PACTIV
Advanced Packaging Solutions

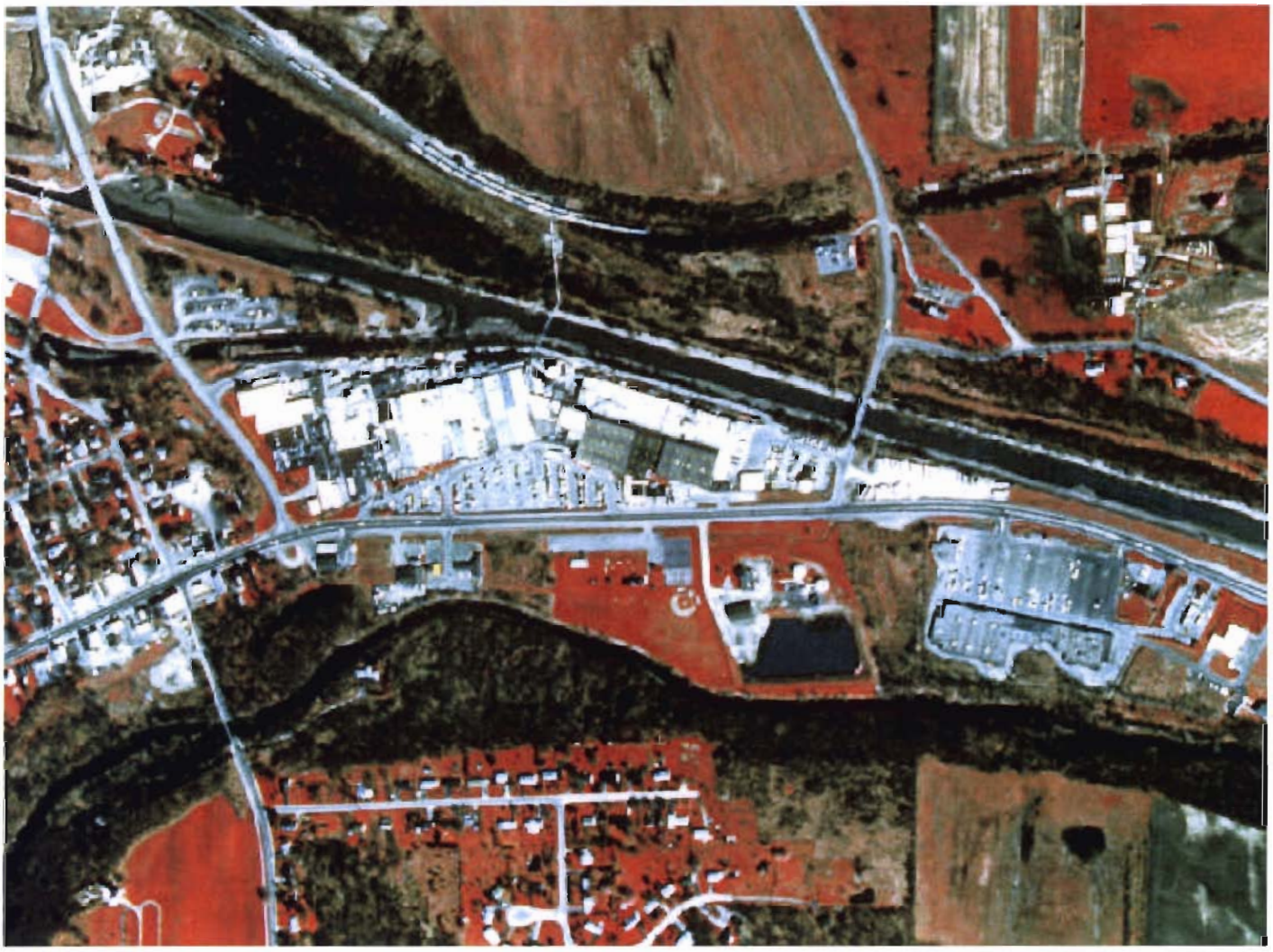
PACTIV CORPORATION

MACEDON FILMS SITE
MACEDON, NEW YORK

SUPPLEMENTAL INVESTIGATION WORK PLAN

MAY 30, 2008

Site # C859025
Index # B8-0669-04-06



Prepared for
Pactiv Corporation
Canandaigua, New York

URS Corporation - New York
77 Goodell Street
Buffalo, New York 14203

PACTIV
Advanced Packaging Solutions

Pactiv Corporation
Technology Center
2651 Brickyard Road
Canandaigua, New York 14424-7990

May 29, 2008

Ms. Nicole Bonsteel
New York State Department of Environmental Conservation
Remedial Bureau D
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233-7013

RE: Macedon Films Site
Supplemental Investigation Work Plan
Brownfield Cleanup Agreement #B8-0669-04-06
Site ID C859025

Dear Ms. Bonsteel:

Enclosed you will find two copies of the *Supplemental Investigation Work Plan* (*SI Work Plan*) for the Macedon Films Site in Macedon, New York. The scope of work presented in this SI Work Plan is in response to the March 13, 2008 NYSDEC comment letter regarding the *Remedial Investigation Report* dated November 28, 2005.

Pactiv understands that a certification by the person with the primary responsibility for the day-to-day performance of the activities under the above referenced Brownfield Cleanup Agreement is to accompany this *SI Workplan*. This letter and my signature below serves as that certification.

If you have any questions on this submittal, please do not hesitate to contact me at 585-393-5062 or email me at dstjames@pactiv.com.

Sincerely,

Dick St. James

Dick St. James
Pactiv Remediation Manager

cc: Ed Hampston - NYSDEC
James Charles – NYSDEC

Deborah McNaughton - NYSDOH
Ray Reott – Law Offices of Ray Reott, LLC
Tim Sheehan – Pactiv
John Rousakis – Law Offices of O'Melveny & Myers
Steve Knapp – Berry – Covalence Plastics
Mathew Tanzer - Tyco
John Bruzzi – Exxon-Mobil
Mary Bitka – URS – Buffalo
Don Porterfield – URS – Clifton Park

SUPPLEMENTAL INVESTIGATION WORK PLAN

FOR THE MACEDON FILMS SITE

MACEDON, NEW YORK 14502

Prepared for:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

625 BROADWAY, 12TH FLOOR

ALBANY, NY 12233

Prepared by:

URS CORPORATION

77 GOODELL STREET

BUFFALO, NY 14203

May 30, 2008

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1.0 INTRODUCTION

On behalf of Pactiv Corporation (Pactiv), URS Corporation-New York (URS) is pleased to present the New York State Department of Environmental Conservation (NYSDEC) with this Supplemental Investigation Work Plan (SI Work Plan) for the Macedon Films Site at 112 Main Street in Macedon, New York. The location of the Macedon Films Site is shown in Figure 1. The NYSDEC's identification number for this site is C859025. This site is being investigated under the Brownfield Cleanup Program (BCP) in accordance with Brownfield Site Cleanup Agreement (BCA) number B8-0669-04-06 between Pactiv and the NYSDEC.

This SI Work Plan incorporates, by reference, the following three documents, which are being submitted concurrently with the SI Work Plan:

- Field Sampling Plan (FSP) (Attachment 1)
- Quality Assurance Project Plan (QAPP) (Attachment 2), and
- Health and Safety Plan (HSP) (Attachment 3).

The scope of work presented in this SI Work Plan is in response to the March 13, 2008 NYSDEC comment letter regarding the URS Draft Remedial Investigation (RI) Report for the Macedon Films Site, November 28, 2005 (URS 2005). A conference call was held on March 24, 2008 with Pactiv, NYSDEC, and URS to discuss further investigation/additional information required for this site. The scope of work presented in this SI Work Plan reflects what was agreed upon during the conference call.

2.0 BACKGROUND

2.1 Site Description

Pactiv's former Macedon facility is on Main Street in the Village of Macedon, Wayne County, New York. Pactiv's former Macedon facility (Macedon Films) is the westernmost part of a 23.6-acre complex. The 23.6-acre complex consists of approximately 92,000 square feet of building space and includes manufacturing facilities for Pliant Corporation (formerly Huntsman Design Products).

The Macedon Films site occupies 6.95 acres on the western portion of the 23.6 acre complex. The Macedon Films site is bordered by a spillway of the New York State Barge Canal and a Pennsylvania Central railroad spur to the north, New York State Route 31 to the south, New York State Route 350 to the west, and Pliant Corporation to the east. Quaker Road and a truck trailer parking area are east of Pliant Corporation.

2.2 Site History

In the 1920's, the site was originally developed for vegetable canning operations. Sanborn maps from 1906, 1912, and 1931 show that there also were lumberyards and a creamery previously located on the site.

Polyethylene flexible packaging products have been manufactured at the site since the 1950s. Polyethylene resin pellets were processed and extruded to form a film that was subsequently converted into packaging products such as produce bags. Manufacturing operations ceased at the site in July 2004.

2.3 Geology and Hydrogeology

The site geology and hydrogeology is discussed in detail in the RI Report (URS 2005).

2.4 Previous Investigations

Previous investigations completed at the site have been documented in the following ten reports:

- Environmental Priority Initiative Preliminary Assessment, Mobil Chemical Company, Macedon Packaging, USEPA, June 30, 1992.
- Soil-Gas Survey Building 10 Courtyard Storm Drain No. 93 Area, Mobil Chemical Company, Macedon, New York, H&A of New York, January 1995.
- Environmental Audit Tenneco Packaging Specialty Products, Macedon, New York, CH2M Hill, April 19, 1997.
- Summary of Environmental Issues and Investigation Plan, Tenneco Packaging Macedon Plant, IT Corporation, July 1998.
- Site Assessment and Closure of Two Chemical Bulk Storage Tanks, CBS Registration No. 8-000025, Tenneco Packaging Macedon Facility, International Technology Corporation, January 1999.
- SPDES Investigation Report, URS Corporation, August 31, 1999.
- Soil and Groundwater Investigation for Pactiv Macedon, New York, URS Corporation, August 21, 2000.
- Revised Water Table Maps Soil Gas Survey Former Pactiv Facility Macedon, New York, URS Corporation, September 11, 2002.
- SWMU Questionnaire for Macedon, NY, URS Corporation, October 17, 2002.
- Remedial Investigation Report, Macedon Films Site, URS Corporation, November 28, 2005.

A more in-depth discussion of the previous investigations is presented in the RI Report (URS 2005).

3.0 WORK PLAN OBJECTIVES

The objectives of the supplemental investigation are to continue to define the nature and extent of contamination related to past site activities as requested by NYSDEC in their comment letter dated March 13, 2008 including:

- Evaluation of the potential impacts to surface soil in the southern portion of the courtyard area and west of the former ink room (Buildings 6 and 6A);
- Evaluating whether the soil and groundwater quality have been impacted beneath the Machine Shop (building 7N), ink mixing room (north of Building 10), and the former ink room (in the vicinity of Buildings 6 and 6A);
- Further evaluating groundwater quality by sampling existing monitoring wells at the site.

4.0 RESPONSE TO NYSDEC COMMENT LETTER

The NYSDEC sent a letter dated March 13, 2008 to Pactiv regarding the results of the Remedial Investigation performed in November 2005. A copy of this letter is located in Appendix A. A conference call with Pactiv, NYSDEC and URS was held on March 24, 2008 to discuss the letter. This section provides responses to each item identified in the NYSDEC letter.

I. Surface Soil

Surface soil samples will be collected from the courtyard and the area west of the former ink room. The number of samples collected and parameters of analysis will meet the criteria stipulated within the comment letter and are discussed in Section 5.0.

II. Subsurface Soil and Groundwater Sampling Beneath the Building Footprint

Subsurface soil and groundwater samples will be collected within the machine shop, an ink mixing room, and former ink room. The number of samples collected and parameters of analysis will meet the criteria stipulated within the comment letter and are discussed in Section 5.0.

III. Groundwater Contamination and Plume Delineation

Proposed groundwater sampling locations are presented in Figure 2. Semi-annual groundwater gauging and semi-annual groundwater monitoring will be performed at the site, and will begin shortly after the installation of the new groundwater monitoring wells, as discussed in Section 5.3. NYSDEC has requested that 2 years of monitoring be performed. Pactiv proposes to perform one year of semi-annual groundwater monitoring, present the results to NYSDEC and determine if future monitoring events are necessary. The number of samples collected and parameters of analysis will meet the criteria stipulated within the comment letter and are discussed in Section 5.0.

IV. Soil Vapor Intrusion (SVI) Evaluation

As suggested in the March 13, 2008 comment letter, the necessity of an SVI evaluation will be evaluated by NYSDEC and NYSDOH after their review of the first year of semi-annual groundwater monitoring data.

V. Status of 6,000-gallon UST

In 1987, the 6,000-gallon UST, which was identified as a RCRA-permitted hazardous waste storage tank for solvent-based waste inks, was removed and replaced by Exxon-Mobil (formerly Mobil Chemical) with a double-walled UST. The tank closure activities conducted by O'Brien & Gere are documented in the *Closure Report Underground Storage Tank Removal Project Hazardous Waste Tank,* dated January 1988. The facility switched to water-based inks in 1991, and this storage tank was closed as a RCRA treatment, storage, and disposal facility (TSDF). Beginning in 1991, only non-hazardous water-based inks were used at the site. Mobil Chemical sold the Macedon Films Site to Tenneco Packaging in 1995, which became Pactiv in 1999. Pactiv subsequently sold the property to Tyco in 2001. The tank was utilized for storing non-hazardous waste ink generated at the facility until Tyco shut the plant down in July 2004.

It is Pactiv's understanding that shortly after the plant closure, Tyco had the tank emptied and disposed of all contents from the tank; but did not go through a tank closure process, since the tank had contained only non-hazardous waste inks since the early 1990s. Tyco subsequently sold the property to Covalence Plastics in February 2006, who merged with Berry Plastics in the spring of 2007. Pactiv is trying to obtain records from Tyco and Berry – Covalence. Any information regarding this will be forwarded to NYSDEC under separate cover. Pactiv is not responsible for the appropriate closure, removal, or abandonment of the tank, since the tank was not owned or operated by Pactiv at the time Tyco shut down the plant in 2004.

VI. Status of Old Underground Fuel Lines

No additional information regarding the old fuel lines could be located. Based on the site history and the previous investigations at the site, former underground fuel lines ran between Buildings 10 and 12. During CH2M Hill's 1996 investigation, subsurface soil samples were collected from two borings MA-4A and MA-4B to evaluate whether leaks, if any, from the former fuel line impacted the surrounding soil. The soil samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, and total petroleum hydrocarbons (TPH). The results indicated that VOCs, SVOCs, and TPH had not impacted the soil in this area of the site. Two metals (chromium at 14.20 mg/kg and selenium at 2.79 mg/kg), which are not typically associated with No. 2 fuel oil, were detected at concentrations that exceeded the NYS TAGM 4046 recommended soil cleanup objectives (SCOs) in soil sample MA-4B. It should be noted that the two metal exceedances in sample MA-4A would be below current NYSDEC Part 375 Restricted Industrial Use SCOs (i.e., chromium and selenium SCOs are both 6,800 mg/kg).

The subsurface soil and groundwater sampling that will be performed north of Building 10 during the SI, , will assist with determining if there is any historical contamination associated with the old underground fuel lines.

VII. Groundwater Diesel Compound Contamination

There are no known historical diesel sources in the area of monitoring well MMW-1. Typically, NYSDEC requires the analysis of groups of contaminants (e.g., VOCs, SVOCs, etc.) and not "gross" analysis such as diesel range organics. Additionally, if diesel components were present in the groundwater, constituents of diesel would have been detected in the SVOC analysis. The November 1999 and March 2000 groundwater data from MMW-1 indicates limited detections of SVOCs, and no exceedances of groundwater quality standards. The Spring 2005 sampling of MMW-1 did not have any detection of SVOCs.

VIII. Source of Site Drinking Water

URS contacted the Town of Macedon, along with the Wayne County Water & Sewer Authority (who supplies the town with water) and confirmed that the Town receives their water from Lake Ontario.

IX. Site Conceptual Model

The human health and ecological risks associated with the soil and groundwater quality at the site are anticipated to be minimal based on the limited potential for contact with the site soil and groundwater and the existing deed restrictions limiting site usage to industrial uses and prohibiting use of the site groundwater (see Appendix C). A more detailed description of the conceptual site model is presented in Appendix B.

X. Proposed Future Site Use

The proposed future use of the site will remain industrial. The site is currently zoned: "industrial," as confirmed by the Macedon Village Clerk/Treasurer. The "Bargain & Sale Deed" for the property at 112 Main Street, currently states that "It is hereby covenanted on the part of the Grantee, which covenant hereby runs with the land, that the Grantee, its successors and assignees, will use the above-described premises for industrial purposes only and will prohibit the use of the groundwater beneath the above-described premises as drinking water." Appendix C contains a copy of the "Bargain & Sale Deed."

XI. Erie Canal Spillway

The Erie Canal Spillway is not part of the site covered by this BCP application and is being handled by Exxon-Mobil. The Exxon-Mobil representative is John Bruzzi and his phone number is 908-474-7152 for issues regarding the Erie Canal Spillway.

5.0 SCOPE OF WORK

The proposed scope of work to meet the objectives in Section 3.0 consists of four tasks:

Task 1 – Surface soil sampling

Task 2 – Install three monitoring wells

Task 3 – Conduct two water level gauging and groundwater sampling events

Task 4 – Prepare a Supplemental Investigation Report

These tasks are further described below. Table 1 summarizes the analytical program for this investigation.

5.1 Task 1 – Surface Soil Sampling

Surface soil samples (zero to two inches below ground surface (bgs)) will be collected during the investigation. As shown in Figure 2, three surface soil samples will be collected at the southwest corner of the complex, surrounding piezometer MP-1, and a fourth surface soil sample will be collected in the courtyard area just west of Building 14A near well MMW-7. The surface soil samples will be collected using stainless-steel trowels from beneath the grass cover, if present. The soil sample will be visually inspected by a geologist and screened for volatile organic compounds (VOCs) using a photoionization detector (PID).

All four surface soil samples will be analyzed by a NYSDOH-approved laboratory for polychlorinated biphenyls (PCBs) by USEPA Method 8082, SVOCs by USEPA Method 8270C, and RCRA metals by USEPA 6010B/7470. The RCRA metals include arsenic (As), barium (Ba), cadmium (Cd), chromium (Cr), lead (Pb), mercury (Hg), selenium (Se), and silver (Ag). The analytical laboratory will provide a NYSDEC ASP Category B deliverable package so that URS can prepare a *Data Usability Summary Report (DUSR).*

The rationale for the collection and analysis for the surface soil samples is to evaluate the potential health exposure to direct soil contact in these areas.

5.2 Task 2 – Install Three Monitoring Wells

URS will install three additional overburden monitoring wells at the site, as shown on Figure 2. The precise location will be the areas with significant staining, floor cracking, or within existing pits. The proposed location for monitoring well MMW-8 will be inside Building 7N (the old machine shop) to assess the potential for subsurface soil and groundwater contamination due to historical industrial activities at the site. A second monitoring well, MMW-9, will be installed inside an ink mixing room, north of Building 10, where the storage, use and mixing of ink products historically occurred. The third monitoring well, MMW-10, will be installed indoors, between Buildings 6 and 6A, to determine if ink that was previously stored there may have contaminated the subsurface.

Based on the depth to bedrock at existing monitoring wells, bedrock at proposed well locations would likely be encountered at approximately 14-16 feet bgs. A soil sample will be collected from each boring. The soil sample will be collected from the interval exhibiting the greatest impacts to soil (i.e., the highest PID readings or visual contamination). If no visual contamination or PID readings exist, the soil sample will be collected from the interval just above the water table. The unsaturated soil samples will be analyzed by a NYSDOH-approved laboratory for VOCs using USEPA SW-846 Method 8260B and SVOCs using USEPA SW-846 Method 8270C, and RCRA metals by USEPA 6010B/7470. The analytical laboratory will provide a NYSDEC ASP Category B deliverable package so that URS can prepare a *DUSR*.

Because each proposed well will be located within a building, physical access will be limited. As a result of the limited access, drilling and well installation will be performed using a remote access direct-push drilling unit (e.g., track mounted 36" wide power probe drill rig Geoprobe Model # VTR-MINI 9630). Soil sampling will be performed using a 2-inch diameter, 4-foot long, acetate-lined Macro core sampler. The remote access unit does not have the power to

drill a larger diameter hole. As a result, the wells will be constructed using 1-inch diameter PVC. Drilling and well construction details are provided in the FSP.

5.2.1 Well Development

Well development will begin no sooner than 48 hours after well installation and will be accomplished through a combination of surging and pumping as described in the FSP. Well development procedures will be documented in the field notebook or on a well development record.

5.2.1.1 Investigation Derived Waste Handling

All down-hole drilling tools will be decontaminated between each drilling location to prevent cross-contamination. The decontamination fluids will be containerized for proper off-site disposal.

The drill cuttings and development water from each well will be containerized and stored on-site in DOT-approved 55-gallon drums or a holding tank for later off-site disposal in accordance with all relevant regulations.

5.2.1.2 Well Surveying

The locations and elevations of all new wells will be surveyed by a New York State-licensed surveyor, for inclusion to the existing base map. The survey data will be essential for construction of potentiometric maps from which groundwater gradients can be determined. The geographic location or horizontal survey measurement will be surveyed to an accuracy of 0.01 foot.

A reference point will be marked on the top of the well riser at the time of construction. The elevation of the well riser will be surveyed to the reference point, and all future water level

recordings will be made with respect to the reference point. The elevation of the riser reference mark and ground surface will be surveyed to the nearest 0.01 foot. The survey will use the same coordinate and elevation datum as the existing wells. The surveyor will provide tabular summaries of the vertical elevations and horizontal coordinates of the boring locations, benchmarks, and other reference points as specified in the work plan. The survey data will be used to update the existing computer-aided design (CAD) base map that depicts boring locations, samples, and other reference points.

5.3 Task 3 – Conduct Two Water Level Gauging and Groundwater Sampling Events

URS proposes to conduct two rounds of water level monitoring in order to continue to evaluate the influence of the canal on the onsite groundwater levels. One round will be conducted during the navigation season (i.e., April through October) and the other round when the canal is closed. For each monitoring round, water levels will be obtained from the existing monitoring wells and piezometer, the three new monitoring wells, and the three canal spillway gauging stations (Gauging Stations 1 through 3) that were established in 1999. It is assumed for the purpose of this investigation that the gauging stations no longer exist and new stations will have to be installed and surveyed.

URS proposes to conduct the first gauging event in late summer of 2008, pending the timing of NYSDEC's review and approval of this SI Work Plan, when the water level in the canal is raised for the navigation season. The second round of gauging will be conducted in the winter of 2009 when the water level in the canal is lowered for the season but is not frozen.

The depth to groundwater in the wells and the depth to water at the gauging stations will be measured to the nearest 0.01 foot using an electronic water level indicator (i.e., Model P-1 Solinst or equivalent) following the procedures in the FSP. The order of gauging will be based on the anticipated or known level of contamination in the well; clean wells will be checked first.

In conjunction with water level measurements, URS will also collect two rounds of groundwater samples from the seven existing monitoring wells MMW-1 through MMW-7,

existing piezometer MP-1, and the three new monitoring wells MMW-8, MMW-9, and MMW-10. As requested by NYSDEC, the groundwater samples for the two monitoring events will be analyzed by a NYSDOH-approved laboratory for VOCs by USEPA SW-846 Method 8260B, SVOCs by USEPA SW-846 Method 8270C, and RCRA metals by USEPA 6010B/7470. The analytical laboratory will provide a NYSDEC ASP Category B deliverable package so that URS can prepare a *DUSR*.

It is proposed that additional future groundwater sampling will be dependent on the results of these two monitoring events. Pactiv proposes to evaluate the results and discuss the need for future sampling with NYSDEC.

The monitoring wells and piezometer will be purged and sampled following the USEPA's low flow purging and sampling protocol (EPA 540/S-95/504). The groundwater monitoring well sampling procedures are described in detail in the FSP.

5.4 Task 4 – Prepare Supplemental Investigation Report

URS will prepare a Supplemental Investigation Report that describes the findings of the investigation and submit the report to the NYSDEC. The report will present the geologic and hydrogeologic site conditions of the site, including a description of the nature and extent of soil and groundwater quality for the site.

6.0 SCHEDULE

The proposed project schedule is presented in Table 2. URS anticipates that a Supplemental Investigation Report, including both rounds of the semi-annual groundwater monitoring results, will be submitted within approximately one year of the NYSDEC's approval of this SI Work Plan.

7.0 REFERENCES

CH2M Hill, 1997. *Environmental Audit Tenneco Packaging Specialty Products, Macedon, New York*, April 19, 1997.

Haley & Aldrich of New York, 1995. *Soil-Gas Survey Building 10 Courtyard Storm Drain No. 93 Area, Mobil Chemical Company, Macedon, New York*, January 1995.

International Technology Corporation, 1999. *Site Assessment and Closure of Two Chemical Bulk Storage Tanks, CBS Registration No. 8-000025, Tenneco Packaging Macedon Facility,* January 1999.

IT Corporation, July 1998. *Summary of Environmental Issues and Investigation Plan, Tenneco Packaging Macedon Plant.*

New York State Department of Environmental Conservation, April 1995. Division Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels. HWR-94-4046.

New York State Department of Environmental Conservation, August 1999. *Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations*

New York State Museum, 1991. *Geology of New York A Simplified Account.*

O'Brien & Gere, January 1988. *Closure Report Underground Storage Tank Removal Project Hazardous Waste Tank.*

Rickard and Fisher, 1970. Geologic Map of New York Finger Lakes Sheet.

United States Geological Survey, 1984. 7 ½ Minute Series Topographic Map, Macedon, New York Quadrangle.

United States Department of Agriculture, Soil Conservation Service, 1978. Wayne County, New York.

United States Environmental Protection Agency, January 1999, *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition.*

United States Environmental Protection Agency, December 1995. *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures.* EPA/540/S-95/504.

URS Corporation, 1999. *SPDES Investigation Report*, August 31, 1999.

URS Corporation, 2000. *Soil and Groundwater Investigation for Pactiv Macedon, New York,* August 21, 2000.

URS Corporation, 2002a. *Revised Water Table Maps Soil Gas Survey Former Pactiv Facility Macedon, New York,* September 11, 2002.

URS Corporation, 2002b. *SWMU Questionnaire for Macedon, NY*, October 17, 2002.

TABLES

TABLE 1
ANALYTICAL PROGRAM
SUPPLEMENTAL INVESTIGATION

PACTIV CORPORATION
MACEDON FILMS SITE
MACEDON, NEW YORK

Task	Matrix	Analyses	Method	Number of Field Samples	MS/MSD[1]	Trip Blanks	Equipment Blanks	Total Number of Samples
Surface Soil Sampling	Soil	PCBs	USEPA Method 8082	4	1/1	0	1	7
		SVOCs	USEPA SW-846 8270C	4	1/1	0	1	7
		Metals[2]	USEPA SW846 6010B/7470	4	1/1	0	1	7
Subsurface Sampling	Soil	VOCs	USEPA SW-846 8260B	3	1/1	0	1	6
		SVOCs	USEPA SW-846 8270C	3	1/1	0	1	6
		Metals[2]	USEPA SW846 6010B/7470	3	1/1	0	1	6
Round One Monitoring Wells Sampling	Water	VOCs	USEPA SW-846 8260B	10	1/1	1	1	14
		SVOCs	USEPA SW-846 8270C	10	1/1	0	1	13
		Metals[2]	USEPA SW846 6010B/7470	10	1/1	0	1	13
Round Two Monitoring Wells Sampling	Water	VOCs	USEPA SW-846 8260B	10	1/1	1	1	14
		SVOCs	USEPA SW-846 8270C	10	1/1	0	1	13
		Metals[2]	USEPA SW846 6010B/7470	10	1/1	0	1	13

Notes:

1 - Matrix spike/matrix spike duplicate (organic analysis) or matrix spike/matrix duplicate (metals).

2 - RCRA Metals include As, Ba, Cd, Cr, Pb, Hg, Se, and Ag

3 - Two rounds of groundwater sampling will be performed

The laboratory will provide NYSDEC ASP Category B deliverables.

VOCs - Volatile organic compounds

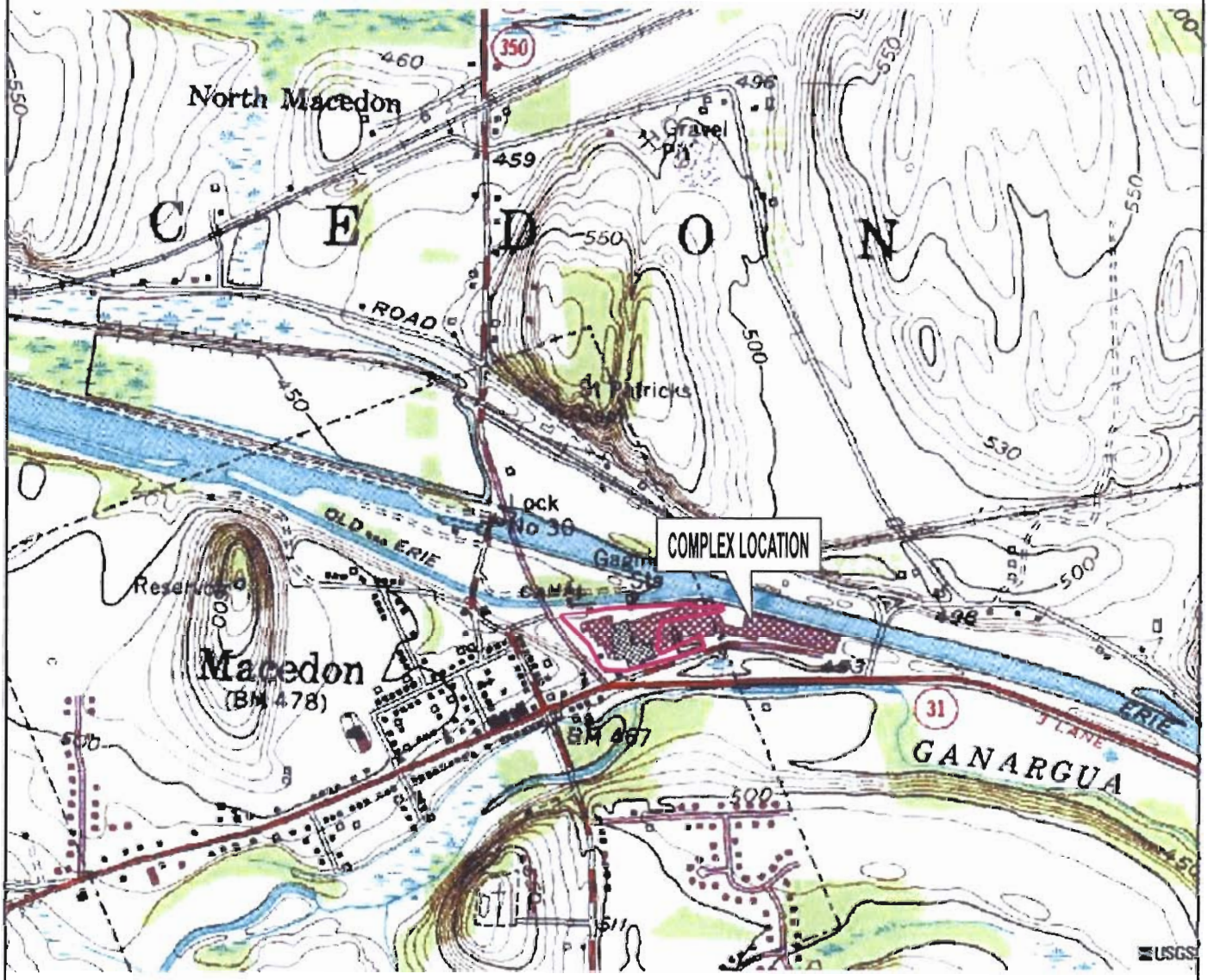
SVOCs - Semivolatile organic compounds

PCBs - Polychlorinated Biphenlys

TABLE 2
MACEDON FILMS SITE
SITE ID C859025, BCP #B8-0669-04-06
PROJECT SCHEDULE

Task	Completion Date
Draft SI Work Plan (WP) Submittal to NYSDEC	May 30, 2008
NYSDEC Review Comments - Received	June 30, 2008
Final Work Plan (WP) Submittal to NYSDEC	July 30, 2008
Notice to Proceed (NTP)	August 30, 2008
Complete Field Work	September 30, 2008
Conduct second semi-annual groundwater monitoring sampling	March 30, 2009
Submit Final SI Report to NYSDEC	May 30, 2009

FIGURES



LEGEND:

Site Boundary

SOURCE:

USGS 7 1/2 Minute Series Topographic Map
Macedon, New York 1984

0 1/4 1/2

GRAPHIC SCALE IN MILES

Title:	COMPLEX LOCATION MAP
Location:	MACEDON, NEW YORK
Client:	PACTIV Advanced Packaging Solutions

URS Corporation
28 Corporate Drive, Suite 200
Clifton Park, New York 12065

Drafter: DAD	Date: November 2005
Drg. Size: 8.5 x 11	Job No.: 38393677

FIGURE 1

P:\Client Documents\Pactiv\38393677\RI Workplan\Figures\Site Location map.ai

LEGEND

- Gauging Location
- Proposed Monitoring Well location
- Proposed Surface Soil Sampling location
- MMW-5 Existing Monitoring Well
- MP-1 Piezometer
- Site Boundary
- BLDG. 7S Building Number

NOTES:
All locations are approximate.

DRAWING SOURCE:
Mobil Chemical Drawing DX1631 (SPCC Drawing) 3/94

0 50 100
GRAPHIC SCALE IN FEET

Title: PROPOSED SAMPLING LOCATIONS

Location: MACEDON, NEW YORK

Client: PACTIV Advanced Packaging Solutions

URS Corporation
77 Goodell Street
Buffalo, New York 14203

Drafter: RAL	Date: May 2008
Drg. Size: 11 x 17	Job No.: 38394424.00000

FIGURE 2

J:\38394424.00000\CAD\FIGURE 2A.dwg 1:1.03 5/28/08 - 4 SRV

APPENDIX A

NYSDEC DRAFT RI REPORT COMMENT LETTER DATED MARCH 13, 2008

New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau E, 12th Floor
625 Broadway, Albany, New York 12233-7017
Phone: (518) 402-9814 • **FAX:** (518) 402-9819
Website: www.dec.ny.gov

Alexander B. Grannis
Commissioner

MAR 13 2008

Mr. Dick St. James
Pactiv Corporation
Technology Center
2651 Brickyard Road
Canandaigua, New York 14424-7990

RE: Draft Remedial Investigation Report Comments
Macedon Films Site
DEC BCP Agreement No. B8-0669-04-06
Site No. C859025

Dear Mr. St. James:

The New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH), collectively the State, have reviewed the Pactiv Corporation *Draft Remedial Investigation Report* (Draft RI), dated November 28, 2005, for the Macedon Films Site (C859025), located in Macedon, New York. Based on review of the Draft RI Report, this letter summarizes the State's comments and outstanding issues that are required to be addressed for the site.

I. Surface Soil

The following areas contain surface soil that may be impacted due to the historic industrial use of the site. These site areas are observed to contain grass/soil cover that exists as an potential health exposure pathway.

Southern Courtyard Grass Area
Although investigations have been conducted within the northern portion of the courtyard in the vicinity of the storm drain to assess soil and soil gas quality, no soil sampling has been conducted within the southern grass/weed covered area of the courtyard located between Site Buildings 13 and 14A. One monitoring well, designated as MMW-7, exists within this area to assess groundwater quality.

West of the Former Ink Room
Multiple soil borings have been collected in this area in order to assess the subsurface soil and groundwater quality in the area of the Former Ink Room (Site Buildings 6 and 6A).

In order to evaluate the potential health exposure to direct soil contact in these areas, surface soil samples (0"-2") are requested to be collected from each area and analyzed for polychlorinated biphenyls (PCBs) via EPA Method 8082, semi-volatile organic compounds (SVOCs) via EPA Method 8270C, and

RCRA Metals including Mercury via EPA Method 6010B/7470. A minimum of one (1) surface soil sample is requested to evaluate the southern courtyard grass area and a minimum of three (3) surface soil samples are requested to evaluate the grass area located west of the former ink room.

If an environmental easement and institutional/engineering controls are implemented as part of the future restricted use of the site, these areas may not require additional sampling if it can be demonstrated that potential exposure to these areas will be prevented (i.e., through the application of a minimum of one (1) foot of clean soil or an surface barrier) in accordance with 6 NYCRR Part 375 Section 3.8 - BCP Remedial Program.

II. Sub-Surface Soil and Groundwater Sampling Beneath the Building Footprint

The following site building areas may have been impacted due to the historic industrial use of the site. These site areas are reported to have been previously used to store, mix, or use hazardous materials as part of the facility operation.

Machine Shop
The machine shop, located in Site Building 7N, was indicated to have used oil as a dust suppressant. According to the 1997 CH2MHill *Environmental Audit for Tenneco Packaging Specialty Products, Macedon, New York*, a long-term facility employee (37+ years) interviewed indicated that an "oily material" was encountered in 1990 during the construction of a dry pit in the machine shop (i.e., a 4' by 4' by 4' deep depression in the floor). According to the employee, the "oily material," which was removed during the construction of the dry pit, was likely a result of the past practices of using oil as an dust suppressant. No additional information (i.e., documentation and/or analytical data) was available to determine the presence or absence of sub-surface soil and/or groundwater contamination resulting from the former use of oil as a dust suppressant. Asphalt patching was observed within the flooring area of the machine shop during a July 2007 site visit. The client contact was not aware of any subsurface work having been performed within this area.

Ink Mixing Rooms
The ink mixing rooms, located north of Site Building 10, were historically used for the storage, use and mixing of ink products. During the July 2007 site visit, the ink mixing rooms were observed to contain heavy ink staining along the walls and floors.

Former Ink Room
The former ink room, located in the vicinity of Site Buildings 6 and 6A, was indicated to have been used to store ink.

In order to determine the soil and groundwater quality beneath these potentially impacted areas, sub-surface soil and groundwater sampling beneath the building foundation flooring is requested. A minimum of one (1) sub-surface sampling point is requested to be installed within each of the above areas. The sampling point(s) shall be installed within areas of significant staining, floor cracking, or within existing/former floor drains/pits locations. Both unsaturated soil and groundwater are requested to be collected from the sampling points. The groundwater sampling points are requested to be installed as permanent monitoring wells that will be sampled as part of the groundwater sampling events. The unsaturated soil and groundwater samples shall be analyzed for volatile organic compounds (VOCs) via EPA Method 8260B, semi-volatile organic compounds (SVOCs) via EPA Method 8270C, and RCRA

Metals including Mercury via EPA Method 6010B/7470. If the sub-surface soil or groundwater is determined to be impacted in these areas, additional sampling may be required.

