDED. IF IN SHOCK, KEEP WARM/QUIET. INGESTION: I NDUCE VOMITING. DON'T GIVE LIQUIDS/INDUCE VOMITING IF UNCONSCIOUS/CONVULSING. IF VOMITING, WATCH CLOSELY TO MAKE SURE AIRWAY DOESN'T BECOME OBSTRUCTED BY VOMIT. OBTAIN MEDICAL ATTENTION IN ALL CASES.

========== Fire Fighting Measures ==========

Extinguishing Media:CO2, DRY CHEMICAL POWDER/SPRAY

========== Accidental Release Measures ==========

Spill Release Procedures:EVACUATE AREA. WEAR OSHA REGULATED EQUIPMENT. VENTILATE AREA. SWEEP UP & PLACE IN AN APPROPRIATE CONTAINER. HOLD FOR DISPOSAL. WASH CONTAMINATED SURFACES TO REMOVE ANY RESIDUES.

========== Handling and Storage ==========

Handling and Storage Precautions:KEEP TIGHTLY CLOSED. STORE IN A COOL, DRY PLACE. STORE ONLY W/COMPATIBLE CHEMICALS. THIS PRODUCT IS FURNISHED FOR LABORATORY USE ONLY.
Other Precautions:AVOID CONTACT W/SKIN, EYES & CLOTHING. DON'T BREATHE VAPORS. PRODUCT MAY NOT BE USED AS DRUGS, COSMETICS, AGRICULTURAL/PESTICIDAL PRODUCTS, FOOD ADDITIVES/AS HOUSEHOLD CHEMICALS.

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:USE APPROPRIATE OSHA/MSHA APPROVED SAFETY EQUIPMENT.
Ventilation:THIS CHEMICAL SHOULD BE HANDLED ONLY IN A HOOD.
Eye Protection:EYE SHIELDS
Work Hygienic Practices:REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE REUSE. CONTACT LENSES SHOULDN'T BE WORN IN THE LABORATORY.
Supplemental Safety and Health
PERSONS NOT SPECIFICALLY/PROPERLY TRAINED SHOULDN'T HANDLE THIS CHEMICAL/ITS CONTAINER. ALL CHEMICALS SHOULD BE CONSIDERED HAZARDOUS-AVOID DIRECT PHYSICAL CONTACT. DATA INFORMATION IS FOR ACETONE.

========== Physical/Chemical Properties ==========

Melt/Freeze Pt:M.P/F.P Text:186.8-192F
Solubility in Water:INSOLUBLE
Appearance and Odor:COLORLESS CRYSTALLINE SOLID W/FRUITY/PLEASANT ODOR

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
STRONG OXIDIZING AGENTS

========== Disposal Considerations ==========

Waste Disposal Methods:BURN IN A CHEMICALS INCINERATOR EQUIPPED W/AN AFTERBURNER & SCRUBBER/DISPOSE OF IN ACCORDANCE W/LOCAL, STATE & FEDERAL REGULATIONS.

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International Chemical Safety Cards

LINDANE

ICSC: 0053

LINDANE
gamma-1,2,3,4,5,6-Hexachlorocyclohexane
gamma-BHC
gamma-HCH
$C_6H_6Cl_6$
Molecular mass: 290.8

CAS # 58-89-9
RTECS # GV4900000
ICSC # 0053
UN # 2761
EC # 602-043-00-6

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION	Risk of fire and explosion if formulations contain flammable/explosive solvents.		In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE!	
• **INHALATION**	Convulsions. Cough. Dizziness. Headache. Nausea. Weakness. Tremors. Paresthesias. Symptoms may be delayed (see Notes).	Avoid inhalation of fine dust and mist. Local exhaust or breathing protection.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
• **SKIN**	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention. Wear protective gloves when administering first aid.
• **EYES**	Redness.	Face shield, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• **INGESTION**	Abdominal pain. Diarrhoea (further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Give a slurry of activated charcoal in water to drink. Do NOT induce vomiting. Give plenty of water to drink. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Do NOT wash away into sewer. Sweep spilled substance into non-metallic sealable containers, then remove to safe place (extra personal protection: P3 filter respirator for toxic particles).	Provision to contain effluent from fire extinguishing. Separated from bases, food and feedstuffs and metals.	Do not transport with food and feedstuffs. T symbol N symbol R: 23/24/25-36/38-50/53 S: (1/2-)13-45-60-61 UN Hazard Class: 6.1 UN Packing Group: III

		Severe marine pollutant.

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0053

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993

International Chemical Safety Cards

LINDANE

ICSC: 0053

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** ODOURLESS, WHITE CRYSTALLINE POWDER. **CHEMICAL DANGERS:** On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes including phosgene and hydrogen chloride. The substance decomposes on contact with alkalis producing trichlorobenzene, or on contact with powdered iron, aluminum and zinc. **OCCUPATIONAL EXPOSURE LIMITS (OELs):** TLV: ppm; 0.5 mg/m^3 (as TWA) (skin) (ACGIH 1994-1995). MAK: ppm; 0.5 mg/m^3; skin (1992).	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation and through the skin, and by ingestion. **INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance irritates the eyes and the respiratory tract. The substance may cause effects on the central nervous system , resulting in convulsions and respiratory failure and collapse. Exposure may result in death. Medical observation is indicated. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the liver and kidneys.
PHYSICAL PROPERTIES	Boiling point: 323°C Melting point: 113°C Relative density (water = 1): 1.87	Solubility in water: none Vapour pressure, Pa at 20°C: 0.0012 Octanol/water partition coefficient as log Pow: 3.61-3.72
ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. In the food chain important to humans, bioaccumulation takes place, specifically in fish. It is strongly advised not to let the chemical enter into the environment, especially in soil, because it persists in the environment. &FIG13	

NOTES

Depending on the degree of exposure, periodic medical examination is indicated. Carrier solvents used in commercial formulations may change physical and toxicological properties. The relation between odour and the occupational exposure limit cannot be indicated. Do NOT take working clothes home. Gammexane, Tri-6, Lindafor, Lindatox, Agrocide, Isotox, Esoderm, Aparasin are trade names.

Transport Emergency Card: TEC (R)-61G53c
NFPA Code: H2; F0; R0

ADDITIONAL INFORMATION

IMPORTANT LEGAL NOTICE:	Neither the CEC or the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use.

International Chemical Safety Cards

HEPTACHLOR

ICSC: 0743

HEPTACHLOR
1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene
$C_{10}H_5Cl_7$
Molecular mass: 373.35

CAS # 76-44-8
RTECS # PC0700000
ICSC # 0743
UN # 2761
EC # 602-046-00-2

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION	Explosion hazard will depend on the solvent used or on the characteristics of the dust.		In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT DISPERSION OF DUST! PREVENT GENERATION OF MISTS! STRICT HYGIENE!	
• **INHALATION**	Irritation from dust.	Breathing protection.	Fresh air, rest. Refer for medical attention.
• **SKIN**	MAY BE ABSORBED!	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• **EYES**		Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• **INGESTION**		Do not eat, drink, or smoke during work.	Do NOT induce vomiting. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Do NOT wash away into sewer. Sweep spilled substance into sealable containers. Carefully collect remainder, then remove to safe place (extra personal protection: complete protective clothing including self-contained breathing apparatus).	Separated from food and feedstuffs, strong bases. Cool. Dry.	Do not transport with food and feedstuffs. T symbol R: 24/25-33-40 S: 36/37-44 UN Hazard Class: 6.1 UN Packing Group: II Severe marine pollutant.

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0743

International Chemical Safety Cards

HEPTACHLOR

ICSC: 0743

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
WHITE CRYSTALS WITH MILD ODOUR OF CAMPHOR.

PHYSICAL DANGERS:

CHEMICAL DANGERS:
The substance decomposes on heating producing toxic fumes: chlorine, hydrogen chloride. Reacts with strong oxidants.

OCCUPATIONAL EXPOSURE LIMITS (OELs):
TLV: ppm; 0.5 mg/m^3 (as TWA) (skin) (ACGIH 1991-1992).
TLV (as STEL): ppm; 2 mg/m^3 (ACGIH 1991-1992).
PDK: 0.01 mg/m^3 (USSR 1977).

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of dusts from powder concentrates, through the skin especially from liquid formulations, and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a nuisance-causing concentration of airborne particles can, however, be reached quickly when dispersed.

EFFECTS OF SHORT-TERM EXPOSURE:
Inhalation of dust may cause irritation.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
This substance is possibly carcinogenic to humans. Heptachlor epoxide has been found in human milk in areas with high heptachlor exposure in the population.

PHYSICAL PROPERTIES

Boiling point at 0.2 kPa: 135-145°C
Melting point: 95-96°C
Relative density (water = 1): 1.65-1.67
Solubility in water: none
Vapour pressure, Pa at 25°C: 0.053
Octanol/water partition coefficient as log Pow: 3.87-5.44 (estimated)

ENVIRONMENTAL DATA

Heptachlor is persistent and rather immobile in soil. This substance may be hazardous to the environment; special attention should be given to marine crustacea and young fish which are very sensitive. In the food chain important to humans, bioaccumulation takes place, specifically in fish and birds. It is strongly advised not to let the chemical enter into the environment.

NOTES

The technical grade is a waxy solid containing ca. 72% heptachlor and 28% related compounds. All uses of this compound are increasingly restricted. Safe and equally effective alternatives should be preferred. Other melting points: 46-74°C for the technical product. Carrier solvents used in commercial formulations may change physical and toxicological properties. Do NOT take working clothes home. Aahepta, Agroceres, Basaklor, Heptagran, Heptamul, Rhodiachlor, Velsicol 104, Drinox, among others are trade names.

Transport Emergency Card: TEC (R)-61G53b

ADDITIONAL INFORMATION

International Chemical Safety Cards

HEPTACHLOR

ICSC: 0743

HEPTACHLOR
1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene
$C_{10}H_5Cl_7$
Molecular mass: 373.35

CAS # 76-44-8
RTECS # PC0700000
ICSC # 0743
UN # 2761
EC # 602-046-00-2

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION	Explosion hazard will depend on the solvent used or on the characteristics of the dust.		In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT DISPERSION OF DUST! PREVENT GENERATION OF MISTS! STRICT HYGIENE!	
• **INHALATION**	Irritation from dust.	Breathing protection.	Fresh air, rest. Refer for medical attention.
• **SKIN**	MAY BE ABSORBED!	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• **EYES**		Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• **INGESTION**		Do not eat, drink, or smoke during work.	Do NOT induce vomiting. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Do NOT wash away into sewer. Sweep spilled substance into sealable containers. Carefully collect remainder, then remove to safe place (extra personal protection: complete protective clothing including self-contained breathing apparatus).	Separated from food and feedstuffs, strong bases. Cool. Dry.	Do not transport with food and feedstuffs. T symbol R: 24/25-33-40 S: 36/37-44 UN Hazard Class: 6.1 UN Packing Group: II Severe marine pollutant.

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0743

International Chemical Safety Cards

HEPTACHLOR

ICSC: 0743

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
WHITE CRYSTALS WITH MILD ODOUR OF CAMPHOR.

PHYSICAL DANGERS:

CHEMICAL DANGERS:
The substance decomposes on heating producing toxic fumes: chlorine, hydrogen chloride. Reacts with strong oxidants.

OCCUPATIONAL EXPOSURE LIMITS (OELs):
TLV: ppm; 0.5 mg/m^3 (as TWA) (skin) (ACGIH 1991-1992).
TLV (as STEL): ppm; 2 mg/m^3 (ACGIH 1991-1992).
PDK: 0.01 mg/m^3 (USSR 1977).

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of dusts from powder concentrates, through the skin especially from liquid formulations, and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a nuisance-causing concentration of airborne particles can, however, be reached quickly when dispersed.

EFFECTS OF SHORT-TERM EXPOSURE:
Inhalation of dust may cause irritation.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
This substance is possibly carcinogenic to humans. Heptachlor epoxide has been found in human milk in areas with high heptachlor exposure in the population.

PHYSICAL PROPERTIES

Boiling point at 0.2 kPa: 135-145°C
Melting point: 95-96°C
Relative density (water = 1): 1.65-1.67
Solubility in water: none
Vapour pressure, Pa at 25°C: 0.053
Octanol/water partition coefficient as log Pow: 3.87-5.44 (estimated)

ENVIRONMENTAL DATA

Heptachlor is persistent and rather immobile in soil. This substance may be hazardous to the environment; special attention should be given to marine crustacea and young fish which are very sensitive. In the food chain important to humans, bioaccumulation takes place, specifically in fish and birds. It is strongly advised not to let the chemical enter into the environment.

NOTES

The technical grade is a waxy solid containing ca. 72% heptachlor and 28% related compounds. All uses of this compound are increasingly restricted. Safe and equally effective alternatives should be preferred. Other melting points: 46-74°C for the technical product. Carrier solvents used in commercial formulations may change physical and toxicological properties. Do NOT take working clothes home. Aahepta, Agroceres, Basaklor, Heptagran, Heptamul, Rhodiachlor, Velsicol 104, Drinox, among others are trade names.

Transport Emergency Card: TEC (R)-61G53b

ADDITIONAL INFORMATION

========== Product Identification ==========

Product ID:ENDRIN ALDEHYDE, 48723
MSDS Date:01/04/1990
FSC:6640
NIIN:00N059189
MSDS Number: BXGNS
=== Responsible Party ===
Company Name:SUPELCO INC
Address:SUPELCO PARK
City:BELLEFONTE
State:PA
ZIP:16823-0048
Country:US
Info Phone Num:814-359-3441
Emergency Phone Num:814-359-3441
CAGE:54968
=== Contractor Identification ===
Company Name:SIGMA-ALDRICH INC.
Address:3050 SPRUCE STREET
Box:14508
City:ST. LOUIS
State:MO
ZIP:63103
Country:US
Phone:314-771-5765/414-273-3850X5996
CAGE:54968

========== Composition/Information on Ingredients ==========

Ingred Name:ENDRIN ALDEHYDE (CERCLA)
CAS:7421-93-4
Fraction by Wt: 0.002%
OSHA PEL:N/K
ACGIH TLV:N/K
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:METHYL ALCOHOL; (METHANOL) (SARA 313) (CERCLA).
LD50:(ORAL,RAT) 5628 MG/KG.
CAS:67-56-1
RTECS #:PC1400000
Fraction by Wt: 99.998%
OSHA PEL:200 PPM, S
ACGIH TLV:200 PPM;250 STEL, S
EPA Rpt Qty:5000 LBS
DOT Rpt Qty:5000 LBS

========== Fire Fighting Measures ==========

Flash Point:50.0F,10.0C
Lower Limits:6%
Upper Limits:36.5%
Extinguishing Media:CO*2, DRY CHEMICAL, ALCOHOL FOAM.
Fire Fighting Procedures:USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE
EQUIPMENT .

========== Exposure Controls/Personal Protection ==========

Supplemental Safety and Health

========== Physical/Chemical Properties ==========

Boiling Pt:B.P. Text:149F,65C
Melt/Freeze Pt:M.P/F.P Text:-144F,-98C
Vapor Pres:100
Vapor Density:1.1
Spec Gravity:0.79 (H*2O=1)
Evaporation Rate & Reference:>1 (ETHER=1)
Solubility in Water:100%
Appearance and Odor:CLEAR, COLORLESS LIQUID.
Percent Volatiles by Volume:100

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
OXIDIZING AGENTS, CHROMIC ANHYDRIDE, LEAD PERCHLORATE, PERCHLORIC ACIDS.

========== Product Identification ==========

Product ID:ENDRIN, F98
MSDS Date:11/02/1992
FSC:6810
NIIN:00N069925
MSDS Number: CBKZJ
=== Responsible Party ===
Company Name:CHEM SERVICE INC
Box:3108
City:WEST CHESTER
State:PA
ZIP:19381
Country:US
Info Phone Num:215-692-3026
Emergency Phone Num:215-692-3026
CAGE:84898
=== Contractor Identification ===
Company Name:CHEM SERVICE INC
Box:3108
City:WEST CHESTER
State:PA
ZIP:19381
Country:US
Phone:215-692-3026
CAGE:84898
Company Name:CHEM SERVICE, INC
Address:660 TOWER LN
Box:599
City:WEST CHESTER
State:PA
ZIP:19301-9650
Country:US
Phone:610-692-3026
CAGE:8Y898

========== Composition/Information on Ingredients ==========

Ingred Name:1,4:5,8-DIMETHANONAPHTHALENE,
1,2,3,4,10,10-HEXACHLORO-6,7-EPOXY-1,4,4A,5,6,7,8,8A-OCTAHYDRO-,
ENDO, ENDO-; (ING 2)
CAS:72-20-8
RTECS #:IO1575000
OSHA PEL:0.1 MG/M3, S
ACGIH TLV:0.1 MG/M3, S
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:ING 1: (ENDRIN) (SARA 302) (CERCLA)
RTECS #:9999999ZZ

Ingred Name:FIRST AID PROC: IF SWALLOWED. DO NOT ADMIN LIQS/INDUCE
VOMITING TO AN UNCONS/CONVULSING PERS. IF PATIENT IS VOMIT(ING 4)
RTECS #:9999999ZZ

Ingred Name:ING 3: WATCH CLOSELY TO MAKE SURE AIRWAY DOES NOT BECOME
OBSTRUCTED BY VOMIT. GET MED ATTN IF NEC. ANTIDOTE:(ING 5)
RTECS #:9999999ZZ

Ingred Name:ING 4: DIAZEPAM/IV GLUCOSE/B VITAMINS/LGE AMTS OF ACTIVATED
CHARCOAL AND SALINE LAXATIVES. OXYGEN MAY BE NECESSARY.

RTECS #:9999999ZZ

========== Hazards Identification ==========

LD50 LC50 Mixture:LD50: (ORAL,RAT) 8 MG/KG
Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:CONT LENSES SHOULD NOT BE WORN IN LABORATORY. ALL CHEMICALS SHOULD BE CONSIDERED HAZARDOUS - AVOID DIRECT PHYSICAL CONTACT! MAY BE FATAL IF ABSORBED THRU SKIN! MAY BE FATAL IF INHALED! MAY BE FATAL IF SWALLOWED! CAN CAUSE NERVOUS SYSTEM INJURY. CAN CAUSE EYE IRRITATION. BASED ON THE TOXICITY OF CMPDS(EFTS OF OVEREXP)
Explanation of Carcinogenicity:NOT RELEVANT.
Effects of Overexposure:HLTH HAZ: OF SIMILAR STRUCTURE THIS MATL IS HAZARDOUS. CAN CAUSE GASTRO-INTESTINAL DISTURBANCES. PRLNGD EXPOS MAY CAUSE NAUSEA/HDCH/DIZZ &/EYE DMG. CAN CAUSE DELAYED ADVERSE HEALTH EFFECTS. CAN CAUSE GENERAL FEELING OF DISORIENTATION. CAN CAUSE CONVULSIONS.
Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

========== First Aid Measures ==========

First Aid:AN ANTIDOTE IS A SUBSTANCE INTENDED TO COUNTERACT EFT OF POIS. IF SHOULD BE ADMIN ONLY BY MD/EMER PERS. MD ADVICE CAN BE OBTAINED FROM POIS CNTRL CNTR. SKIN: FLUSH CONTINUOUSLY W/WATER FOR AT LEAST 15 -20 MINS. SKIN: FLUSH W/WATER FOR 15-20MINS. IF NO BURNS HAVE OCCURRED-USE SOAP & WATER CLEANSE SKIN. INHAL: REMOVE PATIENT TO FRESH AIR. ADMIN O*2 IF PATIENT IS HAVING DFCLTY BRTHG. IF (SUPDAT)

========== Fire Fighting Measures ==========

Extinguishing Media:CARBON DIOXIDE, DRY CHEMICAL POWDER OR SPRAY. NO EXPLOSION LIMITS ARE AVAILABLE FOR THIS COMPOUND.
Fire Fighting Procedures:WEAR NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT.
Unusual Fire/Explosion Hazard:NONE SPECIFIED BY MANUFACTURER.

========== Accidental Release Measures ==========

Spill Release Procedures:EVAC AREA. WEAR APPROP OSHA REG EQUIP. VENT AREA. SWEEP UP & PLACE IN AN APPROPRIATE CONTAINER. HOLD FOR DISPOSAL. WASH CONTAMINATED SURFACES TO REMOVE ANY RESIDUES.
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

========== Handling and Storage ==========

Handling and Storage Precautions:KEEP TIGHTLY CLOSED. STORE IN COOL DRY PLACE. STORE ONLY WITH COMPATIBLE CHEMICALS.
Other Precautions:AVOID CONTACT W/SKIN, EYES & CLTHG. DO NOT BREATH VAPORS. THIS PRODUCT FURNISHED FOR LABORATORY USE ONLY! OUR PRODUCTS MAY NOT BE USED AS DRUGS, COSMETICS, AGRICULTURAL OR PESTICIDAL PRODUCTS, FOOD AD DITIVES/HOUSEHOLD CHEMICALS.

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:USE NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN.
Ventilation:THIS CHEMICAL SHOULD BE HANDLED ONLY IN A HOOD.
Protective Gloves:IMPERVIOUS GLOVES.
Eye Protection:ANSI APPRVD CHEM WORKERS GOGGS.
Other Protective Equipment:EMERGENCY EYEWASH & DELUGE SHOWER MEETING

ANSI DESIGN CRITERIA.
Work Hygienic Practices:NONE SPECIFIED BY MANUFACTURER.
Supplemental Safety and Health
FIRST AID PROC: PATIENT HAS STOPPED BREATHING ADMIN ARTF RESP. IF PATIENT IS IN CARDIAC ARREST ADMIN CPR. CONTINUE LIFE SUPPORTING MEASURES UNTIL MED ASSIST HAS ARRIVED. REMOVE & WASH CONTAMD CLTHG. I F PATIENT IS EXHIBITING SIGNS OF SHOCK - KEEP WARM & QUIET. CONT POIS CNTRL CNTR IMMED IF NEC. INDUCE VOMITING(ING 3)

========== Physical/Chemical Properties ==========

Melt/Freeze Pt:M.P/F.P Text:>439F,>226C
Vapor Pres:2E-7 @ 25C
Solubility in Water:INSOL(IMMISCIBLE)
Appearance and Odor:COLORLESS CRYSTALLINE SOLID.

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
STRONG ACIDS, STRONG OXIDIZING AGENTS.
Stability Condition to Avoid:NONE SPECIFIED BY MANUFACTURER.
Hazardous Decomposition Products:NONE SPECIFIED BY MANUFACTURER.

========== Disposal Considerations ==========

Waste Disposal Methods:BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER AND SCRUBBER. DISPOSE OF IN ACCORDANCE W/LOCAL, STATE & FEDERAL REGULATIONS.

========== Product Identification ==========

Product ID:ENDOSULFAN II (BETA) 25 MG,48578
MSDS Date:05/16/1985
FSC:6810
NIIN:00N010649
MSDS Number: BHYRD
=== Responsible Party ===
Company Name:SUPELCO,INC.
Address:SUPELCO PARK
City:BELLEFONTE
State:PA
ZIP:16823-0048
Info Phone Num:814-359-3441
Emergency Phone Num:814-359-3441
CAGE:HO582
=== Contractor Identification ===
Company Name:SIGMA-ALDRICH INC.
Address:3050 SPRUCE STREET
Box:14508
City:ST. LOUIS
State:MO
ZIP:63103
Country:US
Phone:314-771-5765/414-273-3850X5996
CAGE:54968
Company Name:SUPELCO,INC.
Address:SUPELCO PARK
Box:City:BELLEFONTE
State:PA
ZIP:16823-0048
Phone:814-359-3441
CAGE:HO582

========== Composition/Information on Ingredients ==========

Ingred Name:BETA - ENDOSULFAN (SARA III)
CAS:33213-65-9
RTECS #:RB9875200
Other REC Limits:N/K
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

========== Hazards Identification ==========

LD50 LC50 Mixture:LD50 RAT ORAL 249 MG/KG.
Routes of Entry: Inhalation:YES Skin:NO Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:HARMFUL IF INHALED OR SWALLOWED.
Explanation of Carcinogenicity:NONE
Effects of Overexposure:EYES/SKIN:N/K .INGESTION/INHALATION:HARMFUL.
Medical Cond Aggravated by Exposure:N/K

========== First Aid Measures ==========

First Aid:EYES:FLUSH W/ H*2O FOR AT LEAST 15 MIN.SKIN:FLUSH W/ LARGE VOLUMES OF WATER.INGESTION:NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.NEVER TRY TO MAKE AN UNCONSCIOUS PERSON VOMIT.INHALATION:IMM EDIATELY MOVE TO FRESH AIR.GIVE OXYGEN IF BREATHING IS LABORED.CONTACT MD.

========== Fire Fighting Measures ==========

Flash Point:N/K
Lower Limits:N/K
Upper Limits:N/K
Extinguishing Media:WATER,CO*2,DRY CHEMICAL.
Fire Fighting Procedures:USE NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT .
Unusual Fire/Explosion Hazard:TOXIC VAPORS OF CHLORIDES AND SO*X ARE FORMED WHEN THIS MATERIAL IS HEATED TO DECOMPOSITION.