III. Groundwater Contamination and Plume Delineation

As recommended within the Draft RI report, semi-annual groundwater gauging and semi-annual groundwater monitoring shall be conducted for a minimum of two years. The semi-annual groundwater sampling shall be conducted in the spring/summer and fall/winter. All existing and newly installed monitoring wells and piezometers shall be sampled on an semi-annual basis for volatile organic compounds (VOCs) via EPA Method 8260B, semi-volatile organic compounds (SVOCs) via EPA Method 8270C, and RCRA Metals including Mercury via EPA Method 6010B/7470.

In order to evaluate the groundwater quality of the site, the laboratory method detection limits of the semi-annual groundwater sampling shall meet the NYSDEC Groundwater GA standards and guidance values (TOGS 1.1.1) for the analyzed parameters. Groundwater contour maps shall also be generated for each groundwater sampling event.

IV. Soil Vapor Intrusion Evaluation

The necessity for soil vapor intrusion at the site will be evaluated by the State based on the findings of the requested semi-annual groundwater monitoring. If based on the monitoring results, it is determined that the soil vapor intrusion pathway is required to be evaluated, the Brownfield Cleanup Program (BCP) volunteer will be requested to provide: (1) a work plan which outlines procedures for soil vapor sampling with the understanding that if there are detections, soil vapor intrusion sampling (subslab, indoor and ambient air samples) will need to be implemented; or 2) provide a work plan which outlines the procedures to collect soil vapor intrusion sampling within in the on-site building. All sampling shall be conducted in accordance with the NYSDOH *Guidance for Evaluating Soil Vapor Intrusion in the State of New York,* (NYSDOH Guidance) dated October 2006. All soil vapor intrusion work plans shall be submitted to the State for review and approval prior to sampling. Based on a review of the results and/or changes to future site use (e.g., future development/changes to the on-site buildings), additional sampling or other measures may need to be taken.

If the site is occupied prior to the collection and evaluation of current groundwater quality, the BCP volunteer will be requested to conduct a soil vapor intrusion evaluation (subslab, indoor and ambient air samples) of the site buildings in accordance with the NYSDOH Guidance.

V. Status of 6,000-gallon Underground Storage Tank (UST)

Please provide additional information regarding the current status of the 6,000-gallon underground storage tank (UST) located north of Site Building 10. According to documentation, the 6,000-gallon UST was installed by Exxon-Mobil in 1987 as a replacement tank and was used to collect solvent based ink wastewater until the 1990s when the site's ink was converted to soy based ink.

In accordance with 6 NYCRR Part 375, Section 1.8, all remedial programs, including the Brownfield Cleanup Program (BCP), shall address the registration and proper closure of bulk storage tanks or containment vessels. Please indicate whether this tank currently contains ink product and is still connected to the Building's internal collection piping. If this tank is determined to be out of service, it will require closure in accordance with 6 NYCRR Part 375, Section 1.8(b)(3) and all other applicable

State and federal requirements.

VI. Status of Old Underground Fuel Lines

Please provide additional information (i.e., documentation and/or analytical data) regarding the current status of the old underground fuel lines depicted on previous site maps as located beneath the building's foundation and the asphalt area between Site Buildings 10 and 12. According to site documentation, an unknown amount of Fuel Oil No. 2 was released to the ground and canal due to the rupture of the underground fuel oil line in 1977. The underground line was permanently deactivated and a new overhead line was installed in response to the fuel line rupture. Please indicate whether this line has been cleaned and removed/or closed in place and if any soil sampling was conducted beneath the building footprint within this area to determine the presence or absence of petroleum contamination resulting from the former use of the underground fuel oil lines.

VII. Groundwater Diesel Compound Contamination

In 1999, monitoring well MMW-1 was installed near the main entrance of the building along the southern border of the site. Monitoring well MMW-1 was determined to contain elevated concentrations of diesel range organics during the November 1999 sampling event. Although diesel range organics were detected during the November 1999 sampling event, MMW-1 was not analyzed for diesel range organics during the subsequent groundwater sampling events conducted in March 2000, April 2005 or May 2005. Please provide additional information (i.e., documentation or data) indicating the suspected source and nature and extent of the diesel range organic contamination previously encountered in groundwater in this area.

VIII. Source of Site Drinking Water

According to the Draft RI report, the source of drinking water supplied to the Village of Macedon is from Lake Erie. Please verify that Lake Erie is the site's drinking water source since it is feasible that the source of drinking water may actually be from Lake Ontario.

IX. Site Conceptual Model

The additional data, in conjunction with existing analytical data previously collected on site, shall be used to update the Site Conceptual Model. The Site Conceptual Model shall identify and describe: (1) the sources of contamination, (2) the nature and extent of the contamination, (3) the dominant fate and transport characteristics of the site, (4) the potential exposure pathways, and (5) the potentially impacted receptors.

X. Proposed Future Site Use

The Draft RI report does not adequately address the proposed future site use. This should be clearly stated within the report. According to the Brownfield Cleanup Program (BCP) agreement No. B8-0669-04-06, the intended use of the property is to remain industrial. Any land use restrictions, easements, or institutional controls required for the intended future use should be provided to the State for review and approval in accordance with the BCP agreement and 6 NYCRR Part 375.

XI. Erie Canal Spillway

In 1996 (surface water and sediment sampling) and 1998 (sediment sampling), investigations were performed within the Erie Canal Spillway located along the northern boundary of the site. The results of Erie Canal Spillway investigations indicated that the sediment in the spillway had been impacted by SVOCs and metals. According to the Draft RI report, Pactiv indicated that any further investigations required associated with the canal spillway would be conducted at the responsibility of ExxonMobil.

The State shall determine the requirements of additional canal sampling and coordinate any additional requests with ExxonMobil.

Please submit a work plan which addresses the above comments and requests for additional information within 30 days of the date of this letter for NYSDEC review. If you should have any questions regarding the above, please feel to contact me at the address given above, via phone (518) 402-9814, or via email at nmbonste@gw.dec.state.ny.us.

Sincerely,

Nicole M. Bonsteel, P.E.
Environmental Engineer
Remedial Section C, Remedial Bureau E
Division of Environmental Remediation

ec: D. McNaughton, NYSDOH

APPENDIX B

CONCEPTUAL SITE MODEL

B-1 CONCEPTUAL SITE MODEL

A conceptual site model has been developed based upon the RI investigation results and the historical information reported as part of previous investigations.

B1.1 Sources Of Contamination

Historical site investigations have revealed several areas that are possible sources of contamination. These include:

- Former gasoline underground storage tanks (USTs) and diesel aboveground storage tanks (ASTs) near area north of Building 11;
- Waste ink tank area north of Building 10;
- Former solvent tank area west of Building 12; and
- Courtyard area between Buildings 3, 3B, 7S, 10, and 13.
- Area near the Building 6A Former Ink Room;
- Former fuel oil ASTs area near the east side of Building 12;
- Former methyl ethyl alcohol AST north of Building 10;
- Former lube oil drum storage area near the fire tank;
- Former UST area between the fire tank and the cooling tower;
- Former electrical transformer near the east side of the cooling tower;
- Former underground fuel line between Building 10 and Building 12;
- Former methyl ethyl ketone (MEK) ASTs near the west side of Building 34;
- Former glycol AST near Building 1 at the south side of the site; and

- Former gasoline AST east of Building 34.

B1.2 Nature and Extent of Contamination

The first three listed areas above are between the main buildings and the canal. These three areas have been impacted by petroleum hydrocarbons and petroleum-related volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). The courtyard was included in a 2005 RI because only limited investigation work was previously conducted there.

Groundwater data collected in 2005 indicates that the groundwater quality at the site has not been significantly impacted by VOCs, SVOCs, or metals. Trace levels of petroleum-related VOCs were detected in the groundwater at well MMW-3, which is near the former gasoline USTs and diesel fuel ASTs area. The only VOCs detected in groundwater that exceeded their respective groundwater standards were n-propylbenzene and 1,2,4-trimethylbenzene in well MMW-3 and chloroform in well MMW-6. Well MMW-6 was installed east of the cooling tower along the north side of the site. The presence of chloroform in groundwater at well MMW-6 is attributed to the use of water treatment chemicals associated with the cooling tower. Bis(2-ethylhexyl)phthalate was detected in the April 2005 groundwater sample from piezometer MP-1 at a concentration of 28 µg/L, which exceeds the groundwater standard of 5 µg/L, but was not detected in the May/June 2005 groundwater sample from piezometer MP-1. Piezometer MP-1 is upgradient of the site.

No metals were detected in the April 2005 groundwater samples at concentrations that exceed NYSDEC groundwater standards. Based on the analytical results from the groundwater samples collected from monitoring well MMW-1 through MMW-7 and piezometer MP-1, the groundwater quality at the site has not been impacted by metals. The elevated concentrations of metals previously detected in the groundwater samples collected from temporary wells MA-1 through MA-3 during the 1996 CH2M Hill investigation are not representative of the site groundwater quality.

Previous groundwater samples collected from the site monitoring wells have indicated the presence of gasoline range organics in groundwater from wells MMW-3 and MMW-4 and diesel range organics in groundwater from well MMW-1. Phenol was the only SVOC previously detected at concentrations that exceed its groundwater standard of 1.0 µg/L in groundwater samples from the site (MMW-1 through MMW-5). Phenol was not detected in any of the groundwater samples collected from the site wells in 2005.

B1.3 Fate and Transport Characteristics of the Site

Groundwater impacts downgradient of the waste ink tank area are very limited. Groundwater exceedances downgradient of the waste ink tank area are limited to chloroform in downgradient well MMW-6. The source of the chloroform is attributed to water treatment chemicals associated with the cooling tower. No VOCs, SVOCs, or metals were detected in downgradient well MMW-5.

There appears to be no evidence of soil or groundwater impacts beneath the courtyard area. During the installation of monitoring well MMW-7 in the courtyard in 2005 there was no evidence of soil contamination. No VOCs, SVOCs, or metals were detected at concentrations that exceed groundwater standards in either of the groundwater samples from well MMW-7 in 2005.

The previous detection of tetrachloroethene in soil sample MSB-4 (four to six feet below grade) from the waste ink tank area was not replicated in the two soil samples collected from boring MSB-8 during the 2005 RI.

Although seasonal fluctuations in the canal and the spillway affect localized flow directions and gradients along the north side of the site near the spillway, the overall groundwater flow direction at the site is generally from the southwest toward the northeast. In April 2005, when the canal was closed for navigation, the water levels in the canal spillway were lower than the water levels beneath the site. In late May 2005, after the canal was opened for navigation, the

water levels in the canal spillway west of the Building 12 weir were higher than the water levels beneath the site.

The potential for VOCs in the subsurface to impact indoor air at the site is low. Therefore, based on the current data, NYSDEC and NYSDOH concur that an indoor air investigation is not warranted at the site.

B1.4 Potential Exposure Pathways and Potentially Impacted Receptors

The migration of contaminants from the source areas to other portions of the site is controlled by the nature of the source areas, surface features, and hydrogeologic conditions at the site. Potential releases of contaminants may have either migrated over the ground surface to the Erie Canal Spillway (via stormwater runoff), remained in the soil within and near the potential contamination sources (USTs and ASTs), migrated through the overburden groundwater to the Erie Canal Spillway and to the bedrock beneath the site, or naturally attenuated over time. Contaminants may have also been released and migrated through dust and/or volatile emissions. As a result, area residents and site visitors, as well as terrestrial and aquatic biota all could have been exposed to migrated contaminants.

However, the potential for exposure to the compounds detected in soil and groundwater at the site is minimal. Most of the site is paved or is covered by the buildings. Therefore, direct contact with the site soil or groundwater by site visitors is unlikely. Furthermore, deed restrictions at the Macedon Films Site prohibit the use of groundwater beneath the site as drinking water. Additionally, both the Village and Town of Macedon drinking water supply originates from Lake Ontario, and not from localized groundwater. Also, there are no drinking water supply wells at the site and there are no confirmed water supply wells in Macedon according to the Macedon Water Department or the NYSDOH Source Water Assessment database.

The groundwater beneath the site is influenced by flow within the canal, which is controlled by the New York State Thruway Authority. As the water level in the canal changes

seasonally, groundwater may migrate into the canal at various locations along the Erie Canal spillway. However, the canal spillway and the canal are not used as drinking water sources.

In summary, the human health and ecological risks associated with the soil and groundwater quality at the site are anticipated to be minimal based on the limited potential for contact with the site soil and groundwater.

APPENDIX C

BARGAIN & SALE DEED

WITH COVENANT AGAINST GRANTOR'S ACTS

This document prepared by and
mail after recording to:

Julie M. Mandanas, Esq.
Jenner & Block, LLC
One IBM Plaza
Chicago, IL 60611

Above Space For Recorder's Use Only

BARGAIN & SALE DEED
WITH COVENANT AGAINST GRANTOR'S ACTS
(Macedon)

THIS INDENTURE is made as of this ____ day of January, 2001 between PACTIV CORPORATION, a Delaware corporation, formerly known as Tenneco Packaging Inc., a Delaware corporation, successor by merger to Tenneco Packaging Specialty and Consumer Products Inc., a Delaware corporation, with an office at 1900 West Field Court, Lake Forest, Illinois 60045 ("Grantor") and CARLISLE PLASTICS L.P., a Delaware limited partnership having an address of 1401 West 94th Street, Minneapolis, Minnesota 55431 ("Grantee").

WITNESSETH, that the Grantor, in consideration of One and 00/100 Dollar ($1.00) paid by the Grantee, hereby grants and releases unto the Grantee, the distributees, successors and assigns of the Grantee forever,

ALL THOSE TRACTS OR PARCELS OF LAND, together with the buildings and improvements thereon and the appurtenances and all the estate and rights of the Grantor in and to said premises (including, without limitation, all rail track located thereon), situate partially in the Village of Macedon and partially in the Town of Macedon, County of Wayne and State of New York, as more particularly described on Schedule A attached hereto as a part hereof, EXCEPT items of personal property and the fixtures described on Schedule B attached hereto as a part hereof, regarding which the Grantor's predecessor in title retains title and ownership.

THIS CONVEYANCE is made and accepted subject to covenants, easements and restrictions set forth on Schedule C (collectively, the "Permitted Exceptions") attached hereto and made a part hereof, affecting the above described premises. It is hereby covenanted on the part of the Grantee, which covenant hereby runs with the land, that the Grantee, its successors

and assignees, will use the above-described premises for industrial purposes only and will prohibit the use of the groundwater beneath the above-described premises as drinking water.

BEING AND HEREBY intending to describe the following premises:

1. The premises conveyed by Cecil Kelly to Kordite Corporation, by Deed recorded in the Wayne County Clerk's Office on June 8, 1964, in Liber 532 of Deeds, page 220.

2. The premises conveyed by Margaret Ellen Gorman to Kordite Corporation, by Deed recorded in the Wayne County Clerk's Office on June 5, 1964, in Liber 532 of Deeds, page 30.

3. The premises conveyed by Farmington Realty to Kordite Corporation, by Deed recorded in the Wayne County Clerk's Office on June 5, 1964, in Liber 532 of Deeds, page 28.

4. The premises conveyed by Watson Caryl to Kordite Corporation, by Deed recorded in the Wayne County Clerk's Office on April 23, 1964, in Liber 530 of Deeds, page 319.

5. The premises conveyed by Tressa Caryl to Kordite Corporation, by Deed recorded in the Wayne County Clerk's Office on March 21, 1960, in Liber 480 of Deeds, page 500.

6. The premises conveyed by the People of the State of New York to Mobil Oil Corporation, by Deed recorded in the Wayne County Clerk's Office on February 15, 1967, in Liber 584 of Deeds, page 396.

7. The premises (formerly Tripp Street) conveyed by Robert M. Gorman and Margaret Ellen Gorman, Grace Cunningham, Jacob DeNeef and Florence DeNeef to Mobil Oil Corporation, by Deed recorded in the Wayne County Clerk's Office on February 15, 1967, in Liber 584 of Deeds, page 392.

8. Part of the premises conveyed by Textron, Inc. to Kordite Corporation, by Deed recorded in the Wayne County Clerk's Office on August 1, 1958, in Liber 464 of Deeds, page 119.

9. Part of Abandoned Highway Land
See Discontinuance - Limited Section State Highway No. 8037 - Village of Macedon R.C. 4069, Wayne County, dated January 4, 1940 filed in Town Clerk's Office - See Resolution by Village of Macedon dated August 3, 1959 relative to discontinued use of portion of Old Route 31 between New Route 31 and Quaker Road.

10. The premises conveyed by Textron, Inc. to Kordite Corporation, by Deed recorded in the Wayne County Clerk's Office on August 1, 1958, in Liber 464 of Deeds, page 119.

11. The premises conveyed by Edna J. Howe to Kordite Corporation, by Deed recorded in the Wayne County Clerk's Office on March 21, 1960, in Liber 480 of Deeds, page 498.

12. The premises conveyed by Margaret Lyke to Mobil Oil Corporation recorded in the Wayne County Clerk's Office on March 9, 1967 in Liber 584 of Deeds Page 722.

13. The premises conveyed by The Owasco River Railway, Inc. to Mobil Oil Corporation, by Deed recorded in the Wayne County Clerk's Office on December 24, 1980, in Liber 744 of Deeds, page 180.

14. The premises conveyed by Mobil Oil Corporation to Tenneco Packaging Specialty and Consumer Products Inc. by Deed recorded in the Wayne County Clerk's Office on September 20, 1999, in Liber 970 or Deeds, page 210.

The premises described in Item Number 13 above are shown on the survey prepared by Denluck-O'Neill, P.C., being Project Number 97-0351, dated June 18, 1997, and filed in the Wayne County Clerk's Office on September 20, 1999, as Map No. 24156.

The premises described in Item Number 1 through 12 above, inclusive, are shown on the following surveys prepared by The Sear-Brown Group, and filed in the Wayne County Clerk's Office on September 20, 1999:

1. The premises are shown as the "Parcel to be Conveyed, Area = 8.947 Acres" on a "Boundary Map", being Project No. 12405, Drawing No. SU 5, Sheet 1 of 2, dated November 11, 1998 and filed as Map No. 24155

2. The improvements shown on the premises, as reflected on an "Instrument Location Map", being Project No. 12405, Drawing No. SU 6, Sheet 2 of 2, dated November 11, 1998, and filed as Map No. 24155 .

TAX ACCOUNT NOS.: 30111-08-947965
30112-20-926096
31112-00-010048

TAX MAILING ADDRESS: Carlisle Plastics L.P.
1401 West 94th Street
Minneapolis, Minnesota 55431

TOGETHER with the perpetual easement and right-of-way created by that certain Indenture recorded on April 19, 1965 in Liber 553 at Page 633, and by that certain Indenture recorded on August 5, 1965 in Liber 557 at Page 605, over, under and through the following described property:

All that tract or parcel of land situate in Town Lot No. 29, Town of Macedon, Wayne County, New York, and being intended to describe a piece of land fifty

(50) feet in width, twenty-five (25) feet either side of an airveyor, the center line of which is more particularly described as follows:

Beginning at a point in the northerly line of the Barge Canal right-of-way, otherwise known as the Blue Line, said point being at right angles from Barge Canal Station 7512 + 65.85 and 90.00 feet north from the monumented offset center line and running thence N 7° 32' 30" west 220 feet, plus or minus, to the lands of the West Shore Railroad according to a survey made by Harnish Lookup Assoc. on December 2, 1964.

and the appurtenances and all the estate and rights of the Grantor in and to said premises.

AND TOGETHER with the permanent right and easement to use, in common with others lawfully entitled to the use thereof, the existing roadway extending from New York State Route No. 350 (Macedon-Ontario Center Road) to the west line of the premises hereby conveyed as Parcel 2, as described in Schedule A attached hereto and made a part hereof, as a means of access to and from Parcel 2, as conveyed to Mobil Oil Corporation in that certain Quit Claim Deed from The Owasco River Railway, Inc., recorded on December 24, 1980 in Liber 744 of Deeds, Page 180.

TOGETHER with and subject to the rights, title and interests set forth in a certain Reciprocal Easement Agreement entered into between the Mobil Oil Corporation and Grantor as of the 10th day of August, 1999 and recorded in the Wayne County Clerk's Office on September 20, 1999 in Liber 970 of Deeds, page 225.

and the appurtenances and all the estate and rights of the Grantor in and to said premises.

TO HAVE AND TO HOLD the premises herein granted unto the Grantee, the heirs or successors and assigns of the Grantee forever.

AND the Grantor covenants that it has not done or suffered anything whereby the said premises have been encumbered in any way whatever, other than the Permitted Exceptions.

This deed is subject to the trust provisions of Section 13 of the Lien Law. The words "Grantor" and "Grantee" shall be construed to read in the plural whenever the sense of this deed so requires.

IN WITNESS WHEREOF, the Grantor has executed this Indenture as of the day and year first above written.

PACTIV CORPORATION, a Delaware corporation

By: David Brush

Name: David Brush

Its: Vice President

552765.3

STATE OF NEW YORK)
) SS
COUNTY OF MONROE)

On this 30th day of January, 2001, before me personally came David Brush, to me known, who, being by me duly sworn did depose and say that the above-named person resides in Lake County, Illinois, that said person is Vice President of PACTIV CORPORATION, the corporation described in and which executed the foregoing instrument; and that the above-named person signed thereto by order of the Board of Directors of said corporation.

Given under my hand and notarial seal this 30th day of Jan, 2001.

Sue A. Minton
Notary Public

[SEAL]

My Commission expires:

"OFFICIAL SEAL"
SUE A. MINTON
Notary Public, State of Illinois
My Commission Expires March 9, 2003

EXHIBIT A

Legal Description

PARCEL I

ALL THAT TRACT OR PARCEL OF LAND containing 8.947 acres, more or less, situate in the Village of Macedon, Town of Macedon, County of Wayne, State of New York, as shown on a map entitled "Mobil Oil Corporation, Boundary Map (Sheet 1 of 2)", prepared by The Sear-Brown Group, Inc., last revised March 17, 1998, having Drawing No. 12405 SU 5 and a drawing entitled "Mobil Oil Corporation, Instrument Location Map (Sheet 2 of 2)" prepared by The Sear-Brown Group, Inc., last revised November 10, 1998, having Drawing No. 12405 SU 6, and being more particularly bounded and described as follows:

Beginning at a point in the northerly right-of-way line of Main Street, New York State Route 31, State Highway No. 8037 (width varies), said point being at the southeasterly corner of a parcel of land conveyed to Wayne County by Doyle, as filed in the Office of the Clerk of Wayne County in Liber 329 of Deeds at Page 75, said point being marked in the field by a found monument 0.2 foot east; thence the following six (6) courses and distances along the northerly right-of-way line of said Route 31

1. N 19° 41' 00" W, a distance of 28.76 feet to a point marked by a found monument 0.1 foot east; thence

2. S 76° 33' 00" W, a distance of 159.18 feet to a point marked by a found monument 0.1 foot north and 0.2 foot east; thence

3. S 86° 25' 00" W, a distance of 57.41 feet to a found monument; thence

4. S 87° 03' 30" W, a distance of 168.92 feet to a point marked by a found monument 0.1 foot west; thence

5. S 87° 44' 20" W, a distance of 192.71 feet to a point marked by a found 3/4" iron pipe 0.4 foot east; thence

6. S 76° 54' 46" W, a distance of 47.72 feet to a found monument in the easterly right-of-way line of NYS Route 350 (width varies), said point being the southeasterly corner of a parcel of land conveyed to Mobil Oil Corporation by the People of the State of New York on December 28, 1966 and filed in the Office of the Clerk of Wayne County in Liber 584 of Deeds at Page 396; thence the following seven (7) courses and distances along said easterly right-of-way line

7. N 63° 54' 11" W, a distance of 61.35 feet to a found monument; thence

8. N 24° 35' 08" W, a distance of 253.75 feet to a point marked by a found 4" x 4" granite monument 0.8 foot south; thence

9. N 33° 51' 14" W, a distance of 78.45 feet to a 4" x 4" granite monument; thence

10. N 39° 57' 01" W, a distance of 58.22 feet to a point marked by a found monument 0.2 foot south; thence

11. N 40° 23' 34" W, a distance of 153.47 feet to a point marked by a found monument 0.2 foot south; thence

12. N 30° 08' 02" W, a distance of 19.65 feet to a point; thence

13. N 23° 41' 28" W, a distance of 51.32 feet to a point marked by a found monument 0.1 foot south and 0.1 foot east, said point being in the southerly line of lands now or formerly of the New York State Barge Canal; thence the following eight (8) courses and distances along said southerly line.

14. N 83° 10' 30" E, a distance of 50.00 feet to a point marked by a found monument 0.1 foot east; thence

15. N 84° 19' 40" E, a distance of 132.00 feet to a point marked by a found monument 0.1 foot east; thence

16. N 71° 32' 40" E, a distance of 68.70 feet to a point marked by a found monument 0.1 foot south; thence

17. N 78° 30' 30" E, a distance of 64.80 feet to a point; thence

18. N 84° 19' 30" E, a distance of 264.00 feet to a point; thence

19. N 85° 03' 00" E, a distance of 302.51 feet to a point marked by a found 3/8" rod in concrete 0.7 foot north and 0.1 foot west; thence

20. S 04° 57' 00" E, a distance of 41.91 feet to a point marked by a found shaft 0.8 foot north and 0.1 foot west; thence

21. N 84° 13' 00" E, a distance of 206.46 feet to a point; thence the following twenty three (23) courses and distances through lands now or formerly of Mobil Oil Corporation.

22. S 13° 41' 00" E, a distance of 13.39 feet to a point; thence

23. S 76° 19' 00" W, along the edge of the upper concrete pad for Silos 7, 8 and 9 and the edge of pad for Silos 31 and 32, a distance of 36.00 feet to a point; thence

24. S 13° 41' 00" E, continuing along the edge of concrete pad and between Silos 9 and 4, a distance of 16.00 feet to a point; thence

25. N 76° 19' 00" E, along the southerly edge of said concrete pad for Silos 7, 8 and 9, a distance of 28.70 feet to a point; thence

26. S 14° 08' 00" E, through the wall of an existing building, a distance of 19.51 feet to a point in the center of an eight inch (8") block wall; thence

27. S 75° 52' 00" W, along the centerline of the said 8" block wall, a distance of 5.21 feet to a point on the easterly face of aluminum framing; thence

28. N 14° 08' 00" W, along said easterly face of aluminum framing a distance of 6.25 feet to the northeasterly corner thereof; thence

29. S 75° 52' 00" W, along the northerly face of said aluminum framing, a distance of 19.40 feet to the northwesterly corner thereof; thence

30. S 14° 08' 00" E, along the westerly face of said aluminum framing, a distance of 6.25 feet to a point in the center of the previously mentioned 8" block wall; thence

31. S 75° 52' 00" W, along the centerline of said wall, a distance of 408.92 feet to a point; thence

32. S 14° 08' 00" E, along the centerline of an 8" block wall, a distance of 64.80 feet to a point; thence

33. S 75° 52' 00" W, along the centerline of an 8" block wall, a distance of 22.70 feet to a point; thence

34. S 14° 08' 00" E, along the centerline of a 12" block wall, a distance of 29.46 feet to a point in the center of an 8" block wall; thence

35. S 75° 43' 30" W, along the centerline of said 8" block wall, a distance of 13.34 feet to a point on the westerly face of an existing wall; thence

36. S 14° 16' 30" E, along said westerly face of wall, a distance of 111.10 feet to a point in the center of an 8" block wall; thence

37. S 75° 43' 30" W, along the centerline of said 8" block wall, a distance of 24.38 feet to a point; thence

38. S 14° 16' 30" E, along the centerline of an 8" block wall, a distance of 75.83 feet to a point; thence

39. N 75° 43' 30" E, along the centerline of an 8" block Wall, a distance of 7.50 feet to a point; thence

40. S 14° 16' 30" E, along the centerline of an 8" block wall, and continuing beyond the exterior of the existing building, a total distance of 66.70 feet to a point lying 8", more or less, southeasterly of an existing 6' chain link fence with barbed wire; thence

41. N 67° 56' 48" E, along a line which is parallel with and 8", more or less, southeasterly of said chain link fence, a distance of 256.45 feet to a point; thence

42. N 14° 19' 36" W, along a line which is parallel with and 8", more or less, easterly of said chain link fence, a distance of 13.24 feet to a point; thence

43. N 76° 49' 27" E, along a line which is parallel with and 8", more or less, southerly of said chain link fence, a distance of 58.98 feet to a point; thence

44. S 08° 17' 56" E, along the centerline of a driving lane between parking rows, a distance of 210.83 feet to a point in the first mentioned northerly right-of-way line of Route 31; thence

45. S 86° 31' 40" W, along said right-of-way line, a distance of 22.34 feet to the Point or place of Beginning.

PARCEL II

ALL THAT TRACT OR PARCEL OF LAND, being part of Town Lots 29 and 30, Town and Village of Macedon, County of Wayne, State of New York, all as shown on a map prepared by Donald B. Schwartz, Professional Land Surveyor, dated August 15, 1980, being Job No. 80-581, and being particularly described as follows:

COMMENCING at a point in the centerline of N.Y.S. Route 350 (Macedon-Ontario Center Road), at its intersection with the Railroad Centerline at Station 1803 - 923.15 therein; thence easterly, on a curve to the right, having a radius of 2864.93 feet, along said centerline, a distance of 205.15 feet to P.C. Station 1803 + 718.00; thence South 51 degrees 25 minutes 00 seconds East, along said centerline, a distance of 455.48 feet, to a point on said centerline, said point being Centerline Station 1803 + 262.52; thence North 38 degrees 35 minutes 00 seconds East, at right angles to said centerline, a distance of 28.49 feet to an iron pipe set at the POINT OF BEGINNING; thence North 40 degrees 44 minutes 30 seconds East, a distance of 32.37 feet to an iron pipe; thence South 48 degrees 56 minutes 40 seconds East, a distance of 140.52 feet to an iron pipe; thence South 81 degrees 49 minutes 00 seconds East, a distance of 142.52 feet to an iron pipe set on the north boundary of land belonging to The Owasco River Railway, Inc.; thence South 57 degrees 32 minutes 48 seconds East, along said north boundary, a distance of 450.57 feet to an iron pipe, said iron pipe being 175.00 feet northerly, as measured at right angles, from Centerline Station 1802 + 550.00; thence South 39 degrees 21 minutes 41 seconds East, along

said north boundary, a distance of 406.98 feet to an iron pipe, said iron pipe being 90.00 feet northerly, as measured at right angles, from centerline P.T. Station 1802 – 152.00; thence South 59 degrees 15 minutes 37 seconds East, along said north boundary, a distance of 333.91 feet to an iron pipe, said iron pipe being 105.00 feet northerly, as measured radially, from Center Station 1801+ 800.00; thence South 69 degrees 28 minutes 35 seconds East, along said north boundary, a distance of 471.20 feet to an iron pipe, said iron pipe being 105.00 feet northerly, as measured radially, from Centerline Station 1801 + 300.00; thence South 80 degrees 04 minutes 03 seconds East, along said north boundary, a distance of 283.86 feet to an iron pipe, said iron pipe being 98.00 feet northerly, as measured radially from Centerline Station 1801 + 000.00; thence South 86 degrees 03 minutes 24 seconds East, along said north boundary, a distance of 258.60 feet to an iron pipe, said iron pipe being 80.00 feet northerly, as measured at right angles, from Centerline P.C. Station 1800 + 729.20, said iron pipe being further defined as being South 85 degrees 54 minutes 00 seconds West, a distance of 351.22 feet from a railroad spike set on the centerline of the relocated O'Neill Road; thence South 4 degrees 06 minutes 00 seconds East, along the division line between the lands of The Owasco River Railway, Inc. (reputed owner) on the west and the lands of Harlan Hilton Jr. & Robert Stanton (reputed owners) on the east, a distance of 150.00 feet to an iron pipe set on the south boundary of lands belonging to The Owasco River Railway, Inc., said point being 70.00 feet southerly, as measured at right angles from Center P.C. Station 1800 + 729.20; thence westerly, on a curve to the right, having a radius of 1980.00 feet, parallel to and 70.00 feet southerly, as measured radially from the centerline of said railroad, a distance of 1399.44 feet to an iron pipe, said last course being further defined by chords, as North 73 degrees 51 minutes 07 seconds West, a distance of 1370.49 feet; thence North 4 degrees 14 minutes 30 seconds West, a distance of 121.62 feet to an iron pipe; thence westerly, on a curve to the right, having a radius of 2208.24 feet, a distance of 8.37 feet to an iron pipe, said last course being further defined by chords, as North 51 degrees 46 minutes 58 seconds West, a distance of 8.37 feet; thence North 51 degrees 40 minutes 27 seconds West, parallel to. and 30.00 feet northerly from the centerline of the existing main track line, a distance of 719.52 feet to an iron pipe; thence westerly, on a curve to the left, having a radius of 2810.27 feet, a distance of 112.81 feet to an iron pipe, said last course being further defined by chords, as North 50 degrees 31 minutes 27 seconds West, a distance of 112.80 feet; thence North 49 degrees 22 minutes 27 seconds West, parallel to, and 30.00 feet northerly from the centerline of the existing main track line, a distance of 262.92 feet, to an iron pipe set at the point of beginning.

EASEMENT PARCEL

TOGETHER with the perpetual easement and right-of-way created by that certain Indenture recorded on April 19, 1965 in Liber 553 at Page 633, and by that certain Indenture recorded on August 5, 1965 in Liber 557 at Page 605, over, under and through the following described property:

ALL THAT TRACT OR PARCEL OF LAND situate in Town Lot No. 29, Town of Macedon, Wayne County, New York, and being intended to describe a piece of land fifty (50) feet in width, twenty-five (25) feet either side of an airveyor, the center line of which is more particularly described as follows:

Beginning at a point in the northerly line of the Barge Canal right-of-way, otherwise known as the Blue Line, said point being at right angles from Barge Canal Station 7512 +65.85 and 90.00 feet north form the monumented offset center line and running thence N 7° 32' 30" west 220 feet, plus or minus, to the lands of the West Shore Railroad according to a survey made by Harnish Lookup Assoc.. on December 2, 1964.

Together with and subject to those rights, title and interests set forth in a certain Reciprocal Easement Agreement entered in to between Mobil Oil Corporation and Tenneco Packaging Specialty and Consumer Products Inc. as of the 10th day of August, 1999 and recorded in the Wayne County Clerk's Office on September 20, 1999 at Liber 970 of Deeds, at page 225.

Schedule B

Excluded Personal Property and Fixtures

The following items of personal property and fixtures located on **Parcel 1** of the property being conveyed by this Deed to Carlisle Plastics L.P. as to which Mobil Oil Corporation retained title and ownership pursuant to that Deed recorded on September 2, 1999 in Liber 970, page 210:

Resin Silos "A" and "B", as shown on the Instrument Location Map, prepared by The Sear-Brown Group, Project Number 12405, Drawing Number SU 6, dated November 10, 1998, as filed in the Wayne County Clerk's Office on September 20, 1999, as Map Number 24155.

The following items of personal property and fixtures located on **Parcel 2** of the property being conveyed by this Deed to Carlisle Plastics L.P. as to which Mobil Oil Corporation retained title and ownership pursuant to that Deed recorded on September 2, 1999 in Liber 970, page 210:

(1) a block building with vacuum lines and aluminum vacuum pipes for part of the resin transfer system, (2) a small frame building, and (3) a small metal clad building (stationary trailer), all situated west of the small trailer and concrete building owned by Tenneco, and all as shown on the survey prepared by Denluck-O'Neill, P.C., being Project Number 97-0351, dated June 18, 1997, and filed in the Wayne County Clerk's Office on September 20, 1999 as Map No. 24156. North Parcel Map prepared by Denluck-O'Neill, P.C., being Project Number 97-0351.

Schedule C

Permitted Title Exceptions
(Page 1 of 2)

1. Easement to New York State Electric & Gas Corporation recorded June 13, 1990 in Liber 848 of Deeds, at page 869.

2. Easement to New York State Electric & Gas Corporation recorded March 11, 1959 in Liber 469 of Deeds, at page 561.

3. Permanent easement for drainage to the State of New York recorded in Liber 527 of Deeds, page 93.

4. Easement to New York State Electric & Gas Corporation recorded May 2, 1961 in Liber 494 of Deeds at page 528.

5. Easement to New York State Electric & Gas Corporation recorded December 2, 1963 in Liber 523 of Deeds, at page 305.

6. Easement to New York State Electric & Gas Corporation recorded March 22, 1950 in Liber 386 of Deeds, at page 166.

7. Option granted to Empire Gas & Electric Company recorded in Liber 301 of Deeds, page 18.

8. Restrictive covenants and mineral rights exception contained in deed recorded in Liber 473 of Deeds, page 101.

9. Easement granted to New York State Electric & Gas Corporation recorded July 30, 1959 in Liber 474 of Deeds, at page 95.

10. Permit to Discharge Sewage or Wastes by and between Department of Health and Kordite Corporation dated September 14, 1959 and recorded October 1, 1959 in Liber 15 of Miscellaneous Records, Page 91.

11. Rights of others to the natural and unobstructed flow of the Barge Canal crossing premises.

12. Covenants and restrictions as contained in deed recorded November 19, 1964 in Liber 550 of Deeds, page 31.

Permitted Title Exceptions
(Page 2 of 2)

13. Terms and conditions of Easement Agreement dated November 17, 1995 between Mobil Oil Corporation and Huntsman Design Packaging Corporation recorded November 17, 1995 in Liber 913 of Deeds, page 272.

14. Covenants contained in deed recorded March 21, 1960 in Liber 480 of Deeds, page 495.

15. Easement granted to New York State Electric & Gas Corporation recorded on April 12, 1950 in Liber 386 of Deeds at page 270.

16. Sewer Easement granted to Dairymen's League Cooperative Association, Inc. by instrument recorded on December 10, 1928 in Liber 286 of Deeds, at page 81.

17. Restrictive covenants in deed recorded in Liber 724 of Deeds, at page 51 on November 3, 1978.

18. Terms and conditions of Reciprocal Easement Agreement dated August 10, 1999 between Mobil Oil Corporation and Tenneco Packaging Speciality and Consumer Products Inc. recorded September 20, 1999 in Liber 970 of Deeds, page 225.

19. Instrument location map made by The Sear-Brown Group, dated November 16, 1995, last revised July 15, 1998 discloses the following:

    a) Silos #31, 38, 39 and frame shed encroaching north of a portion of the northerly boundary.

    b) 6' chain link fence extending north of northerly boundary.

20. Liens for taxes, assessments and other governmental charges not yet due and payable but not delinquent or being contested in good faith by appropriate proceedings.

21. Mechanics', workmen's, repairmen's, warehousemen's, carrier's or other similar liens arising or incurred in the ordinary course of business.

22. Any condition that may be shown by a current survey, report or physical inspection.

23. Zoning, building and other similar restrictions.

ATTACHMENT 1

FIELD SAMPLING PLAN

SUPPLEMENTAL INVESTIGATION
FIELD SAMPLING PLAN
FOR THE MACEDON FILMS SITE
MACEDON, NEW YORK 14502

Prepared for:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

625 BROADWAY, 12TH FLOOR

ALBANY, NY 12233

Prepared by:

URS CORPORATION

77 GOODELL STREET

BUFFALO, NY 14203

May 30, 2008

FIELD SAMPLING PLAN

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1.0 INTRODUCTION

URS Corporation – New York (URS) has prepared this Field Sampling Plan (FSP) on behalf of Pactiv Corporation (Pactiv). The site, as shown in Figure 1, is being investigated under the Brownfield Cleanup Program (BCP) in accordance with Brownfield Cleanup Agreement Number B8-0669-04-06 (BCA) between Pactiv and the New York State Department of Conservation (NYSDEC). This FSP provides detailed descriptions of the routine field methods to be used during the investigation of the site. Specialized sampling methods, as needed, will be described in specific work plans and approved by NYSDEC.

2.0 SAMPLING PROCEDURES

The scope of work for the supplemental field investigation of the site will consist of the following tasks:

- Collect surface soil samples;
- Collect subsurface soil samples;
- Install and develop groundwater monitoring wells;
- Collect groundwater samples from new and existing monitoring wells;
- Measure groundwater elevations.

The remainder of this section describes the procedures that will be followed to complete these tasks.

2.1 Surface Soil Sampling Procedures

Surface soil samples (0 to 2-inches below ground surface) will be collected during the investigation. Three surface soil samples will be collected at the southwest corner of the complex, surrounding piezometer MP-1, and a fourth surface soil sample will be collected in the courtyard area just west of Building 14A near well MMW-7, as shown in Figure 2. The surface soil samples will be collected using stainless-steel. Some or all of the following equipment will be used to collect surface soil samples:

- Field boring log sheet and field notebook;
- Stainless-steel trowel;
- Stainless-steel knife, trowels, spoons, scoops, and bowls;
- Personal protective equipment (PPE);

- Disposable gloves;
- Distilled/deionized water;
- Cleaning detergents and decontamination chemicals;
- Five-gallon pails for decontamination;
- Brushes;
- Laboratory-supplied sample bottles;
- Cooler;
- Sufficient ice or freezer packs to maintain the samples at four degrees Celsius; and
- Chain of Custody (COC) forms.

Prior to sampling, any vegetative cover (e.g., grass) or gravel will be removed. The soil from the 0 to 2-inch depth will be collected with the trowel and put into a clean stainless-steel bowl. After removal of any stones, large twigs, or other vegetation, the sample will be thoroughly homogenized in the bowl. The sample will then be quartered in the bowl and each quarter then will be mixed separately, before finally mixing the entire sample again. The sample will then be placed in properly labeled sample containers. A stainless-steel scoop or trowel will be used to fill the sample containers.

All soil sample locations will be marked on the ground surface using identification materials and markings that will remain until the end of the project.

To minimize the potential for cross-contamination of samples, the field personnel will wear disposable gloves when collecting and handling samples. The gloves will be changed between samples. The stainless-steel hand trowels will be decontaminated between samples following the procedures in Section 3.3.

Quality assurance samples, such as duplicates samples and equipment rinseate blanks, will be collected as necessary in accordance with the procedures described in Section 3.1. Sample chain of custody procedures are described in Section 4.0.

A description of the sampling area and other pertinent sample information will be recorded in a field notebook.

2.2 Subsurface Soil Sampling Procedures

Soil borings will be advanced and continuous overburden soil samples will be obtained to verify the geologic profile, determine the depth to groundwater, and assure proper placement of the well screens.

Some or all of the following equipment will be used during soil sampling:

- Field boring log sheet and field notebook;
- Photo-ionization detector (PID);
- Stainless-steel knife, trowels, spoons, scoops, and bowls;
- PPE;
- Disposable gloves;
- Distilled/deionized water;
- Cleaning detergents and decontamination chemicals;
- Five-gallon pails for decontamination;
- Brushes;
- Sample bottles;

- Coolers;
- Sufficient ice or freezer packs to maintain the samples at four degrees Celsius; and
- COC forms.

2.2.1 Subsurface Soil Sampling

Because each proposed well will be located within a building, physical access will be restricted due to ceiling heights and doorway widths. As a result of the limited access, drilling and well installation will be performed using a remote access direct-push drilling unit (e.g., track mounted 36" wide power probe drill rig Geoprobe Model # VTR-MINI 9630). Soil sampling will be performed using a 2-inch diameter, 4-foot long, acetate-lined Macro core sampler.

Upon recovery, the acetate liner will be split open and the soil inspected for evidence of contamination and screened for volatile organic vapors using a PID. Information including, but not limited to the length of sample recovery, percent recovery, PID readings, and soil description, including observations such as odors and staining, will be recorded on the boring log. Soils will be described using the Unified Soil Classification System (USCS). A copy of a field boring log sheet is provided in Appendix A.

For soil samples selected for laboratory analysis, a portion of the soil will be transferred directly into the volatile organic compound (VOC) sample containers immediately upon retrieval of the sample. The VOC sample containers will be completely filled to minimize headspace in the containers.

A portion of soil from the sampler will be retained for headspace analysis using a PID. Headspace analysis procedures are described in Section 2.2.3. The rationale behind this sequence of procedures (i.e., collecting a sample first, and then screening) is to minimize the loss of VOCs from samples that will be sent to a laboratory for analysis.

The remaining soil will be placed in a clean stainless-steel bowl. After removal of any stones, large twigs, or other vegetation, the sample will be thoroughly homogenized by mixing the sample in the bowl with a stainless-steel spoon. The sample will then be placed in appropriate. Properly labeled sample containers.

Field personnel will wear disposable gloves for the collection and handling of all samples and will be changed between each sample. The stainless-steel scoop or trowel will be used to fill the sample containers.

Samples that are to be sent for laboratory analysis will be packed into sample coolers containing sufficient bags of ice or freezer packs to maintain the samples at 4° Celsius (°C). All acetate liners will be discarded after use. Upon completion of sampling at each location, all sampling equipment will be decontaminated in accordance with the procedures described in Section 3.3. Quality assurance samples, including duplicate samples, equipment rinseate blanks, and trip blanks will be collected as necessary in accordance with the procedures described in Section 3.1. The sample custody procedures are described in Section 4.0.

2.3 Monitoring Well Installation Procedures

This section describes the procedures that will be used to install monitoring wells using the direct-push drilling unit. The procedures described in this section will provide monitoring wells that will:

- Provide reliable stratigraphic information about penetrated soils;
- Provide representative samples of groundwater for analysis;
- Permit collection of representative water level data; and
- Effectively isolate the separate hydrogeologic strata penetrated during drilling.

Some or all of the following equipment will be used during monitoring well installations:

- Remote access direct-push drilling unit;
- 1-inch diameter threaded Schedule 40 polyvinyl chloride (PVC) well risers and screens with a screen slot size of 0.010-inch;
- Sand
- Bentonite
- PVC well caps and bottom plugs;
- Protective casings and/or roadboxes;
- Concrete mix for surface completions;
- Polyethylene sheeting; and
- Field notebook, soil boring logs, and well construction logs.

2.3.1 Drilling, Borehole Logging, Well Installation, and Construction

There are three proposed monitoring well locations. The first location is in the Ink Mixing Room located north of Site Building 10. The second location is in the Machine Shop, located in Site Building 7N. And the third proposed monitoring well location is in the Former Ink Room, located in the vicinity of Site Buildings 6 and 6A. Based on data from existing monitoring wells, it is anticipated that each well will be installed to a depth of 15 feet below grade.

The supervising field geologist will properly log all soil boring and well construction details. All notes will be entered on a standard boring log sheet (Appendix A) and field book. The following information will be recorded on the boring log sheet:

- Project name and number
- Boring or well number and location
- Drilling contractor

- Drilling method and equipment
- Sampling method and equipment
- Start and finish time and date
- Name of the supervising field geologist.

Before moving onto the first well location, all reusable drilling equipment and tools will be steam-cleaned. Decontamination procedures are in Section 3.3.

Groundwater Monitoring Well Construction

As previously mentioned, due to physical constraints that limit access to the investigation areas, overburden drilling and monitoring well installation will be performed using the remote access direct-push drilling unit.

After the boring is advanced to the required depth of approximately 15 feet, a 10-foot length of 1-inch diameter, Schedule 40 flush-threaded, PVC well riser and screen will be installed. A threaded bottom plug will be placed at the bottom of the screen. The well screen will be placed so that it spans the water table with approximately 1/3 of the well screen above the water table and 2/3 below.

The wells will be installed in the open 2-inch diameter borehole formed by the Macro core sampler. The sand pack will be installed around the well screen to a depth extending two to three feet above the top of the screen. A weighted fiberglass tape will be used to measure the top of the sand pack and detect bridging of the sand pack material. If bridging is detected it will be corrected prior to the addition of more filter pack material.

The annular space above the sandpack will be backfilled to approximately 1-foot below grade with bentonite pellets/chips. Because the bentonite will be above the water table, potable water will be added to hydrate the bentonite so that it will form a hydraulic seal.

Wellhead Construction

All wells will be completed with flush-mount road boxes set in concrete. The top of the well riser will be fitted with a well cap.

2.3.2 Well Development

This section describes the groundwater monitoring well development procedures and quality control requirements for the newly installed monitoring wells. The following equipment will be used for well development:

- New high density polyethylene (HDPE) tubing;
- New HDPE foot valves and surge blocks;
- ASTM Type II or analyte-free distilled water;
- Water level indicator;
- Five-gallon bucket;
- Polyethylene sheeting;
- Well development record and field notebook; and
- pH, conductivity, and turbidity meters.

Well development will begin no sooner than 48 hours after well installation and will be accomplished through a combination of surging and pumping. T tubing with a surge block and foot valve will be lowered to the bottom of the well. The tubing will then be raised and lowered to remove water and sediment from the well.

Water quality measurements will be recorded frequently during the development process. Development will continue until the well is pumped dry or until the discharged water contains no

visible particles and water quality parameters stabilize and the turbidity is less than 50 NTU. Well development procedures will be documented in the field notebook or on a well development record. A copy of a well development record is provided in Appendix A.

2.3.3 Management of Investigation-Derived Wastes (IDW)

Drill cuttings and waste materials (e.g., spent acetate liners) will be containerized in New York State Department of Transportation's (NYSDOT) approved 55-gallon drums and disposed in accordance with relevant regulations by Pactiv. Drilling fluids, decontamination water and well development water will also be containerized for off-site disposal. The drums will be labeled and staged on-site.

2.3.4 Well Surveying

A New York State-licensed surveyor will survey the locations and elevations of the new wells and surface soil sampling locations. The well survey data will be essential for construction of potentiometric maps from which groundwater gradients can be determined. The geographic location or horizontal survey measurement will be surveyed to an accuracy of 0.01 foot.

A reference point will be marked on the top of the well riser at the time of construction. The elevation of the well riser will be surveyed to the reference point, and all future water level recordings will be made with respect to the reference point. The elevation of the riser reference mark and ground surface will be surveyed to the nearest 0.01 foot.

The survey will use the same coordinate and elevation datum as the existing wells.

The surveyor will provide tabular summaries of the vertical elevations and horizontal coordinates of the boring locations, benchmarks, and other reference points as specified in the work plan. The survey data will be used to update the existing computer-aided design (CAD) base map that depicts boring locations, samples, and other reference points.

2.4 Groundwater Elevation Measurement

Prior to groundwater sampling, groundwater elevations will be collected for all existing and newly installed monitoring wells. Some or all of the following equipment will be used to collect water level measurements.

- Electronic water level indicator with 0.01 feet graduations;
- PPE;
- Disposable gloves;
- Distilled/deionized water; and
- Cleaning detergents and decontamination chemicals.

After the new wells have been developed, the new and existing wells will be gauged using an electronic water level meter to obtain water level elevations. The water level data will be used to further refine the groundwater flow regime beneath and near the site. Groundwater levels will be measured in all monitoring wells using the following procedures:

- Verify the identification of the monitoring well.
- Observe the wellhead for signs of deterioration. Record observations. Cut off older locks of existing monitoring wells and replace with new keyed-alike locks.
- Slowly lower the electronic water level indicator probe into the well.
- When the water level indicator contacts groundwater, note the point on the water level indicator as referenced by the measuring point on the well.
- Record the water level to within 0.01 foot in the field notebook or gauging form.
- Retrieve the water level indicator and re-lock the well.

- Decontaminate the water level indicator after each use with an Alconox/distilled water wash followed by a distilled water rinse.

The order of gauging will be based on the anticipated or known level of contamination in the well. The clean wells will be checked first. The gauging data will be recorded on a gauging form. A copy of a gauging form is provided in Appendix A.

2.5 Groundwater Sampling Procedures

Groundwater samples will be collected following the USEPA's low-flow sampling protocol (EPA/540/S-95/504) to obtain representative groundwater samples. Some or all of the following equipment will be used to collect groundwater samples:

- Sampling and purging logs;
- Peristaltic or Waterra Hydrolift-II pump;
- New or dedicated HDPE tubing;
- New or dedicated foot-valve;
- VOC sampling kit for Waterra pump;
- PPE;
- Disposable gloves;
- Distilled/deionized water;
- Cleaning detergents for decontamination;
- Five-gallon pails for decontamination;
- Brushes;
- Laboratory-supplied sample bottles;

- Coolers;
- Sufficient ice or freezer packs to maintain the samples at four degrees Celsius; and
- COC forms.

2.5.1 Well Purging and Stabilization

Upgradient wells, background wells, and other wells that are considered to be relatively uncontaminated, based on available data, will be purged and sampled first, whenever feasible. This practice is intended to minimize the potential for cross-contamination from more contaminated wells.

Groundwater samples will be collected following the USEPA's low-flow sampling protocol for purging and sampling (EPA/540/S-95/504). Wells will be purged using a peristaltic pump with new or dedicated polyethylene tubing with a stainless steel foot valve. During purging, URS will monitor temperature, pH, specific conductivity, dissolved oxygen (DO), oxidation-reduction potential (ORP), and turbidity using a multi-parameter meter connected to an in-line flow-though cell. Purging will be maintained at a pumping rate that minimizes drawdown to less than 0.3 feet (typically 0.1 liters per minute [L/min] to 0.5 L/min). In all cases, the purge rate will not exceed one L/min. If drawdown cannot be maintained at less than 0.3 feet, then the condition will be noted. Samples will be collected following a minimum of 30 minutes of purging and once parameters have stabilized (within 10 percent for temperature, specific conductivity, DO and turbidity, within 0.1 pH units, within 10 mV for ORP over three consecutive readings collected at three- to five-minute intervals). The flow-through cell equipment will be calibrated daily in accordance with the manufacturer's instructions.

A maximum of five wetted screen volumes will be purged from those wells that are not purged dry. A wetted screen volume is defined as the volume of water within the screen. The wetted screen volume can be calculated using the following equation:

$$V \text{ (in cubic feet)} = \pi r^2 h$$

where:

V = volume of water in well;
$\pi = 3.14$;
h = length of screen below the water table in feet; and
r = well radius in feet.

This equation simplifies the following equation, which uses the diameter of the well in inches and a constant to convert the volume to gallons.

$$V \text{ (in gallons)} = h \times d^2 \times 0.0408$$

where d is the well diameter in inches.

2.5.2 Groundwater Sampling Procedures

This procedure describes steps involved in collecting groundwater samples after the well has been purged according to the methods in Section 2.4.1. The objectives of the activities covered by this procedure are to:

- Obtain groundwater samples for laboratory and field analysis;
- Ensure that the groundwater samples will be representative of actual groundwater quality;
- Ensure quality control and consistency during sampling; and
- Serve as a means to allow traceability of error(s) in sampling and data recording.

At wells that are not purged dry, groundwater sampling will commence immediately after purging without turning the pump off. The discharge hose will be disconnected or cut off from the flow-through cell prior to sampling to minimize cross-contamination. The groundwater samples will be collected using VOC sampling kits compatible with the Waterra Hydrolift II pump, if used.

Containers used for VOC analysis will be filled first using small diameter tubing designed for VOC sampling with the pump, which reduces air bubbles and minimizes agitation so as to prevent aeration. The pumping rate will be lowered while VOC vials are being filled. After the VOC vials are filled, then the remaining sampling containers will be filled. At well locations where turbidity is greater than 50 NTUs then the groundwater samples for metals analysis, if required, will be field-filtered using a 0.45 micron (µm) in-line disposable filter. The aliquot for metals analysis will be preserved by adding a sufficient amount of concentrated nitric acid to maintain the sample at a pH of less than 2 standard units (SU).

If a peristaltic pump is used, a foot-valve will be placed on the bottom of the tubing prior to purging. When purging is complete, sampling containers (except VOCs) will be filled directly from the pump discharge line. At well locations where turbidity is greater than 50 NTUs then the groundwater samples for metals analysis will be field-filtered using a 0.45 µm in-line disposable filter. The aliquot for metals analysis will be preserved by adding a sufficient amount of concentrated nitric acid to maintain the sample at a pH of less than 2. The pump will then be turned off and the HDPE tubing will be disconnected from the pump. The VOC sampling vial will be filled by raising the tubing (with a foot-valve) from the well head and allowing the water to gently flow into the vial. The vial will be immediately capped such that no headspace or bubbles are present in the vial. This procedure ensures that the sample is representative of the purged interval and minimizes the potential for volatilization of VOCs, which may occur as a result of the pumping mechanism in the peristaltic pump.

The sample containers will be wiped dry and each sample container will be labeled. The sample number, date, time, location, depth, type of analysis, preservative, and sample collector's name will be recorded on the sample label. This information will also be recorded on the groundwater sampling data sheet along with a description of the physical appearance of the sample including color, clarity, suspended solids, and odor.

The samples will be placed in coolers with sufficient bagged ice or ice packs to maintain a temperature of 4°C during shipment. Sample vials for VOC analyses will be placed in resealable plastic bags prior to placement in the coolers. Quality assurance samples, including duplicates, equipment rinseate blanks, and trip blanks will be collected as necessary in accordance with the

procedures described in Section 3.1 and the *QAPP*. The sample custody procedures for the groundwater samples are described in Section 4.0.

All data relating to weather conditions, time of collection, sampling method, field observation, sample location, and analysis will be recorded on a field sampling record or field notebook. A copy of a field sampling record is provided in Appendix A.

2.6 Staff Gauge Measurements

In addition to groundwater elevation measurements, three staff gauging stations (Gauging Stations 1 through 3) in the canal spillway will be inspected. If functional, staff gauge measurements will be collected to help further evaluate the groundwater and surface water relationship. Some or all of the following equipment will be used to collect water level measurements.

- Electronic water level indicator with 0.01 feet graduations;
- PPE;
- Disposable gloves;
- Distilled/deionized water; and
- Cleaning detergents and decontamination chemicals.

The staff gauge measurements will be measured from the marked surveyed elevation point and recorded to 0.01 foot in the field notebook or gauging form. Remark the surveyed elevation point as necessary with spray paint. The water level indicator will be decontaminated after each use with an Alconox/distilled water wash followed by a distilled water rinse. Gauging data will be recorded in the field notebook.

3.0 QUALITY ASSURANCE FIELD PROCEDURES

This section describes the quality assurance procedures that will be followed while conducting the field investigation.

3.1 Quality Assurance Samples

As part of the quality assurance (QA) program, QA samples will be prepared and collected to provide control over the collection of environmental measurements and interpretation of the analytical data. Three types of QA samples will be prepared or collected:

1) field duplicate samples

2) equipment rinseate blanks

3) trip blanks.

Duplicate samples and equipment blanks will be prepared for all sampling parameters. Trip blanks will only be analyzed for VOCs when aqueous sampling for VOCs is conducted. The three types of QA samples are discussed in the following sections. In addition, matrix spike/matrix duplicates (MS/MSD) (organic analyses) or matrix spike/matrix duplicate (MS/MD) (inorganic analyses) samples will be collected in accordance with the *QAPP*.

3.1.1 Field Duplicate Samples

The analysis of blind duplicate samples provides a means of evaluating the relative precision of the sample collection and analytical procedures. An important factor in evaluating the analytical data from sample pairs is the homogeneity of the analyte within the sample matrix. Therefore, whenever possible, the field personnel will homogenize an aliquot from a discrete location or interval before the sample and duplicate are collected. However, in order to prevent the loss of VOCs, VOC samples must never be homogenized. In general, the handling of VOC samples will be minimized to preserve the physical integrity of the VOC fraction. Duplicate samples will be prepared for each

sample matrix at a rate of one duplicate per twenty samples. Duplicates will be designated with fictitious sample identification following the format for field samples.

Duplicates of solid samples for VOC analysis will be obtained by alternately filling the sample containers for the sample and duplicate for VOC analysis with aliquots collected from the same discrete location or interval. Once samples for VOC analysis have been collected, the sample will be thoroughly homogenized. Following homogenization, the sample containers for the remaining parameters will be filled.

Duplicates of liquid samples will be obtained by alternately filling the sample and duplicate containers with aliquots of liquid collected with the same sampling device. VOC samples and duplicates will be collected first in order to minimize the potential for loss of VOCs. After the VOC samples are collected, any liquid remaining in the sampling device will be equally apportioned among all the sample containers. Upon retrieval of the next aliquot of liquid, the order in which the sample bottles are filled will change by one increment.

3.1.2 Equipment Rinsate Blanks

An equipment rinsate blank is used to test for potential contamination from sampling instruments used to collect and transfer samples from point of collection into sample containers. If re-usable equipment is used, equipment rinseate blanks will be collected at a rate of one per 20 samples per matrix.

Equipment rinsate blanks are prepared by passing laboratory-supplied analyte-free water (or the distilled/deionized water that is used for decontamination) through decontaminated sampling equipment and collecting it in an empty sample container for analysis. Rinseate blanks will be denoted with a "RB" followed by the six digit date (i.e.,: RBYYYYMMDD).

3.1.3 Trip Blanks

The primary purpose of a trip blank is to detect sources of VOC cross-contamination during shipment that might potentially influence VOC concentration values reported in actual samples. Thus, trip blanks serve as a mechanism of control on sample bottle preparation and blank water quality, as well as, sample handling. The trip blank is prepared by the laboratory and travels to the site with the empty sample bottles and back from the site with the collected samples in an effort to simulate sample handling conditions.

Contaminated trip blanks may indicate inadequate bottle cleaning or blank water of questionable quality. The following have been identified as potential sources of contamination:

- Laboratory reagent water;
- Sample containers;
- Cross contamination in shipment;
- Contact with analytical instrumentation during preparation and analysis at the laboratory; and
- Laboratory reagents used in analytical procedures.

A trip blank consists of a set of sample bottles filled at the laboratory with analyte-free water. The trip blank and laboratory method blank water must originate from one common source and physical location within the laboratory. Trip blanks will be handled, transported, and analyzed in the same manner as the other analytical samples, except that the sample containers for the trip blanks will not be opened in the field. Trip blanks must return to the lab with the same set of bottles they accompanied to the field. The trip blanks will be shipped and analyzed at a frequency of one trip blank per cooler per shipment of aqueous samples for VOC analysis. Trip blank sample identification consists of a "TB" followed by the six digit date (i.e.,: TBYYYYMMDD).

3.2 Field Equipment Calibration And Maintenance

Field equipment used during the investigation will be maintained and calibrated in accordance with the manufacturer's supplied equipment operation manuals. Equipment requiring calibration will be calibrated on a daily basis or according to the manufacturer's recommendations, whichever is more frequent.

Equipment that report erratic readings during use will be recalibrated. If erratic readings persist after recalibration, the equipment will be replaced with an equivalent model.

3.3 Sampling Equipment Decontamination Procedures

Sampling equipment will be decontaminated in the laboratory or the field prior to site use and between sampling locations. The sampling device and equipment decontamination method will involve a non-phosphate detergent wash, tap water rinse, distilled/deionized water rinse, air drying, and a second distilled/deionized water rinse.

All down-hole drilling tools will be cleaned between each drilling location to prevent cross-contamination. Decontamination will be conducted on the temporary decontamination pad constructed at the rear of the manufacturing buildings. The decontamination fluids will be containerized for proper off-site disposal by Pactiv.

3.4 Project Files

Throughout the field investigation, URS field personnel will maintain field notebooks to document project activities. Each individual making an entry into a field notebook will date and sign their entry. The field notebook entries will contain accurate and inclusive information of the project activities. Only facts and observations will be written in the field notebooks.

In addition, URS field personnel will note all measurements, calculations, and data relating to location, date, time, weather conditions, and sample types directly on the appropriate field records. Copies of field records, which include a soil boring log, a well development record, and a groundwater sampling data sheet, that will be completed in the field are provided in Appendix A.

Photographs may be taken during the field investigative activities. Each photograph will include a scale to show dimensions. All photographs will be labeled to include a description of the feature photographed, the location and depth (if applicable), and date the photograph was taken.

The field notebooks, field records, and photos will be maintained in the project files. The original (final) copies of the field sheets will be maintained by the field personnel and project manager in URS' office in Buffalo, New York. The project manager will keep copies of all files while the project is active.

Other data files that will be maintained in the project files will include equipment calibration sheets, analytical requests to subcontract laboratories, survey data, and chains of custody documentation.

Originals of the contract laboratory reports will be stored in the project files and maintained at the contracted laboratory. The laboratory analytical data will be entered into the laboratory's computer database. The data will be manipulated in order to achieve the quality assurance/quality control (QA/QC) and reporting requirements described in the *Quality Assurance Project Plan*. The laboratory will provide URS with a hard copy and electronic copy of the analytical data.

4.0 SAMPLE HANDLING AND CUSTODY

All samples will be collected and handled in a manner such that sample agitation, cross-contamination, and contact with the atmosphere is reduced or kept to minimum. Field personnel will wear new disposable gloves when collecting and handling samples, and will change gloves between sampling locations.

Sample chain of custody will be initiated by the laboratory with the selection and preparation of the sample containers. To reduce the chance for error, the number of personnel assuming custody of the sample and sample containers will be held to a minimum. Personnel involved in the chain of custody and transfer of samples will be briefed on the procedures and their purposes prior to the initiation of sampling.

4.1 Field Sample Custody

A Chain of Custody (COC) form will accompany the sample from initial sample container selection and preparation commencing at the laboratory, to the field for sample containment and preservation, through its return to the laboratory.

The Project Manager will notify the laboratory of upcoming field sampling activities and the subsequent transfer of samples to the laboratory. This notification will include information concerning the number and type of samples to be shipped as well as the anticipated date of arrival. Sample shipping containers (coolers or "shuttles") will be provided by the laboratory. The shipping containers will be insulated. All sample bottles within each shipping container will be individually labeled for identification.

The labels will include the following information:

- Site name;
- Sample number;

- Name of collector;
- Date and time of collection;
- Place of collection;
- Type of sample;
- Sample volume;
- Analyses required; and
- Preservative (if used).

If a sample shipping container has been assigned a unique identification number by the laboratory, then this number will be recorded on the COC.

Personnel receiving the sample containers will check each cooler for the integrity of the seals. Coolers or shuttles with broken seals will be returned to the laboratory, and the sample containers will not be used. The receiving personnel will break the seal, inspect the contents for breakage, and record and sign on the COC form that the sample containers have been received. A temporary seal will be affixed to each cooler until the sample containers are filled.

Sample Location Designation

This section describes the procedure for identifying each soil boring location, monitoring well location, and sediment sampling location.

Each soil boring advanced using a Geoprobe will be designated by a "MGP." The two digit year and number will follow the "MGP" name to associate the boring with a specific location. For example, geoprobe boring number 3 advanced in 2008 will be identified as MGP-08-03.

The proposed well names for the overburden monitoring wells have been designated by a "MMW" followed by a number.

Sample Designation

Each subsurface soil sample collected from a geoprobe boring location will be identified using the following code: MGP-YY-ZZ (TT-BB) where:

MGP = geoprobe boring;

TT= the starting depth (feet) of the interval from which the sample was collected;

BB = the end depth (feet) of the interval from which the sample was collected;

YY = the two digit year; and

ZZ = the boring location number.

For example, a subsurface soil sample collected from 8-10 feet from geoprobe boring MGP-08-24 would be coded MGP-08-24 (08-10).

Groundwater samples will be identified by using the following code: MMW-ZZ (MM/DD/YYYY) where,

MMW-ZZ = location number.

MM/DD/YYYY = sample date.

For example, a groundwater sample to be collected from the well MMW-03 on May 1, 2008 will be coded MMW-03 (05/01/2008).

QC samples can be coded using this same system and simply adding a MS, MSD, or MD (for matrix spike, matrix spike duplicate, or matrix duplicate) to the end of the code. Blind duplicates can be coded using this system with a fictitious location number. The locations of each blind duplicate will be recorded in its respective field sampling sheet.

Once the sample containers are filled, the samples will be immediately preserved, as required and stored at 4°C until delivered to the laboratory. Preservation requirements are provided in Table 1. The samples will be kept cool at 4¬C using insulated containers containing sufficient ice or ice packs. If ice is used, the ice will be double-bagged at a minimum. VOC sample jars will be placed in resealable plastic bags prior to placement in coolers. The field sampler will indicate sample designation/location number in the spaces provided on the appropriate COC for each sample of water or soil. The COC will be signed and placed in the cooler. The cooler will be sealed. The samples will be delivered to the laboratory no later than 24 hours after sample collection.

If samples are split and sent to different laboratories, a copy of the COC will accompany the replicate sample. The original COC will accompany the sample for the primary laboratory. The "remarks" column of the COC will be used to record specific considerations associated with sample acquisition such as: sample type, container type, sample preservation methods, and analyses to be performed. The laboratory will maintain on file the completed original forms. Copies will be submitted as a part of the final analytical report.

The specific analyses for each sample are outlined in the workplan. Samples will be collected according to the procedures in this *FSP*. Samples will be hand-delivered or shipped in coolers with sufficient packing material and ice to insure that samples arrive at the laboratory intact, below 4°C, and within 18 hours of shipping.

4.2 Laboratory Sample Custody

Receipt, storage, and tracking of samples submitted to the laboratory must be conducted according to NYSDEC ASP protocol to prevent sample contamination or loss, as well as, the production of invalid laboratory data as a result of sample deterioration or tampering.

5.0 REFERENCES

A Compendium of Superfund Field Operation Methods, OSWER Directive 9355.0-14, December 1987, EPA/540/P-87/001, Office of Solid Waste and Emergency Response.

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Herzog, B.L., Chou, Sheng-Fu J., Valkenburg, J.R., and Griffin, R.A., 1988. "Changes in Volatile Organic Chemical Concentrations after Purging Slowly Recovering Wells." *Ground Water Monitoring Review*, vol. 8, no. 4, pp. 93-99.

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McAlarv, T.A., and Barker, J.F., 1987. "Volatilization Losses of Organics During Ground Water Sampling from Low Permeability Materials." *Ground Water Monitoring Review*, vol. 8, no. 4, pp. 63-68.

Robin, M.J.L., and Gillham, R.W., 1987. "Field Evaluation of Well Purging Procedures." *Ground Water Monitoring Review*, vol. 8, no. 4, pp. 85-93.

USEPA, 1995. *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures.* EPA/540/G-95/504.

TABLES

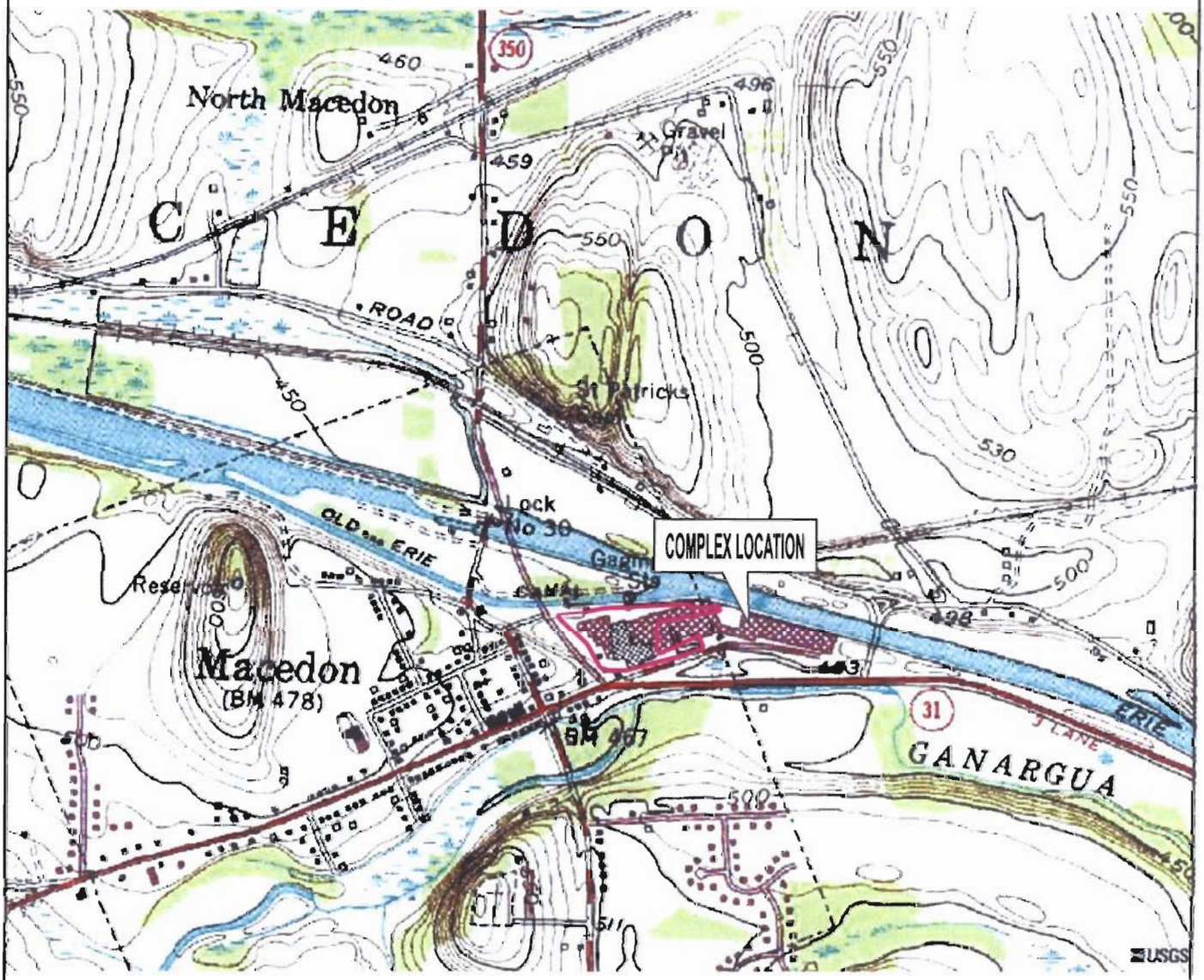
TABLE 1
ANALYTICAL METHODS, SAMPLE CONTAINERS, PERSERVATION REQUIREMENTS, AND ANALYTICAL HOLDING TIMES

PACTIV CORPORATION
MACEDON FILMS SITE
MACEDON, NEW YORK

Analysis	Container	Preservation	Holding time
FIELD MEASUREMENTS			
Field pH	Flow-cell	N/A	Immediate
Dissolved Oxygen	Flow-cell	N/A	Immediate
Oxidation-reduction potential	Flow-cell	N/A	Immediate
Temperature	Flow-cell	N/A	Immediate
Specific conductivity	Flow-cell	N/A	Immediate
Turbidity	Flow-cell	N/A	Immediate
LAB MEASUREMENTS			
Aqueous Samples			
VOCs (EPA Method 8260B)	Three 40 ml septa vials, Glass	HCl to pH < 2, Cool 4 °C	Analyze within 10 days (7 days if not preserved with HCl)
SVOCs (EPA Method 8270C)	Two 1-Liter Glass	Cool 4 °C	Extract within five days; analyze within 40 days
RCRA Metals (EPA Method 6010B/7470)	32 oz., HDPE	HNO_3 to pH < 2, Cool 4 °C	Analyze within 6 months (Mercury - 26 days)
Surface Soil Samples			
PCBs (EPA Method 8082)	4 oz. Glass jar, Teflon cap	Cool 4 °C	Analyze within 10 days.
SVOCs (EPA Method 8270C)	1-6oz. Glass jar, Teflon cap	Cool 4 °C	Extract within 5 days; analyze within 40 days.
RCRA Metals (EPA Method 6010B/7470)	1-6oz. Glass jar, Teflon cap	Cool 4 °C	Analyze within 6 months (Mercury - 26 days)
Subsurface Soil Samples			
VOCs (EPA Method 8260B)	Two 2 oz. Glass, Teflon cap	Cool 4 °C	Analyze within 10 days.
SVOCs (EPA Method 8270C)	1-6oz. Glass jar, Teflon cap	Cool 4 °C	Extract within 5 days; analyze within 40 days.
RCRA Metals (EPA Method 6010B/7470)	1-6oz. Glass jar, Teflon cap	Cool 4 °C	Analyze within 6 months (Mercury - 26 days)

Notes:
VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
Holding times from validated time of sample receipt (VTSR) at the laboratory.
RCRA metals include arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver.