========== Accidental Release Measures ==========

Spill Release Procedures:TAKE UP WITH ABSORBENT MATERIAL.AVOID GENERATING DUST.
Neutralizing Agent:N/K

========== Handling and Storage ==========

Handling and Storage Precautions:STORE IN SEALED CONTAINER IN COOL,DRY LOCATION.AVOID GENERATING DUST.
Other Precautions:AVOID EYE OR SKIN CONTACT.

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN .
Ventilation:LOCAL AND GENERAL VENTILATION NECESSARY TO KEEP AIR CONCENTRATION BELOW LEVEL OF CONCERN .
Protective Gloves:RECOMMENDED
Eye Protection:CHEMICAL WORKERS GOGGLES .
Work Hygienic Practices:N/K
Supplemental Safety and Health
ROUTES OF ENTRY:INHALATION/SKIN/INGESTION .

========== Physical/Chemical Properties ==========

Melt/Freeze Pt:M.P/F.P Text:208C,406F
Decomp Temp:Decomp Text:N/K
Appearance and Odor:GRAYISH-WHITE POWDER.

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
Hazardous Decomposition Products:CHLORIDES AND SO*X.

========== Disposal Considerations ==========

Waste Disposal Methods:DISPOSAL MUST BE IN ACCORDANCE WITH FEDERAL,STATE AND LOCAL REGULATIONS .

========== Product Identification ==========

Product ID:F202AS ENDOSULFAN I 100 MG/ML IN +-BUTYLMETHYL ETHER
MSDS Date:12/01/1990
FSC:6550
NIIN:00F050829
MSDS Number: CCDBM
=== Responsible Party ===
Company Name:CHEM SERVICE INC
Address:660 TOWER LN
Box:3108
City:WEST CHESTER
State:PA
ZIP:19381-3108
Country:US
Info Phone Num:215-692-3026/800-452-9994
Emergency Phone Num:215-386-2100/215-692-3026
CAGE:84898
=== Contractor Identification ===
Company Name:CHEM SERVICE INC
Box:3108
City:WEST CHESTER
State:PA
ZIP:19381
Country:US
Phone:215-692-3026
CAGE:84898
Company Name:CHEM SERVICE, INC
Address:660 TOWER LN
Box:599
City:WEST CHESTER
State:PA
ZIP:19301-9650
Country:US
Phone:610-692-3026
CAGE:8Y898

========== Composition/Information on Ingredients ==========

Ingred Name:ENDOSULFAN I *96-3*
CAS:959-98-8
RTECS #:RB9275100
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:METHYL TERT BUTYL ETHER (MTBE), 2-METHOXY-2-METHYL PROPANE,
T-BUTYLMETHYL ETHER *96-3*
CAS:1634-04-4
RTECS #:KN5250000
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

========== Hazards Identification ==========

Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:MAY BE HARMFUL BY INHALATION,
INGESTION & SKIN ABSORPTION. INGESTION: FATAL AS A RESULT OF SPASM,
INFLAMMATION & EDEMA OF THE LARYNX & BRON-CHEMICAL PNEUMONITIS &
PULMONARY EDEMA. IRRITATION TO EYES, MUCOUS MEMBRANES, UPPER

RESPIRATORY TRACT & SKIN.
Explanation of Carcinogenicity:NONE
Effects of Overexposure:IRRITATION.

========== First Aid Measures ==========

First Aid:EYES: FLUSH W/WATER FOR 15-20 MINS. SKIN: FLUSH W/WATER. IF NO BURNS OCCUR, USE SOAP & WATER TO CLEANSE. INHALATION: REMOVE TO FRESH AIR. GIVE OXYGEN/CPR IF NEEDED. IF PATIENT IS EXHIBITING SIGNS OF S HOCK, KEEP WARM & QUIET. INGESTION: RINSE OUT MOUTH W/WATER, PROVIDING PERSON IS CONSCIOUS. OBTAIN MEDICAL ATTENTION IN ALL CASES.

========== Fire Fighting Measures ==========

Flash Point:18.4F
Lower Limits:1.6
Upper Limits:15.1
Extinguishing Media:CO2, DRY CHEMICAL POWDER/SPRAY
Unusual Fire/Explosion Hazard:AUTOIGNITION TEMP: 377.6F. FORMS EXPLOSIVE MIXTURES IN AIR, MAY TRAVEL CONSIDERABLE DISTANCES TO IGNITION SOURCES & FLASH BACK.

========== Accidental Release Measures ==========

Spill Release Procedures:EVACUATE & VENTILATE AREA. WEAR APPROPRIATE EQUIPMENT. SWEEP UP & PLACE IN AN APPROPRIATE CONTAINER/DISPOSAL. WASH CONTAMINATED SURFACES TO REMOVE ANY RESIDUES.

========== Handling and Storage ==========

Handling and Storage Precautions:KEEP TIGHTLY CLOSED. STORE ONLY W/COMPATIBLE CHEMICALS. STORE UNDER REFRIGERATION.
Other Precautions:AVOID CONTACT W/SKIN, EYES & CLOTHING. DON'T BREATHE VAPORS. FOR LABORATORY USE ONLY.

========== Exposure Controls/Personal Protection ==========

Ventilation:HANDLE ONLY IN A HOOD.
Eye Protection:EYESHIELDS
Other Protective Equipment:WEAR APPROPRIATE OSHA REGULATED/APPROVED EQUIPMENT.
Work Hygienic Practices:REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE REUSE.
Supplemental Safety and Health

========== Physical/Chemical Properties ==========

Boiling Pt:B.P. Text:131.3F
Melt/Freeze Pt:M.P/F.P Text:-164.2F
Vapor Pres:245
Vapor Density:3.1
Solubility in Water:SLIGHT
Appearance and Odor:COLORLESS LIQUID W/ETHER LIKE ODOR.

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
STRONG OXIDIZING AGENTS, STRONG ACIDS
Hazardous Decomposition Products:TOXIC FUMES

========== Disposal Considerations ==========

Waste Disposal Methods:BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AFTERBURNER & SCRUBBER. DISPOSE OF IAW/FEDERAL, STATE & LOCAL REGULATIONS.

DIELDRIN

ICSC: 0787

DIELDRIN
HEOD
1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro,endo,exo-1,4:5,8-dimethanonaphthalene
$C_{12}H_8Cl_6O$
Molecular mass: 381

CAS # 60-57-1
RTECS # IO1750000
ICSC # 0787
UN # 2761
EC # 602-049-00-9

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Liquid formulations containing organic solvents may be flammable.		In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION	Explosion hazard will depend on the solvent used or on the characteristics of the dust.		
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
• **INHALATION**	(see Ingestion).	Ventilation (not if powder).	Fresh air, rest. Refer for medical attention.
• **SKIN**	MAY BE ABSORBED! See Ingestion.	Protective gloves. Rubber boots.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• **EYES**	Redness.	Safety goggles or face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• **INGESTION**	Convulsions. Dizziness. Headache. Nausea. Vomiting. Weakness.	Do not eat, drink, or smoke during work.	Do NOT induce vomiting. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into sealable containers. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment (extra personal protection: complete protective clothing including self-contained breathing apparatus).	Separated from food and feedstuffs. Cool. Dry.	Do not transport with food and feedstuffs. T+ symbol R: 25-27-40-48 S: 22-36/37-45 UN Hazard Class: 6.1 UN Packing Group: I Marine pollutant.

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0787

International Chemical Safety Cards

DIELDRIN

ICSC: 0787

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
COLOURLESS CRYSTALS.

PHYSICAL DANGERS:

CHEMICAL DANGERS:
The substance decomposes on heating producing toxic and corrosive fumes (chlorine fumes, hydrogen chloride). Reacts with oxidants, concentrated mineral acids, acid acatalysts, metals (copper, iron). Attacks metal due to the slow formation of hydrogen chloride in storage.

OCCUPATIONAL EXPOSURE LIMITS (OELs):
TLV (as TWA): ppm; 0.25 mg/m^3 (skin) (ACGIH 1991-1992).

ROUTES OF EXPOSURE:
The substance can be absorbed into the body through the skin and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly on spraying.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance may cause effects on the central nervous system , resulting in convulsions. Medical observation is indicated.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The substance may be found in the human placenta.

PHYSICAL PROPERTIES

Melting point: 175-176°C
Relative density (water = 1): 1.62
Solubility in water: None
Vapour pressure, Pa at 20°C: 0.0004
Octanol/water partition coefficient as log Pow: 6.2

ENVIRONMENTAL DATA

Dieldrin persists in the environment: 50% disappear after 4 to 7 years. This substance may be hazardous to the environment; special attention should be given to birds and water organisms. In the food chain important to humans, bioaccumulation takes place, specifically in aquatic organisms.

NOTES

Technical dieldrin (95%) consists of light tan flakes with a mild odour. Carrier solvents used in commercial formulations may change physical and toxicological properties. Do NOT take working clothes home. The recommendations on this Card also apply to ICSC # 0774 (aldrin). Alvit, Octalox, Quintox, Illoxol, Panoram D-31, Dieldrite, Dorytox, Compound 497 are trade names.

Transport Emergency Card: TEC (R)-61G53b

ADDITIONAL INFORMATION

========== Product Identification ==========

Product ID:BETA-BHC,50MG.CATALOG NO 48494
MSDS Date:03/10/1988
FSC:6810
NIIN:00N010746
MSDS Number: BHHGD
=== Responsible Party ===
Company Name:SUPELCO,INC.
Address:SUPELCO PARK
City:BELLEFONTE
State:PA
ZIP:16823-0048
Info Phone Num:814-359-3441
Emergency Phone Num:814-359-3441
CAGE:HO582
=== Contractor Identification ===
Company Name:SIGMA-ALDRICH INC.
Address:3050 SPRUCE STREET
Box:14508
City:ST. LOUIS
State:MO
ZIP:63103
Country:US
Phone:314-771-5765/414-273-3850X5996
CAGE:54968
Company Name:SUPELCO,INC.
Address:SUPELCO PARK
Box:City:BELLEFONTE
State:PA
ZIP:16823-0048
Phone:814-359-3441
CAGE:HO582

========== Composition/Information on Ingredients ==========

Ingred Name:BETA-BHC (SARA III)
CAS:319-85-7
RTECS #:GV4375000
Fraction by Wt:
Other REC Limits:
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

========== Hazards Identification ==========

LD50 LC50 Mixture:LD50 6000 MG/KG ORAL RAT
Routes of Entry: Inhalation:YES Skin:NO Ingestion:YES
Reports of Carcinogenicity:NTP:YES IARC:NO OSHA:NO
Health Hazards Acute and Chronic:SEE SIGNS & SYMPTOMS OF OVEREXPOSURE.
Explanation of Carcinogenicity:BHC (BETA ISOMER):NTP ANTICIPATED HUMAN
CARCM(SOURCE LIST C)REPORTED ANIMAL CARCINOGEN (MFR).
Effects of Overexposure:HARMFUL IF INHALED,HARMFUL IF
SWALLOWED.REPORTED ANIMAL CARCINOGEN(MFR).
Medical Cond Aggravated by Exposure:

========== First Aid Measures ==========

First Aid:EYES:FLUSH WITH PLENTY OF POTABLE WATER FOR AT LEAST 15
MINUTES,THEN OBTAIN PROMPT MEDICAL ATTENTIONSKIN:FLUSH SKIN WITH
LARGE VOLUMES OF WATER.INHALATION;IMMEDIATELY MOVE TO FRESH

AIR.GIVE OXYG EN IF BREATHING IS LABORED,CONTACT A PHYSICIAN.INGESTION;NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON,NEVER TRY TO MAKE AN UNCONSCIOUS PERSON VOMIT(MFR).CALL MD IMMEDIATELY (CPN).

========== Fire Fighting Measures ==========

Flash Point:
Lower Limits:
Upper Limits:
Extinguishing Media:WATER,CO*2,DRY CHEMICAL.
Fire Fighting Procedures:WEAR SCBA WHEN FIGHTING A CHEMICAL FIRE (MFR).USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT
Unusual Fire/Explosion Hazard:THE FOLLOWING TOXIC VAPORS ARE FORMED WHEN THIS MATERIAL IS HEATED TO DECOMPOSITION.CHLORIDES(MFR).HCL,PHOSGENE

========== Accidental Release Measures ==========

Spill Release Procedures:TAKE UP WITH ABSORBENT MATERIAL,AVOID GENERATING DUST.
Neutralizing Agent:N/K

========== Handling and Storage ==========

Handling and Storage Precautions:STORE IN SEALED CONTAINER IN COOL,DRY LOCATION.AVOID GENERATING DUST.
Other Precautions:REPORTED CANCER HAZARD.AVOID EYE OR SKIN CONTACT.

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:WEAR NIOSH/OSHA APPROVED RESPIRATORY PROTECTION (MFR).NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN
Ventilation:USE ONLY IN WELL VENTILATED AREA.
Protective Gloves:WEAR GLOVES.RUBBER
Eye Protection:CHEMICAL WORKERS GOGGLES
Other Protective Equipment:EYE WASH AND SAFETY SHOWER
Work Hygienic Practices:OBSERVE GOOD WORK HYGIENIC PRACTICES
Supplemental Safety and Health

========== Physical/Chemical Properties ==========

Boiling Pt:B.P. Text:N/A MFR
Melt/Freeze Pt:M.P/F.P Text:593 F;312 C
Decomp Temp:Decomp Text:N/K FPM
Vapor Pres:N/A MFR
Vapor Density:N/A MFR
Spec Gravity:N/A MFR
pH:
Evaporation Rate & Reference:N/A MFR
Solubility in Water:N/A MFR
Appearance and Odor:WHITE SOLID
Percent Volatiles by Volume:N/AMFR
Corrosion Rate:

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
Hazardous Decomposition Products:CHLORIDES(MFR),HCL,PHOSGENE
Conditions to Avoid Polymerization:WILL NOT OCCUR.

========== Disposal Considerations ==========

Waste Disposal Methods:COMPLY WITH ALL APPLICABLE FEDERAL,STATE,OR LOCAL REGULATIONS.

========== Product Identification ==========

Product ID:ALPHA-BHC,50 MG,R431020
MSDS Date:03/10/1988
FSC:6810
NIIN:00N010773
MSDS Number: BHVJC
=== Responsible Party ===
Company Name:SUPELCO,INC.
Address:SUPELCO PARK
City:BELLEFONTE
State:PA
ZIP:16823-0048
Info Phone Num:814-359-3441
Emergency Phone Num:814-359-3441
CAGE:HO582
=== Contractor Identification ===
Company Name:SUPELCO,INC.
Address:SUPELCO PARK
Box:City:BELLEFONTE
State:PA
ZIP:16823-0048
Phone:814-359-3441
CAGE:HO582
Company Name:SIGMA-ALDRICH INC.
Address:3050 SPRUCE STREET
Box:14508
City:ST. LOUIS
State:MO
ZIP:63103
Country:US
Phone:314-771-5765/414-273-3850X5996
CAGE:54968

========== Composition/Information on Ingredients ==========

Ingred Name:ALPHA-BHC (SARA III)
CAS:319-84-6
RTECS #:GV3500000
Other REC Limits:N/K
EPA Rpt Qty:10 LBS
DOT Rpt Qty:10 LBS

========== Hazards Identification ==========

LD50 LC50 Mixture:LD50 RAT ORAL 500 MG/KG
Routes of Entry: Inhalation:YES Skin:UNKNOWN Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:YES OSHA:NO
Health Hazards Acute and Chronic:HARMFUL IF INHALED OR SWALLOWED.
Explanation of Carcinogenicity:ALPHA-HEXACHLOROCYCLOHEXANE (BENZENE HEXACHLORIDE):SUFFICIENT EVIDENCE FOR CARCINOGENICITY IN ANIMALS (IARC 1987).
Effects of Overexposure:EYES/SKIN:N/K .INGESTION:HARMFUL IF SWALLOWED.INHALATION:HARMFUL IF INHALED.
Medical Cond Aggravated by Exposure:N/K

========== First Aid Measures ==========

First Aid:EYES:FLUSH WITH WATER FOR AT LEAST 15 MINUTES.SKIN:FLUSH WITH LARGE VOLUMES OF WATER.INGESTION:NEVER GIVE ANYTHING BY MOUTH TO UNCONSCIOUS PERSON.NEVER TRY TO MAKE UNCONSCIOUS PERSON

VOMIT.INHALATION: IMMEDIATELY MOVE TO FRESH AIR.GIVE OXYGEN IF BREATHING IS LABORED.CONTACT PHYSICIAN.

========== Fire Fighting Measures ==========

Flash Point:N/K
Lower Limits:N/K
Upper Limits:N/K
Extinguishing Media:WATER,CO*2,DRY CHEMICAL.
Fire Fighting Procedures:USE NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT .
Unusual Fire/Explosion Hazard:TOXIC CHLORIDE VAPORS ARE FORMED WHEN THIS MATERIAL IS HEATED TO DECOMPOSITION.

========== Accidental Release Measures ==========

Spill Release Procedures:TAKE UP WITH ABSORBENT MATERIAL.AVOID GENERATING DUST.
Neutralizing Agent:N/K

========== Handling and Storage ==========

Handling and Storage Precautions:STORE IN SEALED CONTAINER IN COOL,DRY LOCATION.AVOID GENERATING DUST.
Other Precautions:REPORTED CANCER HAZARD.AVOID EYE OR SKIN CONTACT.

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN .
Ventilation:LOCAL AND GENERAL VENTILATION NECESSARY TO KEEP AIR CONCENTRATION BELOW LEVEL OF CONCERN .
Protective Gloves:RECOMMENDED
Eye Protection:CHEMICAL WORKERS GOGGLES .
Work Hygienic Practices:N/K
Supplemental Safety and Health
ROUTES OF ENTRY:INHALATION/INGESTION .

========== Physical/Chemical Properties ==========

Melt/Freeze Pt:M.P/F.P Text:159C,318F
Decomp Temp:Decomp Text:N/K
Appearance and Odor:WHITE SOLID.

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
Hazardous Decomposition Products:CHLORIDES

========== Disposal Considerations ==========

Waste Disposal Methods:DISPOSAL MUST BE IN ACCORDANCE WITH FEDERAL,STATE AND LOCAL REGULATIONS .

========== Product Identification ==========

Product ID:4,4'-DDT 20UG/ML 1ML, 48678
MSDS Date:09/13/1991
FSC:6850
NIIN:00N021852
MSDS Number: BLRZG
=== Responsible Party ===
Company Name:SUPELCO INC
Address:SUPELCO PARK
City:BELLEFONTE
State:PA
ZIP:16823-0048
Country:US
Info Phone Num:814-359-3441
Emergency Phone Num:814-359-3441
CAGE:54968
=== Contractor Identification ===
Company Name:SIGMA-ALDRICH INC.
Address:3050 SPRUCE STREET
Box:14508
City:ST. LOUIS
State:MO
ZIP:63103
Country:US
Phone:314-771-5765/414-273-3850X5996
CAGE:54968

========== Composition/Information on Ingredients ==========

Ingred Name:DDT (DICHLORODIPHENYLTRICHLOROETHANE) (SARA III)
CAS:50-29-3
RTECS #:KJ3325000
Fraction by Wt: 0.02%
OSHA PEL:S, 1 MG/M3
ACGIH TLV:1 MG/M3; 9192
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:METHYL ALCOHOL (METHANOL) (SARA III)
CAS:67-56-1
RTECS #:PC1400000
Fraction by Wt: 99.98%
OSHA PEL:S,200PPM/250STEL
ACGIH TLV:S,200PPM/250STEL; 93
EPA Rpt Qty:5000 LBS
DOT Rpt Qty:5000 LBS

========== Hazards Identification ==========

LD50 LC50 Mixture:SEE INGREDIENTS 1 & 2.
Routes of Entry: Inhalation:YES Skin:NO Ingestion:YES
Reports of Carcinogenicity:NTP:YES IARC:YES OSHA:NO
Health Hazards Acute and Chronic:HARMFUL IF INHALED. MAY BE FATAL IF SWALLOWED. CONTAINS LOW CONCENTRATIONS OF MATLS KNOWN TO STATE OF CALIF TO CAUSE CANCER. HEADACHE, NAUSEA, GASTROINTESTINAL DISTURBANCES, BLINDNESS.
Explanation of Carcinogenicity:4,4-DDT:GROUP 2B(IARC), GROUP 2(NTP).
Effects of Overexposure:SEE HEALTH HAZARDS.
Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

========== First Aid Measures ==========

First Aid:EYES:FLUSH W/H2O FOR @ LST 15 MIN. CALL MD. SKIN:FLUSH W/LG VOLS OF H2O. INHAL:IMMED MOVE TO FRESH AIR. IF BRTHG STOPS, GIVE ARTF RESP. CALL MD. INGEST:NEVER GIVE ANYTHING BY MOUTH TO UNCON PERS. NEVE R TRY TO MAKE UNCON PERS VOMIT. GIVE 2 TABLESPOONS OF BAKING SODA IN GLASS OF H2O, PRESS FINGERS TO BACK OF TONGUE TO INDUCE VOMIT. IMMED CALL MD.

========== Fire Fighting Measures ==========

Flash Point:50.0F,10.0C
Lower Limits:6%
Upper Limits:36.5%
Extinguishing Media:CO2, DRY CHEMICAL, ALCOHOL FOAM.
Fire Fighting Procedures:WEAR NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT .

========== Accidental Release Measures ==========

Spill Release Procedures:TAKE UP WITH ABSORBENT MATERIAL. VENTILATE AREA. ELIMINATE ALL IGNITION SOURCES.
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

========== Handling and Storage ==========

Handling and Storage Precautions:STORE IN SEALED CNTNR IN COOL, DRY LOCATION. KEEP AWAY FROM OXIDIZERS. KEEP AWAY FROM IGNITION SOURCES.
Other Precautions:AVOID EYE/SKIN CONTACT. AVOID BREATHING VAPORS. SUBJ TO REPORTING REQUIREMENTS OF SARA TITLE III, SECTION 313.

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:WEAR NIOSH/MSHA APPROVED FACE MASK WITH ORGANIC VAPOR CANISTER.
Ventilation:USE ONLY IN WELL VENTILATED AREA.
Protective Gloves:WEAR RUBBER GLOVES.
Eye Protection:CHEMICAL WORKERS GOGGLES .
Work Hygienic Practices:NONE SPECIFIED BY MANUFACTURER.
Supplemental Safety and Health
NONE SPECIFIED BY MANUFACTURER.

========== Physical/Chemical Properties ==========

HCC:F5
Boiling Pt:B.P. Text:149F,65C
Melt/Freeze Pt:M.P/F.P Text:-144F,-98C
Vapor Pres:100 MM
Vapor Density:1.1
Spec Gravity:0.79
Evaporation Rate & Reference:>1 (ETHER=1)
Solubility in Water:100
Appearance and Odor:CLEAR COLORLESS LIQUID
Percent Volatiles by Volume:100

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
OXIDIZING AGENTS, CHRONIC ANHYDRIDE, LEAD PERCHLORATE, PERCHLORIC ACIDS.

========== Disposal Considerations ==========

Waste Disposal Methods:COMPLY WITH ALL APPLICABLE FEDERAL, STATE & LOCAL REGULATIONS.

Disclaimer (provided with this information by the compiling agencies): This information is formulated for use by elements of the Department of Defense. The United States of America in no manner whatsoever, expressly or implied, warrants this information to be accurate and disclaims all liability for its use. Any person utilizing this document should seek competent professional advice to verify and assume responsibility for the suitability of this information to their particular situation.

========== Product Identification ==========

Product ID:F93S 4.4'-DDE 100UG/ML IN METHANOL
MSDS Date:11/13/1991
FSC:6550
NIIN:00F051012
MSDS Number: CCDKM
=== Responsible Party ===
Company Name:CHEM SERVICE INC
Address:660 TOWER LN
Box:3108
City:WEST CHESTER
State:PA
ZIP:19381-3108
Country:US
Info Phone Num:215-692-3026/800-452-9994
Emergency Phone Num:215-386-2100/215-692-3026
CAGE:84898
=== Contractor Identification ===
Company Name:CHEM SERVICE INC
Box:3108
City:WEST CHESTER
State:PA
ZIP:19381
Country:US
Phone:215-692-3026
CAGE:84898
Company Name:CHEM SERVICE, INC
Address:660 TOWER LN
Box:599
City:WEST CHESTER
State:PA
ZIP:19301-9650
Country:US
Phone:610-692-3026
CAGE:8Y898

========== Composition/Information on Ingredients ==========

Ingred Name:P,P-DICHLORODIPHENYL DICHLOROETHYLENE (ANIMAL CARCINOGEN
BY IARC GROUP 2B) *96-3*
CAS:72-55-9
RTECS #:KV9450000
Other REC Limits:1 MG/CUM
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:METHANOL (METHYL ALCOHOL), COLUMBIAN SPIRITS *96-3*
CAS:67-56-1
RTECS #:PC1400000
Other REC Limits:200 PPM
OSHA PEL:200 PPM
ACGIH TLV:200 PPM
EPA Rpt Qty:5000 LBS
DOT Rpt Qty:5000 LBS

========== Hazards Identification ==========

LD50 LC50 Mixture:ORAL LD50(RAT): 5628MG/KG METHYL ALCOHOL
Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO

Health Hazards Acute and Chronic:METHYL ALCOHOL: MAY BE FATAL IF ABSORBED THROUGH THE SKIN/INHALED. MAY BE FATAL/CAUSE BLINDNESS IF SWALLOWED. REPEATED EXPOSURE CAN CAUSE EYE INJURY. CAN CAUSE LIVER & KIDNEY DAMAGE & CARDIOVASCULAR S YSTEM INJURY. GI DISTURBANCES.
Explanation of Carcinogenicity:NONE
Effects of Overexposure:METHYL ALCOHOL: GASTROINTESTINAL DISTURBANCES, CONVULSIONS

========== First Aid Measures ==========

First Aid:METHYL ALCOHOL: EYES: FLUSH CONTINUOUSLY W/WATER FOR 15-20 MINS. SKIN: FLUSH W/WATER FOR 15-20 MINS. IF NO BURNS, USE SOAP & WATER TO CLEANSE. INHALATION: REMOVE TO FRESH AIR. GIVE OXYGEN/CPR IF NECES SARY. OBTAIN MEDICAL ATTENTION IN ALL CASES.

========== Fire Fighting Measures ==========

Flash Point:51.8F
Lower Limits:6
Upper Limits:36
Extinguishing Media:CO2, DRY CHEMICAL POWDER
Fire Fighting Procedures:DON'T USE WATER!

========== Accidental Release Measures ==========

Spill Release Procedures:EVACUATE AREA. WEAR OSHA REGULATED EQUIPMENT. VENTILATE AREA. ABSORB ON VERMICULITE/SIMILAR MATERIAL. SWEEP UP & PLACE IN AN APPROPRIATE CONTAINER. HOLD FOR DISPOSAL. WASH CONTAMINATED SURFACES TO REM OVE RESIDUES.

========== Handling and Storage ==========

Handling and Storage Precautions:KEEP TIGHTLY CLOSED. STORE IN A COOL, DRY PLACE. STORE ONLY W/COMPATIBLE CHEMICALS. HYGROSCOPIC.
Other Precautions:AVOID CONTACT W/SKIN, EYES & CLOTHING. DON'T BREATHE VAPORS. PERSONS NOT SPECIFICALLY & PROPERLY TRAINED SHOULDN'T HANDLE THIS CHEMICAL/ITS CONTAINER. THIS PRODUCT IS FOR LABORATORY USE ONLY.

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:OSHA/MSHA APPROVED SAFETY EQUIPMENT REQUIRED.
Ventilation:THIS CHEMICAL SHOULD BE HANDLED ONLY IN A HOOD.
Eye Protection:EYE SHIELDS
Work Hygienic Practices:DON'T WEAR SHOES/CLOTHING UNTIL ABSOLUTELY FREE OF CHEMICAL ODORS. CONTACT LENSES SHOULDN'T BE WORN IN THE LABORATORY.
Supplemental Safety and Health
THIS PRODUCT MAY NOT BE USED AS DRUGS, COSMETICS, AGRICULTURAL/PESTICIDAL PRODUCTS, FOOD ADDITIVES/AS HOUSEHOLD CHEMICALS. ALL CHEMICALS SHOULD BE CONSIDERED HAZARDOUS-AVOID PHYSICAL CONTACT. DATA INF ORMATION IS FOR THE SOLVENT METHYL ALCOHOL.

========== Physical/Chemical Properties ==========

Boiling Pt:B.P. Text:148.28F
Melt/Freeze Pt:M.P/F.P Text:-144.4F
Vapor Pres:96
Vapor Density:1.11
Solubility in Water:MISCIBLE
Appearance and Odor:COLORLESS LIQUID

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
STRONG ACIDS, ACID HALIDES, ANHYDRIDES, STRONG OXIDIZING AGENTS, STRONG REDUCING AGENTS, ACTIVE METALS; SODIUM
Stability Condition to Avoid:MOISTURE
Hazardous Decomposition Products:TOXIC FUMES

========== Disposal Considerations ==========

Waste Disposal Methods:BURN IN A CHEMICALS INCINERATOR EQUIPPED W/AN AFTERBURNER & SCRUBBER/IN ACCORDANCE W/LOCAL, STATE & FEDERAL REGULATIONS.

International Chemical Safety Cards

METHYL ETHYL KETONE

ICSC: 0179

METHYL ETHYL KETONE
2-Butanone
Methylpropanone
MEK
$CH_3COC_2H_5$
Molecular mass: 72.1

CAS # 78-93-3
RTECS # EL6475000
ICSC # 0179
UN # 1193
EC # 606-002-00-3

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable.	NO open flames, NO sparks, and NO smoking.	Powder, AFFF, foam, carbon dioxide.
EXPLOSION	Vapour/air mixtures are explosive.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling. Use non-sparking handtools.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE			
• **INHALATION**	Cough. Dizziness. Dullness. Headache. Nausea. Shortness of breath. Unconsciousness. Vomiting.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
• **SKIN**	MAY BE ABSORBED! Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
• **EYES**	Redness. Pain.	Face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• **INGESTION**	Abdominal cramps. Confusion (further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Give plenty of water to drink. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer (extra personal protection: self-contained breathing apparatus).	Fireproof. Separated from strong oxidants, strong acids. Cool. Well closed.	F symbol Xi symbol R: 11-36/37 S: 9-16-25-33 UN Haz Class: 3 UN Pack Group: II

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0179

International Chemical Safety Cards

METHYL ETHYL KETONE

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.

PHYSICAL DANGERS:
The vapour is heavier than air and may travel along the ground; distant ignition possible.

CHEMICAL DANGERS:
Reacts violently with strong oxidants and inorganic acids causing fire hazard.

OCCUPATIONAL EXPOSURE LIMITS (OELs):
TLV (as TWA): 200 ppm; 590 mg/m^3; (as STEL: 300 ppm; 885 mg/m^3 (ACGIH 1992-1993).
MAK: 200 ppm; 590 mg/m^3; D (1992).

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation and through the skin, and by ingestion.

INHALATION RISK:
A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance irritates the eyes, the skin and the respiratory tract. The substance may cause effects on the central nervous system.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The liquid defats the skin.

PHYSICAL PROPERTIES

Boiling point: 80°C
Melting point: -86°C
Relative density (water = 1): 0.8
Solubility in water, g/100 ml at 20°C: 29
Vapour pressure, kPa at 20°C: 10.5
Relative vapour density (air = 1): 2.41
Flash point: -9°C (c.c.)
Auto-ignition temperature: 505°C
Explosive limits, vol% in air: 1.8-11.5
Octanol/water partition coefficient as log Pow: 0.29

ENVIRONMENTAL DATA

This substance may be hazardous to the environment; special attention should be given to water organisms.

NOTES

The odour warning when the exposure limit value is exceeded is insufficient.

Transport Emergency Card: TEC (R)-88
NFPA Code: H 1; F 3; R 0;

ADDITIONAL INFORMATION

ICSC: 0179 **METHYL ETHYL KETONE**

1,4-DICHLOROBENZENE

ICSC: 0037

1,4-DICHLOROBENZENE
para-Dichlorobenzene
PDCB
$C_6H_4Cl_2$
Molecular mass: 147

CAS # 106-46-7
RTECS # CZ4550000
ICSC # 0037
UN # 2811
EC # 602-035-00-2

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames. NO contact with strong oxidants.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Above 66°C explosive vapour/air mixtures may be formed.	Above 66°C use a closed system, ventilation, and explosion-proof electrical equipment.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE!	
• **INHALATION**	Burning sensation. Cough. Drowsiness. Headache. Nausea. Shortness of breath. Vomiting.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
• **SKIN**	Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
• **EYES**	Pain.	Face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• **INGESTION**	Burning sensation. Convulsions. Diarrhoea (further see Inhalation).	Do not eat, drink, or smoke during work. Wash hands before eating.	Give plenty of water to drink. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place (extra personal protection: P2 filter respirator for harmful particles).	Provision to contain effluent from fire extinguishing. Separated from strong oxidants, acids, food and feedstuffs. Keep in a well-ventilated room.	Do not transport with food and feedstuffs. Xn symbol R: 36/38 S: (2-)22-24/25-46 UN Hazard Class: 6.1 UN Packing Group: III Marine pollutant.

SEE IMPORTANT INFORMATION ON BACK

International Chemical Safety Cards

ICSC: 0037

1,4-DICHLOROBENZENE

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** COLOURLESS TO WHITE CRYSTALS WITH A STRONG ODOUR. **PHYSICAL DANGERS:** The vapour is heavier than air. **CHEMICAL DANGERS:** On combustion, forms toxic and corrosive fumes including phosgene, hydrogen chloride. The substance decomposes on contact with acids or acid fumes producing highly toxic fumes. Reacts with strong oxidants. **OCCUPATIONAL EXPOSURE LIMITS (OELs):** TLV: 10 ppm; 60 mg/m^3 (as TWA) (ACGIH 1991-1992). MAK: 50 ppm; 300 mg/m^3; Pregnancy: C (1993). **ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation and by ingestion. **INHALATION RISK:** A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C. **EFFECTS OF SHORT-TERM EXPOSURE:** The vapour irritates the eyes, the skin and the respiratory tract. The substance may cause effects on the blood and central nervous system , resulting in impaired functions and haemolytic anemia. Medical observation is indicated. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The substance may have effects on the liver, kidneys and blood. This substance is possibly carcinogenic to humans.
PHYSICAL PROPERTIES	Boiling point: 174°C Melting point: 53°C Relative density (water = 1): 1.2 Solubility in water: none Vapour pressure, kPa at 55°C: 1.33 Vapour pressure, Pa at 20°C: 170 Relative vapour density (air = 1): 5.08 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.01 Flash point: 66°C c.c. Octanol/water partition coefficient as log Pow: 3.37
ENVIRONMENTAL DATA	The substance is toxic to aquatic organisms.

NOTES

Depending on the degree of exposure, periodic medical examination is indicated. Dichloricide, Paracid, Parazene, Paramoth, Paradow, and Santochlor are trade names.

Transport Emergency Card: TEC (R)-61G12c
NFPA Code: H 2; F 2; R 0;

ADDITIONAL INFORMATION

ICSC: 0037 **1,4-DICHLOROBENZENE**

Material Safety Data Sheet

1,3-Dichlorobenzene, 98%

ACC# 62847

Section 1 - Chemical Product and Company Identification

MSDS Name: 1,3-Dichlorobenzene, 98%
Catalog Numbers: AC151180000, AC151180010, AC151180050, AC151180250, AC151181000, AC151182500 AC151182500, AC151185000
Synonyms: m-Dichlorobenzene; Benzene, 1,3-dichloro-; m-Phenylenedichloride
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
541-73-1	1,3-Dichlorobenzene	98	208-792-1

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: Clear - Colorless Liquid. Flash Point: 67 deg C.
Warning! Harmful if swallowed. Causes eye and skin irritation. **Combustible liquid and vapor.** May be absorbed through intact skin. Causes digestive and respiratory tract irritation.
Target Organs: Kidneys, liver.

Potential Health Effects
Eye: Causes eye irritation.
Skin: Causes skin irritation. May be absorbed through the skin.
Ingestion: Harmful if swallowed. Causes gastrointestinal irritation with nausea, vomiting and diarrhea.
Inhalation: Causes respiratory tract irritation.
Chronic: Chronic exposure may cause liver damage. Chronic exposure may cause kidney damage.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.
Skin: Get medical aid immediately. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Get medical aid. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.

Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Combustible liquid. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. Containers may explode when heated.
Extinguishing Media: Do NOT get water inside containers. For small fires, use dry chemical, carbon dioxide, or water spray. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray. Cool containers with flooding quantities of water until well after fire is out.
Flash Point: 67 deg C (152.60 deg F)
Autoignition Temperature: 640 deg C (1,184.00 deg F)
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 2; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Avoid runoff into storm sewers and ditches which lead to waterways. Remove all sources of ignition. Provide ventilation. Cover with dry earth, dry sand, or other non-combustible material followed with plastic sheet to minimize spreading and contact with water. Stop leak only if you can do so without risk.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use only in a well-ventilated area. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Keep away from heat, sparks and flame. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.
Storage: Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
1,3-Dichlorobenzene	none listed	none listed	none listed

OSHA Vacated PELs: 1,3-Dichlorobenzene: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: Clear - Colorless Liquid
Odor: None reported.
pH: Not available.
Vapor Pressure: 1.8 hPa @ 20 C
Vapor Density: 5.07
Evaporation Rate: Not available.
Viscosity: 1.045 cP 23 deg C
Boiling Point: 172.0 - 173.0 deg C @ 760.00m
Freezing/Melting Point:-24 deg C
Decomposition Temperature:> 300 deg C
Solubility: Insoluble.
Specific Gravity/Density:1.2880g/cm3
Molecular Formula:C6H4Cl2
Molecular Weight:147.00

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, ignition sources, excess heat.
Incompatibilities with Other Materials: Strong oxidizing agents, aluminum.
Hazardous Decomposition Products: Hydrogen chloride, carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 541-73-1: CZ4499000
LD50/LC50:
Not available.
intraperitoneal, mouse: LD50 = 1062 mg/kg.; Oral, rat: TDLo = 1470 mg/kg/10D-I.; Oral, rat: TDLo = 3330 mg/kg/90D-I.; CAS# 106-46-7 Oral, rat LD50 = 500 mg/kg.; Dermal, rat: LD50 = >2gm/kg. The toxicity of this product is partially based on the hazards associated with
Carcinogenicity:
CAS# 541-73-1: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information.
Teratogenicity: No data available.
Reproductive Effects: No information.
Mutagenicity: Gene conversion and mitotic recombination: Saccharomyces cerevisiae =5ppm.; Micronucleus test-Intraperitoneal, mouse = 175 mg/kg/24H.
Neurotoxicity: No information.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Fathead Minnow: 12.7 mg/L; 96 Hr; Static Bioassay Experimental BCF Values of 89-740 reported, and 1,3-Dichlorobenzene was detected in trout in Lake Ontario. Koc values of 12600-31600 calculated from sediment/water monitoring data in Great Lakes Area. An experimental Koc value of 293 was calculated in a silt loam soil containing 1.9% organic matter. 1,3-Dichlorobenzene can be moderately to highly absorbed to soil. Leaching can occur.
Environmental: No information available.
Physical: No information available.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 541-73-1: waste number U071.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	TOXIC LIQUIDS, ORGANIC, N.O.S.	TOXIC LIQUID ORGANIC NOS (1,3 - DICHLOROBENZENE)
Hazard Class:	6.1	6.1
UN Number:	UN2810	UN2810
Packing Group:	III	III

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 541-73-1 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
CAS# 541-73-1: 100 lb final RQ; 45.4 kg final RQ
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 541-73-1: immediate, delayed, fire.
Section 313

This material contains 1,3-Dichlorobenzene (CAS# 541-73-1, 98%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA. CAS# 541-73-1 is listed as a Priority Pollutant under the Clean Water Act. CAS# 541-73-1 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 541-73-1 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XN N

Risk Phrases:

R 22 Harmful if swallowed.
R 51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)

CAS# 541-73-1: 2

Canada - DSL/NDSL

CAS# 541-73-1 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of B3, D1B, D2A.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 541-73-1 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 11/03/1998
Revision #5 Date: 11/20/2008

o-DICHLOROBENZENE

ICSC: 1066

o-DICHLOROBENZENE
1,2-Dichlorobenzene
ortho-Dichlorobenzene
o-Dichlorobenzol
$C_6H_4Cl_2$
Molecular mass: 147.0

CAS # 95-50-1
RTECS # CZ4500000
ICSC # 1066
UN # 1591
EC # 602-034-00-7

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Above 66°C explosive vapour/air mixtures may be formed.	Above 66°C use a closed system, ventilation.	
EXPOSURE			
• **INHALATION**	Cough. Drowsiness. Sore throat. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
• **SKIN**	Redness. Burning sensation. Symptoms may be delayed. Blisters.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
• **EYES**	Redness. Pain.	Face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• **INGESTION**	Burning sensation. Diarrhoea. Nausea. Vomiting.	Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment (extra personal protection: filter A for organic vapours.	Separated from strong oxidants, acids, food and feedstuffs and aluminum compounds.	Do not transport with food and feedstuffs. Xn symbol N symbol R: 22-36/37/38-50/53 S: (2-)23-60-61 UN Hazard Class: 6.1 UN Packing Group: III Marine pollutant.

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1066

International Chemical Safety Cards

o-DICHLOROBENZENE

ICSC: 1066

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** COLOURLESS TO PALE-YELLOW, VISCOUS LIQUID , WITH CHARACTERISTIC ODOUR. **PHYSICAL DANGERS:** **CHEMICAL DANGERS:** The substance decomposes on heating producing toxic and corrosive gases and fumes, e.g. hydrogen chloride. See ICSC 0163. Reacts with oxidants, acids, aluminium and its alloys. **OCCUPATIONAL EXPOSURE LIMITS (OELs):** TLV: 25 ppm; 150 mg/m^3 (as TWA); 50 ppm; 301 mg/m^3 (as STEL) (skin) (ACGIH 1995-1996). MAK: 50 ppm; 300 mg/m^3; (1992). **ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation and by ingestion. **INHALATION RISK:** A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20° C. **EFFECTS OF SHORT-TERM EXPOSURE:** The vapour irritates the eyes, the skin and the respiratory tract. The liquid, left on the skin may produce blistering. The substance may cause effects on the the central nervous system. Exposure could cause lowering of consciousness. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Repeated or prolonged contact may cause skin sensitization. The substance may have effects on the liver and kidneys.
PHYSICAL PROPERTIES	Boiling point: 180-183°C Melting point: -17°C Relative density (water = 1): 1.3 Solubility in water: none Vapour pressure, kPa at 20°C: 0.16 Relative vapour density (air = 1): 5.1 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.006 Flash point: 66°C c.c. Auto-ignition temperature: 648°C Explosive limits, vol% in air: 2.2-9.2 Octanol/water partition coefficient as log Pow: 3.38
ENVIRONMENTAL DATA	It is strongly advised not to let the chemical enter into the environment because it persists in the environment.

NOTES

Protective clothing recommended (for more than 8 hours: Viton(TM)).

Transport Emergency Card: TEC (R)-817
NFPA Code: H2; F2; R0;

ADDITIONAL INFORMATION

ICSC: 1066 **o-DICHLOROBENZENE**

VULCAN CHEMICALS DIVISION, VULCAN MATERIAL COMPANY -- SOLVENT 111;1,1,1-TRICHLOROETHANE;IND.GRADE -- 6810-00-930-6311

========== Product Identification ==========

Product ID:SOLVENT 111;1,1,1-TRICHLOROETHANE;IND.GRADE
MSDS Date:10/01/1988
FSC:6810
NIIN:00-930-6311
MSDS Number: BFXFC
=== Responsible Party ===
Company Name:VULCAN CHEMICALS DIVISION, VULCAN MATERIAL COMPANY
Address:NO 1 METROPLEX DR
Box:7689
City:BIRMINGHAM
State:AL
ZIP:35253
Country:US
Info Phone Num:205-877-3459
Emergency Phone Num:316-524-5751
CAGE:EO675
=== Contractor Identification ===
Company Name:VULCAN CHEMICALS
Box:530390
City:BIRMINGHAM
State:AL
ZIP:35253-0390
Country:US
Phone:316-524-5751
CAGE:EO675
Company Name:VULCAN MATERIALS CO
Address:NO 1 METROPLEX DR
Box:530390
City:BIRMINGHAM
State:AL
ZIP:35253
Country:US
Phone:316-524-5751
CAGE:1B637

========== Composition/Information on Ingredients ==========

Ingred Name:METHYL CHLOROFORM (1,1,1-TRICHLOROEHANE) (SARA III)
CAS:71-55-6
RTECS #:KJ2975000
Fraction by Wt: 96.5%
OSHA PEL:350 PPM/450 STEL
ACGIH TLV:350 PPM/450STEL;9192
EPA Rpt Qty:1000 LBS
DOT Rpt Qty:1000 LBS
Ozone Depleting Chemical:1

Ingred Name:1,4-DIOXANE (DIETHYLENE DIOXIDE) (SARA III)
CAS:123-91-1
RTECS #:JG8225000
Fraction by Wt: <3.0%
OSHA PEL:S, 100 PPM
ACGIH TLV:S, 25 PPM; 9293
EPA Rpt Qty:100 LBS
DOT Rpt Qty:100 LBS

========== Hazards Identification ==========

Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Health Hazards Acute and Chronic:ACUTE:IRRITATION OF EYES(CORNEAL INJURY POSSIBLE)SKIN AND RESP.SYSTEM;DIZZINESS,DROWSINESS,THROAT IRRITATION;CNS DEPRESSION,CARDIAC SENSITIZATION,UNCONSCIOUSNESS AT HIGH CONCENTRATIONS. CHRONIC:DEFATT ING OF SKIN,DERMATITIS,LIVER OR KIDNEY DAMAGE POSSIBLE.
Explanation of Carcinogenicity:DIETHYLENE DIOXIDE(DIOXANE) IS SUSPECTED ANIMAL CARCINOGEN.NTP/IARC USED AS STABLIZER IN SMALL AMOUNTS.
Effects of Overexposure:CAN CAUSE:VOMIT,NAUSEA,DROWSINESS, UNCONSCIOUSNESS & EVEN DEATH IN EXTREME CASES.
Medical Cond Aggravated by Exposure:PRE-EXISTING CONDITIONS MAY BE WORSEN;ACUTE AND CHRONIC LIVER DISEASE RHYTHM DISORDERS OF THE HEART.

========== First Aid Measures ==========

First Aid:SKIN:WASH W.SOAP & H2O. EYES:FLUSH W. H2O. INGESTED:DON'T INDUCE VOMITING. INHALED:REMOVE TO FRESH AIR. GIVE CPR/ OXYGEN IF NEED. KEEP WARM & QUIET. REMOVE CONTAMINATED CLOTHING. NEVER GIVE ANYTHING B Y MOUTH TO UNCONSCIOUS PERSON.

========== Fire Fighting Measures ==========

Flash Point:NONE
Lower Limits:7.5
Upper Limits:15.0
Extinguishing Media:WATER,FOAM,DRY CHEMICAL,CARBON DIOXIDE(CO2)
Fire Fighting Procedures:SELF-CONTAINED BREATHING EQUIP.SHOULD BE USED.KEEP COOL
Unusual Fire/Explosion Hazard:VAPORS CAN BE IGNITED BY ENERGY IGNITION SOURCE.DECOMPOSES WITH FIRE OR HOT SURFACES TO ACIDIC GASES

========== Accidental Release Measures ==========

Spill Release Procedures:EVACUATE THE AREA,VENTILATE, & AVOID BREATHG VAP.USE APPROPRIATE PROTCTV GEARS.DIKE AREA TO CONTAIN SPILL.CLEAN UP AREA BY MOPPNG OR WITH ABSORBENT MATL & PLACE IN CLOSED CONTAINERS FOR DISPOSAL. AVOI D CONTAMINATING GROUND WATER.DO NOT FLUSH TO SEWER

========== Handling and Storage ==========

Handling and Storage Precautions:STORE IN COOL,DRY,WELL VENTILATED,LOW FIRE RISK AREA. PROTECT FROM PHYSICAL DAMAGE.KEEP CONTAINERS CLOSED. MAINTAIN STRICT HYGIENE FOR CHEM HANDLING.
Other Precautions:AVOID CONTACT W/SKIN & AVOID BREATHG VAP.DO NOT WORK AROUND SPILLED AREA.DO NOT EAT/DRINK IN WORK AREA; NOTE TO DR:ADRENLIN SHOULD NEVER BE GIVEN TO PERSONS OVEREXPOSED TO 1,1,1-TRICHLOROETHAN

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:USE NIOSH/MSHA APPROVED RESPIRATOR FOR METHYL CHLOROFORM IF ABOVE PEL/TLV OR SCBA IN AN ENCLOSED AREA.
Ventilation:USE LOCAL EXHAUST/GENERAL TO MAINTAIN PEL/TLV.
Protective Gloves:NEOPRENE/VITON
Eye Protection:CHEM.SAFETY GOGGLES
Other Protective Equipment:SAFETY SHOWER & EYEWASH STATION SHOULD BE AVAILABLE.
Work Hygienic Practices:AVOID CONTACT WITH EYES AND SKIN;DO NOT BREATHE VAPORS/MIST;DO NOT EAT,SMOKE OR DRINK IN AN ENCLOSED AREA.
Supplemental Safety and Health

========== Physical/Chemical Properties ==========

HCC:V2
Boiling Pt:B.P. Text:165F/74C
Vapor Pres:100
Vapor Density:4.6
Spec Gravity:1.32
Evaporation Rate & Reference:(ETHER =1) =0.4
Solubility in Water:NEGLIGIBLE
Appearance and Odor:COLORLESS CLEAR LIQUID,MILDLY SWEET
Percent Volatiles by Volume:100

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
STRONG ALKALIES,OXIDIZERS,& REACTIVE MATERIALS.
Stability Condition to Avoid:CONTACT WITH OPEN FLAME,HOT SURFACES OR EMISSIONS FRM.WELD A
Hazardous Decomposition Products:HYDROGEN CHLORIDE,PHOSGENE, & OTHER HIGHLY TOXIC SUBSTANCE

========== Disposal Considerations ==========

Waste Disposal Methods:RECOVERED LIQUIDS MAY BE SENT TO LICENSED RECLAIMER OR INCINERATION FACILITY. CONTAMINATED MATERIAL MUST BE DISPOSED OF IN A PERMITTED WASTE MANAGEMENT FACILITY. CONSULT FEDERAL,STATE,OR LOCAL DISPOSA L AUTHORITIES FOR APPROVED PROCEDURES.