FIGURES



LEGEND:

Site Boundary

SOURCE:

USGS 7 1/2 Minute Series Topographic Map
Macedon, New York 1984

0 1/4 1/2

GRAPHIC SCALE IN MILES

Title: COMPLEX LOCATION MAP

Location: MACEDON, NEW YORK

Client: PACTIV Advanced Packaging Solutions

URS Corporation
28 Corporate Drive, Suite 200
Clifton Park, New York 12065

Drafter: DAD	Date: November 2005
Drg. Size: 8.5 x 11	Job No.: 38393677

FIGURE 1

P:\Client Documents\Pactiv\38393677\RI Workplan\Figures\Site Location map.ai

N

True North Per Barge Canal Mapping Prepared By State of New York

LEGEND

- Gauging Location
- Proposed Monitoring Well location
- Proposed Surface Soil Sampling location
- MMW-5 Existing Monitoring Well
- MP-1 Piezometer
- Site Boundary
- BLDG. 7S Building Number

NOTES:
All locations are approximate.

DRAWING SOURCE:
Mobil Chemical Drawing DX1631 (SPCC Drawing) 3/94

0 50 100
GRAPHIC SCALE IN FEET

Title: PROPOSED SAMPLING LOCATIONS

Location: MACEDON, NEW YORK

Client: PACTIV Advanced Packaging Solutions

URS
URS Corporation
77 Goodell Street
Buffalo, New York 14203

Drafter: RAL	Date: May 2008
Drg. Size: 11 x 17	Job No.: 38394424.00000

FIGURE 2

J:\38394424.00000\CAD\FIGURE 2A.dwg 1:1.03 5/28/08 - 4 SRV

APPENDIX A

FIELD FORMS

URS Corporation - New York
28 Corporate Drive, Suite 200
Clifton Park, New York 12065
Tel. 518.688.0015
Fax 518.688.0022

DAILY FIELD RECORD

Project:_____ Date:_____
Client:_____ Contractor:_____

From	To	Productive Hours	Activity/Comments
Total Productive Hours			LEVEL B / LEVEL C / LEVEL D (circle selection)

LABOR		MATERIALS/SUPPLIES	
UNITS	ACTIVITY	UNITS	ITEM

WEATHER:

_____ URS ON-SITE COORDINATOR

_____ CONTRACTOR REPRESENTATIVE

FIELD PARAMETER METER CALIBRATION SHEET

Project#____________________ Project Name_________________________

Meter 1: __________________ Equipment #___________________

Meter 2: __________________ Equipment #___________________

Meter 3: __________________ Equipment #___________________

Meter 4:__________________ Equipment #___________________

Date	Initials	Meter 1	Meter 2	Meter 3	Meter 4	Comments
		pH SC Temp DO ORP Turb Other	pH SC Temp DO ORP Turb Other	pH SC Temp DO ORP Turb Other	pH SC Temp DO ORP Turb Other	
		pH SC Temp DO ORP Turb Other	pH SC Temp DO ORP Turb Other	pH SC Temp DO ORP Turb Other	pH SC Temp DO ORP Turb Other	
		pH SC Temp DO ORP Turb Other	pH SC Temp DO ORP Turb Other	pH SC Temp DO ORP Turb Other	pH SC Temp DO ORP Turb Other	
		pH SC Temp DO ORP Turb Other	pH SC Temp DO ORP Turb Other	pH SC Temp DO ORP Turb Other	pH SC Temp DO ORP Turb Other	
		pH SC Temp DO ORP Turb Other	pH SC Temp DO ORP Turb Other	pH SC Temp DO ORP Turb Other	pH SC Temp DO ORP Turb Other	
		pH SC Temp DO ORP Turb Other	pH SC Temp DO ORP Turb Other	pH SC Temp DO ORP Turb Other	pH SC Temp DO ORP Turb Other	
		pH SC Temp DO ORP Turb Other	pH SC Temp DO ORP Turb Other	pH SC Temp DO ORP Turb Other	pH SC Temp DO ORP Turb Other	

FIELD PARAMETER METER CALIBRATION SHEET

Instrument__________________ Equipment #__________________

Project#__________________ Project Name________________________

Date	Initials	Battery	pH	Conductivity	Dissolved Oxygen	ORP	Turbidity	Comments
			1 2 3 Point List Standards	1 2 3 Point List Standards	Barometer Zero Check (Y/N)	Checked (Y/N) Reading______ Calibrated (Y/N)	Standard Used:	
			1 2 3 Point List Standards	1 2 3 Point List Standards	Barometer Zero Check (Y/N)	Checked (Y/N) Reading______ Calibrated (Y/N)	Standard Used:	
			1 2 3 Point List Standards	1 2 3 Point List Standards	Barometer Zero Check (Y/N)	Checked (Y/N) Reading______ Calibrated (Y/N)	Standard Used:	
			1 2 3 Point List Standards	1 2 3 Point List Standards	Barometer Zero Check (Y/N)	Checked (Y/N) Reading______ Calibrated (Y/N)	Standard Used:	
			1 2 3 Point List Standards	1 2 3 Point List Standards	Barometer Zero Check (Y/N)	Checked (Y/N) Reading______ Calibrated (Y/N)	Standard Used:	
			1 2 3 Point List Standards	1 2 3 Point List Standards	Barometer Zero Check (Y/N)	Checked (Y/N) Reading______ Calibrated (Y/N)	Standard Used:	
			1 2 3 Point List Standards	1 2 3 Point List Standards	Barometer Zero Check (Y/N)	Checked (Y/N) Reading______ Calibrated (Y/N)	Standard Used:	
			1 2 3 Point List Standards	1 2 3 Point List Standards	Barometer Zero Check (Y/N)	Checked (Y/N) Reading______ Calibrated (Y/N)	Standard Used:	
			1 2 3 Point List Standards	1 2 3 Point List Standards	Barometer Zero Check (Y/N)	Checked (Y/N) Reading______ Calibrated (Y/N)	Standard Used:	

GROUNDWATER SAMPLING DATA SHEET

URS

WELL NO: _____

Field Personnel:

_____

_____

Date: _____

Job No.: 38394236.00000

Location: Macedon Films Site

Total Well Depth (from top of casing): _____ feet

Depth to Water Surface Before Purging (from top of casing): - _____ feet

Height of Water Column: a = _____ feet

Length of screen b = _____ feet

Lesser of a and b _____

Well Diameter (d): _____ inches Gals per ft: $(d^2 \times 0.0408) =$ x _____

Volume of Water Column Before Purging: = _____ gallons or _____ liters

Volume of Water Equal to two saturated screen volumes: _____ gallons or _____ liters
(Volume of Column by 2.0) (1 gallon = 3.785 liters)

Purging Method: Bladder Pump/Waterra Pump/Peristaltic Pump Meter #_____

Time	Well Volumes (Gallons / Liters)	Depth to Water (feet)	SC (mmhos/cm or µmhos)	Temp. (°F or °C)	pH (SU)	Dissolved Oxygen (mg/L)	Redox Potential (mV)	Turbidity (NTU)

Total Volume of Water Purged: _____ gallons/liters

Sampling Data:

- Sampling Method: Bailer or Pump
- Depth of Pump intake or bailer: _____ feet
- Color: Odor: Sheen/Appearance:

Notes:

URS

GROUNDWATER SAMPLING DATA SHEET

WELL NO: ____________

Field Personnel: ____________________

Date: ____________________

Job No.: 38394236.00000

Location: Macedon Films Site

Time	Well Volumes (Gallons / Liters)	Depth to Water (feet)	SC (mmhos/cm or µmhos)	Temp. (°F or °C)	pH (SU)	Dissolved Oxygen (mg/L)	Redox Potential (mV)	Turbidity (NTU)

Total Volume of Water Purged: ______________ gallons/liters

Notes:

URS

MONITORING WELL COMPLETION RECORD

Project: _____ **Well No.** _____ Driller: _____

Project No. and Location: _____ Drilling Method: _____

Installation Date(s): _____ Development

Field Geologist: _____ Method: _____

DISSOLVED OXYGEN SATURATION LIMIT VERSUS TEMPERATURE

T (°F)	T(°C)	O_2 Solubility (mg/L)
32	0	14.6
41	5	12.8
50	10	11.3
59	15	10.1
68	20	9.1
77	25	8.3
86	30	7.6
95	35	6.9
104	40	6.4

Dissolved oxygen saturation limit represents the maximum concentration expected (100% saturation). Only under extremely rare field conditions can DO be greater than the solubility.

Well Development Record

URS

Project:_____
Contractor:_____
Field Personnel:_____
Project No._____
Method of Development:_____

Site Location:_____
Well No._____

Date	Weather / Temp.	Time	Static Water Level	pH (units)	Temp (°C)	Conductivity (umhos)	NTU	Appearance / Odor, etc.	Notes: Gallons removed, etc.

URS Corporation									TEST BORING LOG
									BORING NO:
PROJECT:									SHEET: 1 of
CLIENT:									JOB NO.:
BORING CONTRACTOR:									BORING LOCATION:
GROUNDWATER:					CAS.	SAMPLER	CORE	TUBE	GROUND ELEVATION:
DATE	TIME	LEVEL	TYPE	TYPE					DATE STARTED:
				DIA.					DATE FINISHED:
				WT.					DRILLER:
				FALL					GEOLOGIST:
				* POCKET PENETROMETER READING					REVIEWED BY:

	SAMPLE						DESCRIPTION				REMARKS
DEPTH FEET	STRATA SYMBOL	"S" NO.	"N" NO.	BLOWS PER 6"	REC% RQD%	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	USCS	MOISTURE PID
5										
10										
15										
20										
25										
30										

COMMENTS:	PROJECT NO.
	BORING NO.

WELL DEVELOPMENT LOG

URS Corporation

PROJECT TITLE: _____ WELL NO.: _____

ROJECT NO.: _____

STAFF: _____

DATE(S): _____

			WELL ID.	VOL. (GAL/FT)
1. TOTAL CASING AND SCREEN LENGTH (FT.)	=		1"	0.04
2. WATER LEVEL BELOW TOP OF CASING (FT.)	=		2"	0.17
3. NUMBER OF FEET STANDING WATER (#1 - #2)	=	0.0	3"	0.38
4. VOLUME OF WATER/FOOT OF CASING (GAL.)	=	0.17	4"	0.66
5. VOLUME OF WATER IN CASING (GAL.)(#3 x #4)	=	0.0	5"	1.04
6. VOLUME OF WATER TO REMOVE (GAL.)(#5 x ___)	=	0	6"	1.50
7. VOLUME OF WATER ACTUALLY REMOVED (GAL.)	=		8"	2.60

OR

$V=0.0408 \times (\text{CASING DIAMETER})^2$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
H											
SPEC. COND. (umhos)											
APPEARANCE											
TEMPERATURE (°C)											

COMMENTS:

LOW FLOW GROUNDWATER PURGING/SAMPLING LOG

Project: _____ Site: _____ Well I D.: _____

Date: _____ Sampling Personnel: _____ Company: URS Corporation

Purging/ Sampling Device: _____ Tubing Type: _____ Pump/Tubing Inlet Location: Screen midpoint

Measuring Point: Below Top of Riser Initial Depth to Water: _____ Depth to Well Bottom: _____ Well Diameter: _____ Screen Length: _____

Casing Type: PVC Volume in 1 Well Casing (liters): _____ Estimated Purge Volume (liters): _____

Sample ID: _____ Sample Time: _____ QA/QC: _____

Sample Parameters: _____

PURGE PARAMETERS

TIME	pH	TEMP (°C)	COND. (mS/cm)	DISS. O_2 (mg/l)	TURB. (NTU)	Eh (mV)	FLOW RATE (ml/min.)	DEPTH TO WATER (btor)
Tolerance:	0.1	---	3%	10%	10%	+ or - 10	---	

Information: WATER VOLUMES--0.75 inch diameter well = 87 ml/ft; 1 inch diameter well = 154 ml/ft; 2 inch diameter well = 617 ml/ft; 4 inch diameter well = 2470 ml/ft ($vol_{cyl} = \pi r^2 h$)

Remarks:

WELL PURGING LOG

URS Corporation

PROJECT TITLE: _____ WELL NO.: _____

PROJECT NO.: _____

STAFF: _____

DATE(S): _____

			WELL ID.	. (GAL/FT)
1. TOTAL CASING AND SCREEN LENGTH (FT.)	=		1"	0.04
2. WATER LEVEL BELOW TOP OF CASING (FT.)	=		2"	0.17
3. NUMBER OF FEET STANDING WATER (#1 - #2)	=	0.00	3"	0.38
4. VOLUME OF WATER/FOOT OF CASING (GAL.)	=	0.17	4"	0.66
5. VOLUME OF WATER IN CASING (GAL.)(#3 x #4)	=	0.00	5"	1.04
6. VOLUME OF WATER TO REMOVE (GAL.)(#5 x 3)	=	0.00	6"	1.50
7. VOLUME OF WATER ACTUALLY REMOVED (GAL.)	=		8"	2.60

OR

$V=0.0408 \times (\text{CASING DIAMETER})^2$

	ACCUMULATED VOLUME PURGED (GALLONS)										
PARAMETERS	INITIAL										INSTRUMENT
pH											
SPEC. COND. (umhos)											
APPEARANCE											
TEMPERATURE (°C)											
TURBIDITY (NTU)											
DISSOLVED OXYGEN											
WATER LEVEL											
TIME											

COMMENTS:

WATER LEVEL FIELD DATA SHEET

Project: _____ Field Personnel

Date: _____ _____

WELL #	TIME	DEPTH TO WATER	INSTRUMENT	NOTES

ATTACHMENT 2

QUALITY ASSURANCE PROJECT PLAN

SUPPLEMENTAL INVESTIGATION
QUALITY ASSURANCE PROJECT PLAN
FOR THE MACEDON FILMS SITE
MACEDON, NEW YORK 14502

Prepared for:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

625 BROADWAY, 12TH FLOOR

ALBANY, NY 12233

Prepared by:

URS CORPORATION

77 GOODELL STREET

BUFFALO, NY 14203

May 30, 2008

QUALITY ASSURANCE PROJECT PLAN

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1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) is designed to provide an overview of quality assurance/quality control (QA/QC) procedures and programs which will be adhered to during the investigation and remedial program as described in the Brownfield Cleanup Agreement Number B8-0669-04-06 (BCA) between Pactiv Corporation (Pactiv) and the New York State Department of Environmental Conservation (NYSDEC). The QAPP will identify specific methods and QA/QC procedures for chemically testing environmental samples collected from the Macedon Films Site in Macedon, Wayne County, New York (the site). The NYSDEC number for the site is C859025.

2.0 PROJECT/SITE DESCRIPTION

A project/site description of the Macedon Films Site is provided in the Supplemental Investigation Work Plan.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The project organization chart is shown on Figure 1. The URS Project Manager will be responsible for overseeing both the analytical and field QA/QC activities, coordinating the overall project, and maintaining quality throughout the project.

The URS Field Geologist is responsible for verifying that QA procedures are followed in the field so that valid, representative samples are collected. This person will also be responsible be in daily communication with the URS Project Manager. The Field Geologist will verify that all field work is carried out in accordance with the approved project plans.

The URS QA Officer is responsible for verifying that corporate QA procedures are followed. The URS QA Officer (or designee) will be in direct contact with the analytical laboratory to monitor laboratory activities so that holding times and other QA/QC requirements will be met. The analytical laboratory to be used for the analysis of soil and water samples will be certified by the New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) for the specified analyses. The QA Manager of the laboratory will be responsible for performing project-specific audits and for overseeing the quality control data generated. Also, the Laboratory Project Manager will be in daily communication with the URS QA Officer (or designee).

4.0 DATA QUALITY OBJECTIVES

4.1 Background

Data quality objectives (DQOs) are qualitative and quantitative statements, which specify the quality of data required to support the investigation of the site. The project DQOs focus on the identification of the end use of the data to be collected. The project DQOs will be achieved using screening and definitive data categories, as outlined in *Data Quality Objectives Process* for Superfund, Interim Final Guidance, QA/G-4, United States Environmental Protection Agency (USEPA, September 1993). The definitive data are generated using rigorous analytical methods, such as approved USEPA reference methods. The laboratory analytical methods to be used are presented in Table 1.

The project DQO for data collected during this supplemental investigation are to:

- Evaluate the lateral extent of contamination of volatile organic compounds, semivolatile organic compounds, PCBs and metals through the analysis of soil and groundwater samples in the areas of the Machine Shop (building 7N), ink mixing room (north of Building 10), the former ink room (in the vicinity of Buildings 6 and 6A) and courtyard.

4.2 QA Objectives For Chemical Data Measurement

For the definitive data category described above, the data quality indicators of precision, accuracy, representativeness, comparability, and completeness will be measured during offsite chemical analysis.

4.2.1 Precision

Precision examines the distribution of the reported values about their mean. The distribution of reported values refers to how different the individual reported values are from the average reported

value. Precision may be affected by the natural variation of the matrix or contamination within that matrix, as well as by errors made in the field and/or laboratory handling procedures. Precision is evaluated using analyses of laboratory matrix spike/matrix spike duplicates (MS/MSD) and matrix duplicates (MD), which not only exhibit sampling and analytical precision, but indicate analytical precision through the reproducibility of the analytical results. Relative percent difference (RPD) is used to evaluate precision. RPD criteria are specified in the methods identified in Table 1.

4.2.2 Accuracy

Accuracy measures the analytical bias in a measurement system. Sources of error are the sampling process, field contamination, preservation, handling, sample matrix, sample preparation, and analysis techniques. Sampling accuracy may be assessed by evaluating the results of rinse and trip blanks. These data help to assess the potential contamination contribution from various outside sources. The laboratory objective for accuracy is to equal or exceed the accuracy demonstrated for the applied analytical methods on samples of the same matrix. The percent recovery (%R) criterion is used to estimate accuracy based on recovery in the MS/MSD, laboratory control sample (LCS), and matrix spike blank (MSB) samples. The MS/MSD, which will give an indication of matrix effects that may be affecting target compounds, are also a good gauge of method efficiency. Recovery criteria are specified in the methods identified in Table 1.

4.2.3 Representativeness

Representativeness expresses the degree to which the sample data accurately and precisely represent the characteristics of a population of samples, parameter variations at a sampling point, or environmental conditions. Representativeness is a qualitative parameter, which is most concerned with the proper design of the sampling program or subsampling of a given sample. Objectives for representativeness are defined for sampling and analysis tasks and are a function of the investigative objectives. The sampling procedures, as described in Section 2.0 of the Field Sampling Plan (FSP) have been selected with the goal of obtaining representative samples for the media of concern.

4.2.4 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. An objective for this program is to produce data with the greatest possible degree of comparability. This goal is achieved through using standard techniques to collect and analyze representative samples, and reporting analytical results in appropriate units.

Complete field documentation using standardized data collection forms will support the assessment of comparability. Comparability is limited by the other parameters (e.g., precision, accuracy, representativeness, completeness) because only when precision and accuracy are known can data sets be compared with confidence. For data sets to be comparable, it is imperative that the analytical methods and procedures be explicitly followed.

4.2.5 Completeness

Completeness is defined as a measure of the amount of valid data obtainable from a measurement system compared to the amount that was expected to be obtained under normal conditions. To meet project needs, it is important that appropriate QC procedures be maintained to verify that valid data are obtained. For the data generated, a goal of 90% is required for completeness (or usability) of the analytical data. If this goal is not met, then NYSDEC, Pactiv, and URS project personnel will determine whether the deviations may cause the data to be rejected and what, if any, further actions need to be taken.

5.0 SAMPLING LOCATIONS AND PROCEDURES

Sampling locations and procedures are discussed in Section 5.0 of the Supplemental Investigation Work Plan.

6.0 SAMPLE CUSTODY AND HOLDING TIMES

Proper documentation of sample collection and the methods used to control these documents are referred to as chain-of-custody procedures. Chain-of-custody procedures are essential for presenting sample analytical results as evidence in litigation or at administrative hearings held by regulatory agencies. Chain-of-custody procedures also serve to minimize loss or misidentification of samples and to ensure that unauthorized persons do not tamper with collected samples.

The procedures used in these investigations will follow the chain-of-custody guidelines of National Enforcement Investigations Center (NEIC) *Policies and Procedures*, prepared by the NEIC of the USEPA Office of Enforcement.

6.1 Custody Definitions

- Chain-of-Custody Officer - The employee responsible for oversight of all chain-of-custody activities is the URS Field Geologist (or his/her designee).
- Under Custody - A sample is "Under Custody" if:
  - It is in one's possession, or
  - It is in one's view, after being in one's possession, or
  - It was in one's possession and one locked it up, or
  - It is in a designated secure area.

6.2 Responsibilities

The URS Field Geologist will be responsible for monitoring all chain-of-custody activities and for collecting legally admissible chain-of-custody documentation for the permanent project file. An example chain-of-custody form is included in Appendix A. The URS Field Geologist will be responsible for:

- Initially reviewing sample labels or tags, closure tapes, and chain-of-custody record forms. The Field Geologist or his/her designee shall document this review for the project file.

- Training all field sampling personnel in the methodologies for carrying out chain-of-custody and the proper use of all chain-of-custody forms and record documents.

- Monitoring the implementation of chain-of-custody procedures.

- Submitting copies of the completed chain-of-custody forms to the Project Manager on a daily basis.

6.3 Chain-of-Custody

Chain-of-custody is initiated in the laboratory when the sample containers are cleaned, packed, and shipped to the site for use in the field. When the containers are received at the site, they will be checked for any breach of chain-of-custody seals or any evidence of tampering.

6.4 Sample Containers and Holding Times

Table 2 identifies the analytical methods, sample container and preservation requirements, and analytical holding times to be used for the samples collected as part of this investigation.

7.0 ANALYTICAL PROCEDURES

Table 1 identifies the specific methods to be performed on each of the sample matrices. All holding times begin with the validated time of sample receipt (VTSR) at the laboratory (except where noted otherwise on Table 2). All analyses will be performed in accordance with the following documents:

- USEPA Office of Solid Waste *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* SW-846 (Final Update III, June 1997).
- New York State Department of Environmental Conservation *Analytical Services Protocol,* June 2000 Edition.

8.0 CALIBRATION PROCEDURES AND FREQUENCY

In order to obtain a high level of precision and accuracy during sample processing and analysis procedures, laboratory instruments must be calibrated properly. Several analytical support areas must be considered so the integrity of standards and reagents is upheld prior to instrument calibration. The following sections describe the analytical support areas and laboratory instrument calibration procedures.

8.1 Analytical Support Areas

Prior to generating quality data, several analytical support areas must be considered:

Standard/Reagent Preparation - Primary reference standards and secondary standard solutions shall be obtained from sources traceable to National Institute of Standards and Technology (NIST), or other reliable commercial sources to verify the highest purity possible. The preparation and maintenance of standards and reagents will be accomplished per the methods referenced in Table 1. All standards and standard solutions are to be formally documented (i.e., in a bound logbook) and should identify the supplier, lot number, purity/concentration, receipt/preparation date, preparer's name, method of preparation, expiration date, and any other pertinent information. All standard solutions shall be validated prior to use. Care shall be exercised in the proper storage and handling of standard solutions (e.g., separating volatile standards from nonvolatile standards). The laboratory shall continually monitor the quality of the standards and reagents through well documented procedures.

Balances - The analytical balances shall be calibrated and maintained in accordance with manufacture specifications. Calibration is conducted with two ASTM Class 1 weights that bracket the expected balance use range. The laboratory shall check the accuracy of the balances daily and properly document results in permanently bound logbooks.

Refrigerators/Freezers - The temperature of the refrigerators and freezers within the laboratory shall be monitored and recorded daily. This will verify that the quality of the standards and reagents is not compromised and the integrity of the analytical samples is upheld. Appropriate acceptance ranges (4°C ± 2°C for refrigerators) shall be clearly posted on each unit in service.

Water Supply System - The laboratory must maintain a sufficient water supply for all project needs. The grade of the water must be of the highest quality (analyte-free) in order to eliminate false-positives from the analytical results. Ultraviolet cartridges or carbon absorption treatments are recommended for organic analyses and ion-exchange treatment is recommended for inorganic tests. Appropriate documentation of the quality of the water supply system(s) will be performed on a regular basis.

8.2 Laboratory InstRuments

Calibration of instruments is required to verify that the analytical system is operating properly and at the sensitivity necessary to meet method established quantitation limits. Each instrument for organic analysis shall be calibrated with standards appropriate to the type of instrument and linear range established within the analytical method(s). Calibration of laboratory instruments will be performed according to methods specified in Table 1.

Calibration of an instrument must be performed prior to the analysis of any samples (initial calibration) and then at periodic intervals (continuing calibration) during the sample analysis to verify that the instrument is still properly calibrated. If the contract laboratory cannot meet the method-required calibration requirements, corrective action shall be taken as discussed in Section 11.0. All corrective action procedures taken by the contract laboratory are to be documented, summarized within the case narrative, and submitted with the analytical results.

9.0 INTERNAL QUALITY CONTROL CHECKS

Internal QC checks are used to determine if analytical operations at the laboratory are in control, as well as to determine the effect sample matrix may have on data being generated. Two types of internal checks are performed - batch QC and matrix-specific QC procedures. The type and frequency of specific QC samples performed by the laboratory will be determined by the specified analytical method and project specific requirements. Acceptable criteria and/or target ranges for these QC samples are presented within the analytical methods referenced in Table 1.

QC results that vary from acceptable ranges shall result in the implementation of appropriate corrective measures, potential application of qualifiers to the analytical data, and/or an assessment of the impact these corrective measures have on the established data quality objectives. Quality control samples including any project-specific QC will be analyzed are discussed below.

9.1 Batch QC

Method Blanks - A method blank is defined as laboratory demonstrated analyte-free water, analyte-free solid or humid zero air that is carried through the entire analytical procedure. The method blank is used to determine the level of laboratory background contamination. Method blanks are analyzed at a frequency of one per analytical batch.

Laboratory Control Samples/Matrix Spike Blanks – An LCS or MSB is an analyte-free matrix spiked with all or a representative group of the analytes being analyzed for. The LCS/MSB is a measure of precision and accuracy that is used to verify that the analysis being performed in control. An LCS/MSB will be performed for each matrix.

9.2 Matrix-Specific QC

Matrix Spike/Matrix Spike Duplicate Samples - An aliquot of a sample is spiked with known concentrations of specific compounds as stipulated by the methodology. The MS and MSD

are subjected to the entire analytical procedure in order to assess both accuracy and precision of the method for the matrix by measuring the percent recovery and relative percent difference of the two spiked samples. The samples are used to assess matrix interference effects on the method, as well as to evaluate instrument performance. For sample batches greater than five, MS/MSDs are analyzed at a frequency of one each per twenty samples per matrix, as listed in Table 1.

Matrix Duplicates - The MD is a second aliquot of a sample, which is prepared and analyzed in a manner identical to that used for the parent sample. Collection of MD samples provides for the evaluation of precision both in the field and at the laboratory by comparing the analytical results of two samples taken from the same location. An MD (for inorganic parameters only) will be performed instead of the MSD. Every effort will be made to obtain replicate samples; however, due to interferences, lack of homogeneity, and the nature of the soil samples, the analytical results are not always reproducible. For sample batches greater than five, MD samples are to be included at a frequency of one per twenty samples per matrix, as listed in Table 1.

9.3 Additional QC

Rinsate (Equipment) Blanks – For soil and groundwater samples, an equipment blank is a sample of laboratory demonstrated analyte-free water passed over and/or through the cleaned sampling equipment. The water must originate from one common source within the laboratory and must be the same water used by the laboratory performing the analysis. For air samples, the equipment blank consists of zero humid air drawn through any equipment used for sample collection (e.g., flow controllers, filters, etc.) after it has been cleaned. An equipment blank is used to indicate potential contamination from sample instruments used to collect and transfer samples. The equipment blanks should be collected, transported, and analyzed in the same manner as the samples acquired that day.

Trip Blanks - Trip blanks are not required for non-aqueous matrices. Trip blanks are required for aqueous sampling events. They consist of a set of sample bottles filled at the

laboratory with laboratory demonstrated analyte-free water. These samples then accompany the bottles that are prepared at the laboratory into the field and back to the laboratory, along with the collected samples for analysis. These bottles are never opened in the field. Trip blanks must return to the laboratory with the same set of bottles they accompanied to the field. Trip blanks will be analyzed for volatile organics only. Trip blanks will be analyzed at the frequency stated in Table 1.

10.0 CALCULATION OF DATA QUALITY INDICATORS

10.1 Precision

Precision is evaluated using analyses of a laboratory MS/MSD, which not only exhibit sampling precision, but indicate analytical precision through the reproducibility of the analytical results. Relative percent difference (RPD) is used to evaluate precision by the following formula:

$$RPD = \left(\frac{|X_1 - X_2|}{(X_1 + X_2)/2} \right) \times 100\%$$

where:

X_1 = *Measured value of sample or matrix spike*
X_2 = *Measured value of matrix duplicate or matrix spike duplicate*

Precision will be determined through the use of MS/MSD/MD analyses. RPD criteria for this project must meet the requirements of the methods referenced in Table 1.

10.2 Accuracy

Accuracy is defined as the degree of difference between the measured or calculated value and the true value. The closer the numerical value of the measurement comes to the true value or actual concentration, the more accurate the measurement is. Analytical accuracy is expressed as the percent recovery of a compound or element that has been added to the environmental sample or laboratory demonstrated analyte free-water/solid matrix at known concentrations before analysis. Analytical accuracy may be assessed through the use of known and unknown QC samples and spiked samples. Accuracy will be determined from MS, MSD, MSB, and LCS analyses as well as from surrogate compounds added to organic fractions (i.e., volatile and semivolatile organics), and is calculated as follows:

$$\%R = \left(\frac{X_s - X_n}{K} \right) \times 100\%$$

where:

X_s - Measured value of the spike sample
X_u - Measured value of the unspiked sample
K - Known amount of spike in the sample

10.3 Completeness

Completeness is calculated on a per matrix basis for the project and is calculated as follows:

$$\%\,Completeness = \frac{N - X_n}{N} \times 100\%$$

where:

X_n - Number of invalid measurements
N - Number of valid measurements expected to be obtained

11.0 CORRECTIVE ACTIONS

Laboratory corrective actions shall be implemented to resolve problems and restore proper functioning to the analytical system when errors, deficiencies, or out-of-control situations exist at the laboratory. Full documentation of the corrective action procedure needed to resolve the problem shall be filed in the project records, and the information summarized in the case narrative. A discussion of the corrective actions to be taken is presented in the following sections.

11.1 Incoming Samples

Problems noted during sample receipt shall be documented by the laboratory. The URS Project QA Officer (or designee) shall be contacted immediately for problem resolution. All corrective actions shall be documented thoroughly.

11.2 Sample Holding Times

If any sample extractions and/or analyses exceed method holding time requirements, the URS QA Officer (or designee) shall be notified immediately for problem resolution. All corrective actions shall be documented thoroughly.

11.3 Instrument Calibration

Sample analysis shall not be allowed until all initial calibrations meet the appropriate requirements. All laboratory instrumentation must be calibrated in accordance with method requirements. If any initial/continuing calibration standards exceed method QC limits, recalibration must be performed, and if necessary, all samples affected back to the previous acceptable calibration check must be reanalyzed.

11.4 Reporting Limits

The laboratory must meet all method-required quantitation limits, which are referenced in the methods listed in Table 1. If difficulties arise in achieving these limits due to a particular sample matrix, the laboratory must notify the URS QA Officer (or designee) for problem resolution. To achieve those quantitation limits, the laboratory must utilize all appropriate cleanup procedures. When any sample requires a secondary dilution due to high levels of target analytes, the laboratory must report all initial and secondary dilution sample results. Dilution will be permitted only to bring target analytes within the linear range of calibration. If samples are analyzed at a dilution with no target analytes detected, the URS QA Officer (or designee) will be immediately notified so that appropriate corrective actions can be initiated.

11.5 Method QC

All QC, including blanks, matrix spikes, matrix spike duplicates, matrix duplicates, surrogate recoveries, laboratory control samples, and other method-specified QC samples, shall meet the requirements of the methods referenced in Table 1. Failure of method-required QC will result in the review and possible qualification of all affected data. When the criteria are not met, the affected sample(s) shall be reanalyzed (when required by the analytical method) within holding times to verify the presence or absence of matrix effects. If matrix effect is confirmed, the corresponding data shall be flagged accordingly using the flagging symbols and criteria as defined by the data validation guidelines identified in Section 12.2. If matrix effect is not confirmed, then the entire batch of samples may have to be reanalyzed at no cost to URS or Pactiv. The URS QA Officer (or designee) shall be notified as soon as possible to discuss possible corrective actions should unusually difficult sample matrices be encountered.

11.6 Calculation Errors

All analytical results must be reviewed systematically for accuracy prior to submittal. If upon data review, calculation and/or reporting errors exist, the laboratory will be required to reissue

the analytical data report with the corrective actions appropriately documented in the laboratory report case narrative.

12.0 DATA REDUCTION, VALIDATION, AND USABILITY

The laboratory will provide NYSDEC ASP Category B deliverable data packages for all sample analyses. The standard NYSDEC Data Package Summary Forms (see Appendix B) will be completed by the analytical laboratory and included in the deliverable data packages.

12.1 Data Reduction

Laboratory analytical data are first generated in raw form at the instrument. These data may be either graphic or printed tabular form. Specific data generation procedures and calculations are found in each of the referenced methods. Analytical results must be reported consistently. Data for aqueous samples will be reported in concentrations of micrograms per liter (µg/L) or milligrams per liter (mg/L). Data for soils will be reported in concentrations of micrograms per kilograms (µg/kg) or milligrams per kilogram (mg/kg) and reported on a dry weight basis.

Identification of all analytes must be accomplished with an authentic standard of the analyte traceable to NIST or other reliable commercial sources. Data reduction will be performed by individuals experienced with a particular analysis and knowledgeable of requirements.

12.2 Data Validation

Data validation is a systematic procedure of reviewing a body of data against a set of established criteria to provide a specified level of assurance of validity prior to its intended use.

Data validation will be performed by environmental chemists under the supervision of the URS QA Officer (or designee). All analytical samples collected will receive a limited data review. This review will include a review of holding times; completeness of all required deliverables; review of QC results (surrogates, spikes, blanks) to determine if the data is within the protocol-required limits and specifications; a determination that all samples were analyzed using established and agreed upon analytical protocols; an evaluation of the raw data to confirm the results provided in the data

summary sheets; and a review of laboratory data qualifiers. The methods referenced in Table 1 as well as the general guidelines presented in the following USEPA Region II documents will be used to aide the chemist during the data review:

- CLP Organic Data Review and Preliminary Review, SOP HW-6, Revision 12, March 2001;
- Evaluation of Metals Data for the Contract Laboratory Program, HW-2, Revision XI, January 1992; and
- Validating Volatile Organic Compounds by SW-846 Method 8260B, HW-24, Revision 1, June 1999; and
- Validating Semivolatile Organic Compounds by SW-846 Method 8270, HW-22, Revision 2, June 2001.

12.3 Data Usability

A *Data Usability Summary Report* (*DUSR*) (NYSDEC, 1999) will be submitted to NYSDEC, and will describe the samples and the analytical parameters. Data deficiencies, analytical protocol deviations, and quality control problems are identified and their effect on the data will be discussed. The DUSR will also include recommendations on resampling/reanalysis.

13.0 PREVENTIVE MAINTENANCE

The laboratory is responsible for maintaining its analytical equipment. Preventive maintenance is provided on a regular basis to minimize down-time and the potential interruption of analytical work. Instruments are maintained in accordance with the manufacturer's recommendations. If instruments require maintenance, only trained laboratory personnel or manufacturer-authorized service specialists are permitted to do the work. Maintenance activities will be documented and kept in permanent logs. These logs will be available for inspection by auditing personnel.

14.0 PERFORMANCE AND SYSTEM AUDITS

Audits are evaluations of both field and laboratory quality control procedures, and are performed before or shortly after systems are operational. Performance audits are conducted by introducing control samples into the data production process. These control samples may include performance evaluation samples, or field samples spiked with known amounts of analytes.

System audits are onsite qualitative inspections and reviews of the quality assurance system used by some part of or the entire measurement system. They provide a qualitative measure of the quality of the data produced by one section or the entire measurement process. The audits are performed against a set of requirements, which may be a quality assurance project plan or work plan, a standard method, or a project statement of work. The primary objective of the systems audits is to verify that the QA/QC procedures are being followed.

14.1 Performance and External Audits

In addition to conducting internal reviews and audits, as part of its established quality assurance program, the laboratory is required to take part in regularly-scheduled performance evaluations and laboratory audits from state and federal agencies. They are conducted as part of the certification process and to monitor the laboratory performance. The audits also provide an external quality assurance check of the laboratory, and provide reviews and information on the management systems, personnel, standard operating procedures, and analytical measurement systems. Acceptable performance on evaluation samples and audits is required for certification and accreditation. The laboratory shall use the information provided from these audits to monitor and assess the quality of its performance. Problems detected in these audits shall be reviewed by the Laboratory QA Manager and Laboratory Management, and corrective action shall be instituted as necessary.

14.2 Systems/Internal Audits

As part of its Quality Assurance Program, the Laboratory QA Manager shall conduct periodic checks and audits of the analytical systems. The purpose of these is to verify that the analytical systems are working properly, and that personnel are adhering to established procedures and documenting the required information. These checks and audits also assist in determining or detecting where problems are occurring.

The Laboratory QA Manager periodically will submit laboratory control samples. These samples will serve to check the entire analytical method, the efficiency of the preparation method, and the analytical instrument performance. The results of the control samples are reviewed by the Laboratory QA Manager, who then reports the results to the analyst and the Laboratory Director. When a problem is indicated, the Laboratory QA Manager will assist the analyst and laboratory management in determining the reason and in developing solutions. The Laboratory QA Manager will also recheck the systems as required.

15.0 REFERENCES

Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Quality Assurance Manual, Final Copy, Revision I, October 1989.

National Enforcement Investigations Center of USEPA Office of Enforcement. *NEIC Policies and Procedures.* Washington: USEPA.

New York State Department of Environmental Conservation (NYSDEC). Analytical Services Protocol, June 2000 Edition.

NYSDEC. 1999. Division of Environmental Remediation, *Guidance for the Development of Data Usability Summary Reports*. June.

USEPA. 2001a. *Contract Laboratory Program Organic Data Review, SOP No. HW-6, Revision 12.* USEPA Region II. March.

USEPA, 2001b. *Validating Semivolatile Organic Compounds by SW-846 Method 8270*, HW-22, Revision 2, June 2001.

USEPA, 1999a. *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air*, Second Edition.

USEPA, 1999b. *Validating Volatile Organic Compounds by SW-846 Method 8260B*, HW-24, Revision 1, June 1999; and

USEPA. 1993. *Data Quality Objectives Process for Superfund, Interim Final Guidance.* September. EPA540-R-93-071.