Appendix D

HEARING CONSERVATION PLAN

C&S ENGINEERS

Hearing Conservation Plan

1.0 Purpose

To establish guidelines for protecting employees from the effects of noise levels exceeding the Permissible Exposure Limits (PEL's) as established by the Occupational Safety and Health Administration Construction Industry Standard 29 CFR 1926.52. The protection against the effects of noise exposure shall be provided when sound levels exceed those shown in Table D-2 of 29 CFR1926.52 when measured on the A-scale of a standard sound level meter.

2.0 Scope

This plan provides policy guidance and coordination on hearing conservation matters within C & S Companies The plan applies to all employees of C & S Companies

3.0 Definitions

Decibels on the A Scale (dBA) the unit of measurement to indicate noise level.

Time Weighted Average (TWA) the formula utilized to calculate the noise level impact for an eight hour period.

4.0 Responsibilities

Health & Safety Manager- The health and safety manager will use these guidelines in the development of site specific health and safety plan (HASP) and in the selection of engineering methods, administrative controls and personal protective equipment.

Employee- The employee is responsible for attending training and wearing the appropriate personal protective equipment (PPE).

5.0 Guidelines

When employees are subjected to sound levels exceeding those listed in the table below, feasible administrative or engineering controls will be utilized. If such controls fail to reduce sound level within the levels of the table, personal protective equipment as required by OSHA Standard 29 CFR 1926 subpart E, shall be provided and used to reduce sound levels of the Table.

PERMISSIBLE NOISE EXPOSURES (Table D-2, 29 CFR 1926.52)

Duration per day, hour's	dBA slow response
8	**90**
6	**92**
4	**95**
3	**97**
2	**100**
1 ½	**102**
1	**105**
½	**110**
¼ or less	**115**

When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. Exposure to different levels for various periods of time shall be computed according to the formula set forth below.

F(e)=(T(1)divided by L(1))+(T(2) divided by L(2))+…+(T(n)divided by L(n)) where:

F(e) = the equivalent noise exposure factor
T = the period of noise exposure at any essentially constant level
L = the duration of the permissible noise exposure at the constant level (from table above)

If the value of F(e) exceeds unity (1) the exposure exceeds the permissible levels.

Sample computation:

110 dBA @ ¼ hour
100 dBA @ ½ hour
90 dBA @ 1 ½ hours

F(e) = (1/4 divided by ½)+(1/2 divided by 2) + (1 ½ divided by 8)
F(e) = 0.500+0.25+0.188
F(e) = 0.938

In any case exposure to impulse or impact noise should never exceed 140 dB peak sound pressure level.

5.1 Hearing Conservation

TWA noise levels shall be measured at all potentially hazardous noise work sites where routine use of equipment or machines is known to produce levels above the action level. Instrumentation used must meet or exceed requirements for type 2 sound level meters (ANSI Standard S1.4-1983). Acoustical calibration must be performed before and after each day's survey. Continuous and intermittent noise levels shall be measured using "A" weighting, with the meter set to "slow."

Engineering controls shall be the primary means of eliminating personnel exposure to potentially hazardous noise. All practical design approaches to reduce noise levels to below hazardous level by engineering principles shall be explored. Where engineering controls are undertaken, the design objective shall be to reduce steady-state levels to below 85 dBA, regardless of employee exposure time, and to reduce impulse noise levels to below 140 dB peak SPL. New equipment being considered for purchase shall have the lowest sound emission levels that are technologically and economically possible and compatible with performance requirements. Acoustics should be considered in specifications for all new projects, new facilities, substantial modification projects and new equipment. The objective should be to ensure, if possible, a steady state level less than 85 dBA at all employee work sites.

5.2 Personal Hearing Protectors

The use of personal hearing protectors to limit noise exposure is considered to be an interim protective measure, while engineering control measures are being explored. Such devices shall constitute a permanent measure, only if engineering controls are not technologically, economically, or operationally possible.

C & S Companies shall provide, free of charge, to all employees personal hearing protectors who work at locations designated as hazardous noise areas, or operate hazardous noise equipment. C & S Companies shall maintain an adequate supply of all sizes of approved ear muff and disposable earplugs. These hearing protectors must be capable of attenuating worker noise exposure below a TWA of 85 dBA. If hearing protectors do not provide sufficient attenuation, administrative control of the exposure shall be necessary.

Hearing aids may not be used in place of approved hearing protectors, however, certain hearing aids may be used with over-the-ear hearing protectors after evaluation and approval by a certified audiologist or otolaryngologist, or physician, on a case by case basis.

Employees shall receive adequate and effective training in the proper care and use of personal hearing protectors.

5.3 Training

All employees who routinely work at sites designated as hazardous noise areas shall receive training on the following:

- The effects of noise on hearing
- The purpose of hearing protection
- The advantages, disadvantages, and attenuation of various hearing protectors
- The mandatory requirement to wear assigned protective equipment
- The purpose of audiometric testing
- An explanation of the test procedures

- Encouragement to use hearing protectors when they are exposed to hazardous noise during off work hours

5.4 **Audiometric Testing**

All employees who are routinely exposed to hazardous noise levels, described as exceeding permissible levels in paragraph 5.0, shall be placed in a hearing testing program. That program shall include pre-placement, periodic (annually), and termination audiograms. Employees who infrequently or incidentally enter designated hazardous noise work sites need not participate in the audiometric testing program.

All audiometric testing shall be performed by a licensed or certified audiologist, otolaryngologist, or other physician, or by a technician who is certified by the Council for Accreditation in Occupational Hearing Conservation. A technician who performs audiometric tests shall be responsible to an audiologist, an otolaryngologist, or other physician.

The test environment shall meet the requirements of background sound pressure levels as required in OSHA Standard 29 1910.95, appendix D, Audiometric Test Rooms.

The audiometric test shall include pure tone, air induction, and hearing threshold examinations of each ear at the test frequencies of 500, 1000, 2000, 3000, 4000, and 6,000 Hz.

Employee audiometric testing shall not be conducted within 14 hours of employee exposure to workplace noise.
A standard threshold shift is a change in hearing threshold relative to the baseline examination of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear.

Employees shall be notified within ten days of any standard threshold shift identified by audiometric testing. Employees identified as having a standard threshold shift shall have their work site, equipment and machinery re-evaluated to determine permissible noise exposure levels and the effectiveness of engineering control and or personal hearing protection.

6.0 Record retention

All employee audiometric testing results shall be maintained by C & S Companies as part of the employee personal file.

7.0 Program review

The C & S Companies hearing conservation program shall receive an annual review for effectiveness and applicability.

Appendix E

EXCAVATION/TRENCHING GUIDELINE

C&S ENGINEERS

C&S ENGINEERS, INC. HEALTH & SAFETY GUIDELINE #14
EXCAVATION/TRENCHING OPERATIONS

TABLE OF CONTENTS

C&S ENGINEERS, INC.
EXCAVATION/TRENCHING OPERATIONS

1.0 PURPOSE

To establish safe operating procedures for excavation/trenching operations at C&S work sites.

2.0 SCOPE

Applies to all C&S activity where excavation or trenching operations take place.

3.0 DEFINITIONS

Excavation — Any manmade cavity or depression in the earth's surface, including its sides, walls, or faces, formed by earth removal and producing unsupported earth conditions by reasons of the excavation.

Trench — A narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench is not greater than 15 feet.

4.0 RESPONSIBILITY EMPLOYEES

Employees — All employees must understand and follow the procedures outlined in this guideline during all excavation and trenching operations.

Health and Safety Coordinator/Officer (HSC/HSO) - The HSC/HSO is responsible for ensuring that these procedures are implemented at each work site.

5.0 GUIDELINES

5.1 Hazards Associated With Excavation/Trenching

The principal hazards associated with excavation/trenching are:

- Suffocation, crushing, or other injury from falling material.
- Damage/failure of installed underground services and consequent hazards.
- Tripping, slipping, or falling.
- Possibility of explosive, flammable, toxic, or oxygen-deficient atmosphere in excavation.

5.2 Procedures Prior to Excavation

1. Underground Utilities

   - Determine the presence and location of any underground chemical or utility pipes, electrical, telephone, or instrument wire or cables.
   - If the local DigSafely NY is unable to locate private/domestic or plant utilities, then an independent utility locating service must be contacted and mobilized to the site.
   - Identify the location of underground services by stakes, markers or paint.
   - Arrange to de-energize or isolate underground services during excavation. If not possible, or if location is not definite, method of excavation shall be established to minimize hazards by such means as:

     a) Use of hand tools in area of underground services.
     b) Insulating personnel and equipment from possible electrical contact.
     c) Use of tools or equipment that will reduce possibility of damage to underground services and hazard to worker.

2. Identify Excavation Area — Areas to be excavated shall be identified and segregated by means of barricades, ropes, and/or signs to prevent access of unauthorized personnel and equipment. Suitable means shall be provided to make barriers visible at all times.
3. Surface Water Provide means of diverting surface water from excavation.
4. Shoring/Bracing — Shoring or bracing that may be required for installed equipment adjacent to the excavation shall be designed by a competent person.
5. Structural Ramps — Structural ramps that are used solely by employees as a means of access to or egress from the excavation shall be designed by a competent person.

5.3 Procedures For Doing The Excavation

1. **Determine the need for shoring/sloping** — the type of soil will establish the need for shoring, slope of the excavation, support systems, and equipment to be used. The soil condition may change as the excavation proceeds. Appendices A, B, C, D, E, and F of the OSHA Excavation Regulation, 29 CFR 1926 Subpart P, are to be used in defining shoring and sloping requirements.

2. **Mobile equipment** — For safe use of mobile industrial equipment in or near the excavation, the load carrying capacity of soil shall be established and suitable protection against collapse of soil provided by the use of mats, barricades, restricting the location of equipment, or shoring.

3. Excavated material (spoil) shall be stored at least two (2) feet from the edge of the excavation.

4. All trench (vertical sides) excavations greater than five (5) feet deep shall be shored.

5. The excavation shall be inspected daily for changes in conditions, including the presence of ground water, change in soil condition, or effects of weather such as rain or freeze. A safe means of continuing the work shall be established based on changes in condition. Typically test trench excavations made as part of an environmental subsurface nvestigation are made and backfilled the same day.

6. Appropriate monitoring for gas, toxic, or flammable materials will be conducted to establish the need for respiratory equipment, ventilation, or other measures required to continue the excavation safely.

7. Adequate means of dewatering the excavation shall be provided by the contractor as required.

8. A signal person shall be provided to direct powered equipment if working in the excavation with other personnel.

9. A signal person shall be provided when backfilling excavations to direct powered equipment working in the excavation with other personnel.

10. Warning vests will be worn when employees are exposed to public vehicular traffic.

11. Employees shall stand away from vehicles being loaded or unloaded, and shall not be permitted underneath loads handled by lifting or dragging equipment.

12. Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, shall be readily available if hazardous atmospheric conditions exist or may be expected to develop. The specifics will be determined by the HSC/HSM.

13. Walkways or bridges with standard guardrail shall be provided where employees or equipment are required or permitted to cross over excavations.

5.4 Entering the Excavation

No C&S Engineers, Inc., employee shall enter an excavation which fails to meet the requirements of Section 5.3 of this guideline.

6.0 REFERENCES

29 CFR 1926, Subpart P - Excavations

7.0 ATTACHMENTS

29 CFR 1926 Subpart P - Appendices A, B, F

• **Part Number:**	1926
• **Part Title:**	Safety and Health Regulations for Construction
• **Subpart:**	P
• **Subpart Title:**	Excavations
• **Standard Number:**	1926 Subpart P App A
• **Title:**	Soil Classification

(a) Scope and application - (1) Scope. This appendix describes a method of classifying soil and rock deposits based on site and environmental conditions, and on the structure and composition of the earth deposits. The appendix contains definitions, sets for requirements, and describes acceptable visual and manual tests for use in classifying soils.

(2) Application. This appendix applies when a sloping or benching system is designed in accordance with the requirements set fo 1926.652(b)(2) as a method of protection for employees from cave-ins. This appendix also applies when timber shoring for excav designed as a method of protection from cave-ins in accordance with appendix C to subpart P of part 1926, and when aluminum shoring is designed in accordance with appendix D. This Appendix also applies if other protective systems are designed and selec from data prepared in accordance with the requirements set forth in 1926.652(c), and the use of the data is predicated on the us classification system set forth in this appendix.

(b) Definitions. The definitions and examples given below are based on, in whole or in part, the following; American Society for T Materials (ASTM) Standards D653-85 and D2488; The Unified Soils Classification System; The U.S. Department of Agriculture (US Textural Classification Scheme; and The National Bureau of Standards Report BSS-121.

"Cemented soil" means a soil in which the particles are held together by a chemical agent, such as calcium carbonate, such that a hand-size sample cannot be crushed into powder or individual soil particles by finger pressure.

"Cohesive soil" means clay (fine grained soil), or soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical sideslopes, and is plastic when moist. Cohesive soil is hard to break up when dry, and exhibits significant cohesion when submerged. Cohesive soils include clayey silt, sandy clay, silty clay, clay and organic clay.

"Dry soil" means soil that does not exhibit visible signs of moisture content.

"Fissured" means a soil material that has a tendency to break along definite planes of fracture with little resistance, or a material that exhibits open cracks, such as tension cracks, in an exposed surface.

"Granular soil" means gravel, sand, or silt (coarse grained soil) with little or no clay content. Granular soil has no cohesive strength. Some moist granular soils exhibit apparent cohesion. Granular soil cannot be molded when moist and crumbles easily when dry.

"Layered system" means two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered.

"Moist soil" means a condition in which a soil looks and feels damp. Moist cohesive soil can easily be shaped into a ball and rolled into small diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.

"Plastic" means a property of a soil which allows the soil to be

deformed or molded without cracking, or appreciable volume change.
"Saturated soil" means a soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a pocket penetrometer or sheer vane.
"Soil classification system" means, for the purpose of this subpart, a method of categorizing soil and rock deposits in a hierarchy of Stable Rock, Type A, Type B, and Type C, in decreasing order of stability. The categories are determined based on an analysis of the properties and performance characteristics of the deposits and the characteristics of the deposits and the environmental conditions of exposure.
"Stable rock" means natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed.
"Submerged soil" means soil which is underwater or is free seeping.
"Type A" means cohesive soils with an unconfined, compressive strength of 1.5 ton per square foot (tsf) (144 kPa) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, no soil is Type A if:
(i) The soil is fissured; or
(ii) The soil is subject to vibration from heavy traffic, pile driving, or similar effects; or
(iii) The soil has been previously disturbed; or
(iv) The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater; or
(v) The material is subject to other factors that would require it to be classified as a less stable material.
"Type B" means:
(i) Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa); or
(ii) Granular cohesionless soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam.
(iii) Previously disturbed soils except those which would otherwise be classed as Type C soil.
(iv) Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration; or
(v) Dry rock that is not stable; or
(vi) Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified as Type B.
"Type C" means:
(i) Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less; or
(ii) Granular soils including gravel, sand, and loamy sand; or
(iii) Submerged soil or soil from which water is freely seeping; or
(iv) Submerged rock that is not stable, or
(v) Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.
"Unconfined compressive strength" means the load per unit area at which a soil will fail in compression. It can be determined by laboratory testing, or estimated in the field using a pocket penetrometer, by thumb penetration tests, and other methods.
"Wet soil" means soil that contains significantly more moisture than moist soil, but in such a range of values that cohesive material will slump or begin to flow when vibrated. Granular material that would exhibit cohesive properties when moist will lose those cohesive properties when wet.

(c) Requirements - (1) Classification of soil and rock deposits. Each soil and rock deposit shall be classified by a competent perso Rock, Type A, Type B, or Type C in accordance with the definitions set forth in paragraph (b) of this appendix.

(2) Basis of classification. The classification of the deposits shall be made based on the results of at least one visual and at least analysis. Such analyses shall be conducted by a competent person using tests described in paragraph (d) below, or in other reco methods of soil classification and testing such as those adopted by the American Society for Testing Materials, or the U.S. Depart Agriculture textural classification system.

(3) Visual and manual analyses. The visual and manual analyses, such as those noted as being acceptable in paragraph (d) of thi shall be designed and conducted to provide sufficient quantitative and qualitative information as may be necessary to identify prc properties, factors, and conditions affecting the classification of the deposits.

(4) Layered systems. In a layered system, the system shall be classified in accordance with its weakest layer. However, each laye classified individually where a more stable layer lies under a less stable layer.

(5) Reclassification. If, after classifying a deposit, the properties, factors, or conditions affecting its classification change in any w changes shall be evaluated by a competent person. The deposit shall be reclassified as necessary to reflect the changed circumst

(d) Acceptable visual and manual tests. - (1) Visual tests. Visual analysis is conducted to determine qualitative information regarc excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil take samples from excavated material.

(i) Observe samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes and the amounts of the particle sizes. Soil that is primarily composed of fine-grained material material is cohesive material. Soil composec of coarse-grained sand or gravel is granular material.

(ii) Observe soil as it is excavated. Soil that remains in clumps when excavated is cohesive. Soil that breaks up easily and does nc clumps is granular.

(iii) Observe the side of the opened excavation and the surface area adjacent to the excavation. Crack-like openings such as tens could indicate fissured material. If chunks of soil spall off a vertical side, the soil could be fissured. Small spalls are evidence of m ground and are indications of potentially hazardous situations.

(iv) Observe the area adjacent to the excavation and the excavation itself for evidence of existing utility and other underground s and to identify previously disturbed soil.

(v) Observed the opened side of the excavation to identify layered systems. Examine layered systems to identify if the layers slop the excavation. Estimate the degree of slope of the layers.

(vi) Observe the area adjacent to the excavation and the sides of the opened excavation for evidence of surface water, water see the sides of the excavation, or the location of the level of the water table.

(vii) Observe the area adjacent to the excavation and the area within the excavation for sources of vibration that may affect the s the excavation face.

(2) Manual tests. Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil a provide more information in order to classify soil properly.

(i) Plasticity. Mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as 1/8-inch in diameter. Cohe material can be successfully rolled into threads without crumbling. For example, if at least a two inch (50 mm) length of 1/8-inch be held on one end without tearing, the soil is cohesive.

(ii) Dry strength. If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is g combination of gravel, sand, or silt). If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clu only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breaks into clumps wh break up into small clumps and which can only be broken with difficulty, and there is no visual indication the soil is fissured, the s considered unfissured.

(iii) Thumb penetration. The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive so test is based on the thumb penetration test described in American Society for Testing and Materials (ASTM) Standard designatior "Standard Recommended Practice for Description of Soils (Visual - Manual Procedure).") Type A soils with an unconfined compre strength of 1.5 tsf can be readily indented by the thumb; however, they can be penetrated by the thumb only with very great eff soils with an unconfined compressive strength of 0.5 tsf can be easily penetrated several inches by the thumb, and can be molde finger pressure. This test should be conducted on an undisturbed soil sample, such as a large clump of spoil, as soon as practicat excavation to keep to a minimum the effects of exposure to drying influences. If the excavation is later exposed to wetting influe flooding), the classification of the soil must be changed accordingly.

(iv) Other strength tests. Estimates of unconfined compressive strength of soils can also be obtained by use of a pocket penetron using a hand-operated shearvane.

(v) Drying test. The basic purpose of the drying test is to differentiate between cohesive material with fissures, unfissured cohesi and granular material. The procedure for the drying test involves drying a sample of soil that is approximately one inch thick (2.5 six inches (15.24 cm) in diameter until it is thoroughly dry:

(A) If the sample develops cracks as it dries, significant fissures are indicated.

(B) Samples that dry without cracking are to be broken by hand. If considerable force is necessary to break a sample, the soil ha cohesive material content. The soil can be classified as an unfissured cohesive material and the unconfined compressive strength determined.

(C) If a sample breaks easily by hand, it is either a fissured cohesive material or a granular material. To distinguish between the t pulverize the dried clumps of the sample by hand or by stepping on them. If the clumps do not pulverize easily, the material is cc fissures. If they pulverize easily into very small fragments, the material is granular.

Next Standard (1926 Subpart P App B)

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• **Part Number:**	1926
• **Part Title:**	Safety and Health Regulations for Construction
• **Subpart:**	P
• **Subpart Title:**	Excavations
• **Standard Number:**	1926 Subpart P App B
• **Title:**	Sloping and Benching

(a) ***Scope and application***. This appendix contains specifications for sloping and benching when used as methods of protecting working in excavations from cave-ins. The requirements of this appendix apply when the design of sloping and benching protectiv is to be performed in accordance with the requirements set forth in § 1926.652(b)(2).

(b) ***Definitions***.

Actual slope means the slope to which an excavation face is excavated.

Distress means that the soil is in a condition where a cave-in is imminent or is likely to occur. Distress is evidenced by such phen the development of fissures in the face of or adjacent to an open excavation; the subsidence of the edge of an excavation; the slu material from the face or the bulging or heaving of material from the bottom of an excavation; the spalling of material from the fa excavation; and ravelling, i.e., small amounts of material such as pebbles or little clumps of material suddenly separating from the excavation and trickling or rolling down into the excavation.

Maximum allowable slope means the steepest incline of an excavation face that is acceptable for the most favorable site condi protection against cave-ins, and is expressed as the ratio of horizontal distance to vertical rise (H:V).

Short term exposure means a period of time less than or equal to 24 hours that an excavation is open.

(c) ***Requirements*** -- (1) ***Soil classification***. Soil and rock deposits shall be classified in accordance with appendix A to subpart I 1926.

(2) ***Maximum allowable slope***. The maximum allowable slope for a soil or rock deposit shall be determined from Table B-1 of tl appendix.

(3) ***Actual slope***. (i) The actual slope shall not be steeper than the maximum allowable slope.

(ii) The actual slope shall be less steep than the maximum allowable slope, when there are signs of distress. If that situation occur slope shall be cut back to an actual slope which is at least ½ horizontal to one vertical (½H:1V) less steep than the maximum allo slope.

(iii) When surcharge loads from stored material or equipment, operating equipment, or traffic are present, a competent person sh determine the degree to which the actual slope must be reduced below the maximum allowable slope, and shall assure that such achieved. Surcharge loads from adjacent structures shall be evaluated in accordance with § 1926.651(i).

(4) ***Configurations***. Configurations of sloping and benching systems shall be in accordance with Figure B-1.

TABLE B-1
MAXIMUM ALLOWABLE SLOPES

SOIL OR ROCK TYPE	MAXIMUM ALLOWABLE SLOPES (H:V)(1) FOR EXCAVATIONS LESS THAN 20 FEET DEEP(3)
STABLE ROCK	VERTICAL (90°)
TYPE A (2)	3/4:1 (53°)
TYPE B	1:1 (45°)
TYPE C	1 ½:1 (34°)

Footnote(1) Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angle rounded off.

Footnote(2) A short-term maximum allowable slope of 1/2H:1V (63°) is allowed in excavations in Type A soil that are 12 feed (3.67 m) or l depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 m) in depth shall be 3/4H:1V (53°).

Footnote(3) Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.

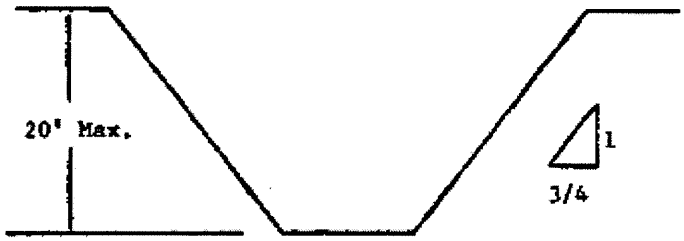
Figure B-1

Slope Configurations

(All slopes stated below are in the horizontal to vertical ratio)

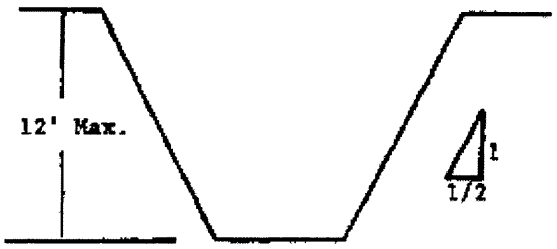
B-1.1 Excavations made in Type A soil.

1. All simple slope excavation 20 feet or less in depth shall have a maximum allowable slope of ¾:1.



SIMPLE SLOPE -- GENERAL

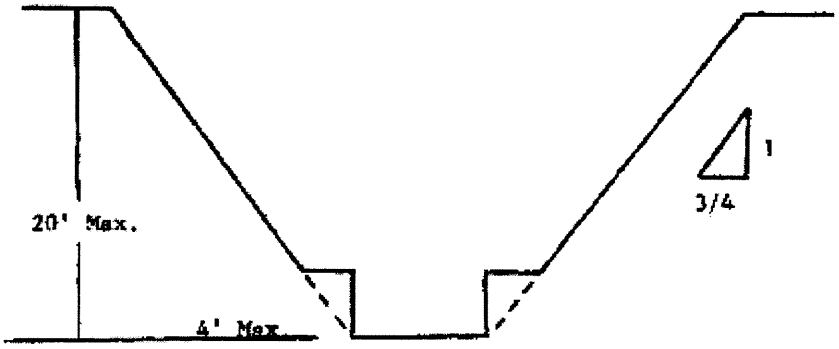
Exception: Simple slope excavations which are open 24 hours or less (short term) and which are 12 feet or less in depth shall have maximum allowable slope of ½:1.



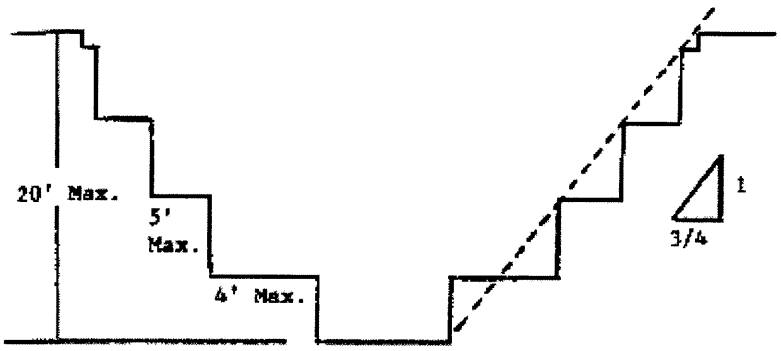
SIMPLE SLOPE -- SHORT TERM

2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 3/4 to 1 and maximum bench dimens

follows:

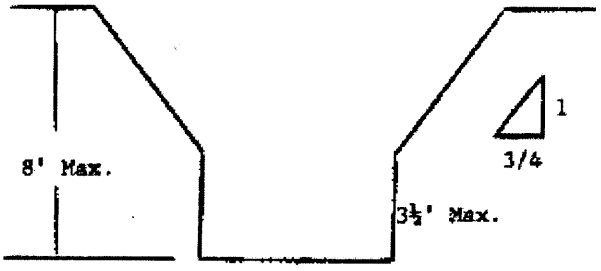


SIMPLE BENCH



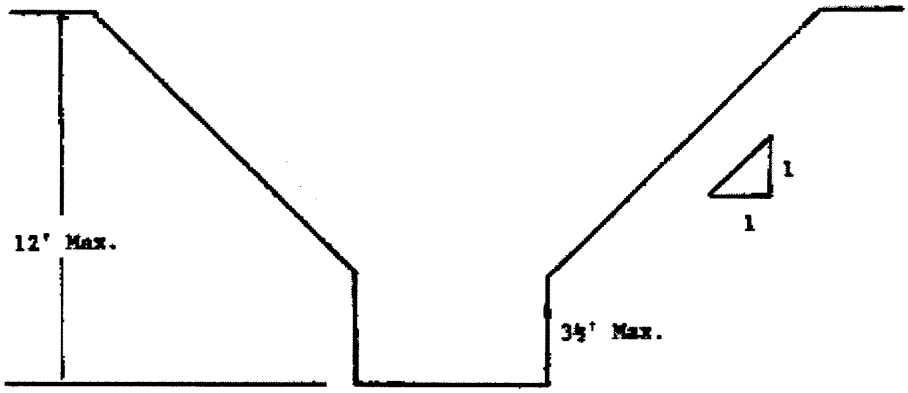
MULTIPLE BENCH

3. All excavations 8 feet or less in depth which have unsupported vertically sided lower portions shall have a maximum vertical sid feet.



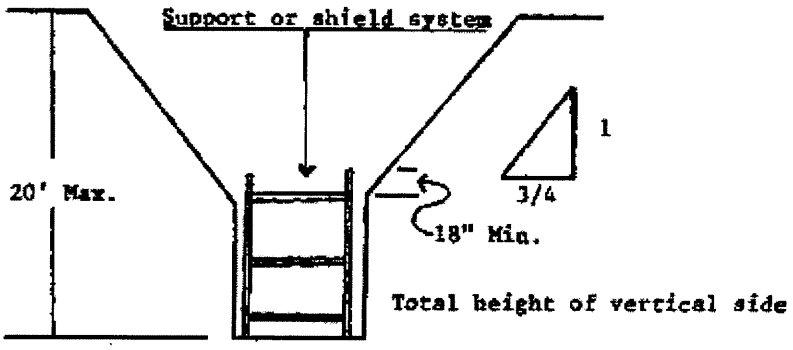
UNSUPPORTED VERTICALLY SIDED LOWER PORTION -- MAXIMUM 8 FEET IN DEPTH)

All excavations more than 8 feet but not more than 12 feet in depth with unsupported vertically sided lower portions shall have a r allowable slope of 1:1 and a maximum vertical side of 3½ feet.



UNSUPPORTED VERTICALLY SIDED LOWER PORTION -- MAXIMUM 12 FEET IN DEPTH)

All excavations 20 feet or less in depth which have vertically sided lower portions that are supported or shielded shall have a maxi allowable slope of ¾:1. The support or shield system must extend at least 18 inches above the top of the vertical side.

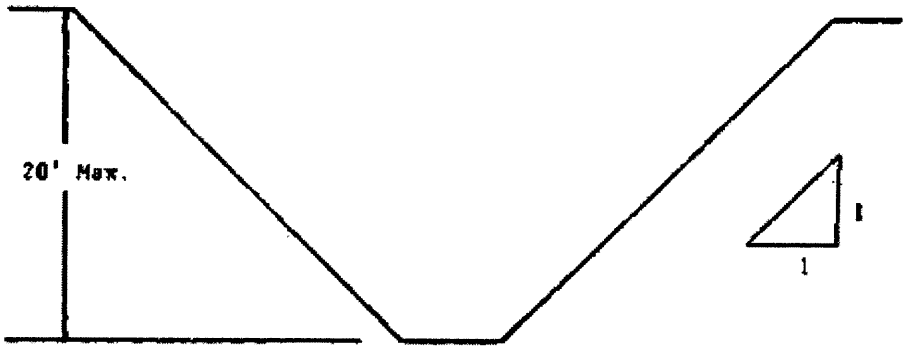


SUPPORTED OR SHIELDED VERTICALLY SIDED LOWER PORTION

4. All other simple slope, compound slope, and vertically sided lower portion excavations shall be in accordance with the other opt permitted under § 1926.652(b).

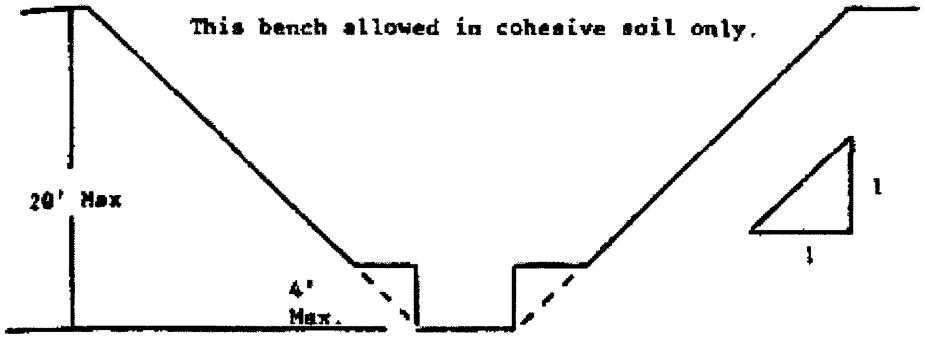
B-1.2 Excavations Made in Type B Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1.

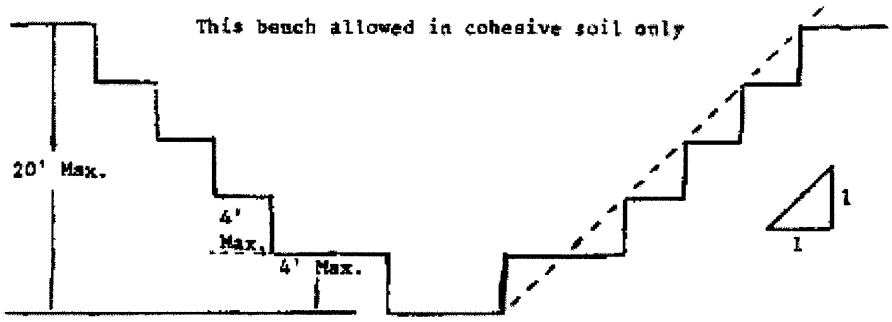


SIMPLE SLOPE

2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1 and maximum bench dimensions

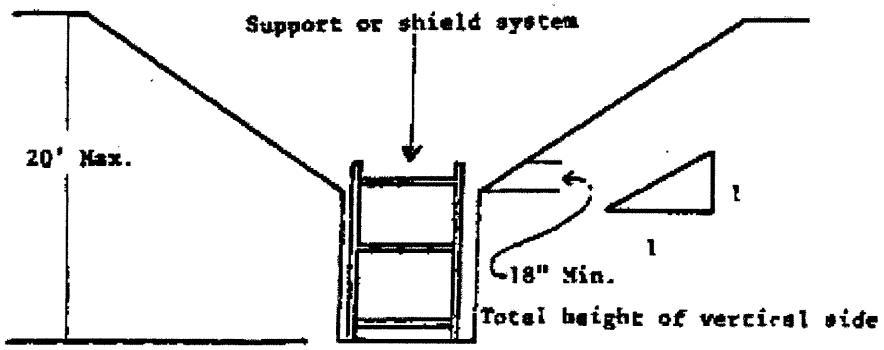


SINGLE BENCH



MULTIPLE BENCH

3. All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at le inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1:1.

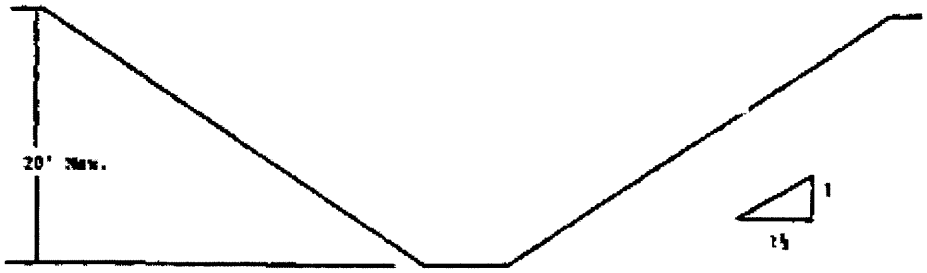


VERTICALLY SIDED LOWER PORTION

4. All other sloped excavations shall be in accordance with the other options permitted in § 1926.652(b).

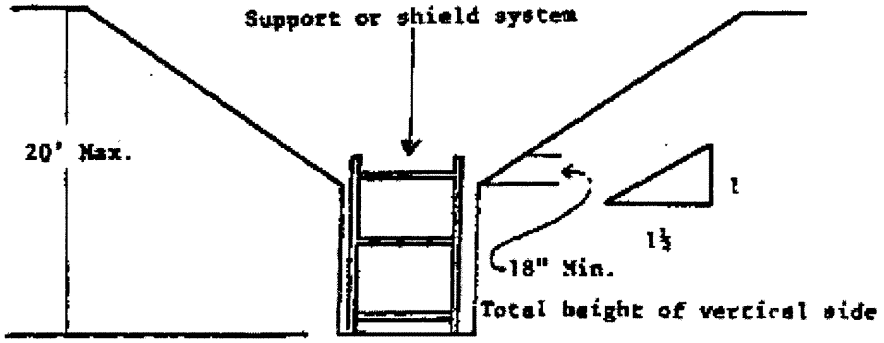
B-1.3 Excavations Made in Type C Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1½:1.



SIMPLE SLOPE

2. All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at le inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1½:1.

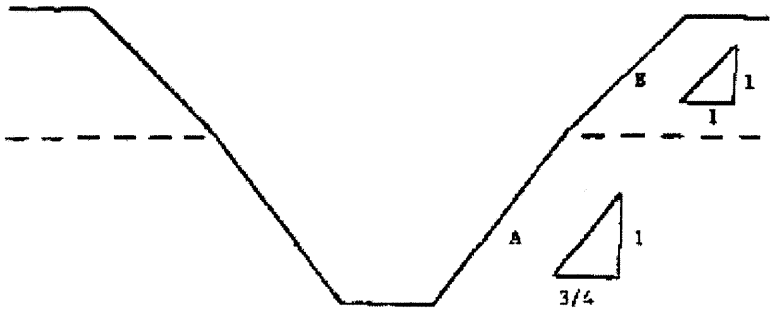


VERTICAL SIDED LOWER PORTION

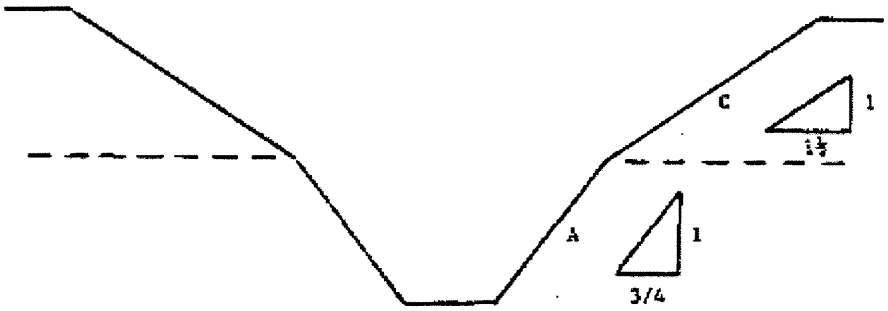
3. All other sloped excavations shall be in accordance with the other options permitted in § 1926.652(b).

B-1.4 Excavations Made in Layered Soils

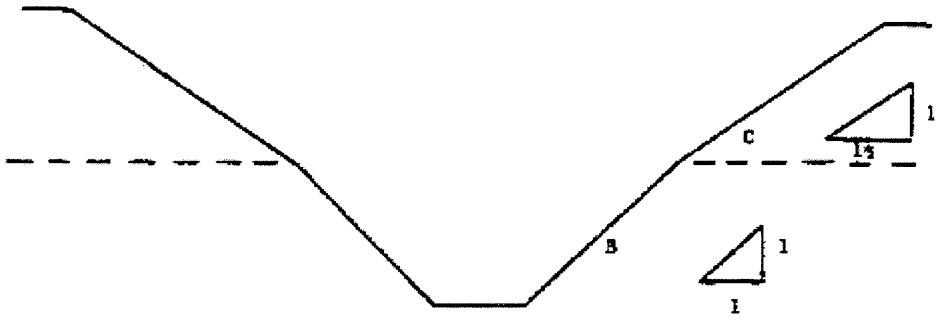
1. All excavations 20 feet or less in depth made in layered soils shall have a maximum allowable slope for each layer as set forth b



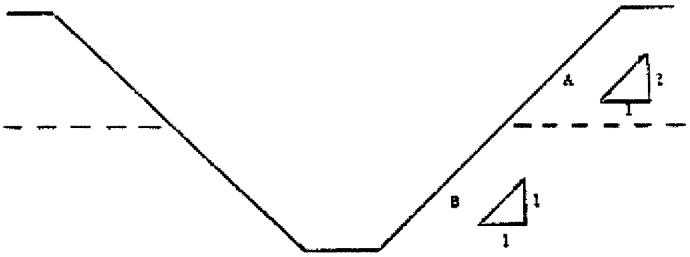
B OVER A



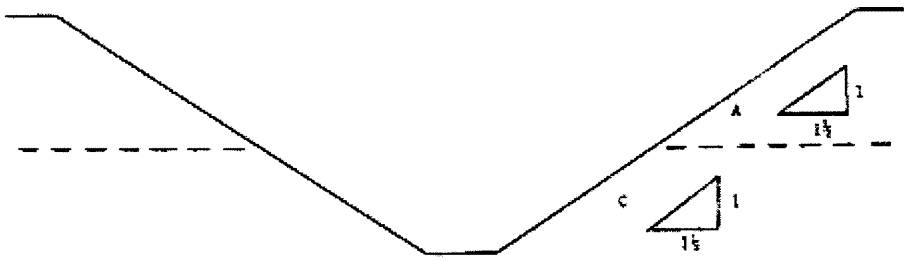
C OVER A



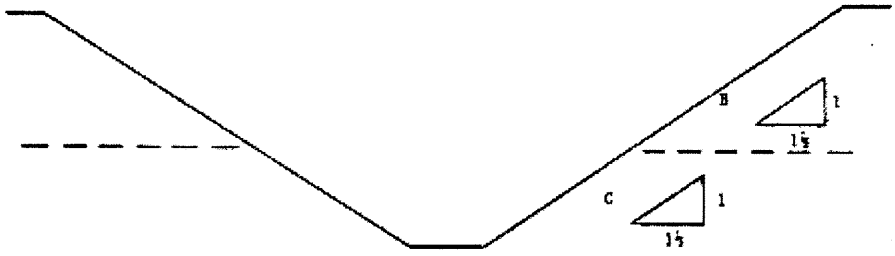
C OVER B



A OVER B



A OVER C



B OVER C

2. All other sloped excavations shall be in accordance with the other options permitted in § 1926.652(b).

Next Standard (1926 Subpart P App C)

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• **Part Number:**	1926
• **Part Title:**	Safety and Health Regulations for Construction
• **Subpart:**	P
• **Subpart Title:**	Excavations
• **Standard Number:**	1926 Subpart P App F
• **Title:**	Selection of Protective Systems

The following figures are a graphic summary of the requirements contained in subpart P for excavations 20 feet or less in depth. Prc systems for use in excavations more than 20 feet in depth must be designed by a registered professional engineer in accordance wit 1926.652(b) and (c).

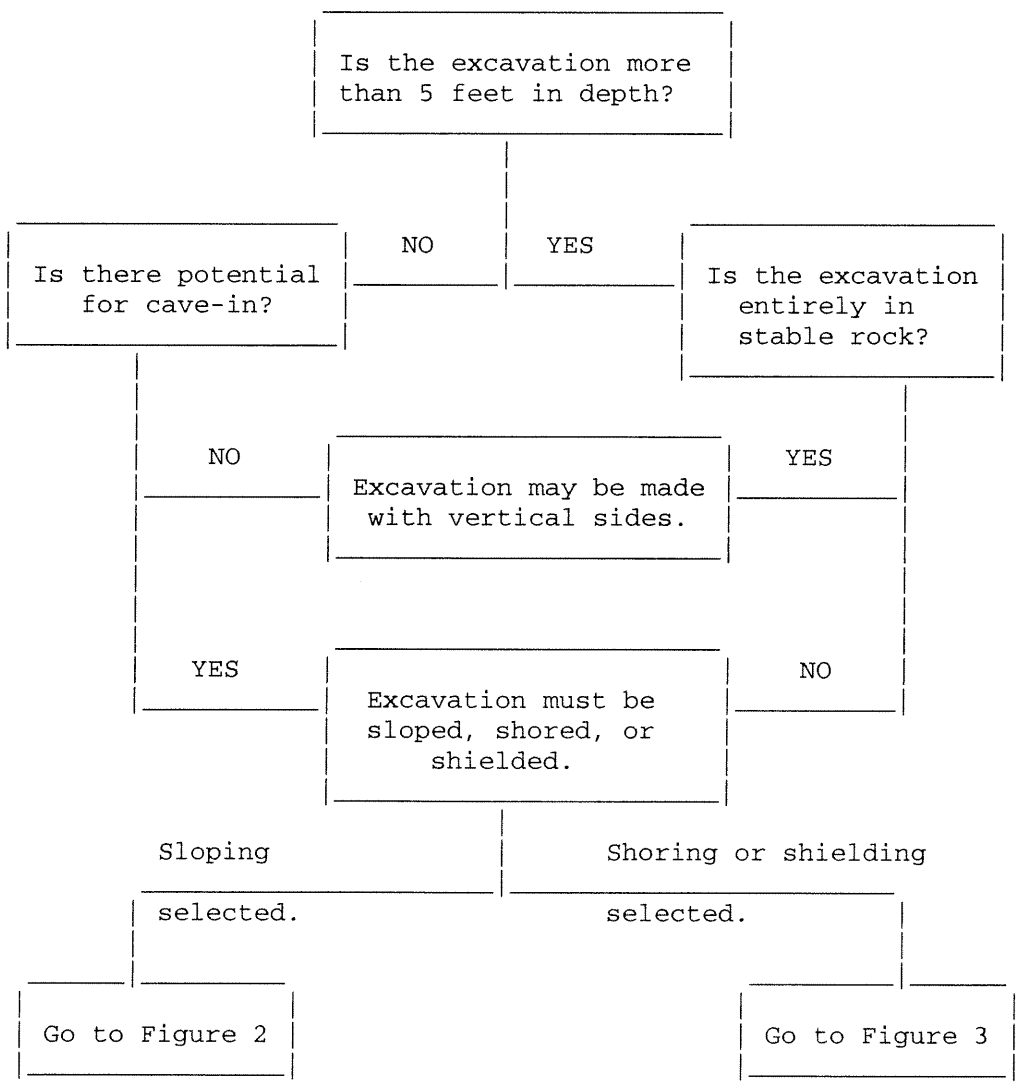

FIGURE 1 - PRELIMINARY DECISIONS

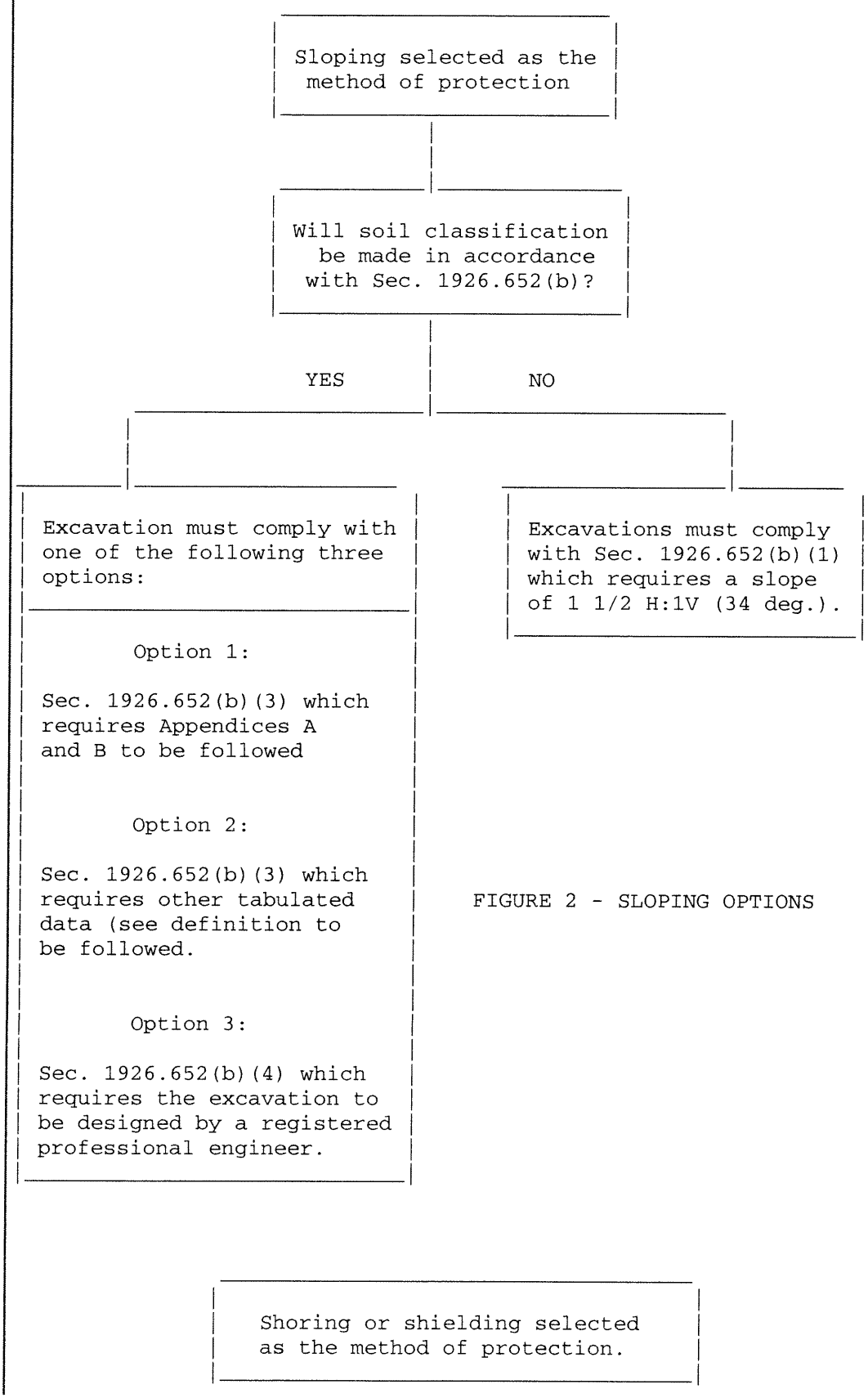

FIGURE 2 - SLOPING OPTIONS

Shoring or shielding selected as the method of protection.

Soil Classification is required when shoring or shielding is used. The excavation must comply with one of the following four options:
Option 1 Sec. 1926.652(c)(1) which requires Appendices A and C to be followed (e.g. timber shoring). **Option 2** Sec. 1926.652(c)(2) which requires manufacturers data to be followed (e.g. hydraulic shoring, trench jacks, air shores, shields). **Option 3** Sec. 1926.652(c)(3) which requires tabulated data (see definition) to be followed (e.g. any system as per the tabulated data). **Option 4** Sec. 1926.652(c)(4) which requires the excavation to be designed by a registered professional engineer (e.g. any designed system).