USEPA, 1994. *Validating Canisters of Volatile Organics in Ambient Air*, SOP HW-18, Revision 0, August 1994

USEPA. 1992. *Evaluation of Metals Data for the Contract Laboratory Program*, PSO No. HW-2, Revision XI. January.

USEPA. 1987. *A Compendium of Superfund Field Operations Methods*, EPA/540/P-87-001, (OSWER Directive 9355.0-14). December. Cincinnati, OH: USEPA.

USEPA SW-846. *Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods.* Final Update III, June 1997

TABLES

TABLE 1
SUMMARY OF ANALYTICAL PARAMETERS AND QA/QC SAMPLES

PACTIV CORPORATION
MACEDON FILMS SITE
MACEDON, NEW YORK

Analysis	Method[1]	Reporting Limit (ppb)	QA/QC Sample Frequency		
			Field Equipment Blanks	Trip Blanks	MS/MSD
Aqueous Samples					
Organic Analyses					
Volatile Organic Compounds	SW-846 Method 8260B	per method	1 per 20	1 per day[2]	1 per 20
Semivolatile Organic Compounds	SW-846 Method 8270C	per method	1 per 20	--	1 per 20
Inorganic Analyses					
Metals	SW-846 Method 6010B/7470A	per method	1 per 20	--	1 per 20
Solids Samples					
Organic Analyses					
Volatile Organic Compounds	SW-846 Method 8260B	per method	1 per 20	--	1 per 20
Polychlorinated Biphenyls	SW-846 Method 8082	per method	1 per 20	--	1 per 20
Semivolatile Organic Compounds	SW-846 Method 8270C	per method	1 per 20	--	1 per 20
Inorganic Analyses					
Metals	SW-846 Method 6010B/7471A	per method	1 per 20	--	1 per 20

Notes:

1 - United States Environmental Protection Agency SW-846 Methods from *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, June 1997.*

2 - One trip blank per sample cooler (aqueous VOC samples only).

TABLE 2
ANALYTICAL METHODS, SAMPLE CONTAINERS AND PERSERVATION REQUIREMENTS, AND ANALYTICAL HOLDING TIMES

PACTIV CORPORATION
MACEDON FILMS SITE
MACEDON, NEW YORK

Analysis	Container	Preservation	Holding time
LAB MEASUREMENTS			
Aqueous Samples			
VOCs (EPA Method 8260B)	Three 40 ml septa vials, Glass	HCl to pH < 2, Cool 4 °C	Analyze within 10 days (7 days if not preserved with HCl)
SVOCs (EPA Method 8270C)	Two 1-Liter Glass	Cool 4 °C	Extract within five days; analyze within 40 days
Metals (EPA Method 6010B/7470A)	32 oz., Plastic	HNO_3 to pH < 2, Cool 4 °C	Analyze within 6 months (Mercury - 26 days)
Solid Samples			
VOCs (EPA Method 8260B)	4 oz. Glass jar, Teflon cap	Cool 4 °C	Analyze within 10 days.
SVOCs (EPA Method 8270C)	1-6oz. Glass jar, Teflon cap	Cool 4 °C	Extract within 5 days; analyze within 40 days.
PCBs (EPA Method 8082)	1-6oz. Glass jar, Teflon cap	Cool 4 °C	Extract within 5 days; analyze within 40 days.
Metals (EPA Method 6010B/7471A)	1-6oz. Glass jar, Teflon cap	Cool 4 °C	Analyze within 6 months (Mercury - 26 days)

Notes:
VOCs indicates Volatile Organic Compounds
SVOCs indicates Semivolatile Organic Compounds
PCBs indicates Polychlorinated Biphenyls.
Holding times from validated time of sample receipt (VTSR) at the laboratory.

FIGURES

PROJECT ORGANIZATION

Pactiv Corporation
Macedon Films Site
Macedon, New York

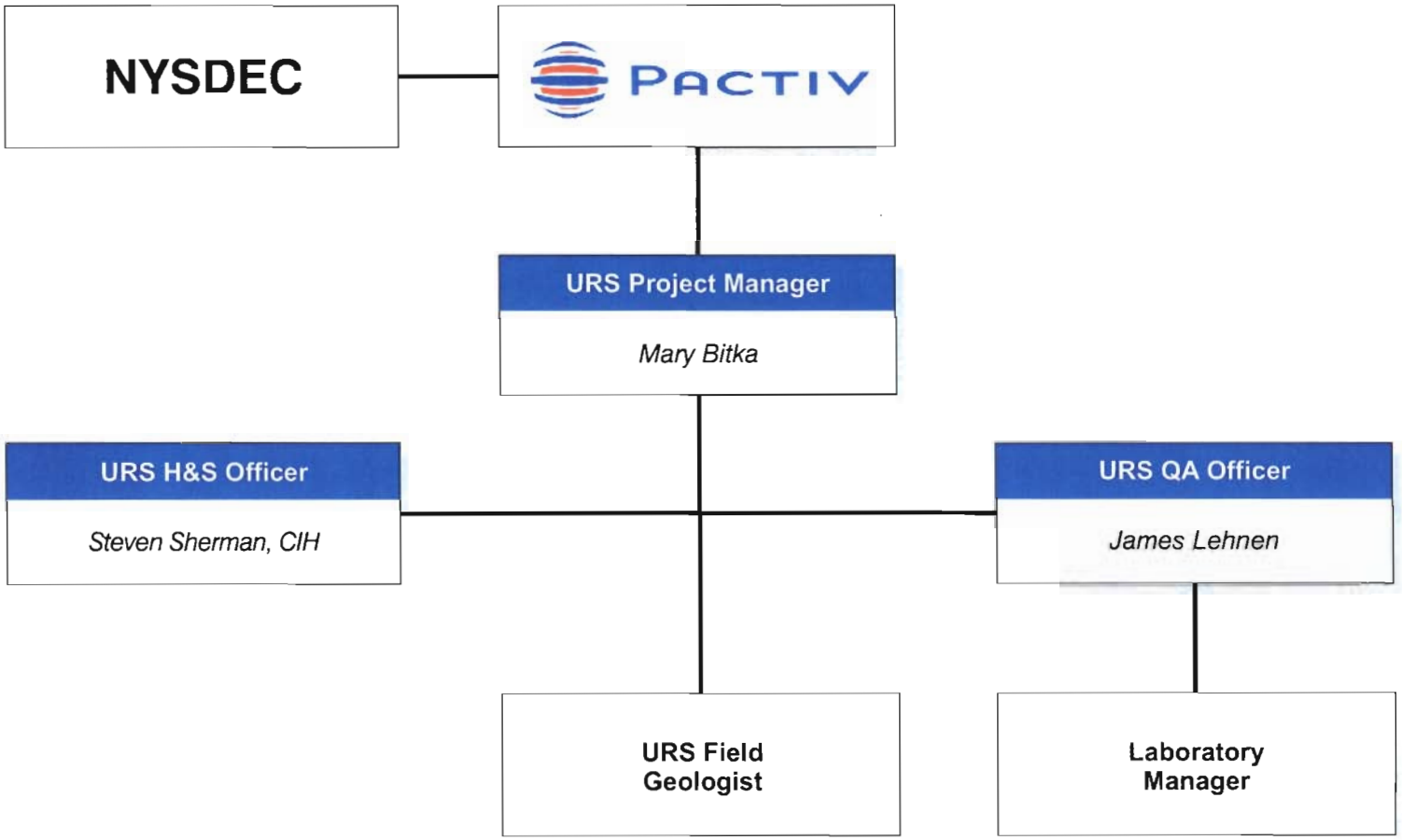


Figure 1

APPENDIX A

SAMPLE CHAIN-OF-CUSTODY RECORD

CHAIN OF CUSTODY RECORD

URS

PROJECT NO. | SITE NAME

SAMPLERS (PRINT/SIGNATURE)

LAB _____

COOLER _____ of _____

PAGE _____ of _____

DELIVERY SERVICE: _____ AIRBILL NO.: _____

LOCATION IDENTIFIER	DATE	TIME	COMP/ GRAB	SAMPLE ID	MATRIX	TOTAL NO.# OF CONTAINERS	TESTS								BOTTLE TYPE AND PRESERVATIVE								REMARKS	SAMPLE TYPE	BEGINNING DEPTH (IN FEET)	ENDING DEPTH (IN FEET)	FIELD LOT NO. # (ERPIMS)

MATRIX CODES

AA - AMBIENT AIR; SE - SEDIMENT; SH - HAZARDOUS SOLID WASTE; SL - SLUDGE; WP - DRINKING WATER; WW - WASTE WATER; WG - GROUND WATER; SO - SOIL; DC - DRILL CUTTINGS; WL - LEACHATE; GS - SOIL GAS; WC - DRILLING WATER; WO - OCEAN WATER; WS - SURFACE WATER; WQ - WATER FIELD QC; LH - HAZARDOUS LIQUID WASTE; LF - FLOATING/FREE PRODUCT ON GW TABLE

SAMPLE TYPE CODES

TB# - TRIP BLANK; SD# - MATRIX SPIKE DUPLICATE; RB# - RINSE BLANK; FR# - FIELD REPLICATE; N# - NORMAL ENVIRONMENTAL SAMPLE; MS# - MATRIX SPIKE

(# - SEQUENTIAL NUMBER (FROM 1 TO 9) TO ACCOMMODATE MULTIPLE SAMPLES IN A SINGLE DAY)

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)	DATE	TIME
RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED FOR LAB BY (SIGNATURE)	DATE	TIME

SPECIAL INSTRUCTIONS

Distribution: Original accompanies shipment, copy to coordinator field files

URSF-075C/1 OF 1/CofCR/GCM

APPENDIX B

NYSDEC DATA PACKAGE SUMMARY

FORMS

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE IDENTIFICATION AND ANALYTICAL REQUIREMENT SUMMARY

Customer Sample Code	Laboratory Sample Code	Analytical Requirements					
		*VOA GC/MS Method #	*BNA GC/MS Method #	*VOA GC Method #	*Pest PCBs Method #	*Metals	*Other

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
SEMIVOLATILE (BNA)
ANALYSES

Laboratory Sample ID	Matrix	Date Collected	Date Rec'd at Lab	Date Extracted	Date Analyzed

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
VOLATILE (VOA)
ANALYSES

Laboratory Sample ID	Matrix	Date Collected	Date Rec'd at Lab	Date Extracted	Date Analyzed

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
PESTICIDE/PCB
ANALYSES

Laboratory Sample ID	Matrix	Date Collected	Date Rec'd at Lab	Date Extracted	Date Analyzed

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
SEMIVOLATILE (BNA)
ANALYSES

Laboratory Sample ID	Matrix	Analytical Protocol	Extraction Method	Auxiliary Cleanup	Dil/Conc Factor

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
INORGANIC ANALYSES

Laboratory Sample ID	Matrix	Metals Requested	Date Rec'd at Lab	Date Analyzed

ATTACHMENT 3

HEALTH AND SAFETY PLAN

SUPPLEMENTAL INVESTIGATION
HEALTH AND SAFETY PLAN
FOR THE MACEDON FILMS SITE
MACEDON, NEW YORK 14502

Prepared for:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

625 BROADWAY, 12TH FLOOR

ALBANY, NY 12233

Prepared by:

URS CORPORATION

77 GOODELL STREET

BUFFALO, NY 14203

MAY 30, 2008

HEALTH AND SAFETY PLAN

SUPPLEMENTAL INVESTIGATION
MACEDON FILMS SITE
MACEDON, NEW YORK

		PHONE
Project Number:	38394424.00000	
Project Manager:	Mary E. Bitka	716-856-5636
Plan Preparer:	Rob Piurek	716-856-5636
Preparation Date:	4/25/08	
Expiration Date:	12/31/08	

APPROVALS

Regional Manager, Health, Safety and Environment:

Steven Jay Sherman, CIH — (DATE) 29 May 08

Project Manager:

Mary E. Bitka — (DATE) 5/29/08

THIS HSP IS TO BE USED FOR THE SPECIFIC PROJECT DESCRIBED HEREIN. IT IS NOT TO BE USED FOR ANY OTHER PROJECT, NOR IS IT TO BE USED FOR PROJECTS IN WHICH SIGNIFICANT CONTAMINANT REMOVAL IS REQUIRED.

SITE HEALTH AND SAFETY PLAN
FIELD ACTIVITIES

Activities covered under this HSP include the oversight of Geoprobe drilling, monitoring well installation, and soil and groundwater sampling activities. This plan has been developed for URS personnel; it is not intended for subcontractor or client use.

URS personnel on this project must meet the training requirements of 29 CFR 1910.120(e) and be participating in a medical surveillance program as per 29 CFR 1910.120(f). Eating, drinking and smoking will only be allowed in designated areas of the support zone.

This plan is valid only for the specific project identified in the following project description. The Project Manager and Site Safety officer are responsible for implementation of this plan that includes the site safety briefing. Field activities are limited to providing general oversight in accordance with the workplan, and obtaining soil and/or groundwater samples for laboratory analysis.

PROJECT DESCRIPTION

Project Name Macedon Films Supplemental Investigation
Field Dates May 2008 through December 2008
Site Address 112 Main Street, Macedon, New York 14502

SITE HISTORY

Pactiv's former Macedon facility is on Main Street in the Village of Macedon, Wayne County, New York. Pactiv's former Macedon facility (Macedon Films) is the westernmost part of a 23.6-acre complex. The 23.6 acre complex consists of approximately 92,000 square feet of building space and includes manufacturing facilities for Mobil's Commercial Films Division (Exxon-Mobil) and Huntsman Design Products (Pliant Corporation).

The Macedon Films site occupies 6.95 acres on the western portion of the 23.6 acre complex. The site is bordered by a spillway of the New York State Barge Canal and a Pennsylvania Central railroad spur north, New York State Route 31 to the south, Quaker Road and a truck trailer parking area to the east of the site, and New York State Route 350 to the west.

In the 1920's the site was originally development for vegetable canning operations. Sanborn maps from 1906, 1912, 1931 and 1953 show that there were lumberyards and a creamery previously located on the site.

Polyethylene flexible packaging products have been manufactured at the site since the 1950s. Polyethylene resin pellets are processed and extruded to form a film that is subsequently converted into packaging products such as produce bags.

Previous investigation results indicate that the area of the site between the buildings and the canal have been impacted by petroleum hydrocarbons, petroleum related volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). VOCs (BTEX compounds) at concentrations that exceed NYSDEC Recommended Soil Cleanup Objectives (RSCOs) and petroleum hydrocarbon compounds have been detected in soil samples collected from the site.

Phenol has also been detected in soil from the site at a concentration that exceeded NYSDEC RSCOs.

Tetrachloroethene (PCE) was also detected at 730 mg/kg in one soil sample (MSB-4) and is the only detection of PCE is the only indication of PCE at the site. In 2002, a soil gas survey was conducted in the area of the waste ink tank to evaluate the extent of the PCE detected and there were no detections of PCE in any of the soil gas samples, which suggests that the PCE detected is limited in lateral extent.

The following compounds have been detected in groundwater samples from the site at concentrations that exceed NYSDEC guidance values or groundwater standards: naphthalene, xylenes, benzo(a) anthracene, benzo(b) fluoranthene, benzo(a) pyrene, bis(2-ethylhexyl) phthalate, chrysene, chromium and lead. Petroleum hydrocarbons have also been detected in the site groundwater.

SCOPE OF WORK

Field activities to be conducted at the site may include:

- Collecting soil samples using hand tools and Geoprobe rigs;
- Collecting groundwater samples;
- Advancing soil borings;
- Installing monitoring wells;
- Collecting surface water/sediment samples.

The scope of work and field methods to be completed are described in the NYSDEC approved work plans and Field Sampling Procedures (FSP).

RESPONSIBLE PERSONNEL	Name	Phone
Project Manager	Mary Bitka	716-856-5636
Site Manager	Rob Piurek	716-856-5636
Site Safety Officer	Rob Piurek	716-856-5636
Health and Safety Representative	Sheldon Nozik	716-856-5636

REGIONAL MANAGER, HEALTH SAFETY AND ENVIRONMENT (RMHSE) Steven Jay Sherman, CIH

RMHSE PHONE NUMBERS 716-923-1363, 716 445-4219 [CELL}

EMERGENCY/CONTINGENCY INFORMATION

Hospital/Clinic Newark Wayne Community Hospital Foundation Phone No. 315-332-2022
Hospital Address Driving Park Ave, Newark, NY 14513
Paramedic 911 Fire Dept. 911 Police Dept. 911

HOSPITAL DIRECTIONS:

To reach the hospital from the site, turn left onto Route 31 and follow Route 31 through Palmyra into Newark. Turn left onto Route 88 (north); turn left onto Stuart Road (west). Turn right onto Driving Park Avenue.

EMERGENCY/CONTINGENCY PLAN

Coordinate evacuation procedures with the drilling contractor and remain a safe distance from the emergency. Perform First Aid/CPR as warranted by the situation. Do not move personnel with suspected neck or back injuries. Report all injuries to the supervisor (see Attachments). Note: the hospital route map is located in the Attachments.

CHEMICAL HAZARDS

Chemical Name	OSHA PEL [ACGIH TLV®]	Concentration Present Soil	Water	Health Hazards/ Target Organs	Symptoms Of Overexposure
Tetrachloroethylene ("perc", PCE)	100 ppm [25 ppm]	730 mg/kg	<5.0 µg/L	Eye, Nose, throat irritant Eyes, skin, respiratory system SUSPECT HUMAN CARC	Nausea, dizziness, headache
Gasoline	300 ppm	61 mg/kg	880 µg/L	Eye & Throat Irritant	Headache, Nausea, Dizziness & Blurred Vision
Diesel	[100 mg/m^3]	3,400 mg/kg	2,200 µg/L	Skin Irritant & Central Nervous System Depressant	Headache, Nausea, Dizziness, Incoordination & Vomiting

PHYSICAL HAZARDS

Physical hazards are inherently present during drilling and sampling activities performed with a conventional drill rig (hollow-stem augers) or Geoprobe unit. Common physical hazards include mechanical hazards; noise exposure associated with the operation of sampling equipment; slip-trip-fall hazards associated with the field environment; hazards associated with weather conditions; musculoskeletal injury resulting from lifting tasks; engine exhaust exposure; and explosion hazards from underground pipes or lines that may be encountered during the drilling process. The typical physical hazards anticipated to be present on the site and the methods for preventing injury due to these hazards are described below.

Sampling Equipment - Operation of drill rig or Geoprobe sampling equipment during site activities presents potential physical hazards to personnel. During all site activities, personal protective equipment (PPE) such as steel-toed shoes, safety glasses or goggles, and hard hats must be worn whenever such equipment is present, and personnel should at all times be aware of the location and operation of sampling equipment, and take precautions to avoid getting in the way of its operation.

Noise - The primary noise hazard at this site is from the drilling/Geoprobe equipment. Whenever feasible, noise levels, identified as exceeding 85 decibels, will be reduced by means of personal protective equipment. Ear plugs and/or muffs will be worn at all times when URS personnel are within 25 feet of operating equipment. Hearing protection will also be worn in the vicinity of generators, concrete cutters, and any other high noise emitting equipment. See URS SMS 26 for additional information.

Slip-Trip-Fall Hazards - Slip-trip fall hazards are common at field sites due to open holes; muddy, slippery or unstable surfaces; and equipment on the ground. While it is difficult to eliminate all slip-trip-fall hazards, implementing safe work practices, utilizing proper footwear, and keeping the work area free of obstructions will minimize risk of injury.

Lifting Hazards - Field operations often require the performance of laborious tasks. All employees must implement proper lifting procedures, such as keeping the load close to the body, and using leg muscles instead of back muscles to perform lifting tasks. Additionally, employees will not attempt to lift large, heavy, or awkwardly shaped objects without assistance. See URS SMS 45 for additional information.

Weather - Weather conditions are an important consideration in planning and conducting site operations. Extremely hot or cold weather can cause physical discomfort, loss of efficiency and personal injury. Of particular importance at drilling sites is heat stress, often resulting from the use of impermeable protective clothing, which decreases the body's natural cooling processes.

Lightning may accompany storms, creating an electrocution hazard during outdoor operations. To eliminate this hazard, weather conditions will be monitored and work suspended during electrical storms.

The following potential weather hazard exists at the site:

_X_ Heat Stress
_X_ Cold Stress
___ Neither is anticipated

Underground Utilities - All proximal underground utility locations must be located and demarcated by qualified utility locator service, "One-Call Service, or combination thereof .prior to the commencement of drilling activities. The proper utility company personnel should certify the deactivation of utilities. See URS SMS 34 for additional information.

Overhead Hazards - Overhead power lines pose a danger of shock or electrocution if the power line is contacted or severed during site operations. Prior to conducting work in areas where overhead lines could be impacted, the appropriate utility company will be notified and information will be obtained regarding the line voltage and the minimum separation distance required for work in this area. See URS SMS 34 for additional information.

Work Area Protection - As the project operation may be undertaken in a roadway or parking lot, motor vehicles may be a hazard. Guidance on properly conning and flagging the work area is located in the Attachments. See URS SMS 32 for additional information.

MONITORING EQUIPMENT

The following monitoring equipment will be used during drilling activities:

___ Organic Vapor Analyzer
___ HNu w/lamp __ eV
___ Explosimeter
___ Microtip w/lamp __ eV
_T_ Organic Vapor Monitor w/lamp 10.2 eV
___ MiniRAE PID w/lamp ___ eV.

(T) The monitoring equipment must be calibrated in accordance with the manufacturer's instructions. In addition, the results of daily instrument calibrations shall be logged in the field logbook, or on the Daily Instrument Calibration Check Sheet found in the Attachments.

ACTION LEVELS

Action levels and response criteria are presented below. Initial monitoring is conducted on a regular basis (every 10 minutes) in the work area. All readings are to be recorded in the field logbook.

Analyzer Reading*	Location	Duration	Action	Personal Protective Equipment
< 15 ppm	Point of Operations/ Release Source point	———	Continue periodic monitoring.	Minimum Site Ensemble (Hardhat, Steel-toed boots, eye protection, hearing protection)
> 15 ppm	Point of Operations/ Release Source point	>1 minute	Monitor OBZ; don protective clothing; establish work zones	Minimum Site Ensemble, PLUS: Tyvek coveralls□, Nitrile Outer Gloves, and Nitrile Inner (surgical) Gloves
< 15 ppm	OBZ	-----	No respirators required.	Same as above
> 15 ppm	OBZ	>1 minute, <15 min	Provide respiratory protection; establish decon area. Continue real-time monitoring	Add full-face Respirators with combination P100/organic vapor cartridges
> 150 ppm	OBZ	>1 minute instantaneous	Stop work; move upwind while vapors dissipate. If elevated levels remain, cover boring and cuttings, evacuate upwind and notify RMHSE or PM.	As specified by RMHSE or HSR

(OBZ - Operator's Breathing Zone)

SITE CONTROL

Work area barricades will be used to prevent access by unauthorized persons. Yellow caution tape and/or sawhorse-type barricades can be used for this purpose. Formal work zones will be implemented if the analyzer reading exceeds 15 ppm in the work area.

DECONTAMINATION PROCEDURES

Decontamination procedures will be performed in accordance with the site specific Field Sampling Plan. All wastes generated by URS activities at the site will be disposed of as directed by the PM. All personal protective equipment will be used as specified and required.

Wash hands thoroughly before eating; clean-up and wash hands and face when work activities are completed. Formal decontamination procedures are required if the analyzer reading exceeds 15 ppm in the OBZ (see Attachments).

HEALTH AND SAFETY EQUIPMENT

R = Required A = As Needed

R Hard Hat	R Eye Protection (Type) Safety Glasses
R Hearing Protection	R Gloves (Type) Nitrile gloves when handling contam. mtls.
R Steel-toed Boots	A Chemical-resistant steel-toed Boots
A Orange Safety Vest	A Respirator (Type) Full-face APR
A Tyvek Coveralls	A Cartridges (Type) Combo P100/Organic Vapor
A Poly-coated Tyvek	R Fire Extinguisher
R First Aid Kit	___ Other ____

The HSP Preparer has conducted a Hazard Assessment for this project based upon information provided by the Project Manager, in accordance with 29 CFR 1910.132 (d).

All samples and preservatives will be handled with minimum nitrile surgical gloves, safety glasses. Uncoated Tyvek® recommended for all soil work

HAZARD COMMUNICATION (MSDSs)

T TSP/Alconox	T Hydrochloric Acid (sample preservation)
T Isobutylene	T Nitric Acid (sample preservation)

(T) See the information sheet found in the Attachments.

INJURY AND ILLNESS PREVENTION PROGRAM

The purpose of this program is to provide and maintain a safe and healthful work environment and to reduce the incidence of work place injuries and illnesses (see Attachments). The SSO is responsible for implementing the Program during site activities. See URS SMS 005 for additional information.

SAFETY MANAGEMENT STANDARDS

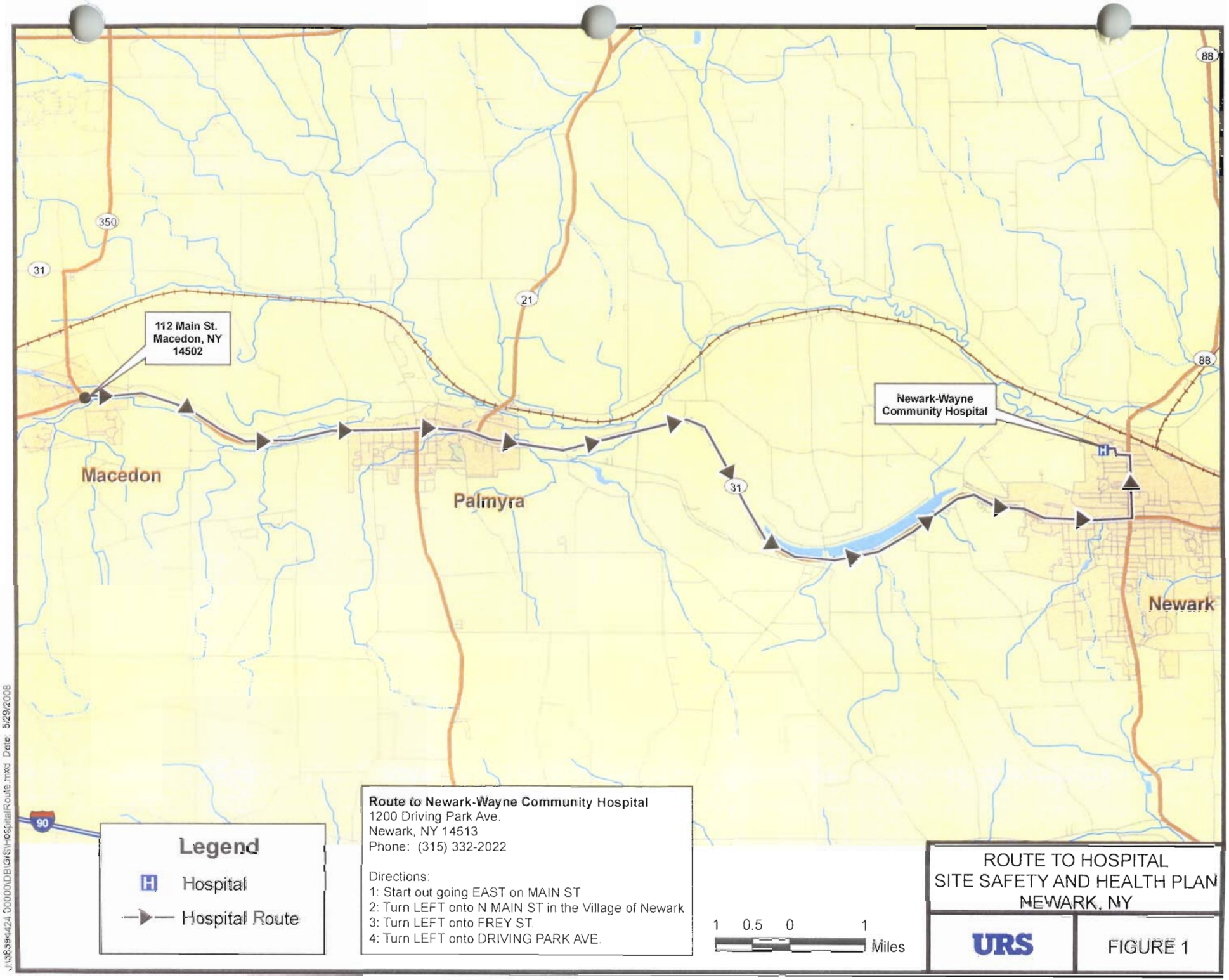
The Project Manager is to append the following URS Safety Management Standards to this HSP:
SMS 46 – Subcontractor Health and Safety Requirements
SMS 49 – Injury/Illness/Incident Reporting
SMS 26 – Noise and Hearing Conservation
SMS 69 – Manual Material Handling
SMS 14 – Fire Prevention
SMS 34 – Utility Clearances and Isolation
SMS 2 – Worker Right to Know (Hazardous Communication)
SMS 59 – Cold Stress
SMS 56 – Drilling Safety Guidelines

SMS 12 – Electrical Safety
SMS 16 – Hand Tools and Portable Equipment
SMS 17 – Hazardous Waste Operations
SMS 18 – Heat Stress
SMS 19 – Heavy Equipment Operations
SMS 24 – Medical Screening Surveillance
SMS 47 – Biological Hazards
SMS 29 – Personal Protective Equipment

These Safety Management Standards (SMS) are available on the URS' Safety intranet. Go to Safety Management Standards, and click on the "Print this SMS" link for each SMS.

ATTACHMENTS

- HOSPITAL ROUTE MAP
- FORMS
- MATERIAL SAFETY DATA SHEETS
- SAFETY MANAGEMENT STANDARDS


112 Main St.
Macedon, NY
14502
Newark-Wayne
Community Hospital
Macedon
Palmyra
Newark
350
31
21
88
90
Legend
Hospital
Hospital Route
Route to Newark-Wayne Community Hospital
1200 Driving Park Ave.
Newark, NY 14513
Phone: (315) 332-2022
Directions:
1: Start out going EAST on MAIN ST
2: Turn LEFT onto N MAIN ST in the Village of Newark
3: Turn LEFT onto FREY ST.
4: Turn LEFT onto DRIVING PARK AVE.
1 0.5 0 1
Miles
ROUTE TO HOSPITAL
SITE SAFETY AND HEALTH PLAN
NEWARK, NY
URS
FIGURE 1

SAFETY COMPLIANCE AGREEMENT, BRIEFING FORM, AIR MONITORING LOG, AND CALIBRATION CHECK SHEET FOR MACEDON FILMS SITE

I have read the Health and Safety Plan for the project and I understand it, and agree to comply with all of its provisions. I understand that I could be prohibited from working on the project for violating any of the health and safety requirements specified in the Plan.

	Name	Signature
URS Site Manager		
URS Site Safety Officer		
URS Site Personnel		
URS Site Personnel		

SAFETY ISSUES

DISCUSSED

	Yes	No
Protective Clothing/Equipment	___	
Chemical and Physical Hazards	___	
Control Methods	___	
Air Monitoring Action Levels and Requirements	___	
Nearest Phone	___	
Hospital Name/Address/Directions	___	

Meeting conducted by: _____ Date: _____

Attendees' Names (print) **Signatures**

_____

_____

_____

_____

_____

DAILY INSTRUMENT CALIBRATION CHECK SHEET

DATE	INSTRUMENT	BATTERY CHECK OK?	ZERO ADJUST OK?	CALIBRATION GAS(PPM)	READING (PPM)	CALIBRATED BY

FIELD MONITORING ACTIVITY LOG

DATE	ACTIVITY MONITORED	TIME	LOCATION	READING	ACTION	READING BY

URS SAFETY MANAGEMENT STANDARD
Worker Right-to-Know (Hazard Communication)

1. Applicability

This program applies to the operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

The worker right-to-know program provides URS personnel with information and training about safety and health hazards associated with the chemicals they might encounter in the workplace. This procedure describes how chemical safety hazards are communicated to URS personnel and how information is to be provided to employees of other employers working at the location. The requirements include steps to acquire this information, maintain it, and train personnel in the hazard communication program.

3. Implementation

Implementation of this procedure is the responsibility of the manager directing activities of the facility or site.

A Corporate, Regional, or Strategic Business Unit (SBU) HSE Manager must approve deviations from this procedure.

4. Requirements

A. Hazardous Material Inventory:

Maintain a hazardous material inventory that lists all of the hazardous materials used at each workplace (i.e., office/field location). Use chemical names consistent with the applicable material safety data sheet (MSDS).

B. Material Safety Data Sheets (MSDS)

1. Obtain a MSDS for each chemical before it is used.

2. Review each MSDS when it is received to evaluate whether the information is complete and to determine if existing protective measures are adequate.

3. Maintain a collection of all applicable and relevant MSDS where they are accessible by all employees at all times.

4. Replace MSDS when updated sheets are received. Communicate any significant changes to those who work with the chemical.

5. MSDS are required for all hazardous materials used on site by project personnel.

C. Labels

Unless each container has appropriate labeling, label all chemical containers with:

1. Identity of the hazardous chemical(s),
2. Appropriate hazard warnings, and
3. Name and address of the chemical manufacturer, importer, or other responsible party.
4. Labels on incoming containers of hazardous materials will not be removed or defaced.

D. Hazardous Nonroutine Tasks

Periodically, employees are required to perform hazardous non-routine tasks. Prior to starting work on such projects, provide each employee with information about hazards to which they may be exposed during such an activity.

This information will include:

1. Specific chemical hazards.
2. Protective/safety measures which must be utilized; and
3. Measures that have been taken to lessen the hazards including ventilation, respirators, presence of another employee and emergency procedures.

E. Informing Contractors/Subcontractors

Provide contractors/subcontractors the following information on chemicals used by or provided to URS personnel:

1. Names of hazardous chemicals to which they may be exposed while on the jobsite.
2. Precautions the employees may take to lessen the possibility of exposure by usage of appropriate protective measures.

3. Location of MSDS.

F. Training

1. Conduct training of all employees potentially exposed to hazardous materials on the following schedule:

   a. Before new employees begin their jobs.

   b. Whenever new chemicals are introduced into the workplace, or

   c. Annually thereafter.

2. This training will include:

   a. Applicable regulatory requirements.

   b. Names of those responsible for implementing this program.

   c. Location of the program, inventory and MSDS.

   d. Chemicals used and their hazards (chemical, physical and health).

   e. How to detect the presence or release of chemicals.

   f. Safe work practices.

   g. How to read an MSDS.

3. Document the training.

4. Where non-English speaking workers are employed, provisions for training in the appropriate language shall be arranged.

5. Documentation Summary

A. File these records:

1. Chemical Inventory.

2. Location of the MSDS inventory.

3. Training records.

4. Contractor/Subcontractor notifications.

6. Resources

A. U.S. OSHA Technical Links - Hazard Communication

B. U.K. - Control of Substance Hazardous to Health - Regulations

References to the UK legislation listed above can be found at the link provided:

www.tionestop.com
username: Thorburn
password: Dames
enter search criteria – (see underlined text)
select the checkbox for Construction Information Service (CIS)

C. National Paint and Coatings Association (NPCA) Hazardous Materials Identification System (HMIS) Version III

D. National Fire Protection Association (NFPA) Standard 704 (Standard System for the Identification of Hazardous Materials for Emergency Response)

URS SAFETY MANAGEMENT STANDARD
Electrical Safety

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies, where electricity is used, electrical systems are installed or maintained, or where live electrical circuits are accessed. For work around overhead or underground utilities, see SMS 34, "Utility Clearances".

2. Purpose and Scope

This procedure describes requirements for working on electrical circuits with voltage greater than 50 volts. The primary hazards related to electricity are shock, burns, arc-blast, fire and explosions. This procedure is intended to reduce worker risk to electrical hazards.

3. Implementation

Implementation of this procedure is the responsibility of the manager directing activities of the facility or site.

A Corporate, Regional, or Strategic Business Unit (SBU) HSE Manager must approve deviations from this procedure.

4. Requirements

A. Any work performed on live electrical systems must be done by a licensed or journeyman electrician.

B. Follow established lockout/tagout procedures. Refer to SMS 23, "Lockout and Tagout Safety".

1. Consider all electrical systems as live until verified de-energized and grounded.

2. Do not work on or in close proximity to electrical circuits unless the circuit is de-energized, grounded or guarded.

C. Hazardous Locations

Determine if electric equipment and wiring will be installed in locations that are classified depending on:

1. The properties of flammable vapors, liquids or gases, or combustible dusts or fibers that may be present; as well as the likelihood that a flammable or combustible concentration or quantity

is present. Refer to Attachment 12-1 for definitions of hazardous locations.

2. Consult Resources A, B, F, and G for information on working in classified locations.

D. Ground Fault Circuit Interrupters and Grounding

1. Ground Fault Circuit Interrupters

   a. Provide approved ground-fault circuit interrupters for all 120-volt, single phase, 15- and 20-ampere receptacle outlets on construction sites.

   b. Provide ground-fault circuit interrupters for all 120-volt, single phase, 15-and 20-ampere receptacle outlets within garages, bathrooms, kitchens and shops.

2. Grounding/Earthing

   Effectively ground all wiring, electrical circuits, and equipment, except portable tools & appliances protected by an UL-approved system of double insulation. Examples of equipment requiring grounding include:

   a. Portable and vehicle or trailer mounted generators.

   b. Electrically powered arc welders.

   c. Switches.

   d. Motor controller cases.

   e. Fuse boxes.

   f. Distribution cabinets.

   g. Frames.

   h. Non-current-carrying rails used for travel and motors of electrically operated cranes.

   i. Electric elevators.

j. Metal frames of non-electric elevators to which electric conductors are attached.

E. Circuits

1. Require that there are no missing blanks.

2. Close doors to circuit and fuse boxes when not in use.

3. Label every circuit located on a circuit breaker/fuse box and/or motor control center (MCC).

F. Temporary Wiring, Electrical Tools and Extension Cords

1. Require that temporary wiring is installed and used in accordance with references. Specifically:

   a. Guard, bury or isolate by elevation temporary wiring to prevent accidental contact by workers and equipment.

   b. Require that vertical clearance above walkways is not less than 10 feet (3 metres) from circuits carrying 600 volts or less.

   c. Support all exposed temporary wiring on insulators.

   d. Protect temporary wiring from accidental damage.

   e. Guard live parts of wiring.

   f. Mark temporary power lines, switch boxes, receptacle boxes, metal cabinets and enclosures around equipment to indicate the maximum operating voltage.

2. Require that lighting strings are installed and used in accordance with Resources A and B. Specifically:

   a. Use nonconductive lamp sockets and connections permanently molded to the conductor insulation.

   b. Require that lighting strings have lamp guards.

   c. Replace all broken or defective bulbs promptly.

d. Protect all lights used for illumination from accidental contact or breakage.

e. Ground metal-case sockets.

3. Require that extension cords are installed and used in accordance with Resources A and B. Specifically:

a. Use only 3-wire grounded type extension cords designated for hard service or extra hard service and listed by Underwriters Laboratories, Inc.

b. Check cords for damage before use and daily thereafter.

c. Do not exceed the rated load.

d. Do not use spliced cords.

e. Destroy and discard worn or frayed cords.

f. Do not fasten extension cords with staples, hang them by nails or suspend them by wire.

g. Do not wrap cords or cables around any conductive materials.

4. Require that portable electric tools brought onto the site are in good condition. Before use on any shift, visually inspect portable cord and plug connected equipment for external defects and evidence of possible internal damage.

G. Report to supervision potential electrical hazards or unexpected occurrences while electrical renovation or construction occurs.

H. Tests shall be performed on cord sets and receptacles before each use, or before return to service following repair or thereafter at intervals not to exceed 3 months in accordance with 1926.404 (b)(1)(iii)(D) and 1926.404 (b)(1).

I. Keep accurate records of all pertinent work performed on a project.

1. Keep as-built designs updated.

2. Share information on modifications with contractors on site.

J. Use of equipment that does not meet the requirements of this standard is not permitted.

K. Isolation of live electrical components

Isolate all live, unprotected electrical components through the use of barricades, fencing or other means to protect employees from contact.

L. Briefing

1. Brief workers on electrical hazards at the beginning of the job. Utilize Attachment 12-2 as a guide for proper PPE as applicable.

2. Brief new workers entering the site.

3. Brief workers when electrical conditions change or when hazards exist.

M. Inspection

Inspect the job site periodically using Attachment 12-3 to evaluate compliance with this standard.

5. Documentation Summary

Project Safety Files

A. Licensed/journeyman electrician for project (as necessary).

B. Attachment 12-3,"Audits."

C. Documented communications between URS, contractors, licensed/journeyman electricians, or others.

6. Resources

A. U.S. OSHA Standard - General Industry Electrical Safety - 29 CFR 1910, Subpart S

B. U.S. OSHA Standard - Construction Electrical Safety - 29 CFR 1926, Subpart K

C. U.S. OSHA Standard - Design Safety Standards for Electrical Systems - 29 CFR 1910, Subpart S

D. U.S. OSHA Standard - The Control of Hazardous Energy (Lockout/Tagout) - 29 CFR 1910.147

E. Australian Standards SAA HB94-1997 - Electrical Safety in the Workplace

F. American National Standards Institute/Institute of Electrical and Electronics Engineers - National Electrical Safety Code (NESC), ANSI/IEEE C2-2002

G. National Fire Protection Association, National Electric Code, NFPA-70

The following documents are PDF files requiring the use of Adobe Acrobat reader.

H. Attachment 12-1 - Hazardous Locations

I. Attachment 12-2 - PPE, Tools and Equipment

J. Attachment 12-3 - Electrical Hazard Check Sheet

URS SAFETY MANAGEMENT STANDARD
Fire Prevention

1. Applicability

This procedure applies to URS Corporation, and its subsidiary companies, office and project locations.

2. Purpose and Scope

The purpose of this procedure is to reduce/eliminate potential fire hazards in the workplace and to provide for a rapid, effective response should a fire occur.

3. Implementation

Implementation of this procedure is the responsibility of the manager directing activities of the facility or site.

A Corporate, Regional, Country or Strategic Business Unit Health, Safety and Environment Manager must approve deviations from this procedure.

4. Requirements

General

A. Develop an Emergency Action Plan as outlined in SMS 3, "Emergency Action Plans."

B. Maintain good housekeeping to reduce fire hazards and to provide safe routes of egress should a fire occur.

C. Provide the appropriate number and types of fire extinguishers for the operations being performed. Refer to Attachment 14-1 for guidance.

D. Inspect fire extinguishers monthly and maintain an inspection log. At a minimum, inspections will include the following:

1. Fire extinguisher is mounted and on a bracket,
2. Access to the fire extinguisher is not obstructed,
3. Pin is in place,
4. Charge indicator is in the full range (green area), and
5. Fire extinguisher shows no indication of physical damage.

E. Fire extinguishers shall be inspected annually by a qualified fire services contractor.

F. Conduct frequent periodic workplace inspections to identify fire hazards such as:

   1. Unnecessary accumulation of combustibles (including paper and boxes).

   2. Unnecessary storage of flammables.

   3. Sources of ignition (e.g., faulty wiring, sparks, open flame, etc.).

G. Remove all fire hazards promptly.

H. Prohibit smoking and other ignition sources in flammable storage and other fire hazard areas.

I. Extinguishers that are out of service or discharged shall be immediately tagged and removed from service and replaced.

J. Post emergency numbers near telephones and evacuation maps in appropriate locations.

K. Conduct evacuation drills at least annually.

L. Train employees in:

   1. Fire hazard recognition.

   2. Fire hazard prevention.

   3. Fire extinguisher use.

   4. Emergency and evacuation procedures.

6. Documentation Summary

File the following in the Office/Project Health and Safety File:

A. Emergency Action Plans.

B. Fire extinguisher inspection logs.

C. Employee training documentation.

D. Site audits.

E. Evacuation drills.

7. Resources

A. U.S. OSHA Standard - Means of Egress - 29 CFR 1910, Subpart E

B. U.S. OSHA Standard – Exit Routes, Emergency Action Plans, and Fire Prevention Plans - 29 CFR 1910.38

C. U.S. OSHA Standard - Fire Protection - 29 CFR 1910, Subpart L

D. U.S. OSHA Software - Fire Safety Advisor

E. U.S. OSHA Construction Standard - Fire Protection and Prevention 29 CFR 1926.150, Subpart F

F. National Fire Protection Association – Standard for Portable Fire Extinguishers – NFPA 10

G. International Code Council – International Fire Code

H. U.K. Statutory Instrument 1997 No. 1840 - Fire Precautions (Workplace) Regulations

I. Australian Standards AS 1851.1-1995 - Maintenance of Fire Protection Equipment - Portable Fire Extinguishers and Fire Blankets

J. USACE EM 385-1-1 Section 9 - Fire Prevention and Protection

K. Attachment 14-1 - Fire Extinguisher Placement Guidelines

URS SAFETY MANAGEMENT STANDARD
Hand Tools and Portable Equipment

1. Applicability

This standard applies to URS operations involving the use of hand tools and/or power equipment, including chain saws, brush cutters, powder-actuated tools, and similar high-hazard implements.

2. Purpose and Scope

The purpose of this standard is to provide procedures for the safe use and handling of hand tools and power equipment.

Also refer to SMS 064, Hand Safety.

3. Implementation

Implementation of this procedure is the responsibility of the manager directing activities of the facility or site.

A Corporate, Regional, or Strategic Business Unit (SBU) HSE Manager must approve deviations from this procedure.

4. Requirements

A. General

1. Keep hand and power tools in good repair and used only for the task for which they were designed.
2. Remove damaged or defective tools from service.
3. Keep surfaces and handles clean and free of excess oil to prevent slipping.
4. Do not carry sharp tools in pockets.
5. Clean tools and return to the toolbox or storage area upon completion of a job.
6. Wrenches must have a good bite before pressure is applied.
    a. Brace yourself by placing your body in the proper position so that that you will not fall in case the tool slips.
    b. Make sure hands and fingers have sufficient clearance in the event the tool slips.

c. Always pull on a wrench, never push.

7. When working with tools overhead, place tools in a holding receptacle or secure when not in use.

8. Do not throw tools from place to place, from person to person, or drop from heights.

9. Use non-sparking tools in atmospheres with fire or explosive characteristics.

10. Inspect all tools prior to start-up or use to identify any defects.

11. Powered hand tools should not be capable of being locked in the on position.

12. Require that all power fastening devices be equipped with a safety interlock capable of activation only when in contact with the work surface.

13. Do not allow loose clothing, long hair, loose jewelry, rings and chains to be worn while working with power tools.

14. Do not use cheater pipes.

15. Make provisions to prevent machines from automatically restarting upon restoration of power (see SMS 023).

B. Grinding Tools

1. Inspect work rests and tongue guards for grinders.

   a. Work rest gaps should not exceed 1/8 inch (3 mm).

   b. Tongue guards gap should not exceed ¼ inch (6 mm).

2. Do not adjust work or tool rests while the grinding wheel is moving.

3. Inspect the grinding wheel for cracks, chips or defects. Remove from service if any defects are found.

4. Wear goggles when grinding. A clear full face shield may be worn with the goggles.

5. Do not use the side of a grinding wheel unless the wheel is designed for side grinding.

6. Always stand to the side of the blade, never directly behind it.

7. Use grinding wheels only at their rated speed.

8. Grinding aluminum is prohibited.

9. For U.K. operations:

    a. No grinding wheels exceeding 55mm are to be used.

    b. All wheels are to be marked with their safe maximum speed.

    c. Abrasive wheels will only be operated by personnel who have been specifically trained and specified competent by URS.

    d. Abrasive wheels will only be operated by persons specified as competent, under the 'Abrasive Wheels" Regulations.

    e. Abrasive wheels must only be operated if the manufacturer's guard is fitted and they are in good working order.

C. Power Saws

1. Require that circular saws are fitted with blade guards.

2. Remove damaged, bent or cracked saw blades from service immediately.

3. Require that table saws are fitted with blade guards and a splitter to prevent the work from squeezing the blade and kicking back on the operator.

4. Require guards that cover the blade to the depth of the teeth on hand held circular saws. The guard should freely return to the fully closed position when withdrawn from the work surface.

D. Wood Working Machinery

1. Do not use compressed air to remove dust and chips from wood working machinery.
2. Locate the on-off switch to prevent accidental start up. The operator must be able to shut off the machine without leaving the work station.
3. Guard planers and joiners to prevent contact with the blades.
4. Use a push stick when:
    a. The cutting operation requires the hands of the operator to come close to the blade.
    b. Small pieces are being machined.
5. Adjust saw blades so they only clear the top of the cut.
6. Automatic feed devices should be used whenever feasible.

E. Pneumatic Tools and Equipment

1. Require that pneumatic tools have:
    a. Tool retainers to prevent the tool from being ejected from the barrel during use.
    b. Safety clips or tie wires to secure connections between tool/hose/compressor if they are of the quick connection (Chicago fittings) type.
2. Do not lay hose in walkways, on ladders or in any manner that presents a tripping hazard.
3. Never use compressed air to blow dirt from hands, face or clothing.
4. Compressed air exhausted through a chip guarded nozzle shall be reduced to less than 30 psi. Proper respiratory, hand, eye and ear protection must be worn.
5. Never raise or lower a tool by the air hose.

F. Powder Actuated Fastener Tools

1. Use powder actuated tools that comply with the requirements of the American National Standards Institute (ANSI)/American Society of Safety Engineers(ASSE) Standard A10.3 - 1995.

2. Use only individuals that have been trained by a manufacturer's representative and possess the proper license to operate, repair, service and handle powder actuated tools.

3. Never use a powder actuated tool in a flammable or explosive atmosphere.

4. Require the use of goggles or a full face shield as well as safety glasses during operation of powder actuated tools.

5. Powder actuated tools must not be able to be fired unless the tool is pressed against the work surface.

6. The tool must not be able to fire if the tool is dropped when loaded.

7. Firing the tool should require two separate operations, with the firing movement being separate from the motion of bringing the tool to the firing position.

8. Never fire into soft substrate where there is potential for the fastener to penetrate and pass through, creating a flying projectile hazard.

9. Do not use powder actuated tools in reinforced concrete if there is the possibility of striking the re-bar.

10. Do not use on cast iron, glazed tile, surface hardened steel, glass block, live rock or face brick.

11. Never load and leave a powder actuated tool unattended. It should only be loaded prior to intended firing.

12. Test tools each day prior to loading by testing safety devices according to manufacturer's recommended procedure.

G. Chain Saws

1. Approval by the HSE Representative is required for all use of chain saws.
2. Inspect the saw prior to each use and periodically during daily use.
3. Never cut above chest height.
4. Require that the idle is correctly adjusted on the chain saw. The chain should not move when the saw is in the idle mode.
5. Start cutting only after a clear escape path has been made.
6. Shut the saw off when carrying through brush or on slippery surfaces. The saw may be carried no more than 50 feet (15 meters) while idling.
7. Require applicable protective gear. This will include, but is not limited to:
    a. Logger's safety hat.
    b. Safety glasses or face shield.
    c. Steel-toed boots.
    d. Protective leggings.
    e. Hearing protection.
8. Inspect saws to require that they are fitted with an inertia break and hand guard.
9. *Never* operate a chain saw when fatigued.
10. Do not allow others in the area when chain saws are operated.
11. Make sure there are no nails, wire or other imbedded material that can cause flying particles.

12. Do not operate a chain saw that is damaged, improperly adjusted, or is not completely and securely assembled. Always keep the teeth sharp and the chain tight. Worn chains should immediately be replaced.

13. Keep all parts of your body away from the saw chain when engine is running.

14. For all operations, only personnel specifically trained and certified as competent by URS may operate chain saws.

H. Hand Operated Pressure Equipment

1. Pressure equipment such as grease guns, paint and garden sprayers shall be directed away from the body and other personnel in the area. The person operating any equipment such as this, which has a potential for eye injury, must wear protective goggles.

2. The noise produced when using certain types of pressure equipment may require the use of hearing protection.

3. Never allow the nozzle of a pressurized tool to come in contact with any body parts while operating. There is potential for injection of a chemical directly into the user's body, resulting in severe injury or death.

I. Gasoline Powered Tools

1. Never pour gasoline on hot surfaces.

2. Never fuel around open flame or while smoking.

3. Shut down the engine before fueling.

4. Provide adequate ventilation when using in enclosed spaces.

5. Use only approved safety cans to transport flammable liquids.

J. Inspection

Inspect all hand tools on a regular basis. Defective tools shall be immediately removed from service and tagged or destroyed to prevent further use.

5. Documentation Summary

Place in the Project Safety File:

A. Site briefings regarding tool use.

B. Records of tools removed from service.

C. Copies of powder actuated tool licenses (as applicable).

D. Tool inspection documentation.

6. Resources

A. U.S. OSHA Standard - Hand and Portable Power Tools - 29 CFR 1910, Subpart P

B. U.S. OSHA Standard - Construction Tools - Hand and Power - 29 CFR 1926, Subpart I

C. ANSI/ASSE A10.3 – 1995

D. National Association of Demolition Contractors

E. U.K. - 'Provision and Use of Work Equipment' Regulations 1998

F. Australia/New Zealand Standards – Powder-Actuated Handheld Fastening Tools - AS/NZS 1873.1:2003

G. Australian/New Zealand Standards – Hand-held Motor-operated Electric Tools – AS/NZS 60745.1:2003

URS SAFETY MANAGEMENT STANDARD
Hazardous Waste Operations

1. Applicability

This standard applies to all operations of URS Corporation and its subsidiary companies involving the investigation or remediation of sites impacted with hazardous wastes or hazardous materials including those associated with underground storage tanks.

Normally, investigation projects for real estate transactions conducted to confirm that a site is "clean" are not covered under this standard. If the Project Manager reasonably expects that there is the potential for a "clean" site to actually have some level of contamination, it should initially be treated as contaminated and subject to this standard. Reference related Safety Management Standards for such operations.

2. Purpose and Scope

The purpose of this standard is to minimize the risks to URS personnel and subcontractors while conducting hazardous waste field operations.

Investigation techniques included under this standard include, but are not limited to, hand auger, soil gas evaluation, groundwater monitoring, test pits, and all types of power drilling, including direct push. Remediation techniques included under this standard include, but are not limited to, excavation, groundwater treatment, soil gas treatment, containment, and landfarming.

3. Implementation

Implementation of this procedure is the responsibility of the manager directing activities of the facility or site/project.

A Corporate, Regional, Country or Strategic Business Unit (SBU) Health, Safety and Environment (HSE) Manager must approve deviations from this procedure.

4. Requirements

The URS Safety Management System and Safety Management Standards were designed to help employees to identify, evaluate and control safety and health hazards and to provide for emergency response. Site/project hazards and scope of work dictate the specifics, which are covered in Facility Emergency Action Plans and Project Health and Safety Plans (HASPs).

A. Project Evaluation

Assess the technical and field aspects of every hazardous waste site project to evaluate:

1. Risk of exposure to hazardous chemicals, with particular attention to suspected or known human carcinogens.
2. Personal protective equipment requirements.
3. Air monitoring requirements.
4. Emergency services requirements.
5. Hazards addressed by other URS Safety Management Standards (e.g. Confined Space Entry - SMS 10).
6. Hazardous materials shipping and disposal responsibilities.
7. Other safety and health hazards associated with site operations.

B. Client/Contract Evaluation

1. Review contract documents to determine whether the client has any special internal or regulatory requirements for hazardous waste site operations.
2. Implement client requirements in addition to those of this standard. Those requirements that are the most protective (e.g., most stringent) will be used.

C. Site-specific Health and Safety Plan

1. Prepare a site-specific Health and Safety Plan (HASP) for every project under this standard.
2. HASPs must be written or approved by a URS Corporate, Regional, Country or Strategic Business Unit (SBU) Health, Safety and Environment (HSE) Manager or a safety professional specifically approved by the HSE Manager, and by the project manager.
3. Evaluate client and agency requirements prior to preparing the HASP, particularly if the client or an agency will approve the HASP prior to implementation.
4. On a site/project specific basis staff conduct a hazard assessment and identify appropriate engineering controls, work practices, and

PPE requirements. This assessment and the mitigations/controls are documented in site/project specific HASPs that are normally provided to clients by the project manager for their review and approval prior to the initiation of field activities.

5. On a site/project specific basis qualified staff conduct a hazard assessment for potential physical and chemical exposures and identify monitoring equipment, frequency, action levels, and actions with approval of the project manager. These are incorporated into project/site specific HASPs which are normally reviewed and approved by our clients prior to the initiation of field activities. Guidance on monitoring is provided in SMS 43 (Personal Monitoring/Industrial Hygiene).

6. On a site/project specific basis and based on the potential chemical exposures, and work activities, staff develop specific decontamination procedures that include instructions on materials, decontamination steps and location of decontamination zones with approval of the project manager. The purpose of these procedures will be to ensure personnel leaving contaminated areas are appropriately decontaminated and all equipment is disposed or decontaminated. This information is incorporated into site/project specific HASPs which are normally reviewed and approved by our clients prior to the initiation of field activities.

7. PPE selection, use and maintenance are presented in SMS 29 (Personal Protective Equipment). This information is documented on a site/project specific basis in the site/project HASP. Staff will remove any non-impermeable PPE clothing that becomes contaminated with hazardous substances in accordance with the decontamination procedures noted above. These instructions are reiterated in the emergency decontamination procedures in the HASPS.

8. On a site/project specific basis, if it is determined that regular showers, change rooms and sanitation facilities are necessary; these will be provided for employees.

D. Training

Verify that each assigned URS employee has completed required training.

1. 40-hours of initial training from an approved training provider, (24 hours of initial training for operations outside of North America).

2. 3-days of on-the-job training (one day is required for operations outside of the United States).

3. 8-hours of refresher training completed within 12 months of the initial or subsequent refresher training.

4. 8-hours of Site Safety Officer (Supervisor) training for directing the activities of any other URS employee or subcontractor.

5. Additional training for the Site Safety Officer as described below.

E. Site Safety Officer

1. Appoint a Site Safety Officer (SSO) with appropriate qualifications for the specific hazardous waste project.

2. Assure that the SSO for complex projects, such as those with complicated remediation activities, has no duties other than site safety and health.

3. Verify that the SSO has completed basic supervisor training, and has additional required training and experience as applicable:

   a. Additional respiratory protection training is required for projects where supplied air respirators may be used.

   b. Heavy equipment/construction safety.

   c. Personal air monitoring.

4. The Site Safety Officer will monitor decontamination and other site activities for effectiveness.

F. Exposure Monitoring

Require that exposure monitoring is conducted in accordance with the HASP on all hazardous waste projects.

G. Project Equipment

1. Provide all health and safety equipment as described by the project HASP.

2. Provide all personal protective equipment as described by the project HASP.

H. Medical Surveillance

Verify that each URS employee assigned to the project meets the minimum requirements of the URS Medical Surveillance Program (refer to SMS 024). This typically includes:

1. Baseline examination.
2. Annual examination.
3. Appropriate clearance for respirator use.

I. Compliance Assurance

Attachment 68-3, Hazardous Waste Site Evaluation is a tool for use in determining the effectiveness and compliance of a waste site operation.

5. Documentation Summary

In the Project Safety File:

A. Completed Health and Safety Plan.

B. Completed and signed HASP approval form.

C. Signed HASP acceptance form.

D. Completed H&S field forms that are included in each HASP.

E. Training and Medical Surveillance Clearance documentation for project personnel.

6. Resources

A. U.S. OSHA - Hazardous Waste Operations

B. Attachment 68-3, Hazardous Waste Site Evaluation

C. European Agency for Safety and Health at Work, Dangerous Substances http://europe.osha.eu.int/good_practice/risks/dangerous_substances/

D. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities - NIOSH 85-115

E. USACE EM 385-1-1 – Hazardous Waste Operations and Emergency Response (HAZWOPER)

URS SAFETY MANAGEMENT STANDARD
Heat Stress

1. Applicability

This procedure applies to URS field projects where ambient (not adjusted) temperatures exceed 70°F (21°C) for personnel wearing chemical protective clothing, including Tyvek coveralls, and 90°F (32°C) for personnel wearing normal work clothes.

2. Purpose and Scope

The purpose of this procedure is to protect project personnel from the effects of heat related illnesses.

3. Implementation

Field Activities - Implementation of this procedure is the responsibility of the Project Manager.

4. Requirements

A. Monitor ambient temperatures and conduct heat stress monitoring when threshold temperatures (see Section 1) are reached.

B. Conduct initial monitoring to determine first rest break.

1. Measure the air temperature with a standard thermometer with the bulb shielded from radiant heat; this yields T (actual).

2. Estimate the fraction of sunshine by judging what percent time the sun is not shielded by clouds that are thick enough to produce a shadow, as follows:

   a. 100 percent sunshine (e.g., no cloud cover) = 1.0

   b. 50 percent sunshine (e.g., 50 percent cloud cover) = 0.5

   c. 0 percent sunshine (e.g., full cloud cover) = 0.0

3. Plug these variables into the following equation to determine the adjusted temperature:

   T (adjusted) = T (actual) + (13 x fraction sunshine)

C. Body Temperature Monitoring

1. Monitor oral body temperature to determine if employees are adequately dissipating heat buildup. Ear probe thermometers which are adjusted to oral temperature are convenient and the preferred method of measurement. Determine work/rest regimen as follows:

    a. Measure oral body temperature at the end of the work period.

    b. If temperature exceeds 99.6 °F (37.5 °C), shorten the following work period by 1/3 without changing the rest period.

    c. If temperature still exceeds 99.6 °F (37.5 °C), shorten the following work period by 1/3.

    d. Do not allow a worker to wear impermeable PPE when his/her oral temperature exceeds 100.6 °F (38.1°C).

2. Oral body temperatures are to be obtained prior to the employee drinking water or other fluids.

D. Pulse Rate Monitoring

1. Take the radial (wrist) pulse as early as possible in the rest period.

    a. If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third.

    b. If the heart rate still exceeds 110 beats per minute at the next rest cycle, shorten the following work cycle by an additional one-third.

E. Record monitoring results on Heat Stress Monitoring Form (Attachment 18-2).

F. Investigate the use of auxiliary cooling devices in extreme heat conditions.

G. Conduct briefings for employees regarding health hazards and control measures associated with heat stress whenever conditions require the implementation of heat stress monitoring. Review the information provided in Attachment 18-3.

H. Provide water and electrolyte replacement drinks fluids as described in Attachment 18-3.

I. Allow employees who are not accustomed to working in hot environments appropriate time for acclimatization (see Attachment 18-3).

J. Provide break areas as described in Attachment 18-3.

5. Documentation Summary

File these records in the Project Safety File.

A. Heat Stress Monitoring Forms.

B. Employee Safety Briefing Verification Forms.

6. Resources

A. NIOSH - "Working in Hot Environments"

B. AFL-CIO Building Trades Division - "Heat Stress in Construction"

C. Attachment 18-1 - Initial Work Monitoring Cycles

D. Attachment 18-2 - Heat Stress Monitoring Record

E. Attachment 18-3 -Informational Supplement

URS SAFETY MANAGEMENT STANDARD
Heavy Equipment Operations

1. Applicability

This procedure applies to URS field projects where heavy equipment is in operation.

2. Purpose and Scope

The purpose of this procedure is to require that heavy equipment is operated in a safe manner, that the equipment is properly maintained and that ground personnel are protected.

3. Implementation

Field Activities - Implementation of this procedure is the responsibility of the Project Manager.

4. Requirements

A. Authorized Operators

1. Evaluate operators through documentable experience (resume) and a practical evaluation of skills.
2. Allow only qualified operators to operate equipment.
3. Prohibit equipment from being operated by any personnel who have not been specifically authorized to operate it.
4. Maintain a list of operators for the project and the specific equipment that they are authorized to operate.
5. Require operators to use seat belts at all times in all equipment and trucks.
6. Prohibit personnel other than the operator from riding in or on the equipment unless additional seating (with seat belts) is provided by the manufacturer.
7. Operators shall maintain three points of contact whenever entering and exiting a piece of equipment.
8. Brief operators on the following rules of operation:

    a. Operators are in control of their work area.

b. Equipment will be operated in a safe manner and within the constraints of the manufacturer's Operation Manual.

c. Operators will stop work whenever unauthorized ground personnel or equipment enter their work area and only resume work when the area has been cleared.

B. Ground Personnel

1. Require that ground personnel on the site have received training and comply with the following rules of engagement:

a. All ground personnel must wear high visibility protective vests when in work areas with any operating equipment.

b. Ground personnel will stay outside of the swing zone or work area of any operating equipment.

c. Ground personnel may only enter the swing or work area of any operating equipment when:

1. They have attracted the operator's attention and made eye contact.

2. The operator has idled the equipment down and grounded all extensions.

3. The operator gives the ground personnel permission to approach.

d. Ground personnel shall never walk or position themselves between any fixed object and running equipment or between two running pieces of equipment.

C. Equipment

1. Maintain operations manuals at the site for each piece of equipment that is present on the site and in use.

2. Require that operators are familiar with the manual for the equipment and operate the equipment within the parameters of the manual.

3. Require that all equipment is provided with roll-over protection systems (ROPS). Tracked excavators are exempt from ROPS requirements but must have a cab which provides protection from overhead hazards

4. Verify that seatbelts are present and functional in all equipment.

5. Prohibit the use of equipment which has cab glass which is cracked, broken or missing.

6. Require that backup alarms are functional on all trucks and equipment. Tracked excavators must have bidirectional alarms or the operator must be provided with a spotter whenever tracking in either direction.

7. Require all extensions such as buckets, blades, forks, etc. to be grounded when not in use.

8. Require brakes to be set and wheels chocked (when applicable) when not in use.

D. Inspection and Maintenance

1. Require daily inspections of equipment by operators using Attachment 19-1.

2. Prohibit use of equipment deemed to be unsafe as a result of daily inspection until required repairs or maintenance have been completed.

3. Conduct maintenance as prescribed by the manufacturer in the Operations Manuals for each piece of equipment.

4. During maintenance/repair, require that:

   a. Motors are turned off.

   b. All extensions are grounded or securely blocked.

   c. Controls are in a neutral position.

   d. Brakes are set.

5. Documentation Summary

File the following documents in the Project Health and Safety File.

A. List of authorized operators.

B. Operator qualifications.

C. Daily Equipment Inspection Logs.

D. Site briefing documentation for operator rules and ground personnel "rules of engagement".

6. Resources

A. U.S. OSHA Standard - Motorized Vehicles and Mechanized Equipment - 29 CFR 1926, Subpart O

B. National Association of Demolition Contractors – Safety Manual

C. Queensland Workplace Health and Safety - Competency Standard for Users & Operators of Industrial Equipment

D. Attachment 19-1 - Equipment Inspection Form

URS SAFETY MANAGEMENT STANDARD
Medical Screening & Surveillance

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies for employees assigned to work environments where there is a potential for exposure to chemical, biological, and/or physical hazards. Individuals will be selected for medical screening based on regulatory standards, project health and safety plan assessments, the expected use of personal protective equipment, and client contract requirements.

2. Purpose and Scope

The overall goal of this program is to prevent occupational illness and injury by early identification of exposure-related health effects before they result in disease. Medical examinations will be performed in order to determine if employees are capable of safely performing assigned tasks, to verify protective equipment and controls are effectively providing protection, and to comply with governmental regulations. Included are provisions for emergency medical consultation and treatment.

3. Implementation

Implementation of this procedure is the responsibility of the manager directing activities of the facility or site.

A Corporate, Regional, Country, or Strategic Business Unit (SBU) HSE Manager must approve deviations from this procedure.

Program Administration – The Occupational Health Manager (OHM) is responsible for development and administration of this program in coordination with the URS Medical Service Provider (MSP). The OHM will maintain current injury and illness data and participate with Corporate, Regional, Country, or Strategic Business Unit (SBU) HSE Managers in evaluation of this program. The MSP will provide board certified occupational medicine oversight for the program and will approve medical surveillance protocols.

Locations in the United States and Canada will follow all requirements of this program.

International locations will follow sections B.1, 2, 3, 5, 6, 7, and 8; G.3; and H.1 of this program.

4. Requirements

A. Selection of program participants.

1. The Medical Surveillance Evaluation (MSE) form - SMS 24-2 provides the primary guidance for determining whether medical screening is required for an employee and the frequency of periodic exams. The MSE is to be completed by the employee and their supervisor at time of hire for any employee who may work outside an office environment and is to be reviewed for accuracy at each annual performance review. Other reviews are required whenever there is a change in job tasks.

2. Additional site/project specific biological monitoring or toxicological screening may be required in addition to this program's core exam schedule. These medical tests will be specified by the project-specific health and safety plan and will be authorized by the MSP on the exam appointment protocol. Note: See Section D.2 if employee will have an initial assignment at a HAZWOPER site.

B. Types of medical screening and surveillance exams

1. A baseline or pre-assignment baseline exam will be conducted prior to the start of work assignments requiring medical surveillance.

2. Periodic exam schedules are established by the MSP using the following criteria:

   a. Employees performing the following types of work will receive annual exams: construction activities in the exclusion zone of HAZWOPER sites, field work activities in the exclusion zone of HAZWOPER sites for 30 or more days per year, or projects involving exposure to OSHA-regulated materials at or above established action levels.

   b. Employees performing the following types of work will receive biennial exams: field work activities at HAZWOPER sites less than 30 days per year; waste disposal activities; non-HAZWOPER environmental sampling; chemistry laboratory, pilot plant projects, or bench scale operations for 30 or more days per year.

3. Employees currently participating in an examination program will receive exit exams when they leave their work assignment as identified in the Exit Exam Determination – SMS 24-6. In the event an employee declines the exit exam, the employee will be

requested to sign a Waiver of Exit Medical Surveillance Exam - SMS 24-7.

4. Department of Transportation (DOT) exams will be conducted biennially when an employee is assigned to drive a vehicle with a gross weight rating of more than 10,000 pounds or when driving a placarded vehicle of any size used to transport hazardous chemicals. DOT exam certification can be added to a routine baseline or periodic exam protocol when scheduling with the MSP.

5. When noise levels in the employee's work environment equal or exceed an 8-hour time-weighted average of 85 decibels as measured on the A-scale (dBA), annual audiograms will be performed. For employees involved in construction activities or management of construction, enrollment in this program will be required if more than 50% of their time is spent in an active construction area.

6. Individual radiation dose monitoring will be conducted as required by the site-specific health and safety plan with approval by a Radiation Safety Officer. Personal dosimetry (film badges) is typically required; however, depending on the specific radiation hazard, additional excretory monitoring or thyroid scans may be required.

7. In order to determine an employee's ability to wear a respirator, a medical evaluation will be performed before an employee is fit tested or assigned to wear a respirator.

8. Employees assigned to work environments with airborne concentrations of asbestos fibers at or above the established action level will receive asbestos-specific baseline and annual exams. Exit exams will be performed if an exam has not been performed within the past 6 month period or if an employee has medical complaints related to asbestos exposure.

9. Blood sampling and monitoring will be conducted every 6 months until 2 consecutive blood samples/analysis are acceptable. An employee with elevated blood levels should be temporarily removed. Sampling and monitoring will be performed at least monthly during the removal period. Employees will be notified within 5 days when levels are not acceptable. Medical Removal Protection benefits apply in this situation.

C. Exam protocols

1. The Medical Screening & Surveillance Exam Protocol – SMS 24-3 identifies the medical exam components of this program.

2. Evaluation will be confidential, during normal hours, and employees may discuss the results with the MSP.

D. Scheduling of exams

1. The Office or Project Manager, usually with assistance of the local HSE Representative, is responsible for contacting the MSP when baseline, exit, and project specific exams are required. The MSP maintains an employee scheduling database for tracking periodic exams and will contact the employee for scheduling the month their exam is due. These steps are detailed in the Medical Surveillance Exam Process – SMS 24-4.

3. Employees hired with an initial assignment to work at a HAZWOPER site whose work duties require passing a physical exam or who have an essential job function of wearing a respirator, will receive a job offer contingent upon passing a pre-assignment baseline exam. See HAZWOPER & Respirator Pre-assignment Baseline Exam Process – SMS 24-5.

4. In the event of an urgent business need, a temporary clearance to begin work the day of the exam may be requested at the time a baseline exam is scheduled through the MSP. The temporary clearance will be issued by the local physician and will be good for up to 14 days or until the MSP physician's final clearance is received, whichever comes first.

4. If an exam becomes due during an employee's pregnancy, it is advised to defer the exam until after delivery and the employee returns to work from family/medical leave status.

E. Exam Follow Up

1. Following each exam, the MSP will issue a physician's written opinion (Health Status Medical Report) to the local HSE Representative which will include any medical restrictions and address the employee's ability to use personal protective equipment. See Exam Follow Up Procedures - SMS 24-8.

2. The MSP will mail the exam invoice to the Local Office HSE Representative who will approve the charge and forward the invoice to the accounts payable department for payment. (Medical exams that are part of this program are provided to URS employees at no cost to the employee).

3. The MSP will mail a confidential letter detailing the results of the exam to the employee at their home address within 30 days of the exam date.

F. Emergency Medical Care

1. Pre-planning is essential to a prompt and proper response to a medical emergency. Site-specific emergency procedures will be provided in the site Health & Safety Plan. Suggested pre-planning actions are provided in SMS 065 (Injury Case Management). See Field First Aid Kit Supply List for recommended supplies. The contents of the first aid kit shall be checked prior to being sent out to each site/project and periodically thereafter to ensure the expended items are replaced.

2. A MSP occupational physician can be reached 24 hours a day for phone consultation at WorkCare™ (1-800-455-6155).

3. A workers' compensation claim should be filed by URS Occupational Health Nurses with Sedgwick CMS(1-866-566-1915) for an injured employee who receives professional medical care or who is disabled from working beyond the initial date of injury.

5. In order to comply with OSHA reporting regulations, immediately notify the OHM or the applicable Corporate, Regional, Country, or Strategic Business Unit (SBU) HSE Manager if there is a work-related hospitalization or death.

G. Medical Records

1. Medical records are maintained and preserved in confidential, locked files in the custody of the MSP for at least the duration of employment plus 30 years. Only information regarding the employee's ability to perform the job assignment will be provided to company representatives.

2. Upon request, each employee (or designated representative) will have access to the employee's medical record. Prior to the release

of health information to the employee (or designated representative), a specific written consent must be signed by the employee.

3. International records (excluding the United States and Canada) will be maintained in country at the local clinic.

H. Program evaluation

1. The OHM and Corporate, Regional, Country, or Strategic Business Unit (SBU) HSE Managers will evaluate this program annually and as needed. Issues to review include program efficacy and efficiency, employee satisfaction, and cost effectiveness.

2. The MSP will prepare an Annual Medical Trending Report specifying the number and types of exams performed and anonymous statistical exam results in group data format.

3. Each employee is mailed a Post-Exam Evaluation by the MSP. Employee feedback regarding the clinic, medical staff, and exam procedures are reviewed and corrective actions are identified and acted upon as needed.

5. Documentation Summary

The Local Office HSE Representative will file the Medical Surveillance Evaluation and the Health Status Medical Report in the site health & safety records.

6. Resources

A. U.S. OSHA Technical Links - Medical Screening/Surveillance

B. U.S. OSHA Publication 3162 (1999) Screening and Surveillance: A Guide to OSHA Standards

C. Attachment 24-1 WorkCare Medical History Questionnaire

D. Attachment 24-2 Medical Surveillance Evaluation

E. Attachment 24-3 Medical Screening & Surveillance Exam Protocol

F. Attachment 24-4 Medical Surveillance Exam Process

G. Attachment 24-5 HAZWOPER/Respirator Preassignment Baseline Exam Process

H. Attachment 24-6 Exit Exam Determination

I. Attachment 24-7 Waiver of Exit Medical Surveillance Exam

J. Attachment 24-8 Exam Follow Up Procedures

K. Attachment 24-9 Field First Aid Kit Supply List

L. SMS 8 Asbestos Survey and Oversight Operations

M. SMS 17 Hazardous Waste Operations

N. SMS 42 Respiratory Protection

o. SMS 65 Injury Case Management

URS SAFETY MANAGEMENT STANDARD
Noise and Hearing Conservation

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies where personnel may encounter noise exposures that may exceed 85 decibels, measured using an "A" weighted scale (dBA), as an 8-hour time weighted average (TWA).

For non U.S. operations, refer to the country/region specific SMS and regulations.

2. Purpose and Scope

The purpose of this procedure is to protect employees from hazardous noise exposures and to prevent hearing loss.

3. Implementation

Implementation of this procedure is the responsibility of the manager directing activities of the facility or site.

A Corporate, Regional, or Strategic Business Unit (SBU) HSE Manager must approve deviations from this procedure.

4. Requirements

A. General

The use of hearing protectors is required in any location where powered or motorized equipment or any other noise source could reasonably be expected to exceed 85 dBA. Use of hearing protectors may only be discontinued when noise levels are verified to be less than 85 dBA through a properly conducted noise survey. Whenever information indicates that any employee's exposure may equal or exceed an 8-hour TWA of 85 dBA, the project manager or location manager will be responsible to enforce the proper use of hearing protectors.