FIGURE 3 - SHORING AND SHIELDING OPTIONS

Next Standard (1926 Subpart Q)

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Appendix F

GUIDANCE ON INCIDENT INVESTIGATION AND REPORTING

C&S ENGINEERS

MEDICAL EMERGENCY/INCIDENT RESPONSE PROTOCOL

1.0 PURPOSE

From time to time employees of C & S Engineers, Inc. will sustain an injury while working on the job. While every effort is being made to prevent this, in the event of an injury or illness on the job, the following procedures will be implemented. This format may also be utilized in the event of a property damage incident.

2.0 SCOPE

This guideline applies to all C & S Engineers, Inc. job sites and employees.

3.0 GUIDELINES

Upon notification or awareness of an incident/accident with injuries or illness the Emergency Coordinator or his On-Site Designee will:

1. Ensure that the injured employee is receiving immediate first aid and medical care.
2. Notify Emergency Services (911) if injuries are severe.
3. Stabilize the work area; ensure that no one else can be injured.
4. Notify the Project Manager at the earliest possible convenience**.**
5. Notify the Owner/Client at the earliest possible convenience.

To assist the Health and Safety Manager in the root cause analysis, the Emergency Coordinator or his On-Site Designee will also make an attempt to:

1. Obtain the names and phone numbers of witnesses.
2. Preserve the accident scene if possible for analysis.

Injury Management

1. If the patient is stable with non-life threatening injuries, the foreman will ensure the employee is transported to Mount St. Mary's Hospital of Niagara Falls.

   At no time will an injured employee drive themselves to medical care.

2. If the patient has serious or life threatening injuries, the emergency coordinator or his on-site designee will notify the emergency services for the area for treatment and transport to a hospital or emergency room. Serious injuries can be considered but not limited to head injuries, loss of consciousness, severe laceration or amputation, fractured bones, burns and eye injuries.

3. Following the treatment and care of the injured employee, the emergency coordinator or his on-site designee and the project manager will initiate the completion of the first injury report. The Health & Safety Manager will assist.

Project Manager

1. Upon notification of a personal injury or illness on the job site, will notify C & S Engineers, Inc, President and Corporate Legal and C&S Companies Health and Safety Manager.
2. Will report to the worksite to initiate the first injury report.
3. Will report to the treatment facility to check on the well being of the injured employee. The project manager will ensure that the treatment facility is aware that this is a workers compensation case.
4. Will assist the Health and Safety Manager in the analysis of the incident.

Health & Safety Manager

1. Upon notification of the personal injury will determined if it is necessary to report to the treatment facility or the accident site, depending on the nature of the injuries and the circumstances of the accident.
2. Will report to the worksite to begin a root cause analysis investigation of the accident. The investigation may include interview of witnesses, field crew , and project manager, the photographing of the scene, reconstruction of the accident scene, using test instruments and taking measurements. The Health and Safety Manager may draw diagrams from the information learned.
3. The Health and Safety Manager will work with the owner/client as necessary to investigate the accident.
4. The Health & Safety manager will ensure that the site is safe to resume work.
5. The Health & Safety Manager shall initiate the New York State Compensation form requirements (C-2) and forward a copy of the C-2 to the C & S Engineers, Inc. controller for transmittal to the Compensation Carrier within 8 hrs of notification of the incident or by the end of the next business day.
6. The Health and Safety manager, upon completion of the investigation, will provide the Project Manager with a written investigative report (copy to the President)
7. The accident will be reviewed at the next Project Managers meeting with the intent to prevent further or similar events on other projects.
8. The Health & Safety Manager will assess the incident to determine OSHA record ability and make record if necessary on the OSHA 300 form, within five working days.

Incident Response

1.0 PURPOSE

To prevent the occurrence of accidents on C&S Engineers, Inc., work sites and to establish a procedure for investigation and reporting of incidents occurring in, or related to C&S work activities.

2.0 SCOPE

Applies to all incidents related to C&S Engineers, Inc. work activities.

3.0 DEFINITIONS

Accident - An undesired event resulting in personal injury and/or property damage, and/or equipment failure.

Fatality - An injury or illness resulting in death of the individual.

Incident - Any occurrence which results in, or could potentially result in, the need for medical care or property damage. Such incidents shall include lost time accidents or illness, medical treatment cases, unplanned exposure to toxic materials or any other significant occurrence resulting in property damage or in "near misses."

Incidence Rate - the number of injuries, illnesses, or lost workdays related to a common exposure base of 100 full-time workers. The rate is calculated as:

N/EH x 200,000

N = number of injuries and illnesses or lost workday cases; EH = total hours worked by all associates during calendar year. 200,000 = base for 100 full-time equivalent workers (working 40 hours per week, 50 weeks per year).

Injury - An injury such as a cut, fracture, sprain, amputation, etc. which results from a work accident or from a single instantaneous event in the work environment.

Lost Workday Case - A lost workday case occurs when an injured or ill employee experiences days away from work beginning with the next scheduled work day. Lost workday cases do not occur unless the employee is effected beyond the day of injury or onset of illness.

Recordable Illness - An illness that results from the course of employment and must be entered on the OSHA 300 Log and Summary of Occupational Injuries and Illnesses. These illnesses require medical treatment and evaluation of work related injury. For example, dermatitis, bronchitis, irritation of eyes, nose, and throat can result from work and non-work related incidents.

Recordable Injury - An injury that results from the course of employment and must be entered on the OSHA 300 Log and Summary of Occupational Injuries and Illnesses. These injuries require medical treatment; may involve loss of consciousness; may result in restriction of work or motion or transfer to another job; or result in a fatality.

Near Miss - An incident which, if occurring at a different time or in a different personnel or equipment configuration, would have resulted in an incident.

4.0 RESPONSIBILITIES

Employees - It shall be the responsibility of all C&S Engineers, Inc. employees to report all incidents as soon as possible to the HSC, regardless of the severity.

Human Resources - has overall responsibility for maintaining accident/ incident reporting and investigations according to current regulations and recording injuries/ illness on the OSHA 300 log, and posting the OSHA 300 log.

Emergency Coordinator - It is the responsibility of the Emergency Coordinator to investigate and prepare an appropriate report of all accidents, illnesses, and incidents occurring on or related to C&S Engineers, Inc. work. The Emergency Coordinator shall complete Attachment A within 24 hours of the incident occurrence.

Health and Safety Manager (HSM) - It is the responsibility of the HSM to investigate and prepare an appropriate report of all lost time injuries and illnesses and significant incidents occurring on or related to C&S Companies. The HSM shall maintain the OSHA 300 form.

Project Managers (PM) - It shall be the PM's responsibility to promptly correct any deficiencies in personnel, training, actions, or any site or equipment deficiencies that were determined to cause or contribute to the incident investigated.

5.0 GUIDELINES

5.1 Incident Investigation

The Project Manager will immediately investigate the circumstances surrounding the incident and will make recommendations to prevent recurrence. The HSM shall be immediately notified by telephone if a serious accident/ incident occurs. The incident shall be evaluated to determine whether it is OSHA recordable. If the incident is determined to be OSHA 300 recordable, it shall be entered on the OSHA 300 form.

The Project Manager with assistance from the HSM must submit to the office an incident report form pertaining to any incident resulting in injury or property damage.

5.2 Incident Report

The completed incident report must be completed by the Project Manager within 12 hours of the incident and distributed to the HSM, and Human Resources. This form shall be maintained by Human Resources for at least five years for all OSHA recordable cases. This form serves as an equivalent to the OSHA 101 form.

5.3 Incident Follow-up Report

The Incident Follow-Up Report (Attachment B) shall be distributed with the Incident Report within one week of the incident. Delay in filing this report shall be explained in a brief memorandum.

5.4 Reporting of Fatalities or Multiple Hospitalization Accidents

Fatalities or accidents resulting in the hospitalization of three or more employees must be reported to OSHA verbally or in writing within 8 hours. The report must contain 1) circumstances surrounding the accident(s), 2) the number of fatalities, and 3) the extent of any injuries.

5.5 OSHA 300A Summary Form

Recordable cases must be entered on the log within six workdays of receipt of the information that a recordable case has occurred. The OSHA log must be kept updated to within 45 calendar days.
OSHA 300 forms must be updated during the 5 year retention period, if there is a change in the extent or outcome of an injury or illness which affects an entry on a log. If a change is necessary, the original entry should be lined out and a corrected entry made on that log. New entries should be made for previously unrecorded cases that are discovered or for cases that initially weren't recorded but were found to be recordable after the end of the year. Log totals should also be modified to reflect these changes.

5.5.1 Posting

The log must be summarized at the end of the calendar year and the summary must be posted from February 1 through May 31.

5.6 OSHA 300A

Facilities selected by the Bureau of Labor Statistics (BLS) to participate in surveys of occupational injuries and illnesses will receive the OSHA 300A. The data from the annual summary on the OSHA 300 log should be transferred to the OSHA 300A, other requested information provided and the form returned as instructed by the BLS.

5.7 Access to OSHA Records

All OSHA records (accident reporting forms and OSHA 300 logs) should be available for inspection and copying by authorized Federal and State government officials.

Employees, former employees, and their representatives must be given access for inspection and copying to only the log, OSHA No. 300, for the establishment in which the employee currently works or formerly worked.

6.0 REFERENCES

29 CFR Part 1904

7.0 ATTACHMENTS

Attachment A - Incident Investigation Form
Attachment B - Incident Follow-Up Report
Attachment C - Establishing Recordability

ATTACHMENT A

INCIDENT INVESTIGATION FORM

Accident investigation should include:

Location: _____

Time of Day: _____

Accident Type: _____

Victim: _____

Nature of Injury: _____

Released Injury: _____

Hazardous Material: _____

Unsafe Acts: _____

Unsafe Conditions: _____

Policies, Decisions: _____

_____

Personal Factors: _____

_____

Environmental Factors: _____

_____

_____

ATTACHMENT B

Date _____

Foreman: _____

INCIDENT FOLLOW-UP REPORT

Date of Incident: _____

Site: _____

Brief description of incident: _____

_____

_____

_____

_____

Outcome of incident: _____

_____

_____

_____

Physician's recommendations: _____

_____

_____

_____

Date the injured returned to work: _____

Project Manager Signature: _____

Date: _____

ATTACH ANY ADDITIONAL INFORMATION TO THIS FORM

ATTACHMENT C

ESTABLISHING RECORDABILITY

1. Deciding whether to record a case and how to classify the case.

   Determine whether a fatality, injury or illness is recordable.

   A fatality is recordable if:

   - Results from employment

   An injury is recordable if:

   - Results from employment and
   - It requires medical treatment beyond first aid or
   - Results in restricted work activity or job transfer, or
   - Results in lost work day or
   - Results in loss of consciousness

   An illness is recordable if:

   - It results from employment

2. Definition of "Resulting from Employment"

   Resulting from employment is when the injury or illness results from an event or exposure in the work environment. The work environment is primarily composed of: 1) The employer's premises, and 2) other locations where associates are engaged in work-related activities or are present as a condition of their employment.

   The employer's premises include company rest rooms, hallways, cafeterias, sidewalks and parking lots. Injuries occurring in these places are generally considered work related.

   The employer's premises EXCLUDES employer controlled ball fields, tennis courts, golf courses, parks, swimming pools, gyms, and other similar recreational facilities, used by associates on a voluntary basis for their own benefit, primarily during off work hours.

   Ordinary and customary commute, is not generally considered work related.

   Employees injured or taken ill while engaged in consuming food, as part of a normal break or activity is not considered work related. Employees injured or taken ill as the result of smoking, consuming illegal drugs, alcohol or applying make up are generally not considered work related. Employee injured by un authorized horseplay is generally not considered work related, however, an employee injured as a result of a fight or other workplace violence act, may be considered work related.

Associates who travel on company business are considered to be engaged in work related activities all the time they spend in the interest of the company. This includes travel to and from customer contacts, and entertaining or being entertained for purpose of promoting or discussing business. Incidents occurring during normal living activities (eating, sleeping, recreation) or if the associate deviates from a reasonably direct route of travel are not considered OSHA recordable.

3. Distinction between Medical Treatment and First Aid.

First aid is defined as any one-time treatment, and any follow up visit for the purpose of observation, of minor scratches, cuts, burns, splinters, etc., which do not ordinarily require medical care. Such one time treatment, and follow up visit for the purpose of observation, is considered first aid even though provided by a physician or registered professional personnel.

Medical Treatment (recordable)

a) They must be treated only by a physician or licensed medical personnel.

b) They impair bodily function (i.e. normal use of senses, limbs, etc.).

c) They result in damage to physical structure of a non superficial nature (fractures).

d) They involve complications requiring follow up medical treatment.

Appendix G

NEW YORK STATE DEPARTMENT OF HEALTH

GENERIC COMMUNITY AIR MONITORING PLAN

C&S ENGINEERS

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

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

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

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

Community Air Monitoring Plan

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

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

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of

taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

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

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 must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

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

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

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

Particulate Monitoring, Response Levels, and Actions

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

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 must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

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

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

June 20, 2000

Appendix 1B
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work, these procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill, these control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Object to be measured: dust, mists, aerosols size range: <0.1 to 10 microns;
(b) Sensitivity: 0.001 mg/m3;
(c) Range: 0.001 to 10 mg/m3;
(d) Overall Accuracy: ±10% as compared to gravimetric analysis of stearic acid or reference dust;
(e) Operating Conditions: Temperature: 0 to 40^{o}C;
(f) Humidity: 10 to 99% Relative Humidity;
(g) Power: Battery operated with a minimum capacity of eight hours continuous operation Automatic alarms are suggested; and
(h) Particulate levels will be monitored immediately downwind at the working site and integrated over a period not to exceed 15 minutes. Consequently, instrumentation shall require necessary averaging hardware to accomplish this task.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 over the integrated period not to exceed 15 minutes. While conservative, this short-term interval will provide areal-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be measured immediately using the same portable monitor. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration.

Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see Paragraph 7). Should the action level of 150 ug/m3 be exceeded, the DER must be notified as provided in the site design or remedial work plan; the notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There maybe situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to migrate contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that utilizing the above-mentioned dust suppression techniques, within reason as not to create excess water which would result in unacceptable wet conditions, the chance of exceeding the 150 ug/m3 action level at hazardous waste site remediation is remote. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. If the dust suppression techniques being utilized at the site do not lower particulates to an acceptable level (that is, below 150 ug/m3 and no visible dust), work must be suspended until appropriate corrective measures are approved to remedy the situation. Also, the evaluation of weather conditions will be necessary for proper fugitive dust control--when extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require appropriate toxic monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

NEW YORK STATE
DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

Fugitive Dust Suppression and Particulate Monitoring Program (TAGM - 4031)

Issuing Authority: Michael J. O'Toole, Jr.
Title: Director, Division of Environmental Remediation
Date Issued: Oct 27, 1989

1. Introduction

Fugitive dust suppression, particulate monitoring, and subsequent action levels for such must be used and applied consistently during remedial activities at hazardous waste sites. This guidance provides a basis for developing and implementing a fugitive dust suppression and particulate monitoring program as an element of a hazardous waste site's health and safety program.

2. Background

Fugitive dust is particulate matter--a generic term for a broad class of chemically and physically diverse substances that exist as discrete particles, liquid droplets or solids, over a wide range of sizes--which becomes airborne and contributes to air quality as a nuisance and threat to human health and the environment.

On July 1, 1987, the United States Environmental Protection Agency (USEPA) revised the ambient air quality standard for particulates so as to reflect direct impact on human health by setting the standard for particulate matter less than ten microns in diameter (PM_{10}); this involves fugitive dust whether contaminated or not. Based upon an examination of air quality composition, respiratory tract deposition, and health effects, PM_{10} is considered conservative for the primary standard--that requisite to protect public health with an adequate margin of safety. The primary standards are 150 ug/m^3 over a 24-hour averaging time and 50 ug/m^3 over an annual averaging time. Both of these standards are to be averaged arithmetically.

There exists real-time monitoring equipment available to measure PM_{10} and capable of integrating over a period of six seconds to ten hours. Combined with an adequate fugitive dust suppression program, such equipment will aid in preventing the off-site migration of contaminated soil. It will also protect both on-site personnel from exposure to high levels of dust and the public around the site from any exposure to any dust. While specifically intended for the protection of on-site personnel as well as the public, this program is not meant to

replace long-term monitoring which may be required given the contaminants inherent to the site and its air quality.

3. Guidance

A program for suppressing fugitive dust and monitoring particulate matter at hazardous waste sites can be developed without placing an undue burden on remedial activities while still being protective of health and environment. Since the responsibility for implementing this program ultimately will fall on the party performing the work, these procedures must be incorporated into appropriate work plans. The following fugitive dust suppression and particulate monitoring program will be employed at hazardous waste sites during construction and other activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.
2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Such activities shall also include the excavation, grading, or placement of clean fill, and control measures therefore should be considered.
3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM_{10}) with the following minimum performance standards:
   Object to be measured: Dust, Mists, Aerosols
   Size range: <0.1 to 10 microns
   Sensitivity: 0.001 mg/m^3
   Range: 0.001 to 10 mg/m^3
   Overall Accuracy: ±10% as compared to gravimetric analysis of stearic acid or reference dust

   Operating Conditions:
   Temperature: 0 to 40°C
   Humidity: 10 to 99% Relative Humidity

   Power: Battery operated with a minimum capacity of eight hours continuous operation

   Automatic alarms are suggested.

   Particulate levels will be monitored immediately downwind at the working site and integrated over a period not to exceed 15 minutes. Consequently, instrumentation shall

require necessary averaging hardware to accomplish this task; the P-5 Digital Dust Indicator as manufactured by MDA Scientific, Inc. or similar is appropriate.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the entity operating the equipment to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.
5. The action level will be established at 150 ug/m^3 over the integrated period not to exceed 15 minutes. While conservative, this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m^3, the upwind background level must be measured immediately using the same portable monitor. If the working site particulate measurement is greater than 100 ug/m^3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see Paragraph 7). Should the action level of 150 ug/m^3 be exceeded, the Division of Air Resources must be notified in writing within five working days; the notification shall include a description of the control measures implemented to prevent further exceedences.
6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM_{10} at or above the action level. Since this situation has the potential to migrate contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.
7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:
    1. Applying water on haul roads.
    2. Wetting equipment and excavation faces.

3. Spraying water on buckets during excavation and dumping.
4. Hauling materials in properly tarped or watertight containers.
5. Restricting vehicle speeds to 10 mph.
6. Covering excavated areas and material after excavation activity ceases.
7. Reducing the excavation size and/or number of excavations.

Experience has shown that utilizing the above-mentioned dust suppression techniques, within reason as not to create excess water which would result in unacceptable wet conditions, the chance of exceeding the 150 ug/m^3 action level at hazardous waste site remediations is remote. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. If the dust suppression techniques being utilized at the site do not lower particulates to an acceptable level (that is, below 150 ug/m^3 and no visible dust), work must be suspended until appropriate corrective measures are approved to remedy the situation. Also, the evaluation of weather conditions will be necessary for proper fugitive dust control--when extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended.

There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require appropriate toxics monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

APPENDIX C

Investigation Personnel and Qualifications

THOMAS A. BARBA
DEPARTMENT MANAGER, ENVIRONMENTAL SERVICES

EXPERIENCE

- Manages and provides technical review for a variety of projects including site investigations, contaminant fate and transport evaluations, air quality studies, environmental site assessments, environmental audits, NEPA/SEQRA reviews and compliance, environmental impact statements, environmental permitting, and environmental compliance.
- Managed site investigations and remediation at several spill and inactive hazardous waste sites. Supervised and conducted work plan development, hydrogeologic programs, sampling and analysis, health and safety, data evaluation, risk assessment, report preparation, remedial design, and construction. Sites included active and inactive disposal sites; ash landfills, PCB sites, drum disposal sites, and solvent/petroleum spill sites.
- Conducted air quality projects for industrial facilities including emission point and source surveys, emission estimates and inventories, and permitting programs. Permitting included minor and major (Title V) facilities.
- Prepared environmental assessments and environmental impact statements for several major projects including a semiconductor manufacturing facility, a truck stop / travel plaza, and an airport expansion.
- Directed various aspects of bulk petroleum and chemical tank management projects including removal, design, and installation of new facilities, testing, soil remediation, and SPCCs.
- Provided environmental consulting services to several colleges and universities. Aspects included air quality services, oil storage, chemical bulk storage, wastewater, hazardous chemical management, and environmental impact review.
- Conducted environmental audits and environmental site assessments for several industrial and commercial facilities. Aspects included air, wastewater, water supply, solid waste, hazardous waste, chemical and petroleum storage, chemicals handling, SARA, and wetlands.
- Provided technical and project management services to a variety of industrial clients including pulp and paper, metal finishing, foundries, metal working, utilities, electronics, food, utilities, cogeneration, recycling, and general manufacturing facilities.
- Managed wastewater treatment programs for several industrial clients for both direct and indirect discharges. Tasks included water use evaluations, SPDES and stormwater permitting, monitoring, treatability studies, and pilot studies. Negotiated reduced permit requirements for several clients resulting in decreased operating costs.
- Developed closure, stormwater, SPR, BMP, SPCC, and similar plans for various facilities.

Mr. Barba has extensive management and technical experience on environmental projects including work in industry and in the consulting field. He has been responsible for projects involving air emissions, wastewater, hazardous waste, site contamination, site investigations, environmental assessments and audits, wetlands and ecological studies, sampling and analysis programs, permitting, and environmental impact statements.

EDUCATION

B.S. (Biochemistry) SUNY College of Environmental Science and Forestry

B.S. (Chemistry) Syracuse University

SPECIALIZED TRAINING

Additional coursework in MBA program, Syracuse University

OSHA 40-Hour HAZWOPER

Risk Analysis in Environmental Health – Harvard University School of Public Health

Groundwater Pollution and Hydrology – Princeton University

Airport Wildlife Hazard Control

PROFESSIONAL ORGANIZATIONS

Air & Waste Management Association

American Chemical Society

STEVEN M. VINCI, CPG
MANAGING GEOLOGIST

EXPERIENCE
Mr. Vinci has completed over 200 Phase I and Phase II environmental site assessments for commercial real-estate transactions right-of-way acquisitions for roadway transportation projects and land acquisition for airports. These assessments have been located in residential, urban, and rural areas. Some of the transportation corridors Mr. Vinci has worked on have exceeded 3 miles in length, while land acquisition projects have been greater than 15,000 acres.

He has experience in assessing undeveloped parcels; low rise and high rise buildings, industrial properties, and areas where extensive modification to the original topography has resulted due to the placement of fill materials. Through this experience, Mr. Vinci has branched into environmental response at construction/demolition sites and pre-construction and pre-demolition assessments to help owners and contractors properly manage waste generated during redevelopment activities on distressed properties.

More recently, Mr. Vinci has utilized his skill set to help assess and develop remedial actions at Brownfield and Voluntary Cleanup program sites located in:

- Meridian, New York – abandoned repair shop/gasoline station
- Syracuse, New York – 20 acre abandoned dry cleaning equipment manufacturing complex, abandoned aerospace contractor machine shop and gasoline station.
- Buffalo, New York – arsenic contaminated soil, Boon Park
- Carthage, New York – abandoned manufacturing complex
- Bradford, New York – former school building utilized by a now-defunct laboratory reagent broker
- Clay, New York – abandoned asphalt and petroleum bulk storage facility

Mr. Vinci has managed over 230 UST/AST removal, spill investigation, and remediation projects throughout New York State as part of multiple year term agreements with the New York State Office of General Services. Included in this work is tank removal oversight, preliminary assessments, preparation of specifications, remedial design, remedial technology pilot testing, installation and O&M of remedial systems, waste disposal, and negotiations with regulators.

PUBLICATIONS
Vinci, S., "Evolution of Practice in New York State", New York State Real Estate Journal, Vol. 6, No. 14.

Vinci, S., "Phase II Environmental Site Assessments: Tackling the Liability Issue", NY State Real Estate Journal, Vol. 7, No. 14.

Beyers, Stephen B., Vinci, Steven M., "Changes At the Town Pump: Helping Towns Understand and Apply Regulations, Clean Up Spills, and Design and Inspect New Fuel Facilities" Talk of the Towns, Vol. 9, No. 4.

Mr. Vinci's responsibilities have included planning, implementation, and supervision of environmental and forensic investigations as well as remedial actions for hazardous waste Brownfield and Voluntary Cleanup programs as well as spill sites. Mr. Vinci has branched into pre-construction and pre-demolition assessments to help owners and contractors properly manage waste generated during redevelopment activities on distressed properties.

EDUCATION
B.S., Geology, SUNY Fredonia

A.S., Liberal Arts, Monroe Community College

SPECIALIZED TRAINING
Aeration Technologies for Soil and Groundwater Remediation Association of Engineering Geologists

40 Hour Safety Course and 8 Hour Supervisors Course for Hazardous Waste Operations as Required by OSHA 29CFR 1910.120

Environmental Site Assessments in Conjunction with Real Estate Transactions, Association of Groundwater Scientists and Engineers

Risk Based Corrective Action Applied at Petroleum Release Sites ASTM RBCA User Training

REGISTRATION
Professional Geologist, South Carolina, Florida, Pennsylvania

PROFESSIONAL ORGANIZATIONS
American Institute of Professional Geologists – Certified Professional Geologist

American Association of Petroleum Geologists – Charter Member Division of Environmental Geosciences

Association of Engineering Geologists

Heron,G., Vinci S., "Combining Thermal Treatment with MNA at a Brownfield DNAPL Site" Proceedings Seventh International Conference Batelle Remediation of Chlorinated and Recalcitrant Compounds, May 2010.