B. Hearing Protectors

1. Require that at least two (2) types of hearing protectors are available to employees free of charge, preferably a plug and a muff type.

2. Minimum Noise Reduction Ratings (NRR)

   Hearing protectors issued must have the following minimum NRR:

Ear Plug	Muffs
29 dBA	27 dBA

3. Require that hearing protectors are used in accordance with manufacturer's specifications and thus effectively protect hearing.

C. Noise Surveys

1. Noise surveys must be conducted in a manner that reasonably reflects the exposure of the affected employees. Surveys must be conducted under the supervision of a URS Health, Safety, and Environment (HSE) Representative.

2. Sound level meters and audio dosimeters used to determine employee exposure to noise sources must be Type II (accurate to within +/- 2 dBA), operated in "slow" response, on the "A" scale, and be calibrated to factory guidelines (including periodic factory recalibration).

D. Noise Controls

Eliminate noise sources to the extent possible. Examples of controls that must be considered include:

1. Addition or replacement of mufflers on motorized equipment.

2. Addition of mufflers to air exhausts on pneumatic equipment.

3. Following equipment maintenance procedures to lubricate dry bearings.

4. Isolation of loud equipment with barriers.

5. Replacement of loud equipment with newer and quieter models.

E. Audiometric Exams

1. Tests

   Details on the medical surveillance program (including audiometric testing) are included in SMS 24.

Audiometric tests shall be performed by a person meeting the requirements described in 29 CFR 1910.95(g)(3). Within 6 months of an employee's first exposure at or above the action level, a valid baseline audiogram shall be established against which subsequent audiograms can be compared. Testing to establish a baseline audiogram shall be preceded by 14 hours without exposure to noise. Hearing protectors may be used as a substitute for the requirement that baseline audiogram shall be preceded by 14 hours without exposure to workplace noise. The medical surveillance provider shall notify employees of the need to avoid high levels of non-occupational noise exposure during the 14-hour period immediately preceding the audiometric examination. For multi-year projects, an annual audiogram shall be obtained for each employee exposed at or above an 8-hour time-weighted average of 85 decibels.

Each employee's annual audiogram shall be compared to that employee's baseline audiogram to determine if the audiogram is valid and if there is a standard threshold shift (STS). A standard threshold shift is a change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear. If the annual audiogram shows that an employee has suffered a STS, the employer will obtain a retest within 30 days and consider the results in assessing an STS as the annual audiogram. The audiologist, otolaryngologist, or physician shall review problem audiograms and shall determine whether there is a need for further evaluation. If an STS has occurred, the medical surveillance provider will notify the employee within 21 days of the determination.

2. Standard Threshold Shifts

   If an employee's test results show a confirmed STS, their hearing protection will be evaluated and refitted, and a medical evaluation may be required.

F. Training

Verify that each employee who must work in a noisy environment is current on required Hearing Conservation Training. Training must include the following topics:

1. The effects of noise on hearing.

2. The purpose of hearing protectors.
3. The advantages and disadvantages of various types of hearing protectors.
4. The attenuation of various types of hearing protection.
5. The selection, fitting, care, and use of hearing protectors.
6. The purpose of audiometric testing.
7. An explanation of the audiometric testing procedure.

5. Documentation Summary

A. File these records in the Safety Filing System:

1. Noise surveys, when applicable.
2. Training Records.

6. Resources

A. U.S. OSHA Standard – Occupational noise exposure – 29 CFR 1910.95

B. U.S. OSHA Construction Standard – Occupational noise exposure – 29 CFR 1926.52

C. U.S. OSHA Technical Links - Noise and Hearing Conservation

D. American Industrial Hygiene Association: The Occupational Environment – Its Evaluation and Control, Chapter 20. Fairfax, VA: 1997

E. National Hearing Conservation Association web site

F. URS SMS 24 - Medical Screening and Surveillance

URS Safety Management Standard
Personal Protective Equipment

1. Applicability

This standard applies to all operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

This procedure provides information on recognizing those conditions that require PPE as well as selecting PPE for hazardous activities.

3. Implementation

Implementation of this procedure is the responsibility of the manager directing activities of the facility or site.

A Corporate, Regional, or Strategic Business Unit (SBU) HSE Manager must approve deviations from this procedure.

4. Requirements

A. Perform hazard assessments for those work activities that are likely to require the use of PPE.

   1. Use Attachment 29-1 to perform the assessment.

   2. Reevaluate completed hazard assessments when job conditions or duties change.

B. Eliminate the hazards identified in Attachment 29-1, if possible, through engineering or administrative controls.

C. Select PPE that will protect employees if hazards cannot be controlled or eliminated.

   1. See Attachment 29-1 for recommended PPE.

   2. Review Material Safety Data Sheets for chemicals used for PPE recommendations.

   3. If needed, consult with the URS Health, Safety, and Environment (HSE) Representative for assistance in selecting PPE.

D. Provide required PPE to employees free of charge (excluding, in some instances, components of standard work attire such as steel-toed boots),

assuring proper fit and providing a choice if more than one type of PPE is available.

E. Whenever a hazard is recognized and PPE is required, the employees will be provided with the appropriate PPE. However, when PPE is not required and the employee elects to wear his or her own PPE, the manager directing activities shall ensure that the employee is properly trained in the fitting, donning, doffing, cleaning, and maintenance of his or her employee owned equipment.

F. Conduct and document employee training.

1. Train all employees who are required to wear PPE.
2. Require that training includes:
    a. When PPE is to be worn.
    b. The type of PPE necessary for the task to be completed.
    c. How to properly don, doff, adjust and wear PPE.
    d. Limitations of PPE.
    e. Proper care, maintenance, useful life and disposal of PPE.
3. Training must be conducted before PPE is assigned.
4. Refresher training is needed when:
    a. New types of PPE are assigned to the worker.
    b. The worker cannot demonstrate competency in PPE use.
5. Keep written records of the employees trained and type of training provided, including the date of training.

G. Maintain Protective Equipment

1. Check PPE for damage, cracks, and wear prior to each use. Replace or repair equipment not found in good condition.
2. Decontaminate non disposable PPE with appropriate cleaner, as necessary, to prevent degradation of the equipment. Staff will remove any non-impermeable PPE/clothing that becomes

contaminated with hazardous substances. These instructions are reiterated in the emergency decontamination procedures in the HASPs.

H. Periodically inspect worksites where employees are using PPE using Attachment 29-2.

5.0 Documentation Summary

A. Records required in the Safety File:

1. Completed Hazard Assessment Certification Forms (Attachment 29-1)
2. Completed Personal Protective Equipment Inspection Sheet (Attachment 29-2)
3. Documentation of employee training.

B. Records required in the Office/Laboratory Safety Filing System:

1. Completed Hazard Assessment Certification Forms (Attachment 29-1)
2. Completed Personal Protective Equipment Inspection Sheet (Attachment 29-2)
3. Documentation of employee training.

6.0 Resources

A. U.S. OSHA Standards - Personal Protective Equipment -29 CFR 1910, Subpart I

B. U.S. OSHA Construction Standard - Personal Protective Equipment –29 CFR 1926 Subpart E

C. U.S. OSHA Technical Links - Personal Protective Equipment

D. Australian Standards SAA HB9-1994 - Occupational Personal Protection

E. American National Standards Institute, ANSI Z89.1-2003, Protective Headwear

F. American National Standards Institute, ANSI Z87.1 - 1989, Eye and Face Protection

G. American Society for Testing and Materials, ASTM F13-WK4519, Specification for Personal Protective Footwear

H. SMS 40 - Fall Protection

I. Queensland Workplace Health and Safety - Personal Protective Equipment

J. Attachment 29-1 Hazard Assessment Form

K. Attachment 29-2 PPE Inspection Form

L. Attachment 29-3 – Eye and Face Protector Selection Guide

M. Best Manufacturing Co. http://www.chemrest.com/

URS SAFETY MANAGEMENT STANDARD
Utility Clearances And Isolation

1. Applicability

This procedure applies to URS projects where personnel may encounter subsurface or overhead utilities.

2. Purpose and Scope

Many field activities are conducted near aboveground and underground utilities. The primary purpose of this Standard is to establish operating requirements that will permit employees to work safely in the vicinity of electrical, natural gas, fuel, water, and other utility systems and installations. The secondary purpose is to prevent economic damage to utility systems from operations associated with project-related activities.

The term "utility clearance" includes

A. The positive locating of utility systems in or near the work area.

B. A signed statement by an appropriate representative attesting to the location of underground utilities and/or the positive de-energizing (including lockout) and testing of electrical utilities.

Note that in some cases, utility representatives may deem it appropriate or necessary to use insulating blankets to isolate a power line. This is an acceptable alternative to positive de-energizing; however, only utility representatives can make the determination.

"Contact" with overhead power lines is considered to occur when equipment is closer to power lines than permitted by the criteria in the table in Section 4.0.C.2.b below. (See note for U.K. operations).

3. Implementation

Field Operations - Implementation of this procedure is the responsibility of the Project Manager.

4. Requirements

A. Time for Completion

Complete utility clearances prior to the start of any work in the area of the utility that could feasibly result in contact with or damage to that utility.

B. Local Regulations

Research local and state codes and regulations regarding utility locating and isolation requirements. Utility companies and locating services are among the appropriate resources.

C. Overhead Power Lines

1. Proximity to Power Lines

   No work is to be conducted within 50 feet (15 meters) of overhead power lines without first contacting the utility company to determine the voltage of the system. No aspect of any piece of equipment is to be operated within 50 feet (15 meters) of overhead power lines without first making this determination.

2. Operations adjacent to overhead power lines are **PROHIBITED** unless one of the following conditions is satisfied:

   a. Power has been shut off, positive means (such as lockout) have been taken to prevent the lines from being energized, lines have been tested to confirm the outage, and the utility company has provided a signed certification of the outage.

   b. The minimum clearance from energized overhead lines is as shown in the table below, or the equipment will be repositioned and blocked so that no part, including cables, can come within the minimum clearances shown in the table.

MINIMUM DISTANCES FROM POWERLINES	
Nominal System kV	Minimum Required Distance
0-50	10 feet (3 meters)
51-100	12 feet (3.6 meters)
101-200	15 feet (4.6 meters)
201-300	20 feet (6.1 meters)
301-500	25 feet (7.6 meters)
501-750	35 feet (10.7 meters)
751-1000	45 feet (13.7 meters)

Note: For U.K. operations, the specific safe distance is determined by the utility company.

   c. The power line(s) has been isolated through the use of insulating blankets which have been properly placed by the utility. If insulating blankets are used, the utility will determine the minimum safe operating distance; get this determination in writing with the utility representative's signature.

3. All inquiries regarding electric utilities must be made in writing and a written confirmation of the outage/isolation must be received by the Project Manager prior to the start of the task which may impact the utility.

D. Underground Utilities

1. Do not begin subsurface work (e.g., trenching, excavation, drilling, etc.) until a check for underground utilities and similar obstructions has been conducted. The use of as-built drawings must be confirmed with additional geophysical or other surveys.

2. Contact utility companies or the state/regional utility protection service at least two (2) working days prior to excavation activities to advise of the proposed work, and ask them to establish the location of the utility underground installations prior to the start of actual excavation. The one call utility location service is available throughout the U.S. by calling 811. Where these services are unavailable (e.g., private properties), contract with an independent utility locating service to perform an evaluation of subsurface utilities.

3. Obtain utility clearances for subsurface work on both public and private property. Clearances are to be in writing, signed by the party conducting the clearance.

4. Protect and preserve the markings of approximate locations of facilities until the markings are no longer required for safe and proper excavations. If the markings of utility locations are destroyed or removed before excavation commences or is completed, the Project Manager must notify the utility company, utility protection service, or the utility locating service to inform them that the markings have been destroyed.

5. Do not conduct mechanical-assisted subsurface work (e.g., powered drill rig, mechanical excavator, etc.) within five (5) feet (1.5 meters) of a confirmed or suspected utility or other subsurface structure. Confirm minimum distances for mechanical-assisted subsurface work with the utility owner, as distances beyond this five foot minimum may be required.

6. Non-destructive clearance techniques (e.g. vacuum extraction or other hand clearing means) are required prior to drilling/excavating in higher risk locations including chemical plants, retail service

stations, or other locations with complex underground utility systems.

7. Subsurface work within five feet (1.5 meters) of a confirmed or suspected utility or other subsurface structure must be done by non-destructive clearing techniques to the point where the obstruction is visually located and exposed. Once the obstruction location is confirmed in this manner, mechanical-assisted work may commence.

8. Reference SMS 013, "Excavation Safety" for additional information regarding subsurface operations.

E. Training

Conduct a briefing for site employees regarding the hazards associated with working near the utilities and the means by which the operation will maintain a safe working environment. Detail the method used to isolate the utility and the hazards presented by breaching the isolation.

5. Documentation Summary

File these records in the Safety Filing System:

1. Documents requesting utility clearance.
2. Documents confirming utility clearance.
3. Training/briefing documentation of each isolation.

6. Resources

A. Utility Locating Services (typically under "Utility" in the Yellow Pages)

B. NIOSH Alert - Preventing Electrocutions from Contact Between Cranes and Power Lines

C. One Call Utility Locating List

D. National Utility Locating Contractor's Association

E. U.K. - Health and Safety Executive GS6

URS SAFETY MANAGEMENT STANDARD
Subcontractor Health and Safety Requirements

1. Applicability

This procedure is applicable to subcontractors retained by URS Corporation and its subsidiary companies. This procedure is applicable to the operations of subcontractors and sub-subcontractors of any tier.

This procedure does not apply to third party contractor operations where there is no subcontract relationship between the contractor and URS Corporation. Health, Safety, and Environment issues regarding third party contractor operations are governed by project specific contracts and are not covered by this standard.

2. Purpose and Scope

This procedure provides requirements on the pre-evaluation of subcontractor safety programs. The attached procedures detail the manner in which this is accomplished by region.

The attached procedures provide requirements on the pre-evaluation of subcontractor safety programs. It also provides requirements on contractual risk management, subcontractor safety performance, and the responsibilities of the Project Manager.

3. Procedures

The associated regional procedures for this standard are included as attachments:

SMS 046NA – North America

SMS 046EU – UK and Ireland, Europe, and Middle East

SMS 046AP – Asia Pacific

URS SAFETY MANAGEMENT STANDARD
Subcontractor Health and Safety Requirements

1. Applicability

This procedure is applicable to subcontractors retained by URS Corporation and its subsidiary companies that perform:

- Intrinsically higher risk construction related activities (e.g. drilling, excavation, surveying, demolition, electrical contractors, steel erection etc.).
- Significant building or infrastructure alteration, demolition, and/or repair activities utilizing their own workforce or equipment.
- Activities on hazardous waste sites.
- Activities in government services operations (e.g. aviation repair, vehicle repair, warehousing, facility operations and maintenance) where the annual cost of the subcontract exceeds $1,000,000.
- Activities where URS Corporation does not supervise the day to day activities and work efforts of subcontractor workers, ***and*** the subcontractor has a designated Supervisor on the work site.

This procedure is applicable to the operations of subcontractors and sub-subcontractors of any tier.

This procedure does not apply to third party contractor operations where there is no subcontract relationship between the contractor and URS Corporation. Health, Safety, and Environment issues regarding third party contractor operations are governed by project specific contracts and are not covered by this standard.

2. Purpose and Scope

This procedure provides requirements on the pre-evaluation of subcontractor safety programs. It also provides requirements on contractual risk management, subcontractor safety performance on the job site, and the responsibilities of the Project Manager with respect to subcontractor jobsite safety performance.

It is required that each URS Corporation subcontractor be evaluated at least annually using Attachment 46-1, "Subcontractor Safety Evaluation Form," or equivalent client or URS International Operations form, in order to perform work on any new URS Corporation projects.

3. Implementation

Implementation of this standard is the responsibility of the manager directing activities of the facility or site.

A Corporate, Regional, or Strategic Business Unit (SBU) Health, Safety, and Environment (HSE) Manager must approve deviations from this procedure.

4. Requirements

A. Pre-qualification of Subcontractor - The Project Manager shall complete the following procedures for all subcontractors retained on projects covered by this standard (the PM should also require subcontractors to follow these procedures with respect to pre-qualification of sub-subcontractors of any tier):

1. Request all subcontractor candidates to complete the attached "Subcontractor Health and Safety Evaluation Form" (Attachment 46-1)

2. Conduct an assessment of each subcontractor's qualifications with respect to the subcontractor health and safety evaluation criteria contained in Attachment 46-2.

3. If subcontractor does not meet the criteria established in Attachment 46-2, and URS must retain the contractor, the Subcontractor Variance Form (Attachment 46-3) must be completed and approved by a Corporate, Regional, or Strategic Business Unit (SBU) Health, Safety and Environment (HSE) Manager.

4. Verify that subcontractors meet the insurance requirements as stated in Attachment 46-2 or as approved by URS Corporation Legal Counsel or Contracting Manager/Officer.

5. If the subcontractor has been successfully evaluated within the last 12 months, that evaluation may be substituted.

6. For long term operations, this evaluation should be updated within 12 months of the previous evaluation.

B. Contractual and Risk Management Requirements of Subcontractors

1. Ensure that subcontractor is contractually bound to comply with applicable client and URS Corporation Health, Safety and Environment Program requirements.

2. Ensure that subcontractor is contractually bound to develop additional safety procedures for work that is exclusive to their activities on the site and for which they may have superior knowledge.

3. Assess compliance of subcontractor's insurance with the URS Corporation subcontract requirements (including, but not limited to, necessary types and amounts of coverage, URS Corporation additional insured endorsement, etc.).

4. Ensure that URS Corporation has the right in its subcontract, without liability to URS Corporation, to stop the subcontractor's work in the event of any violations of the applicable Health & Safety Plan.

C. Subcontractor Safety Representative

1. Require each subcontractor to appoint a Subcontractor Safety Representative (SSR) who:

   a. Is knowledgeable of the subcontractor's activities.

   b. Understands the safety requirements of the subcontractor's activities.

   c. Has the ability to recognize and the authority to correct safety deficiencies and execute a stop work order should an imminent danger arise.

   d. Has the responsibility for the administration of the subcontractor Health and Safety Program.

   e. Will serve as the direct contact with URS Corporation regarding resolution of Health and Safety issues.

D. Communication

1. Provide the SSR with information regarding Site Safety Program including but not limited to:

a. Client Requirements.

b. URS Corporation Site Safety Program.

c. Site Hazard Communication Program.

d. Site Emergency Action Plan.

e. Any additional safety information from other contractors or subcontractors working on the site.

2. Provide SSR with name of URS Corporation project or site contact and alternate for addressing site Health and Safety issues.

3. Require the participation of subcontractors in all Site Safety Briefings.

4. Require subcontractor compliance with all safety directives and/or stop work orders issued by the URS Corporation site representatives.

E. Subcontractor Safety Performance

1. To the extent reasonable in light of URS Corporation's scope of work under the client contract, visit the site and periodically observe subcontractors operations (i.e., conduct spot checks) to assess whether subcontractor appears to be conducting its operations in accordance with applicable health and safety requirements. Periodically review any required subcontractor health and safety written documentation for compliance with applicable requirements.

2. In the event that unsafe acts or unsafe conditions are observed, immediately stop work and bring them to the attention of the SSR for resolution.

3. Investigate all injuries/illnesses related to subcontractor operations to identify causes and effect corrective actions.

4. In the event of serious and/or continuing subcontractor breaches of applicable health and safety requirements contact legal counsel to assess whether formal contractual action is appropriate under the subcontract.

F. Subcontractor Database

1. A database is available to store SMS 46-1 completed by subcontractors. The database is available to all URS Lotus Notes users.

2. A Corporate or Regional HSE Manager can upload completed SMS 46-1.

3. Contact your Office HSE Representative or Corporate/Regional HSE Manager for information on how to access the database.

5. Documentation Summary

A. File in the Project Safety File

1. Subcontractor Health and Safety Evaluation Form (Attachment 46-1).

2. Applicable and current Insurance Certificates.

3. Names and telephone numbers of SSR for each subcontractor.

4. Verification of Health and Safety documents transmitted to subcontractors and received from subcontractors.

5. Identified safety deficiencies as applicable for subcontractors and verification of correction of conditions.

6. All other safety related documentation between URS Corporation and subcontractor such as training certifications, etc.

7. Subcontractor safety plan, incident reports and resolution reports.

6. Resources

A. "Occupational Injury and Illness Rates by SIC", Bureau of Labor Statistics, U. S. Department of Labor (http://www.bls.gov/iif/oshsum.htm)

B. Managing Subcontractor Safety, Prepared by The Construction Industry Institute, Safety Task Force, Publication 13-1, The University of Texas at Austin, Austin, Texas, 1991 (http://www.construction-institute.org/)

C. American National Standard Construction and Demolition Operations -- Safety and Health Program Requirements for Multi-Employer Projects,

ANSI A10.33-1992, National Safety Council, Itasca, Illinois 60143-3201 (http://www.nsc.org)

D. "Liability, OSHA and the Safety of Outside Contractors," Professional Safety, American Society of Safety Engineers, January 1993 (http://www.asse.org)

E. "Proactive Construction Management; Dealing With the Problem of Subcontractor Safety," Professional Safety, American Society of Safety Engineers, January 1990 (http://www.asse.org)

F. Attachment 46-1 - Subcontractor Safety Evaluation Form

G. Attachment 46-2 - Subcontractor Evaluation Criteria

H. Attachment 46-3 - Subcontractor Variance Form

URS SAFETY MANAGEMENT STANDARD

Biological Hazards

1. Applicability

This program applies to job activities performed primarily in outdoor environments.

2. Purpose and Scope

The primary goal of this program is to eliminate or reduce illnesses and injuries transmitted by plants, insects, animals, and pathogenic agents. Although there are many animals and insects that are potentially harmful to humans (i.e. bees, spiders, bears, and rodents), this safety management standard focuses on six common biological hazards: ticks, poison plants, mosquitoes, snakes, Valley Fever, and water-borne pathogenic agents. See SMS 51 concerning Bloodborne Pathogens.

3. Implementation

The Project Manager, with support from the URS HS&E Regional Managers and Occupational Health Manager, will be responsible for implementation of this program.

4. Requirements

A. Ticks

1. Precautionary Measures

Background information: Ticks do not jump, crawl, or fall onto a person. They are picked up when clothing or hair brushes a leaf or other object the tick is on. Ticks are generally found within three feet of the ground. Once picked up, they will crawl until they find a likely site to feed. Often they will find a spot at the back of the knee, near the hairline, behind the ears, or at pressure points where clothing presses against the skin (underwear elastic, belts, neckline). The best way to prevent tick borne diseases is not to be bitten by a tick. Ticks can carry a number of diseases including:

Lyme Disease is an infection caused by the corkscrew-shaped bacteria *Borrelia burgdorferi* that is transmitted by the bite of deer tick (ixodes) and western black-legged ticks. The disease occurs in the forested areas of North America, Europe, and Asia. Symptoms which occur 3-30 days following a tick bite include: a spreading 'bulls-eye" rash, fever, fatigue, headache, and joint and muscle aches. Prompt treatment with antibiotics is essential in order to prevent more serious complications that may occur if left untreated.

Rocky Mountain Spotted Fever is an infection caused by the bacteria *Rickettsia rickettsii*. The disease occurs in North, Central, and South America. Other Rickettsia organisms cause disease worldwide (Mediterranean, Japan, Africa, North Asia). Symptoms which occur 2-6 days following a tick bite include: fever, nausea, vomiting, diarrhea, rash, muscle and joint pain. The disease is treated with antibiotics.

Babesiosis is caused by hemoprotozoan parasites of the genus *Babesia*. It is transmitted by the ixodid tick. The geographic distribution is worldwide. Symptoms include fever, chills, fatigue, muscle aches, and an enlarged spleen and liver. The disease is treated with anti-protozoan drugs.

Ehrlichiosis is caused by several bacteria of the genus *Ehrlichiae*. The geographic distribution is global, primarily in temperate regions. Symptoms which occur 5-10 days following a tick bite include fever, headache, fatigue, muscle aches, nausea, vomiting, diarrhea, confusion, and occasionally a rash. The disease is treated with antibiotics.

a. Avoidance of tick habitats

Whenever possible, persons should avoid entering areas that are likely to be infested with ticks, particularly in spring and summer when nymphal ticks feed. Ticks favor a moist, shaded environment, especially that provided by leaf litter and low-lying vegetation in wooded, brushy, or overgrown grassy habitat. Both deer and rodent hosts must be abundant to maintain the life cycle of the tick.

b. Personal Protective Equipment

1. Wear light colored clothing or white Tyvek® to allow you to see ticks that are crawling on your clothing.

2. Tuck your pant legs into your socks or boots, wear high rubber boots, or use tape to close the opening where they meet so that ticks cannot crawl up the inside of your pant legs.

3. Wear a hat, tie back long hair.

4. Apply repellents to discourage tick attachment. Repellents containing permethrin can be sprayed on boots and clothing and will last for several days. Repellents containing DEET (n,n-diethyl-

m-toluamide) can be applied to the skin, but will last only a few hours before reapplication is necessary. Apply according to Environmental Protection Agency guidelines to reduce the possibility of toxicity.

c. Tick Check

1. Change clothes when you return from an area where ticks may be located.

2. Shower to wash off any loose ticks.

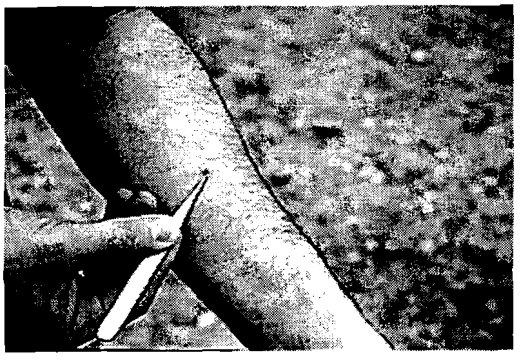
3. Check your entire body for ticks. Use a hand held or full-length mirror to view all parts of your body.

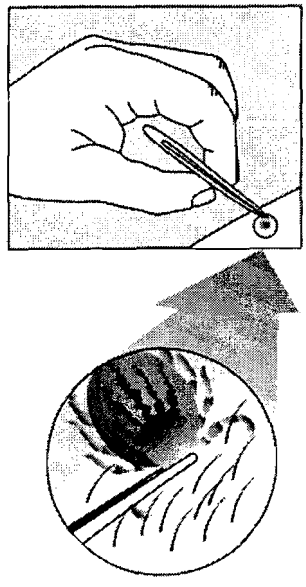
4. Place clothing worn in tick infested areas into the dryer for at least 30 minutes in order to kill any ticks.

2. Tick Removal

Because it takes several hours of attachment before microorganisms are transmitted from the tick to the host, prompt removal of attached or crawling ticks is an important method of preventing disease. Remember, folklore remedies of tick removal to do not work! Methods such as the use of petroleum jelly or hot matches may actually make matters worse by irritating the tick and stimulating it to release additional saliva or regurgitate gut contents, increasing the chances of transmitting disease.

The best method to remove an attached tick is with a set of fine tipped tweezers.





a. Use fine-tipped tweezers. When possible, avoid removing ticks with bare hands.

b. Grasp the tick as close to the skin surface as possible and pull upward with steady, even pressure. Do not twist or jerk the tick; this may cause the mouthparts to break off and remain in the skin. If this happens, remove mouthparts with the tweezers.

c. Do not squeeze, crush, or puncture the body of the tick because its fluids (saliva and gut contents) may contain infectious organisms.

d. After removing the tick, thoroughly disinfect the bite site and wash your hands with soap and water.

e. Disinfect the tweezers.

f. Save the tick for identification in case you become ill. This may help the doctor make an accurate diagnosis. Place the tick in a vial or plastic zip lock bag and put it in the freezer. Write the date of the bite on a piece of paper with a pencil and place it in the bag.

3. Medical Follow-Up

In most circumstances, medical treatment of persons who only have a tick bite is not recommended. However, individuals who are bitten by a tick

should seek medical attention if any signs and symptoms of tick borne disease develop over the weeks following the tick bite.

B. Poisonous Plants

1. Background Information

Poison ivy and poison oak plants are the most common cause of allergic contact dermatitis in North America. These poisonous plants can be a hazard for many various outdoor activities at work, home, and play. Skin contact with the oleoresins (urushiol) from these plants can cause an itchy, red, oozing, blistered rash in sensitive individuals. Oil content in the plants is highest in the spring and summer, however the plants are even hazardous in the winter when they have dropped their leaves. There are three types of exposure:

Direct contact: An initial skin exposure in necessary to "sensitize" the individual. Subsequent contact in a sensitized person will result in a rash appearing within 4 to 48 hours. Approximately 50-70 % of the population is sensitized. Poison plant dermatitis is usually characterized by areas of linear or streaked patches where branches of the plant brushed the skin.

Indirect contact: Skin exposure can happen indirectly. Clothing, shoes, tools, personal protective equipment and other items can be contaminated with the oils and maintain potency for months.

Airborne smoke contact: Never burn poison plants. Droplets of oil can be carried by smoke and enter the respiratory system causing a severe internal outbreak.

Poison plant rash is not contagious. Skin contact with blister fluid from an affected individual will not cause dermatitis in another sensitized person. Scratching the rash can only spread it to other parts of your body if the oil is still on your skin. After the oil has been washed off or absorbed by the skin, scratching will not spread the rash.

The most distinctive features of poison ivy and poison oak are their leaves, which are composed of three leaflets each and are green in the summer and red in the fall. Both plants also have greenish-white flowers and berries that grow in clusters. All parts of these plants are toxic.

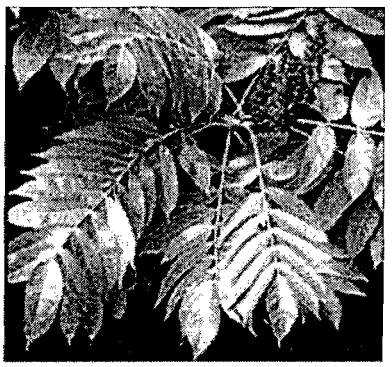
Poison Ivy grows as a small plant, vine, and as a shrub. Leaves always consist of three glossy leaflets.

Poison Ivy

Poison Oak grows as a shrub or vine. It has three leaflets that resemble oak leaves.

Eastern Poison Oak

Poison Sumac grows as a woody shrub or small tree from 5 to 25 feet tall. It has 7 to 13 leaves that grow opposite each other with a leaflet at the tip.



Poison Sumac

1. Precautionary Measures

   The best approach is to learn to identify the plants and avoid them.

   Wear long pants and long sleeves, boots and gloves.

   Barrier skin creams may offer some protection if applied before contact.

Avoid indirect contact from tools, clothing or other objects that have come into contact with a crushed or broken plant. Don't forget to wash contaminated clothing and clean up contaminated equipment.

If you can wash exposed skin areas within 3-5 minutes with cold running water, you may keep the urushiol from penetrating your skin. Proper washing may not be practical in remote areas, but a small wash-up kit with pre-packaged alcohol-based cleansing tissues can be effective.

2. Medical Follow-Up

Home treatment: Calamine lotion and an oatmeal (one cup to a tub full of water) bath can help relieve itching. To prevent secondary skin infection, scratching is not helpful and the finger nails should be cut to avoid damage to the skin. Over-the-counter hydrocortisone cream can decrease inflammation and itching, however read the label and use according to directions.

When to see the doctor: Severe cases may require further treatment. A physician should be seen if the rash appears infected, is on the face or other sensitive body areas, or is too extensive to be easily treated at home.

C. Mosquito Borne Diseases

1. Background Information

a. Arboviral encephalitis is a viral illness causing inflammation of the brain and is transmitted to humans by the bite of infected mosquitoes. Globally there are several strains including: Eastern equine, Japanese, La Crosse, St. Louis, West Nile, and Western equine encephalitis. Some of the strains have a vaccine. Symptoms of infection are nonspecific and flu-like: fever, headache, and tiredness. Fortunately, only a small proportion of infected people progress to encephalitis. Treatment is supportive, antibiotics are not effective.

b. Malaria is a serious but preventable disease spread by the bite of an infected anopheline mosquito. It is caused by four species of the parasite *Plasmodium (P. falciparum, P. vivax, P. ovale, and P malariae).* Malaria-risk areas include primarily tropical areas of Central and South America, Africa, India, Southeast Asia, and the Middle East. Symptoms of malaria which occur 8 days to 1 year after infection

include fever, shaking chills, headache, muscle ache, tiredness, jaundice, nausea, vomiting, and diarrhea. Malaria can be cured with prescription drugs.

c. Dengue Fever is a potentially life-threatening viral illness transmitted by the bite of the Aedes mosquito, found primarily in urban areas. The disease is found in most of tropical Asia, the Pacific Islands, Central and South America, and Africa. There are four dengue virus serotypes. Symptoms include sudden onset, high fever, severe headache, joint and muscle pain, rash, nausea and vomiting. There is no specific treatment and no vaccine.

d. Yellow Fever is a viral disease transmitted between humans by mosquitoes. It occurs only in Africa and South America. There is a vaccine that confers immunity lasting 10 years or more. Symptoms begin 3-6 days after the mosquito bite and include fever, nausea, vomiting, headache, slow pulse, muscle aches, and restlessness. Treatment is symptomatic.

2. Precautionary Measures

Insect Repellent – Use insect repellants that contain DEET. The effect should last about 4 hours. Always use according to label directions. Use only when outdoors and wash skin after coming indoors. Do not breathe in, swallow, or get into the eyes. Do not put on wounds or broken skin.

Protective Clothing – wear long sleeved shirts and long pants, especially from dusk to dawn. Or avoid going outdoors during these hours.

Mosquito netting – Travelers who will not be staying in well-screened or air conditioned rooms should use a pyrethroid containing flying insect spray in living and sleeping areas during evening and nighttime hours. Sleep under mosquito netting (bed nets) that have been sprayed with permethrin.

Malaria prophylaxis medications may be prescribed, however they do not provide complete protection. The type of medication given depends on the area of travel.

D. Poisonous Snakes

1. Background Information

No single characteristic distinguishes a poisonous snake from a harmless one except the presence of poison fangs and glands. Only in dead specimens can you determine the presence of these fangs and glands without danger. Most poisonous snakes have both neurotoxic and hemotoxic venom, however, one type is dominant and the other is weak.

a. Hemotoxic venom. The folded-fang snakes (fangs can raise to an erect position) have venoms that affect the circulatory system, destroying blood cells, damaging skin tissues, and causing internal hemorrhaging.

b. Neurotoxic venom. The fixed-fang snakes (permanently erect fangs) have venoms that affect the nervous system, making the victim unable to breathe.

c. Poisonous snakes in the Americas: copperhead, coral snake, cottonmouth, and rattlesnake.

d. Poisonous snakes in Europe: adder, viper.

e. Poisonous snakes of Africa and Asia: viper, cobra, adder, green mamba.

f. Poisonous snakes in Australia: copperhead, adder, taipan, tiger snake.

2. Precautionary Measures

Bites occur when you don't hear or see the snake, when you step on them, or when you walk too close to them. Follow these simple rules to reduce the chance of accidental snakebite:

Don't put your hands into dark places, such as rock crevices, heavy brush, or hollow logs, without first investigating.

Don't step over a fallen tree. Step on the log and look to see if there is a snake resting on the other side.

Don't walk through heavy brush or tall grass without looking down. Look where you are walking.

Do not pick up any live snake. If you encounter a snake, walk around the snake, giving it plenty of room. A snake can strike half its length.

Don't pick up freshly killed snakes without first severing the head. The nervous system may still be active and a dead snake can deliver a bite.

3. Medical Follow-up

If you are bitten by a snake, the primary goal is to get to a hospital as soon as possible to receive professional medical evaluation and possible treatment with antivenom if warrented. Initial first aid should include: Wash the bite with soap and water. Immobilize the bitten area and keep it lower than the heart. Try to remain calm. If you are unable to reach a hospital within 30 minutes, a bandage, wrapped two to four inches above the bite, may help slow the venom. The bandage should not cut off blood flow from a vein or artery, make sure the band is loose enough that a finger can slip under it. A suction device from a commercial snakebite kit may be placed over the bite to help draw venon out of the wound.

Research has shown the following to be potentially harmful, DO NOT: apply ice, use a tourniquet, or make incisions into the wound.

E. Valley Fever

1. Background Information

Valley Fever is an illness that results from exposure to a fungal spore (*Coccidioides immitis*). It is endemic to the San Joaquin Valley in Californiia as well as areas of Southwestern U.S., Mexico, Central and South America though it has been found in many other areas. It is particularly associated with arid soils that are not cultivated. Exposure is generally by inhalation of spores, though it may also enter through broken skin. Approximately two weeks after inhalation exposure, severe weakness and flu-like symptoms develop; severe pneumonia may occur. It may also affect the brain, bones, and joints causing disability, spinal meningitis, or death. Dermal forms of the infection can form disfiguring fungal lesions.

2. Precautionary Measures

Because it is associated with arid soils, personnel should avoid locations and activities that create dust. Persons at risk of exposure include geologists, surveyors, excavators, archaeologists, etc. Dust suppression

methods should be employed and the use of particulate respirators should be considered for areas known to harbor the fungus. At one phase of the fungus' life cycle, cottony, spider web-like growths may be seen on the soil surface. If observed, these growths must not be disturbed and work should be relocated if possible.

3. Medical Follow-up

   Approximately 60% of exposed persons will not have symptoms. Persons that have been in areas associated with Valley Fever should be alert to the development of flu-like symptoms, fatigue, or skin rashes two to four weeks later. Valley Fever can be treated with anti-fungal medication. Early treatment is critical as disseminated forms of the disease can result in chronic disease or death.

F. Pathogenic organisms

1. Background Information

   Employees who perform certain activities, such as disaster response, may be in areas where water-borne pathogens may be present. A partial list of agents includes: E. coli, Hepatitis A, typhoid, and cholera. Chemical hazards and molds and fungus may also be present. See SMS 51 for information concerning Bloodborne Pathogens.

2. Precautionary Measures

   All work must be performed within the scope of either a Health and Safety Plan or Safe Work Plan that identifies the task hazards and specifies appropriate controls. A medical exam and/or inoculations may be required. See SMS 24, Medical Screening and Surveillance or contact the Occupational Health Manager for assistance.