PRESENTATIONS

Defining the Extent of Contamination/Environmental Due Diligence
Presented at: Transactions and the Environment, Contaminated Property Issues in Real Estate and Corporate Matters
New York State Bar Association CLE Seminar, June 2006, Rochester, NY

RORY WOODMANSEE
SENIOR ENGINEER

EXPERIENCE
Environmental Assessments and Brownfield Site Investigations:

Has performed field work, public contact, and document preparation, associated with site investigations and environmental review processes, including Brownfield site investigations consisting of historical document review, development of sampling and QA/QC plans, and field oversight of sampling activities for:

- Boone Park, Buffalo, New York: recreational facility with arsenic contaminated soil.
- Midler Ave Industrial Park, Syracuse, NY; abandoned factory than manufacturer commercial dry cleaning and laundry machines.
- Sims Matchplate, Syracuse, New York: abandoned factory which formerly made high precision castings for aerospace industry.
- Zip-Zip Mini Mart, Syracuse, New York: former gasoline service station.
- Maider Road, Clay, New York: abandoned 63-acre petroleum and asphalt bulk storage terminal
- Meridian Brownfield, Cayuga County New York: former gasoline service station.
- Phase I Environmental Assessments for municipal and industrial clients, including Departments of Transportation (corridor assessments) and Industrial Development projects (site assessments).
- Principal author of an Expanded Environmental Assessment (per New York State SEQRA) for installation of fiber optic line along Interstate Route 87 from Albany to Montreal. Included assessment of construction impacts within wetlands and adjacent to hazardous waste sites and within the boundaries of the Adirondack Park.

Environmental Design and Evaluation:

Provided design services, including work plans, sampling plans, quality assurance plans, site management plans, and contractor bid documents for environmental projects, including:

- Excavation and off-site disposal of PCB-impacted soils at the Oswego Fire Training School, a CERCLA site and facility operated by Niagara Mohawk Power Corporation.
- Construction and operation of a treatment system to treat PCB im-

Mr. Woodmansee has been involved with environmental investigation, design, and remediation activities for clients within the private, institutional, and government sectors. He has developed subsurface investigations and conducted sampling of soil, sediments, surface water and groundwater associated with releases of petroleum and chemicals at a variety of large and small sites as well as those associated with Brownfield and Voluntary Cleanup Programs. He has also been involved with designing and implementing remediation systems, including excavation and off-site disposal of soils impacted by petroleum products, PCBs, and volatile organic compounds.

EDUCATION

B.S., Environmental Resource and Forest Engineering
State University of New York College of Environmental Science and Forestry

A.S., Engineering
Cayuga County Community College

REGISTRATION

E.I.T., New York State

40-hour Hazardous Waste Operator Certified

pacted groundwater encountered during an excavation and disposal action at a Niagara Mohawk Power Corporation Temporary Storage and Disposal Facility in Liverpool, New York.

- A Feasibility Study for remediating PCB contamination of soil, sediments, and groundwater at a CERCLA site in Cobleskill, New York.

- Design of a bioremediation system for treated saturated soils impacted by volatile and semi-volatile organic compounds at a McKesson Corporation site in Syracuse, New York.

Field Sampling, Construction Oversight and Project Implementation:

Provided field engineering and technical support for environmental projects of varying magnitude, including:

- Field Service Manager for New York State Office of General Services-led removals of underground petroleum storage tanks, including determination of extent of contaminated materials and collection of remediation verification samples.

- Contractor oversight and verification sampling for PCB impacted soils at sites where total volumes of impacted materials ranged from several hundred cubic yards to over 10,000 cubic yards.

- Installation of permanent and temporary water treatment facilities for environmental projects, including installation of buildings, pumping systems, chemical precipitation/flocculation addition, contact clarification tanks, groundwater monitoring wells, and separate phase liquid extraction systems.

THOMAS C.WIRICKX
ENVIRONMENTAL SCIENTIST

EXPERIENCE

As an environmental scientist, Mr. Wirickx is responsible for environmental and ecological investigations and assessments including brownfields, inactive hazardous waste sites, Phase I and Phase II site investigations for real-estate transactions and construction projects as well as performing ecological assessments and wetland delineations. Some of his experience includes the following:

- Oversight of subsurface investigations to assess hydrogeology and extent of groundwater and subsurface contamination.
- Supervision of remedial excavations and UST removal projects
- Supervision of the installation of a variety of remediation systems including soil vapor extraction, air sparge, air stripper, oxygen injection, product recovery, and multi-phase recovery systems
- Operation and maintenance of soil vapor extraction systems, air sparge systems, air stripper systems, oxygen injection systems, carbon filtration systems, product recovery systems, and multi-phase recovery systems.
- Preparation of a variety of documents, including tank closure reports, subsurface investigation reports, remedial action plans, site status reports, and site closure reports.
- Preparation of ecological assessments, wetland delineation reports, and threatened and endangered species screenings and surveys for numerous impact studies, and environmental assessments.
- Conducting wetland delineations consistent with the 1987 Corps of Engineers Wetland Delineation Manual and the New York State Department of Environmental Conservation 1995 Wetlands Delineation Manual, wetland mitigation design and wetland mitigation monitoring for projects ranging from one acre to over fifty acres in size.

As an environmental scientist, Mr. Wirickx is responsible for environmental and ecological assessments and site investigations for real-estate transactions, construction projects and right-of-way acquisition. In addition, Mr. Wirickx is responsible for stream and wetland mitigation planning, design and monitoring, and remediation system design, operation and maintenance

EDUCATION

B.S., Environmental and Forest Biology
SUNY College of Environmental Science and Forestry

A.S., Natural Resources Conservation
SUNY Morrisville College of Agriculture and Technology

Water Purification Specialist
Military Occupational Specialty
United States Army Quartermaster School

SPECIALIZED TRAINING

40-Hour Safety Course for Hazardous Waste Operations
OSHA 29 CFR 1910.120

10-Hour Construction Industry Training
OSHA 29 CFR 1926

Asbestos Awareness Training
OSHA 29 CFR 1910.1001 &
OSHA 29 CFR 1926.1101

Wildlife Hazard Management at Airports and Bird Identification
USDA APHIS

WAYNE N. RANDALL
GEOLOGIST

EXPERIENCE

Mr. Randall is a member of the Remediation and Compliance Group at C&S. Some of his responsibilities include:

- Performing environmental assessments for municipal, commercial, airport, industrial, and private clients. Assessment responsibilities include, but are not limited to; on site inspection, historical use investigations, regulatory review, and report preparation.
- Oversight of subsurface investigations to assess hydrogeology and extent/migration of groundwater and soil contamination at sites. Investigative responsibilities include sampling and field analysis of water, soil and air.
- Performing landfill inspections and combustible gas monitoring in accordance with the NYSDEC.

Some of the projects Mr. Randall has been involved with at C&S include:

Oneida Indian Nation

- Phase I Environmental Site Assessment on a collection of Oneida Indian Nation properties, which was performed consistent with the American Society for Testing and Materials (ASTM) E1527–00*, Standard Practice for Environmental Site Assessments – Phase I Environmental Site Assessment Process*.

Pioneer Midler Avenue, LLC

- Brownfield Remedial Investigation conducted at the former Midler City Industrial Park site, located in the City of Syracuse, Onondaga County, New York.

Knoxboro, New York and Clay, New York Landfills

- Landfill inspection including gas vent pipe monitoring, inspections of the groundwater well network, landfill cap system, vegetative cover, drainage swales, perimeter fence and gate, and surface water retention ponds.

Mr. Randall also has over four years experience working in the groundwater consulting industry. His knowledge and expertise include the following:

- Assess the geologic and hydrologic characteristics of an area and design a plan for groundwater development.
- Conduct geophysical surveys and analysis of geophysical data
- Geophysical Techniques used: Seismic Refraction, VLF (very low frequency), Elecromagnetic, GPR (ground penetrating radar), Electrical Resistivity, Microgravity, and CSAMT (controlled source audio magne-telluric)
- Fracture Trace Analysis of aerial photography and digital elevation models.

Mr. Randall's responsibilities, as a Geologist, include a wide variety of projects dealing with environmental monitoring, regulatory compliance, data interpretation, and environmental assessment.

EDUCATION

B.A., Geology, State University of New York at Potsdam

SPECIALIZED TRAINING

40-hour Safety Training for Hazardous Waste Operations as Required by OSHA 29CFR 1910.120

10-hour Occupational Safety and Health Training Course

Introduction to Permit Required Confined Spaces

PROFESSIONAL ORGANIZATIONS

Geological Society of America

- Oversee well drilling, filter pack design, and well development.
- Supervise well construction and sampling, perform aquifer tests, and water quality sampling for sand and gravel and bedrock wells.
- Sieve analysis of aquifer materials for well screen design.
- Conduct GIS work creating maps and diagrams using Arcveiw 3.x, Spatial Analyst, and Global Mapper to help define geological characteristics of an area.

Some of the projects representative of his past experience include:

Water and Sewage Authority of Trinidad and Tobago (WASA), Trinidad and Tobago, West Indies

- Conducted extensive geophysical surveys to map deep alluvial aquifers through hundreds of feet of clay as well as deep fractured bedrock zones.
- Organized and implemented field crews of up to five people.
- Efforts lead to the discovery of 16 million gallons of new potable groundwater for the island.

Montserrat Water Authority, Montseratt, West Indies

- Conducted CSAMT (controlled source audio magne-tellurics) and Microgravity surveys to locate a groundwater well that yields 1 million gallons of potable water a day.

Village of Malone, NY

- Conducted Electrical Resistivity and Microgravity surveys to locate two wells capable of yielding over 4 million gallons of new potable groundwater to replace surface water intakes the village was using and had to replace per NYS law.

AMANDA B. ATWELL, CPSS
ENVIRONMENTAL SCIENTIST

EXPERIENCE

As an environmental scientist, Ms. Atwell is responsible for environmental and ecological assessments for municipal, commercial, airport, industrial, and private clients. Assessment responsibilities include, but are not limited to; on site inspection, historical use investigations, regulatory review, and report preparation. In addition, she performs wetland delineations, and rare and endangered species reviews for real-estate transactions and right-of-way acquisition. Ms. Atwell coordinates firm activities regarding environmental permits including wetlands mitigation planning and design.

Prior to joining C&S Ms. Atwell conducted environmental and ecological assessments including environmental assessments, brownfields remediation, soil survey and interpretations, wetland delineations, rare and endangered species reviews, tree stand evaluations, and resource protection area determinations as a consultant with firms located in the Washington, DC metropolitan area and in Syracuse, New York. She has considerable experience regarding state and federal environmental permits and wetlands mitigation planning and design. Ms. Atwell conducted her masters' thesis project on mitigation wetlands within the Great Dismal Swamp ecosystem.

Some of her responsibilities while at C&S have included the following:

- Oneida Indian Nation, Oneida, New York. Phase I Environmental Site Assessments on over 7,500 acres encompassing rural agricultural, woodland, and other Oneida Indian Nation properties, which were performed consistent with the American Society for Testing and Materials (ASTM) E1527–00, *Standard Practice for Environmental Site Assessments – Phase I Environmental Site Assessment Process*.

- Syracuse Airport, City of Syracuse, New York. Environmental Due Diligence Audits in the Conduct of FAA Real Property Transactions for Airport acquisitions, which were performed consistent with the American Society for Testing and Materials (ASTM) E1527–00, *Standard Practice for Environmental Site Assessments – Phase I Environmental Site Assessment Process*.

- Crucible Landfill, Solvay, New York. Landfill inspection including groundwater well network monitoring and inspections landfill cap system, vegetative cover, drainage swales, perimeter fence and gate, and surface water retention ponds.

- Lockheed Martin, Syracuse, New York. Phase II investigation regarding potentially contaminated soils.

- Pioneer Midler Avenue, LLC, Syracuse, New York. Brownfield Remedial Investigation, including confirmation sampling, conducted at the former Midler City Industrial Park site.

- Chautauqua County Airport, Runway Safety Area Improvement

Ms. Atwell's responsibilities include a wide variety of projects dealing with environmental and ecological assessments, regulatory affairs, and wetlands mitigation planning and design. In addition, she has experience with brownfields remediation, Phase I and II site investigations, environmental monitoring, regulatory compliance, and data interpretation.

EDUCATION

M.S., Soil, and Environmental Sciences
Virginia Polytechnic Institute and State University

B.S. Environmental Science
Water and Soils Minor
Environmental Ethics Minor
University of Florida

SPECIALIZED TRAINING

Wetland Delineation Training, J.W. Teaford & Company

Wetland Mitigation, Pawtuxet Wildlife Refuge, Environmental Concern, Inc.

40-hour Safety Training for Hazardous Waste Operations as Required by OSHA 29CFR 1910.120

CERTIFICATIONS

Certified Professional Soil Scientist, ARCPACS: A Federation of Certifying Boards in Agriculture, Biology, Earth & Environmental Sciences, 2003

PUBLICATIONS

2001. Wetlands as a Significant Water Quality Issue. Virginia Water Environment Association Newsletter.

2005. Season Length Indicators and Land-Use Effects Southeast

Project, Jamestown, New York: Environmental permitting, wetland mitigation planning and design for creation of a seven-acre wetland including an Osprey nest pole.

- Fort Drum Department of Public Works, Fort Drum, New York, Environmental permitting, wetland mitigation planning and design for creation of four-acre wetland.
- Dormitory Authority of New York State, St. Lawrence Psychiatric Center, Ogdensburg, New York: Wetland delineation and environmental permitting.
- Confidential Client, Syracuse, New York, Construction Development: Wetlands reconnaissance and screening for various proposed locations for project.
- Confidential Client, Proposed Wind Farm siting study in Towns of Fairfield, Little Falls, and Norway, Herkimer County, New York, Conducted Quality Control for a Wetland Delineation along a 43 mile corridor.
- Confidential Client, Proposed Wind Farm wetlands delineation and permitting in Town of Italy, Yates County, and Town of Prattsburg, Steuben County, New York for a 16,000 acre general study area.

Virginia Wet Flats. Soil Science Society of America Journal.

2006. Using CO_2 Efflux Rates to Indicate Below-ground Growing Seasons by Land-use Treatment. Wetlands Ecology and Management. 14:133-145.

ORGANIZATIONS

Mid-Atlantic Hydric Soils Committee

New York State Wetlands Forum

APPENDIX D

Citizen's Participation Plan

New York State Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan
for
Norampac Industries, Former Mill No. 2

Site # C932150
4001 Packard Road
City of Niagara Falls
Niagara County, New York

March 2010
Revised August 2010

CONTENTS

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Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the site's remedial process.

Applicant: Norampac Industries, Inc. ("Applicant")
Site Name: Former Mill No.2 ("site")
Site Number: C932150
Site Address: 4001 Packard Road, City of Niagara Falls
Site County: Niagara

1. What is New York's Brownfield Cleanup Program?

New York's Brownfield Cleanup Program (BCP) is designed to encourage the private sector to investigate, remediate (clean up) and redevelop brownfields. A brownfield is any real property, the redevelopment or reuse of which may be complicated by the presence or potential presence of a contaminant. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal and financial burdens on a community. If the brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants accepted into the BCP as they conduct brownfield site remedial activities. The BCP contains strict investigation and remediation (cleanup) requirements, ensuring that cleanups protect public health and the environment based on the intended use of the brownfield site. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use. For more information about the BCP, go online at: www.dec.state.ny.us/website/der/bcp

2. Citizen Participation Plan Overview

A Citizen Participation (CP) Plan provides members of the affected and interested public with information about how NYSDEC will inform and involve them during the investigation and remediation (cleanup) of a site under the BCP.

This CP Plan has been developed for the site under the BCP. Appendix D contains a map locating the site. NYSDEC is committed to informing and involving the public concerning the investigation and remediation (cleanup) of the site. This CP Plan describes the public information and involvement program that will be carried out with assistance from the Applicant.

Appendix A of this CP Plan identifies NYSDEC project contact(s) to whom the public may address questions or request information about the site's remedial program. The locations of the site's document repositories also are identified in Appendix A. The document repositories provide convenient access to important project documents for public review and comment.

Appendix B contains the brownfield site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and remediation process. The brownfield site contact list includes, at a minimum:

- Chief executive officer and zoning board of each county, city, town and village in which the site is located;

- Residents on and/or adjacent to the site;
- The public water supplier which services the area in which the site is located;
- Any person who has requested to be placed on the site contact list;
- The administrator of any school or day care facility located on and/or adjacent to the site for purposes of posting and/or dissemination at the facility; and
- Document repositories and their contacts.

The brownfield site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project, including notifications of upcoming remedial activities at the site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.

The brownfield site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix A.

Appendix C identifies the CP activities that have been and will be conducted during the site's remedial program.

The CP activities are designed to achieve the following objectives:

- Help the interested and affected public to understand contamination issues related to a brownfield site, and the nature and progress of an Applicant's efforts, under State oversight, to investigate and, if appropriate, remediate (clean up) a brownfield site.

- Ensure open communication between the public and project staff throughout a brownfield site's remedial process.

- Create opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a brownfield site's investigation and remediation (cleanup).

This CP Plan may be revised due to changes in major issues of public concern or in the nature and scope of remedial activities. Modifications may include additions to the site contact list, updates to major issues of concern to the public, and changes in planned citizen participation activities. The public is encouraged to discuss its ideas and suggestions about the citizen participation program with the project contact(s) listed in Appendix A.

3. Site Information

Site Description

The project site referred to as Former Mill No. 2 (as shown on Figures 1, 2 and 3 Refer to Appendix D) is located on approximately 10.3 acres and has a street address of 4001 Packard Road. The site is within a highly industrialized urban area of Niagara Falls, Niagara County, New York. Adjoining properties include: the active paper mill operated by Norampac Industries, Inc. to the north; "Franks Vacuum Service and the former Frontier Chemical Site to the south and west; National Grid

(Niagara Mohawk) and New York Power Authority right- of- way to the east. Further to the northeast of the site are other commercial properties and a little league baseball diamond.

Site History

This former mill, encompassing approximately 661,980 square feet ,historically housed paper manufacturing , finishing and packaging operations of completed goods. The former mill consists of several interconnected two story and five story concrete and masonry buildings which were constructed during various time frames, with the earliest being 1923 and the latest reported date of 1974. The former mill was taken out service several years ago and has fallen into disrepair to the point where certain areas have collapsed and while others exhibit evidence of structural distress.

Given the age of construction, asbestos containing building materials are present in and on the building. Also, PCBs may be present in those areas where electrical equipment had been located including the active transformer yard located in the vicinity of the northwest corner of the former mill.

Relative to historical operations, the use of hazardous substances and petroleum products would have been common. The types of products apparently used at the site included solvents for de-inking (which reportedly occurred on the first floor of Building 14), bleaches, caustics and mineral spirits. Additionally, Building 15 was the location of a "Maintenance Shop" where it is suspected that similar products were used. Building 15 is also the location where a tire fire occurred. A fire of that nature, (which caused obvious structural damage such as cracking and heaving of the concrete floor and ceiling) in a location where unknown containers may have been present, has the potential to be a source area of underlying contaminants in the subsurface.

Based upon information gathered during the preparation of the BCP Application for this site other contaminants which may be in soil or ground water include volatile organic compounds, semi-volatile organic compounds, metals and pesticides.

Environmental History

The following investigative/assessment reports pertaining to the site have been prepared:

- Draft Phase I Environmental Site Assessment Report- 4001 Packard Road- Mill No. 2 Niagara Falls, New York, dated March 2008. Prepared consistent with ASTM E-1527-05 by LaBella Associates, P.C., Rochester, New York.

    - The report documents the findings of a Phase I Environmental Site Assessment and identified several suspect Recognized Environmental Conditions which appeared to warrant further investigation and included:

        – Use of various chemical and petroleum products.

        – Evidence of staining.

- Various process equipment, conveyors as well as an underground hydraulic oil reservoir.

- Electrical transformers

- Rail lines, spurs and sidings on along the north and south side of former Mill No. 2

- Preliminary Subsurface Site Assessment Summary- 4001 Packard Road-Mill No. 2, Niagara Falls, New York, dated August 2008. Prepared by LaBella Associates, P.C., Rochester, New York.

  - Subsequent to the Phase I Environmental Site Assessment Report, a subsurface investigation to obtain soil and groundwater samples was completed. That work consisted of 19 soil borings and 4 groundwater monitoring wells.
  - Laboratory analysis of samples revealed that specific metals, volatile organic compounds and semivolatile organic compounds were found in soil at concentrations that exceeded clean-up objectives to protect groundwater. Also, volatile organic compounds were detected in groundwater at concentrations above NYSDEC guidance/standards

- Summary of Condition of "Abandoned Mill 2" Buildings as Relative to Asbestos Containing Materials @ 4001 Packard Road, Niagara Falls, New York 14303, dated August 8, 2008. Prepared by AFI Environmental.

  - This report provided a general identification of those building materials that are suspect to contain asbestos.

- Draft Environmental Subsurface Investigation-4001 Packard Road Mill No. 2, Niagara Falls, New York, dated December 2009. Prepared by C&S Engineers, Inc., Syracuse, New York.

  - Six soil borings were made as part of a preliminary building foundation investigation. The analytical laboratory results for soil samples were compared to NYSDEC Sub-part 375-6 Remedial Program Soil Cleanup Objectives for the Protection of Public Health for Industrial Use. For the most part, the analytical results did not exceed the Part 375 soil cleanup objectives for industrial use.

Those reports were made a part of the BCP Application for this site.

The site has not been determined to be a significant threat to public health and/or the environment.

4. Remedial Process

The Applicant has applied for and been accepted into New York's Brownfield Cleanup Program as a Volunteer. This means that the Applicant was not responsible for the disposal or discharge of the contaminants or whose ownership or operation of the site took place after the discharge or disposal of contaminants.

The Applicant in its Application proposes that the site will be used for restricted purposes.

To achieve this goal, the Applicant will conduct remedial activities at the site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement provides the responsibilities of each party in conducting a remedial program at the site.

If the Applicant conducts a remedial investigation (RI) of the site, it will be performed with NYSDEC oversight, and with the following goals:

1) Define the nature and extent of contamination in soil, surface water, groundwater and any other impacted media;

2) Identify the source(s) of the contamination;

3) Assess the impact of the contamination on public health and/or the environment; and

4) Provide information to support the development of a Remedial Work Plan to address the contamination, or to support a conclusion that the contamination does not need to be addressed.

The Applicant will prepare an RI Report after it completes the RI. This report will summarize the results of the RI and will include the Applicant's recommendation of whether remediation (cleanup) is needed to address site-related contamination. The RI Report is subject to review and approval by NYSDEC. Before the RI Report is approved, a fact sheet that describes the RI Report will be sent to the site's contact list.

NYSDEC determines whether the site poses a significant threat to public health and/or the environment. If NYSDEC determines that the site is a "significant threat," a qualifying community group may apply for a TAG. The purpose of a TAG is to provide funds to the qualifying community group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the site and the development/implementation of a remedy.

For more information about the TAG Program and the availability of TAGs, go online at: www.dec.state.ny.us/website/der

After NYSDEC approves the RI Report, the Applicant will be able to develop a Remedial Work Plan. The Remedial Work Plan describes how the Applicant would address the contamination related to the site.

The public would have the opportunity to review and comment on the remediation (cleanup) proposal. The site contact list would be sent a fact sheet that describes the Remedial Work Plan and announces a 45-day public comment period. NYSDEC would factor this input into its decision to approve, reject or modify the Remedial Work Plan.

Approval of the Remedial Work Plan by NYSDEC would allow the Applicant to design and construct the alternative selected to remediate (clean up) the site. The site contact list would receive notification before the start of site remediation. When the Applicant completes remedial activities, it will prepare a Remedial Action Report that certifies that remediation (cleanup) activities have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the remediation is protective of public health and the environment for the intended use for the site. The site contact list would receive a fact sheet that announces the completion of remedial activities and the review of the Remedial Action Report.

NYSDEC would then issue the Applicant a Certificate of Completion. This Certificate states that remediation (cleanup) goals have been achieved, and relieves the Applicant from future remedial liability, subject to statutory conditions. If the Applicant used institutional controls or engineering controls to achieve remedial objectives, the site contact list would receive a fact sheet discussing such controls.

An institutional control is a non-physical means of enforcing a restriction on the use of real property that limits human or environmental exposure, restricts the use of groundwater, provides notice to potential owners, operators, or members of the public, or prevents actions that would interfere with the effectiveness of a remedial program or with the effectiveness and/or integrity of site management at or pertaining to a brownfield site. An example of an institutional control is an environmental easement.

An engineering control is a physical barrier or method employed to actively or passively contain, stabilize, or monitor contamination, restrict the movement of contamination to ensure the long-term effectiveness of a remedial program, or eliminate potential exposure pathways to contamination. Examples include caps and vapor barriers.

Site management will be conducted by the Applicant as required with appropriate NYSDEC oversight.

Activities required to be conducted to inform and involve the public during the site's remedial process are introduced in Section 5 and identified in the chart in Appendix C.

5. Citizen Participation Activities

CP activities that have already occurred and are planned during the investigation and remediation of the site under the BCP are included in Appendix C: Summary of Citizen Participation Activities. NYSDEC will ensure that these CP activities are conducted, with appropriate assistance from the Applicant.

All CP activities seek to provide the public with significant information about site findings and planned remedial activities, and some activities announce comment periods and request public input about important draft documents such as the Proposed Remedial Work Plan.

The CP Plan for the site may be revised based on changes in the site's remedial program or major issues of public concern.

All written materials developed for the public will be reviewed and approved by NYSDEC for clarity and accuracy before they are distributed.

6. Major Issue of Public Concern

This section of the CP Plan identifies major issues of public concern as they relate to the site. Additional major issues of public concern may be identified during the site's remedial process.

At this juncture the public has not identified major concerns with the project. However, issues which are commonly concerns with demolition and site work activities include:

- Dust
- Noise
- Health Risks
- Site Security
- Truck Traffic
- Traffic Disruptions

Mitigation of those concerns will be, in part, a responsibility of the contractor performing the work. As described in the Interim Remedial Measure (IRM) Work Plan for the demolition of former Mill No.2, the demolition contractor has specific obligations and will be required to prepare the following plans for implementation during the project:

Site-Specific Asbestos Abatement Work Plan

Prior to demolition, New York State Department of Labor Code Rule 56 requires that asbestos be removed from a building prior to demolition. This work plan to be prepared by the asbestos abatement contractor will include:

- Contractor's Asbestos Handling License and Contractor's employees' asbestos handling certificates.
- Abatement schedule (bar graph) indicating critical dates of the job.
- Work plan summary of method of asbestos removal consisting of a brief overall discussion of proposed asbestos removal methods and materials.
- Written description and plans (i.e., drawings) for the construction of decontamination enclosure systems (personnel and waste), asbestos work zones/areas, decontamination systems locations, proposed placement locations of negative air equipment, and other engineering controls.
- Written description of critical barriers to be used consistent with New York State Department of Labor Code Rule 6.
- Manufacturer's certifications that vacuums, ventilation equipment, and all other equipment required to contain airborne fibers conform to high efficiency particulate absorbing filtration standards.

- Security and Contingency Plans.
- Written proof of notifications to local emergency responders and hospital, New York State Department of Labor, United States Environmental Protection Agency, and the City of Niagara Falls.
- Written respiratory protection program and record keeping requirements for employees.
- Identification of all waste transporters and disposal facilities including all relevant permits.

Demolition Plan of Operations

The Plan of Operation will include a detailed outline of intended demolition, shoring, utility disconnection, protection of adjoining buildings, surface features, infrastructure as well as other related building demolition procedures. The demolition plan will not relieve the Contractor of complete responsibility for the successful performance of the work in accordance with all applicable federal, state, and local codes and restrictions. This plan will also identify the proposed location of major demolition equipment, waste staging areas, waste segregation and characterization procedures.

Building Pre-Cleaning Plan of Operations

Within the building there is abandoned machinery, electrical devices and containers all of which will be removed prior to demolition. This document will include a description of sequencing, phasing, and methods of the work to ensure the proper removal, characterization, and disposal of all wastes within the buildings.

Fire Safety and Pre-fire Plan prepared in accordance with Fire Code of New York State Chapter 4 Emergency Planning and Preparedness; Chapter 5 Fire Service Features and Chapter 14 Fire Safety during Construction and Demolition.

Fugitive Dust Suppression Plan and Community Air Monitoring Program

This submittal by the contractor will be prepared consistent with New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandum (TAGM) 4031 entitled "*Fugitive Dust Suppression and Particulate Monitoring Program"* and New York State Department of Health (NYSDOH) "*Generic Community Air Monitoring Plan"*. The elements of this submittal will include:

- Description of dust suppression techniques to be employed during site activities including demolition and earthwork.
- Description of particulate monitoring techniques and frequency, instrumentation and analytical methods including the name of the professional performing this monitoring.
- Location of monitoring points and record keeping of meteorological data.
- Action levels, corrective actions, and stop work levels.
- Quality Assurance/Quality Control Plan.

In addition to the contractor's responsibilities listed above, Norampac will retain an independent third party laboratory to perform project air monitoring and analysis during the controlled demolition and asbestos abatement activities consistent with New York State Department of Labor (NYSDOL) Code Rule 56-4. Norampac will also retain an independent NYSDOL Certified Project Monitor to

perform a final clearance and visual inspection consistent with Code Rule 56-9 and ASTM Standard E-1368 "Standard Practice for Visual Inspection of Asbestos Abatement Projects."

Site Security

The demolition contractor will erect a suitable fence to prohibit entry by unauthorized personnel. Also, Norampac has a closed circuit video surveillance system that is capable of viewing the area adjacent to the former Mill No. 2. That surveillance system is monitored on a regular basis.

Traffic

Since the project site adjoins the active Mill No.1 operated by Norampac, the routing and use of vehicles associated with demolition and other site activities will be coordinated with Norampac facility operations.

In the event major concerns are expressed, future communication will be issued to stakeholders.

Appendix A – Project Contacts and Document Repositories

Project Contacts

For information about the site's remedial program, the public may contact the following NYSDEC project contacts:

Michael Hinton, P.E.
Project Manager
NYSDEC Region 9
Division of Environmental Remediation
270 Michigan Avenue
(716)851-7220

Document Repositories

The document repositories identified below have been established to provide the public with convenient access to important project documents:

Niagara Falls Public Library
Earl W. Brydges Building
1425 Main Street
Niagara Falls, New York, 14305
Phone: (716) 286-4894
Hours: Mon,Tues,Wed 9AM-9PM
Thurs,Fri,Sat 9AM-5PM
Closed Sunday

NYSDEC Region 9 Office
270 Michigan Avenue
Attn: Michael Hinton, P.E.
Phone: (716)851-7220
Hours: Monday –Friday 8:30AM-4:30PM
(call for appointment)

Appendix B – Brownfield Site Contact List

1. *Chief Executive Officer and City Administrator of each County, City, Town and Village in which the Site is located.*

   a. City of Niagara Falls

   Office of the Mayor
   Mayor Paul A. Dyster
   City Hall
   745 Main Street
   PO Box 69
   Niagara Falls, NY 14302
   (716) 286-4310

   Office of City Administrator
   Ms. Donna D. Owens
   City Hall
   745 Main Street
   PO Box 69
   Niagara Falls, NY 14302
   (716) 286-4320

   Department of Code Enforcement
   Mr. Guy A. Bax-Director/Zoning
   City Hall
   745 Main Street, Room 306
   PO Box 69
   Niagara Falls, NY 14302
   (716)286-4450

   b. Niagara County

   Greg Lewis, County Manager
   2nd Floor Philo J. Brooks County Office Building
   59 Park Avenue
   Lockport, NY 14049
   (716)439-7006

2. *Residents, Owners, and Occupants of the Site and Properties Adjacent to the Site*

   a. Residents, Owners and Occupants of the Site

   Niagara County IDA

Vantage Center
6311 Inducon Corporate Drive
Sanborn, NY 14132
(716) 278-8769

b. Residents, Owners and Occupants of Adjacent Properties

National Vacuum Corp
408 47th Street
Niagara Falls, NY 14304
(866) 773-1167

Midtown Little League, Inc.
4700 Niagara Falls Boulevard
Niagara Falls, NY 14304
(716) 285-1994

Niagara Mohawk Power Corp.
300 Erie Boulevard
Syracuse, NY 13202
(315) 424-1511

3. *Local News Media from which the community typically obtains information*

Niagara Gazette (Newspaper)
310 Niagara Street
PO Box 540
Niagara Falls, NY 14302
(716) 282-2311

WKSE – 98.5 FM (Radio)
401 City Avenue, Suite 809
Bala CYNWYD, PA 19004

WJJL – 1440 AM (Radio)
920 Union Road
West Seneca, NY 14224
(716) 674-9555

WGRZ – NBC (Channel 2)
259 Delaware Avenue
Buffalo, NY 14202
(716) 849-2222

WIVB – CBS (Channel 4)
2077 Elmwood Avenue
Buffalo, NY 14207
(716) 874-4410

WKBK – ABC (Channel 7)
7 Broadcast Plaza
Buffalo, NY 14202
(716) 845-6100

WUTV – FOX (Channel 29)
699 Hertel Avenue, Suite 100
Buffalo, NY 14207

4. *Public Water Supplier which services the area*

Niagara Falls Water Board
PO Box 1114
Buffalo, NY 14240

5. *Any person who has requested to be placed on the contact list*

None Identified to Date

6. *The administrator of any school or day care facility located on or near the property*

None Identified

7. *The location of a document repository for the project*

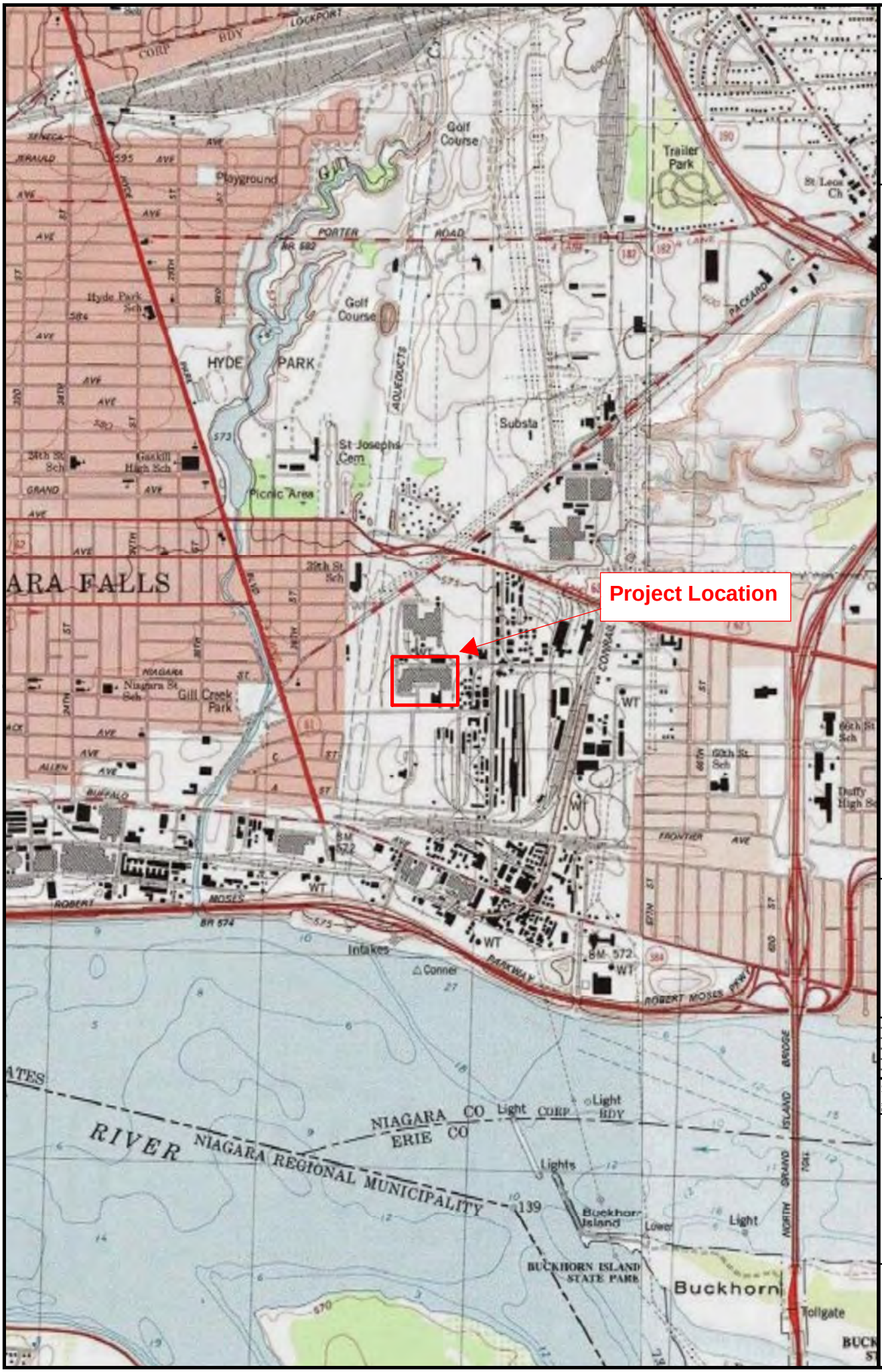
Niagara Falls Public Library
Earl W. Bridges Building
1425 Main Street
Niagara Falls, NY 14305

Appendix C – Identification of Citizen Participation Activities

Required Citizen Participation Activity	CP activity(ies) occur at this point	Date Completed
Application Process:		
• Prepare brownfield site contact list (BSCL) • Establish document repositories • Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day comment period • Publish above ENB content in local newspaper • Mail above ENB content to BSCL	At time of preparation of application to participate in BCP When NYSDEC determines that BCP application is complete. The 30-day comment period begins on date of publication of notice in ENB. End date of comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice and notice to the BSCL should be provided to the public at the same time.	BCP Application Jan.28, 2010 Niagara Gazette Feb.11,2010 ENB Published Feb.17, 2010 BCP Application placed at Niagara Falls Public Library Feb.16,2010 Public Notice Mailed Feb.16,2010
After Execution of Brownfield Site Cleanup Agreement:		
• Prepare citizen participation (CP) plan	Draft CP Plan must be submitted within 20 days of entering Brownfield Site Cleanup Agreement. CP Plan must be approved by NYSDEC before distribution	Draft CPP submitted as part of Draft IRM Work Plan for Demolition of Former Mill #2 March 26, 2010. Conditional Approval by NYSDEC June 14, 2010. CPP revised to incorporate NYSDEC Comments August 2010
After Remedial Investigation (RI) Work Plan Received:		
• Mail fact sheet to BSCL about proposed RI activities and announcing 30-day public comment period on draft RI Work Plan	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, comment periods will be combined and public notice will include fact sheet. 30-day comment period begins/ends as per dates identified in fact sheet.	Draft RI Work Plan submitted to NYSDEC April 2010. Conditional Approval by NYSDEC June 30, 2010.
After RI Completion:		
• Mail fact sheet to BSCL describing results of RI	Before NYSDEC approves RI Report	
After Remedial Work Plan (RWP) Received:		
• Mail fact sheet to BSCL about proposed RWP and announcing 45-day comment period • Public meeting by NYSDEC about proposed RWP (if requested by public)	Before NYSDEC approves RWP. 45-day comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day comment period.	
After Approval of RWP:		
• Mail fact sheet to BSCL summarizing upcoming remedial construction	Before the start of remedial construction	
After Remedial Action Completed:		
• Mail fact sheet to BSCL announcing that remedial construction has been completed • Mail fact sheet to BSCL announcing issuance of Certificate of Completion (COC)	At the time NYSDEC approves Final Engineering Report. These two fact sheets should be combined when possible if there is not a delay in issuance of COC	

APPENDIX D

SITE LOCATION MAPS



C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

Former Mill No. 2, site ID # C932150
Norampac Industries
4001 Packard Road
Niagara Falls, New York

N

0 500 1,000 2,000
Feet

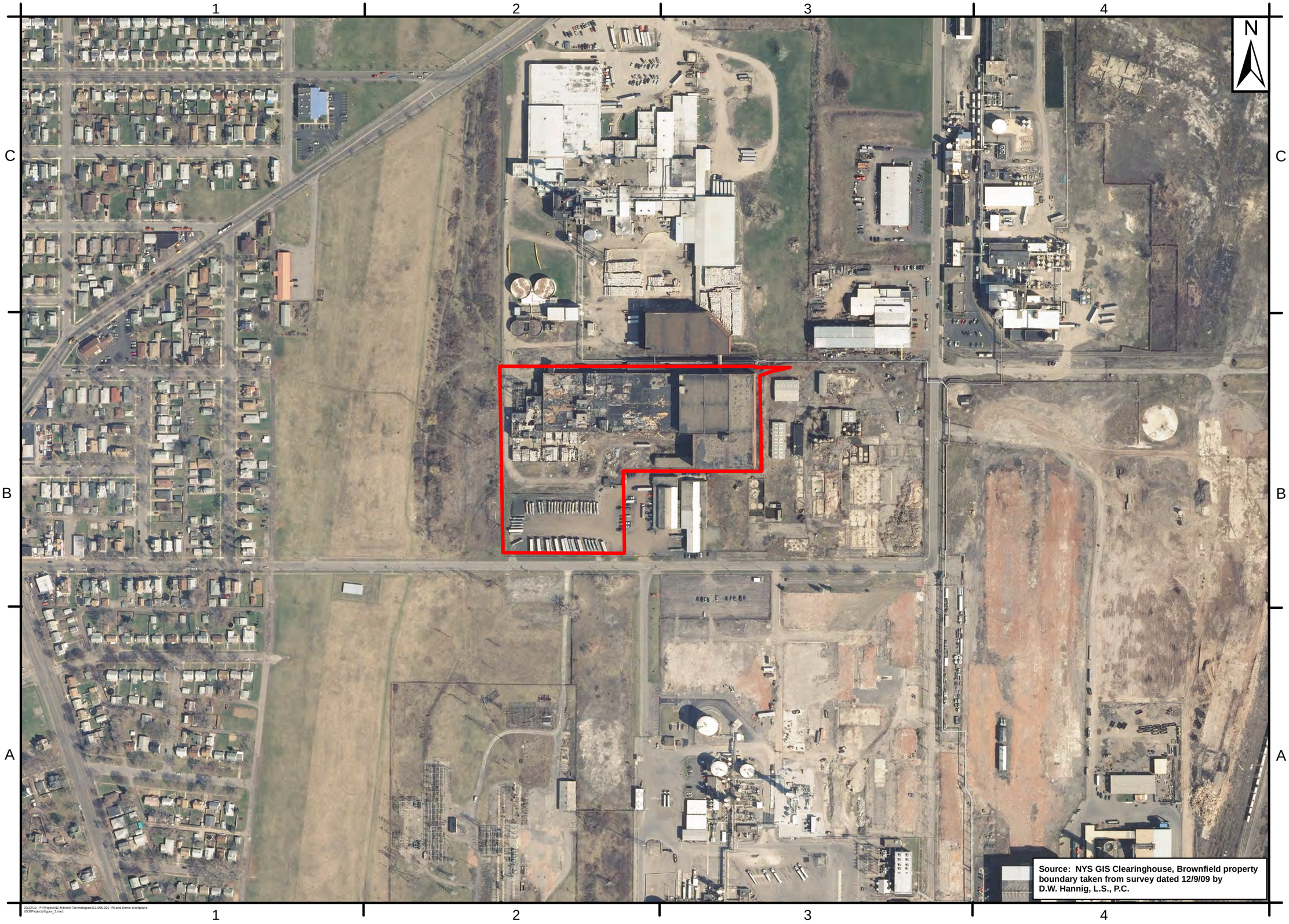
PROJECT NO:	III.005.001.110
DATE:	March 22, 2010
SCALE:	AS SHOWN
DRAWN BY:	WNR
DESIGNED BY:	WNR
CHECKED BY:	SV

03/22/10 - F:\Project\11-Minimill Technologies\11.005.001 -RI and Demo Workplans\GIS\Projects\figure_3.mxd

Source: ESRI USA_Topo_Maps
http://services.arcgisonline.com/arcgis/services

Appendix D
Site Location Map

Figure 1



C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

Legend

Approximate Brownfield Property Boundary

Former Mill No. 2, site ID # C932150
Norampac Industries
4001 Packard Road
Niagara Falls, New York

0 100 200
Feet

PROJECT NO:	III.005.001.110
DATE:	March 22, 2010
SCALE:	AS SHOWN
DRAWN BY:	WNR
DESIGNED BY:	WNR
CHECKED BY:	SV

Appendix D
Property Map

Figure 2

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Source: Image from NYS GIS Clearinghouse, Plant layout from Plant Layout drawing for Kimberly Clark Corporation, Drawing No. F-54000-D dated 1964

03/22/10 - F:\Projects\11-Minimill Technologies\11.005.001 -RI and Demo Work\plans\GIS\Projects\figure_3.mxd

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
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Former Mill No. 2, site ID # C932150
Norampac Industries
4001 Packard Road
Niagara Falls, New York

0 25 50 100 Feet

PROJECT NO:	III.005.001.110
DATE:	March 22, 2010
SCALE:	AS SHOWN
DRAWN BY:	WNR
DESIGNED BY:	WNR
CHECKED BY:	SV

Appendix D
Historic Site Plan

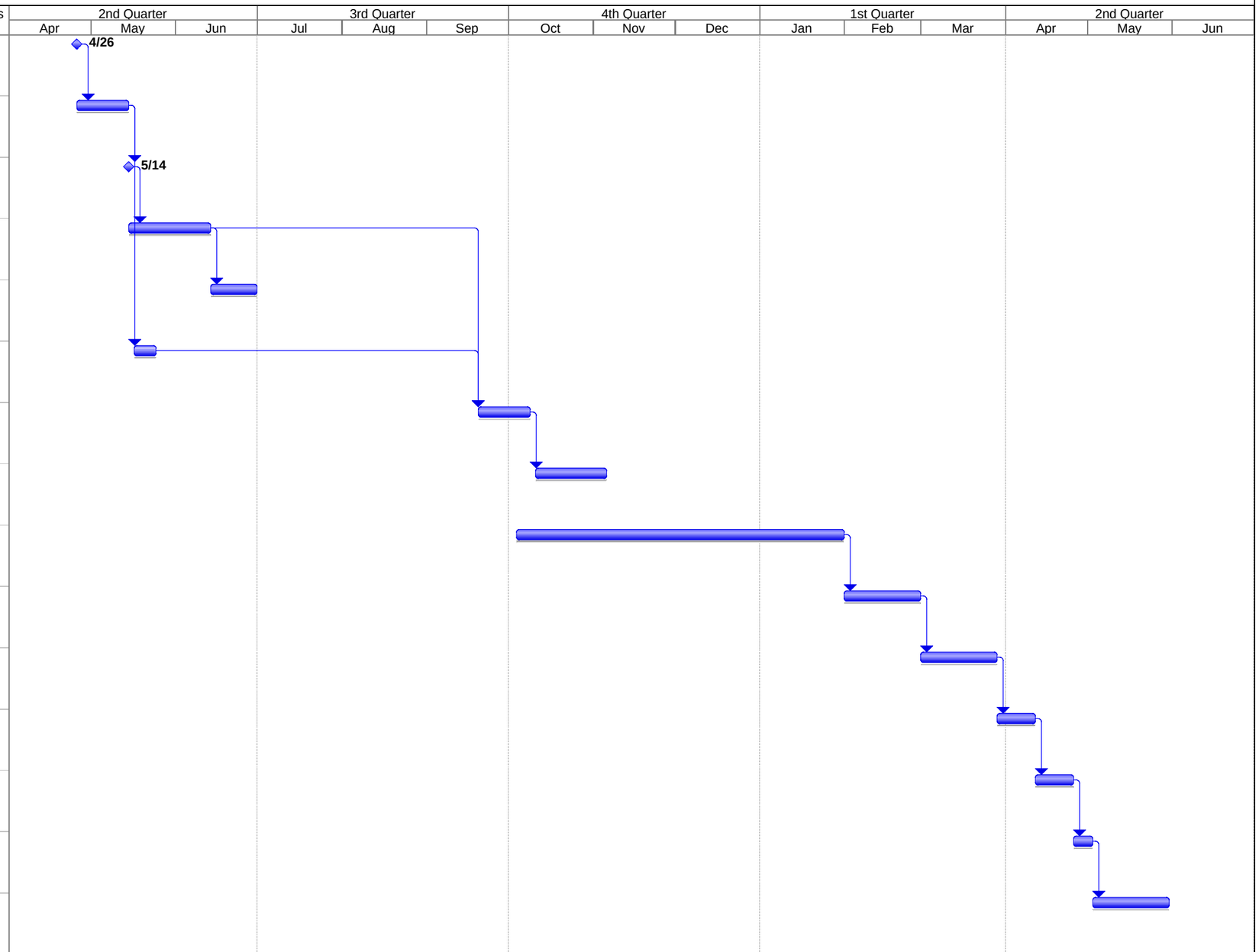
Figure 3

APPENDIX E

Project Schedule

Norampac Brownfield Cleanup Remedial Investigation Draft Schedule

ID	Task Name	Duration	Start	Finish	Predecessors
1	RI work plan submitted to DEC	0 days	4/26/10	4/26/10	
2	NYSDEC & NYSDOH review of RI work plan	15 days	4/26/10	5/14/10	1
3	RI work plan approved by DEC and 30 day public comment period commences	0 days	5/14/10	5/14/10	2
4	RI work plan public comment period	30 edays	5/14/10	6/13/10	3
5	NYSDEC / NYSDOH approval of RI work plan	13 days	6/14/10	6/30/10	4
6	Solicit subcontractor bids (e.g., driller, labs)	6 days	5/17/10	5/24/10	2
7	RI field work	15 days	9/20/10	10/8/10	4,6
8	Analytical work	20 days	10/11/10	11/5/10	7
9	Building demolition	120 edays	10/4/10	2/1/11	
10	Field work under slab and installation of monitoring wells (following demolition)	20 days	2/1/11	2/28/11	9
11	Analytical work	20 days	3/1/11	3/28/11	10
12	Prepare RI report	10 days	3/29/11	4/11/11	11
13	Review of RI Report by client	10 days	4/12/11	4/25/11	12
14	RI report revisions	5 days	4/26/11	5/2/11	13
15	NYSDEC review of RI report	20 days	5/3/11	5/30/11	14



Project: Project Schedule RI 081010
Date: 8/10/10

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External MileTask
Split