   Where contact with water or wet materials may occur, personnel must use protection such as impervious coveralls, boots/waders, faceshields, etc, as specified in the project Health and Safety Plan or Safe Work Plan. Personnel must protect any areas of broken skin, eyes, nose, and mouth from contact with potentially infectious materials and practice good personal hygiene before eating, drinking, etc.

3. Medical Follow-up

   Medical evaluation and/or an inoculation schedule may be required prior to beginning work. Because early evaluation and treatment is more

successful, personnel should be alert to signs and symptoms of possible pathogenic organisms and seek prompt medical evaluation if illness develops or is suspected.

5. Documentation Summary

Complete and distribute a URS Incident Report form 49-1 for all work-related biological exposure incidents.

6. Resources

A. Centers for Disease Control
http://www.cdc.gov

B. U. S. Occupational Safety and Health Administration
http://www.osha.gov

C. U.S. Food and Drug Administration
Treating and Preventing Venomous Snake Bites
http://www.fda.gov/fdac/features/995_snakes.html

URS SAFETY MANAGEMENT STANDARD
Injury / Illness / Incident Reporting & Notifications

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

The purpose of this procedure is to provide guidance for the timely reporting of work related injuries, illness, and incidents. This procedure also defines incident notification procedures for URS employees. Note – For incidents involving motor vehicles, the reporting and notification requirements of URS SMS 057 – Vehicle Safety Program may also apply.

For significant incidents (e.g., fatality, serious injury, injury to members of the public), SMS 066 – Incident Investigation is also required.

3. Implementation

Implementation of this procedure is the responsibility of the manager directing activities of the facility or site.

A Corporate, Regional, Country or Strategic Business Unit (SBU) Health, Safety and Environment (HSE) Manager must approve deviations from this procedure.

4. Requirements

A. Reporting: All employees shall immediately notify their appropriate level of management (line, project, and/or office) of a reportable incident. A reportable incident includes the following:

1. An injury or illness to any URS employee or subcontractor, even if the injury does not require medical attention;
2. An injury to a member of the public, or clients, occurring on a URS controlled work site;
3. Illness resulting from suspected chemical exposure;
4. Chronic or re-occurring conditions such as back pain or cumulative trauma disorders (example: carpal tunnel syndrome);
5. Fire, explosion, or flash;
6. Any vehicle accidents occurring on site, while traveling to or from client locations, or with any company-owned, rented, or leased vehicle (including personal vehicles used for company business);

7. Property damage resulting from any URS or subcontractor activity;
8. Structural collapse or potential structural hazards;
9. Unexpected release or imminent release of a hazardous material;
10. Unexpected chemical exposures to workers or the public;
11. A safety related complaint from the public regarding URS activities.
12. Incidents that could result in adverse public media interest concerning URS or a URS project.
13. Any incident that could result in, or any actual investigation by, State, Federal, or local regulatory agencies.
14. Any other significant occurrence that could impact safety – including a near-miss.

Note: A near-miss is defined as an incident having the potential to cause significant injury or property damage as listed above – but did not. Examples of a near-miss include:

A worker steps off a ledge and falls three feet (1 meter) to the floor – and is uninjured.

A crane drops a 1,000-pound (454 kg) beam during a lift – and nobody is hurt, no equipment is damaged.

A work crew is conducting a survey along the highway. A vehicle leaves the roadway (driver asleep) and the vehicle enters the survey area at 50 mph (80 kph). The vehicle misses an employee by 3-feet (1 meter), the driver recovers control of the vehicle and leaves the area.

B. Actions: The following actions will be taken following a reportable incident:

1. Employees:

   a. If necessary, suspend operations and secure and/or evacuate the area.

   b. Immediately notify your supervisor and/or project manager.

   c. Record information pertaining to the incident (e.g., time, date, location, name and company of person(s) involved, witnesses, description of event, and actions taken) and initiate SMS 49-1 - Incident / Near Miss Report. (Note: The International Divisions

of URS will complete an on-line Incident Report instead utilizing the appropriate HSE and Quality Improvement database).

d. Assist with incident investigation as directed by management.

e. Implement corrective actions as directed by management.

f. *Do not* discuss the incident with members of the news media or legal representatives (except URS legal counsel or your personal legal advisor) unless directed to do so by URS management.

g. *Do not* make statements pertaining to guilt, fault, or liability.

2. Line/Project Management:

a. For instances involving employee or subcontractor death or hospitalization, or equipment damage to Company or customer equipment valued at more than $100,000 (USD), immediately notify by telephone or other direct means URS/EG&G Operations and the Health, Safety and Environment Management (HSE) team in the order listed below. If any level of contact is unsuccessful, continue down the list in sequence. After notification has been made a detailed follow-up, via email, is required.

Appropriate corporate leadership for the affected program up to the RBU or SBU Vice President for the affected Operations

The URS Occupational Health Manager (phone – 866.326.7321; fax – 512.419.6413)

Appropriate RBU and SBU HSE Manager for the affected Operation.

Follow-up notification should be made by forwarding an SMS 49-1 Incident/Near Miss Report Form within 24 hours to the URS Occupational Health Manager. See SMS 49-1 for methods of distribution. Also, assure copies of the report are distributed as outlined on the form.

For the International Division of URS, this follow-up notification is not required.

URS Corporate HSE Management will make notification to Federal and State authorities as appropriate.

b. For minor incidents involving only first aid treatment, minor damage to vehicle of equipment, etc., make notifications to the above number as soon as reasonable during normal business hours and submit the SMS 49-1 Incident/Near Miss Report Form to the URS OHM. See SMS 49-1 for methods of distribution. Also, assure copies of the report are distributed as outlined on the form.

c. For a near-miss incident, complete the SMS 49-1 Incident/Near-Miss Report Form and submit to the URS OHM. Also, assure copies of the report are distributed as outlined on the form.

d. Review circumstances (i.e., who, what, when, where, and how) of the incident with applicable employee(s) to determine apparent causes and to develop recommended corrective actions.

e. Discuss with department or project staff the circumstances surrounding the incident and corrective actions taken.

3. Local Office or Project Health, Safety and Environment Representative

   a. Assist with incident evaluation.

   b. With management, identify cause(s) of incident and identify corrective actions needed to avoid recurrence.

   c. Review injury/incident report or the near-miss report for completeness and accuracy. Assure the reports are distributed properly.

   d. Assure notifications are made in a timely manner.

   e. Assure that the injured employee is properly counseled/advised as directed by SMS 65 - Injury Management. Communicate with the OHM at (866) 326-7321.

4. Occupational Health Manager

   a. Report work-related injuries and illness to workers' compensation carrier.

   b. Assure that the employee's injury is managed in accordance with SMS 065 – Injury Management. Provide guidance for the

affected Office or Project Health, Safety and Environment Representative.

c. Periodically disseminate near-miss reporting summary information to the Regional, Corporate, and SBU HSE Managers.

5. Corporate Health, Safety and Environment Management

a. Notify URS management of any significant occurrence including lost-time injuries, deaths, or other serious result or circumstance.

b. The OHM will review all reported incidents to determine OSHA reporting and recording requirements with input from the appropriate Corporate HSE Manager. For a determination of recordability in those infrequent instances where there is not a clear answer, the Vice President, Health, Safety, and Environment, shall make the final determination. All decisions will be based strictly on current U. S. Occupational Safety and health Administration regulations.

c. Official records (including required reports and logs for all reported incidents) will be maintained at one central location by the OHM.

d. Each January the OHM will prepare and distribute, to each URS establishment, the appropriate government injury/illness reports. These reports will summarize all required government information for incidents that occurred during the preceding calendar year.

5. Documentation Summary

A. File these records in the appropriate Safety File:

1. Attachment 49-1 - Incident / Near Miss Report Form

Note: The International Divisions of URS will utilize the appropriate HSE and Quality Improvement database.

6. References

A. Why Tree - RCA Training Materials

URS SAFETY MANAGEMENT STANDARD
Drilling Safety Guidelines

1. Applicability

This program applies to URS projects in which truck-mounted or other engine powered drill rigs are used. The primary responsibility for drilling safety is with the drilling contractor.

2. Purpose and Scope

The purpose of this SMS is to provide an overview for working safely around drilling operations with truck-mounted and other engine-powered drill rigs. The procedure addresses off-road movement of drill rigs, overhead and buried utilities, use of augers, rotary and core drilling, and other drilling operations and activities. More detailed drilling safety guidelines are provided in the document "Environmental Remediation Drilling Safety Guideline" that is attached in Section 5.

3. Implementation

Field Activities — Drill rig safety and maintenance is the responsibility of the drill rig operator. URS employees are responsible for their own safety including recognizing and avoiding drill rig hazards. URS employees that observe a drill rig condition believed to be unsafe shall advise the drill rig operator of the unsafe condition. If the drilling firm is a subcontractor to URS, work will be stopped if conditions are determined to be unsafe.

Qualifications — Drilling subcontractors shall be qualified in accordance with SMS 46. The project manager has primary responsibility for the qualification process.

4. Safety Guidelines

A. General Guidelines

URS technicians, geologists, engineers, or other field staff assigned to observe drilling operations or collect soil samples should observe the following guidelines:

- Require a meeting at project start-up regarding the drill rig operator responsibility for rig safety and any site and equipment specific safety requirements
- Set up any sample tables and general work areas for the URS field staff to the side of the drill rig (preferably 10 meters away) and not directly behind the rig.

- URS engineers, technician, and geologists shall not assist the drillers with the drilling equipment or supplies and shall not at any time operate the drill rig controls.

B. Movement of Drill Rigs

Before moving a rig, the operator must do the following:

- To the extent practical, walk the planned route of travel and inspect it for depressions, gullies, ruts, and other obstacles.
- Check the brakes of the truck/carrier, especially if the terrain along the route of travel is rough or sloped.
- Discharge all passengers before moving on rough or steep terrain.
- Engage the front axle (on 4x4, 6x6, etc. vehicles) before traversing rough or steep terrain.

Driving drill rigs along the sides of hills or embankments should be avoided; however, if side-hill travel becomes necessary, the operator must conservatively evaluate the ability of the rig to remain upright while on the hill or embankment. The possibility must be considered that the presence of drilling tools on the rig may reduce the ability of the rig to remain upright (raises the center of mass of the rig).

Logs, ditches, road curbs, and other long and horizontal obstacles should be normally approached and driven over squarely, not at an angle.

When close lateral or overhead clearance is encountered, the driver of the rig should be guided by another person on the ground.

Loads on the drill rig and truck must be properly stored while the truck is moving, and the mast must be in the fully lowered position.

After the rig has been positioned to begin drilling, all brakes and/or locks must be set before drilling begins. If the rig is positioned on a steep grade and leveling of the ground is impossible or impractical, the wheel of the transport vehicle should be blocked and other means of preventing the rig from moving or topping over employed.

C. Buried and Overhead Utilities

The location of overhead and buried utility lines must be determined before drilling begins, and the locations should be noted on boring plans and/or assignment sheets.

When overhead power lines are close by, the drill rig mast should not be raised unless the distance between the rig and the nearest power line is at

least 20 feet (7 meters) or other distance as required by local ordinances, whichever is greater. The drill rig operator or assistant should walk completely around the rig to make sure that proper distance exists.

When the drill rig is positioned near an overhead line, the rig operator should be aware that hoist lines and power lines can be moved towards each other by wind. When necessary and approved by the Project Manager (PM), the utility and/or power lines may be shielded, shut down, or moved by the appropriate personnel.

For additional information, please refer to SMS 34 "Utility Clearances and Isolation".

D. Clearing the Work Area

Before a drill rig is positioned to drill, the area on which the rig is to be positioned should be cleared of removable obstacles and the rig should be leveled if sloped. The cleared/leveled area should be large enough to accommodate the rig and supplies.

E. Safe Use of Augers

Never place hands or fingers under the bottom of an auger flight or drill rods when hoisting the augers or rods over the top of another auger or rod in the ground or other hard surfaces, such as the drill rig platform.

Never allow feet to get under the auger or drill rod while they are being hoisted.

When the drill is rotating, stay clear of the drill string and other rotating components of the drill rig. Never reach behind or around a rotating auger for any reason.

Move auger cuttings away from the auger with a long-handled shovel or spade; never use hands or feet.

Never clean an auger attached to the drill rig unless the transmission is in neutral or the engine is off, and the auger has stopped rotating.

Do not wear loose clothing or jewelry while working near the drill rig. Long hair must be pulled back to avoid entanglement with moving parts.

Hearing protection is required when working near an operating drill rig.

F. Rod Separation

Use of manual tools (e.g. pipe wrenches) in combination with rotation of the drill stem is not permitted. Manual tools are not designed for the load, and may break. The tool also creates a significant impact hazard for

those in the work area as it rotates with the drill stem. URS does not permit drillers to use manual tools (e.g. pipe wrenches) in combination with a rotating drill stem to break rods. Manual tools may be used if the drill stem is isolated/positively disengaged.

Mechanical means of rod separation that are permitted include:

- Opposing hydraulic controls
- Rod locking devices
- Hydraulic breakout tools
- Hydraulic foot clamps

G. Safe Use of Hand Tools

Regulations regarding hand tools should be observed in addition to the guidelines provided below:

- Each tool should be used only to perform tasks for which it was originally designed.
- Damaged tools should be repaired before use or discarded.
- Safety goggles or glasses should be worn when using a hammer or chisel. Nearby co-workers and by-standers should be required to wear safety goggles or glasses also, or move away.
- Tools should be kept cleaned and stored in an orderly manner when not in use.

H. Safe use of Wire Line Hoists, Wire Rope, and Hoisting Hardware

Safety rules described in Title 29 Code of Federal Regulations (CFR) 1926.552 and guidelines contained in the Wire Rope User's Manual published by the American Iron and Steel Institute shall be used whenever wire line hoists, wire rope, or hoisting hardware are used. The driller should provide written reports (upon request) documenting inspections of equipment.

I. Traffic Safety

Drilling in streets, parking lots or other areas of vehicular traffic requires definition of the work zones with cones, warning tape, etc. and compliance with local police requirements. Refer to SMS 32 "Work Zone Traffic Control".

J. Fire Safety

- Fire extinguishers (type ABC) shall be kept on or near drill rigs for fighting small fires.
- If methane or other flammable gases or vapors are suspected in the area, a combustible gas indicator (CGI) shall be used to monitor the air near the borehole with all work to stop at 20 percent of the Lower Explosive Limit (LEL).
- Work shall stop during lightning storms.

K. Drilling at Potential MEC/UXO Sites

If the project site is suspected of munitions and explosives of concern (MEC) or unexploded ordnance (UXO) contamination, the UXO team will conduct a reconnaissance and MEC/UXO avoidance to provide clear access routes to each site prior to drilling crews entering the area. The following procedures will be implemented:

- Drilling operations on MEC/UXO sites will not be conducted until a complete plan for the site is prepared and/or approved by the URS UXO Safety Officer. MEC/UXO avoidance must be conducted during drilling operations on known or suspect MEC/UXO sites (SMS-039).
- The UXO team will identify, and clearly mark the boundaries of a clear approach path for the drilling crews, vehicles, and equipment to enter the site. This path will be, at a minimum, twice the width of the widest vehicle. No personnel will be allowed outside any marked boundary.
- If MEC/UXO is encountered on the ground surface, the UXO team will clearly mark the area where it is found, report it to the proper authorities, and divert the approach path around it.
- The UXO team will conduct an access survey using the appropriate geophysical instrument over the approach path for avoidance of MEC/UXO that may be in the subsurface. If a magnetic anomaly is encountered, it will be assumed to be MEC/UXO and the approach path will be diverted around the anomaly. UXO personnel only will operate the appropriate geophysical instrument and identify MEC/UXO.
- An incremental geophysical survey of the drill hole location(s) will be initially accomplished by the UXO team using a hand auger to install a pilot hole. If MEC/UXO is encountered or an anomaly cannot be positively identified as inert material, HTRW sampling personnel will select a new drill hole location.

- Once a drilling site has been surface cleared and a pilot hole established as described above, the drilling contractor will be notified that the site is available for subsurface drilling.
- Additional guidance for MEC/UXO support during drilling activities is provided in URS SMS 039.

L. Protective Gear

1. Minimum Protective Gear

Items listed below should be worn by all staff working within 30 feet (10 meters) of drilling activities.

- Hearing Protection;
- Hard Hat;
- Eye Protection (safety glasses, goggles, or face-shield)
- Safety Shoes (shoes or boots with steel toes)

2. Other Gear

Items listed below should be worn when conditions warrant their use. Some of the conditions are listed after each item.

- **Safety Harnesses and Lifelines:** Safety harnesses and lifelines shall be worn by all persons working on top of an elevated derrick beam or mast. The lifeline should be secured at a position that will allow a person to fall no more than six feet (2 meters). OSHA Fall Protection (1926 Subpart M) requirements apply.
- **Life Vests**: Use for work over water.

5. Resources

A. International Association of Drilling Contractors Safety Alerts
http://iadc.org/alerts.htm

B. Fall Protection - SMS 040

C. Hearing Conservation - SMS 026

D. Subcontractor Health and Safety Requirements - SMS 046

E. Utility Clearances and Isolation - SMS 034

F. Munitions Response / Munitions and Explosives of Concern - SMS 039

G. Environmental Remediation Drilling Safety Guideline

URS SAFETY MANAGEMENT STANDARD
Manual Material Handling

1. Applicability

This standard applies to URS operations where personnel perform manual handling of materials. For this procedure, manual material handling (MMH) is defined as the movement of items by lifting, lowering, pushing, pulling, carrying, holding, or restraining.

2. Purpose and Scope

The purpose of this procedure is to prevent common injuries caused by the practice of MMH. Immediate or short-term effects include lacerations, bruises, and muscle fatigue. Long-term effects include chronic pain, typically in the lower back.

3. Implementation

Implementation of this procedure is the responsibility of the manager directing activities of the facility or site.

A Corporate, Regional, or Strategic Business Unit (SBU) HSE Manager must approve deviations from this procedure

4. Requirements

A. General

1. Prior to lifting, lowering, pushing, pulling, carrying, holding, or restraining an object of any significant size or weight, employees must evaluate the object and the required task to determine if they can handle the object safely.
2. If the employee has any doubt about whether than can safely move the object by themselves, additional manual or mechanical help should be obtained.
3. Healthy employees with no physician imposed restrictions should lift and carry a maximum of 50 pounds (23 kilograms) using proper lifting and carrying techniques. Physical and workplace factors may reduce this recommended weight limit (RWL) significantly and should be considered prior to attempting lifts of this magnitude.
4. An employee's personal "safe" MMH capability is defined as the employee's personal capability to manually lift, carry, push, or pull an object alone. This "safe" limit must consider the employee's past experience and training with MMH, health status, and any other personal or environmental characteristics affecting the

employee's ability to perform these tasks. An employee's "safe" MMH capability is typically at or below the calculated RWL.

5. An MMH task that exceeds an employee's personal "safe" MMH capability or RWL should be brought to the attention of the applicable Manager.
6. If, due to a medical or health condition, the employee's physician or the employee has set a personal "safe" MMH capability, then appropriate medical documentation must be provided to the applicable Manager to define these limits.
7. A recommended RWL can be calculated using the factors described in Attachment 69-1. The weight limit derived from these calculations is considered to be a load that over 99% of men and over 75% of women can safely handle without application of engineering or administrative controls. **Implementation of the calculations in Attachment 69-1 should only be attempted with the assistance of a safety professional knowledgeable in the application of these factors. The calculations are intended to determine RWLs for repetitive lifting scenarios rather than occasional lifts.**

B. Pre-Planning

1. If a heavy object is to be moved to another location, the safest transport route should be determined prior to the activity.
2. The area around the object and the route over which it will be transported should be checked for slip, trip, and fall hazards. Hazards should be removed prior to initiation of the task.
3. The object to be moved should be inspected for grasping or handling hazards, including slivers, sharp edges, grease, water, etc. Eliminate or abate any identified hazards where possible. Safe grasping or handling points on the object should be determined.
4. The distance to be traveled and the length of time which a grip on the object must be maintained should be considered before moving objects.

C. Lifting/Lowering Guidelines

1. Reduce or eliminate manual lifting and lowering tasks where possible. Determine if there are ways to abate the safety and ergonomic hazards associated with manual lifting.

2. The recommended technique for manual lifting/lowering involves five maneuvers:
   a. Get a firm footing. Keep your feet apart for a stable base. Put one foot slightly in front of the other.
   b. Bend your knees. Do not bend at the waist. When grasping the object, a firm grip should be obtained before lifting/lowering.
   c. Lift/lower with your legs. Lift/lower the load slowly and in a straight line, avoiding sudden movements.
   d. Keep the load close to the body. Generally, the closer the load is to the body, the less force it exerts on your back.
   e. Keep your back straight. Do not add the weight of your body to the load. Avoid twisting.
3. When a turn or change of direction is necessary, the object should be lifted or lowered into a carrying position, then the whole body should be turned with the feet, avoiding any trunk twisting motion.
4. Objects to be lifted to shoulder height should first be lifted to waist height, then rested on a level surface so the grasping position can be changed prior to lifting to a higher level.
5. Employees should never lift a load above their head.

D. Carrying/Holding Guidelines

1. Manual carrying is an inefficient way of transporting materials in the work place. Where possible, reduce or eliminate manual carrying tasks.
2. Employees should never carry a load above their head.
3. Carry an object close to the body using both hands. One-handed carries are awkward and tend to unbalance the employee.
4. Do not carry objects that are so large they will obstruct visibility.
5. Grips on an object should not be changed while carrying or holding an object. Rest the object on a secure surface prior to changing grip.
6. Avoid two person carries where possible. If an object is of a size, shape, or mass that it requires two people to carry, use two people of similar size and physique. Perform lifting of the item in unison.
7. Avoid carrying objects on stairs, particularly where the line of sight may be obstructed or the object can interfere with leg movement.

E. Pushing/Pulling Guidelines

1. Check the condition of the floor, ground, or other surface prior to pushing or pulling an object across it.
2. Be aware of the "break out" force of the object - the force at which a push or pull overcomes the frictional force between the surface and object. Adjust posture to avoid losing balance when this point is reached.
3. Get assistance when moving or guiding a large load.
4. Where possible, always push rather than pull a load.

F. Workplace Design

1. Store heavy or bulky materials at heights between the knee and shoulder to avoid the need to stretch or bend.
2. Pack or arrange items to be lifted to avoid shifting of weight in the package.
3. Design work areas to avoid the need to lift, carry, push, or pull heavy or bulky materials for extended distances.
4. Design workplaces with the following in mind.
   a. Lifts from the floor should be avoided.
   b. The torso should never twist while handling loads.
   c. Asymmetrical or unbalanced one-handed lifts should be avoided.
   d. Loads should not be lifted with sudden movements.
   e. Loads should not be lifted over obstacles.
   f. Loads should not be lifted at extended reaches.
   g. Uncomfortable postures should not be necessary throughout the work cycle.
   h. Environmental factors (e.g., task lighting, dry work surfaces, heat stress) should be considered.

G. Training

1. Require that personnel who may have MMH as part of their duties receive training that includes the following topics:
   a. Showing personnel how to avoid unnecessary physical stress and strain during MMH operations.

b. Teaching personnel to become aware of what they can comfortably handle without undue strain.

c. Instructing personnel on the proper use of equipment.

d. Teaching personnel to recognize potential hazards and how to prevent or correct them.

2. This training must be completed prior to an employee being assigned to a task that involves MMH activities.

5. Documentation Summary

Training rosters or other proof of completion of MMH training will be filed in the Health and Safety File.

6. Resources

A. Recommended Weight Limit Calculations (RWL) – Attachment 69-1

B. Work Practices Guide for Manual Lifting, NIOSH
http://www.cdc.gov/niosh

C. Canadian Centre for Occupational Health and Safety
http://www.ccosha.ca/oshaanswers/ergonomics/mmh/

D. Oregon OSHA "Ergonomics of Manual Materials Handling"
http://www.cbs.state.or.us/external/osha/pdf/workshops/206w.pdf

E. North Carolina Department of Labor "A Guide to Manual Materials Handling and Back Safety
http://www.nclabor.com/osha/etta/indguide/ig26.pdf

F. European Agency for Safety and Health at Work
http://uk.osha.eu.int/good_practice/msd.stm

URS SAFETY MANAGEMENT STANDARD
Cold Stress

1. Applicability

This procedure applies to URS projects where field crews are working outdoors in damp and cool (below 50° F or 10°C) conditions or anytime temperatures are below 32°F or 0°C.

2. Purpose and Scope

The purpose of this procedure is to protect project personnel from the following conditions:

Hypothermia: Hypothermia results when the body loses heat faster than it can be produced. When this situation first occurs, blood vessels in the skin constrict in an attempt to conserve vital internal heat. Hands and feet are first affected. If the body continues to lose heat, involuntary shivers begin. This is the body's way of attempting to produce more heat, and it is usually the first real warning sign of hypothermia. Further heat loss produces speech difficulty, confusion, loss of manual dexterity, collapse, and finally death. Wet clothes or immersion in cold water greatly increases the hypothermia risk. The progressive clinical presentation of hypothermia may be seen in Attachment 59-1.

Frostbite: Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite can be categorized into:

Frost Nip or Initial Frostbite: (1st degree frostbite) Characterized by blanching or whitening of skin.

Superficial Frostbite: (2nd degree frostbite) Skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient. Blistering and peeling of the frozen skin will follow exposure.

Deep Frostbite: (3rd degree frostbite) Tissues are cold, pale, and solid; extremely serious injury with possible amputation of affected area.

Frostbite can occur without hypothermia when the extremities do not receive sufficient heat. The toes, fingers, cheeks, and ears are the most commonly affected. Frostbite occurs when there is freezing of the fluids around the cells of the affected tissues. The first symptom of frostbite is an uncomfortable sensation of coldness, followed by numbness. There may be tingling, stinging, or cramping. Contact by the skin with tools or other metal objects below 20°F (-7°C) may result in contact frostbite.

3. Implementation

Field Activities - Implementation of this procedure is the responsibility of the Project Manager and the field supervisor.

4. Requirements

A. Carefully plan work anticipated to be performed in cool or cold conditions. Include costs in project budgets for specialized equipment and supplies needed to complete the field activities.

B. Monitor weather forecasts immediately prior to entering the field.

C. Observe and monitor weather conditions such as ambient temperature, wind speed, and precipitation while in the field. Use Attachment 59-2 to determine wind chill.

D. Wear at least 3 layers of clothing.

An outer layer to break the wind and allow some ventilation (e.g., Gortex® or nylon)

A middle layer of down, wool, or similar materials to provide insulation

An inner layer of cotton or synthetic weave to allow ventilation

In addition:

Wear a hat. Up to 40% of body heat can be lost when the head is left exposed.

Wear insulated boots or other insulated footwear.

Keep a change of dry clothing available in case work clothes become wet.

Do not wear tight clothing. Loose clothing allows better ventilation.

E. Use the following work practices:

Use Attachment 59-3 to establish work/rest cycles in cold weather.

Drink plenty of warm liquids. It is easy to become dehydrated in cold

weather.

Avoiding caffeine and alcohol. Alcohol will accelerate loss of body heat.

Eat high calorie snacks to help maintain body metabolism.

If possible, heavy work should be scheduled during the warmer parts of the day. Take breaks out of the cold.

Work in pairs to keep an eye on each other and watch for signs of cold stress.

NEVER IGNORE SHIVERING. Persistent or violent shivering is a clear warning that you are on the verge of hypothermia.

Avoid exhaustion.

F. When possible, use the following engineering controls:

Provide shelter to escape cold, wind and precipitation

Provide a source of heat (such as warm packs or portable heaters)

Use insulating materials on equipment handles when temperatures drop below 30°F or -1°C.

G. Watch for symptoms and signs of hypothermia (see Attachment 59-1).

H. Treat cold stress illness as follows:

Hypothermia: Prompt treatment of hypothermia is essential. Once the body temperature drops below 95°F or 35°C, the loss of temperature control occurs, and the body can no longer rewarm itself. Initial treatment includes reducing heat loss by moving the individual out of the wind and cold, removal of wet clothing, applying external heat (such as a pre-warmed sleeping bag, electric blanket, or body-heat from other workers) and follow-up medical attention.

Frost Bite: The initial treatment for frostbite includes bringing the individual to a warm location, removal of clothing in the affected area, and, **if help is delayed**, placing the affected parts in warm (100° to104° F or 38° to 40°C) water. Do not massage or rub the frostbite area. After

the initial treatment, wrap the affected area loosely in sterile gauze and seek medical attention.

For further discussion on Cold Stress treatment, please refer to Attachment 59-1

I. Hypothermia in Water:

Loss of body heat to the water is a major cause of deaths in boating accidents. Often the cause of death is listed as drowning; however the primary cause is often hypothermia. It should also be noted that alcohol lowers the body temperature around two to three degrees by dilating the blood vessels. Do not drink alcohol around cold water. The following table shows the effects of hypothermia in water:

WATER TEMPERATURE	EXHAUSTION	SURVIVAL TIME
32.5° F (0°C)	Under 15 min.	Under 15 to 45 min.
32.5 to 40°F (0 – 4°C)	15 to 30 min.	30 to 90 min.
40 to 50°F (4 – 10°C)	30 to 60 min.	1 to 3 hrs.
50 to 60°F (10 – 16°C)	1 to 2 hrs.	1 to 6 hrs.
60 to 70°F (16 – 21°C)	2 to 7 hrs.	2 to 40 hrs.
60 to 70°F (16 – 21°C)	3 to 12 hrs.	3 hrs. to indefinite
Over 80°F (27°C)	Indefinite	Indefinite

SOME POINTS TO REMEMBER:

Wear your PFD. Review SMS 053 - Marine Safety and Boat Operations.

If water is less than 50°F (10°C), wear a wet suit or dry suit for work in water (e.g., wading) or if significant potential to fall in water.

While in the water, do not attempt to swim unless to reach nearby safety. Unnecessary swimming increases the rate of body heat loss. Keep your head out of the water. This will increase your survival time.

Keep a positive attitude about your rescue. This will increase your chances of survival.

If there is more than one person in the water, huddling is recommended.

J. Training

Workers at risk of developing hypothermia or cold-related injury will be trained in:

recognition of the signs and symptoms of cold injury or impending hypothermia,

proper re-warming procedures and appropriate first aid treatment,

proper use of clothing,

proper eating and drinking practices

safe work practices appropriate to the work that is to be performed.

5. Documentation Summary

File these records in the Project Safety File.

A. Completed Project Hazard Analysis form (see Health and Safety Website – "Hazard Analysis")

B. Cold stress training records

6. Resources

A. OSHA Fact Sheets – "Protecting Workers in Cold Environments" http://www.osha-slc.gov/OshDoc/Fact_data/FSNO98-55.html

B. Attachment 59-1 "Signs of, and Treatment for, Cold Stress related Illnesses"

C. Attachment 59-2(a) "Wind Chill Index" (units in °F and miles/hour)

D. Attachment 59-2(b) "Wind Chill Index" (units in °C and Kilometers/hour)

E. Attachment 59-3 "TLVs Work/Warm-up Schedule for Outside Workers based on a Four-hour Shift"

F. OSHA Publication 3156 – Quick Reference Card http://www.osha.gov/Publications/osha3156.pdf

Attachment 59-1
Signs of and Treatment for Cold Stress Related Illnesses

Condition	Signs/Symptoms	Treatment
Hypothermia **Mild** (98° - 90° F) (36° - 32°C)	shivering lack of coordination stumbling, fumbling hands slurred speech memory loss pale, cold skin	move to warm area stay active remove wet clothes and replace with dry clothes or blankets cover the head drink warm (not hot) sugary drink
Hypothermia **Moderate** (90° - 86° F) (32° - 30°C)	shivering stops unable to walk or stand confused and irrational	All of the above, plus Call for an ambulance Cover all extremities completely Place very warm objects, such as hot packs or water bottles on the victim's head, neck, chest and groin
Hypothermia **Severe** (86° - 78° F) (30° - 26°C)	severe muscle stiffness very sleepy or unconscious ice cold skin death	Call for an ambulance Treat the victim very gently Do not attempt to re-warm -- the victim should receive treatment in a hospital
Frostbite	Cold, tingling, stinging or aching feeling in frostbitten area; numbness Skin color turns red, then purple, then white or very pale skin, cold to the touch Blisters in severe cases	Seek medical attention Do not rub the area Wrap in soft cloth If help is delayed, immerse in warm, not hot, water
Trench Foot	Tingling, itching or burning sensation Blisters	Soak feet in warm water, then wrap with dry cloth bandages Drink a warm, sugary drink

Source: Princeton University, Department of Environmental Health and Safety, posted 2/2/99.

Attachment 59-2(a)
Wind-Chill Index[1]
(miles per hour and °F.)

	ACTUAL THERMOMETER READING (F)									
	50	40	30	20	10	0	-10	-20	-30	-40
Wind speed in mph	EQUIVALENT TEMPERATURE (F)									
calm	50	40	30	20	10	0	-10	-20	-30	-40
5	48	37	27	16	6	-5	-15	-26	-36	-47
10	40	28	16	4	-9	-21	-33	-46	-58	-70
15	36	22	9	-5	-18	-36	-45	-58	-72	-85
20	32	18	4	-10	-25	-39	-53	-67	-82	-96
25	30	16	0	-15	-29	-44	-59	-74	-88	-104
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109
35	27	11	-4	-20	-35	-49	-67	-82	-98	-113
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116
Over 40 mph (little added effect)	Little Danger (for properly clothed person)				Increasing Danger (Danger from freezing of exposed flesh)				Great Danger	

[1] Source: Fundamentals of Industrial Hygiene, Third Edition. Plog, B.A., Benjamin, G.S., Kerwin, M.A., National Safety Council, 1988

URS SAFETY MANAGEMENT STANDARD
Cold Stress

Attachment 59-2(b)
Wind-chill Index[1]
(Kilometers per hour and °C.)

Estimated wind speed	Actual temperature reading (°C)												
	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
(in km/h)	Equivalent chill temperature (°C)												
0 (Calm)	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
8	9	3	-2	-7	-12	-18	-23	-28	-33	-38	-44	-49	-54
16	4	-2	-7	-14	-20	-27	-33	-38	-45	-50	-57	-63	-69
24	2	-5	-11	-18	-25	-32	-38	-45	-52	-58	-65	-72	-78
32	0	-7	-14	-21	-28	-35	-42	-50	-56	-64	-71	-78	-84
40	-1	-8	-16	-24	-31	-38	-46	-53	-60	-67	-76	-82	-90
48	-2	-10	-17	-25	-33	-40	-48	-55	-63	-70	-78	-86	-94
56	-3	-11	-18	-26	-34	-42	-50	-58	-65	-73	-81	-89	-96
64	-3	-11	-19	-27	-35	-43	-51	-59	-66	-74	-82	-90	-98
(Wind speeds greater than 64 km/h have little additional effect.)	LOW HAZARD Risk of exposed, dry skin being affected in less than one hour. Awareness of hazard low.				INCREASING HAZARD Danger from freezing of exposed flesh within one minute.			HIGH HAZARD Flesh may freeze within 30seconds.					

The table was originally developed by the U.S. Army Research Institute of Environmental Medicine, Natick, MA, and is adapted from the 1995-1996 *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices,* published by the ACGIH. The ACGIH publication provides the equivalent table with temperature in degrees Fahrenheit and wind speed in mph.

Equivalent chill temperature requiring dry clothing to maintain core body temperature above 36°C (96.8°F).

Attachment-59-3

TLVs Work/Warm-up Schedule for Outside Workers based on a Four-hour Shift*

The ACGIH has adopted the guidelines devel oped by the Saskatchewan Labour for working outdoors in cold weather conditions. These guidelines recommend protective clothing and limits on exposure time. The recommended exposure times are based on the wind chill factor, a scale based on air temperature and wind speed. The work-break schedule applies to any four-hour period with moderate or heavy activity. The warm-up break periods are of 10-minute duration in a warm location. The schedule assumes that "normal breaks" are taken once every two hours. At the end of a 4-hour period, an extended break (e.g. lunch break) in a warm location is recommended. More information is available in the ACGIH publications "2000 TLVs and BEIs" and "Documentation of TLVs and BEIs" and on the Saskatchewan Labour web page "Cold Conditions Guidelines for Outside Workers".

<table>
<tr><th colspan="2">Air Temperature - Sunny Sky</th><th colspan="2">No Noticeable Wind</th><th colspan="2">5 mph Wind</th><th colspan="2">10 mph Wind</th><th colspan="2">15 mph Wind</th><th colspan="2">20 mph Wind</th></tr>
<tr><td>°C (approx.)</td><td>°F (approx.)</td><td>Max. work Period</td><td>No. of Breaks* *</td><td>Max. Work Period</td><td>No. of Breaks</td><td>Max. Work Period</td><td>No. of Breaks</td><td>Max. Work Period</td><td>No. of Breaks</td><td>Max. Work Period</td><td>No. of Breaks</td></tr>
<tr><td>-26° to -28°</td><td>-15° to -19°</td><td colspan="2">(Norm breaks) 1</td><td colspan="2">(Norm breaks) 1</td><td>75 min.</td><td>2</td><td>55 min.</td><td>3</td><td>40 min.</td><td>4</td></tr>
<tr><td>-29°to -31°</td><td>-20°to -24°</td><td colspan="2">(Norm breaks) 1</td><td>75 min.</td><td>2</td><td>55 min.</td><td>3</td><td>40 min.</td><td>4</td><td>30 min.</td><td>5</td></tr>
<tr><td>-32° to -34°</td><td>-25°to -29°</td><td>75 min.</td><td>2</td><td>55 min.</td><td>3</td><td>40 min.</td><td>4</td><td>30 min.</td><td>5</td><td colspan="2" rowspan="4">Non-emergency work should cease</td></tr>
<tr><td>-35° to -37°</td><td>-30° to -34°</td><td>55 min.</td><td>3</td><td>40 min.</td><td>4</td><td>30 min.</td><td>5</td><td colspan="2" rowspan="3">Non-emergency work should cease</td></tr>
<tr><td>-38° to -39°</td><td>-35° to -39°</td><td>40 min.</td><td>4</td><td>30 min.</td><td>5</td><td colspan="2" rowspan="2">Non-emergency work should cease</td></tr>
<tr><td>-40° to -42°</td><td>-40°to -44°</td><td>30 min.</td><td>5</td><td colspan="2" rowspan="2">Non-emergency work should cease</td></tr>
<tr><td>-43° & below</td><td>-45° & below</td><td colspan="2">Non-emergency work should cease</td></tr>
</table>

*2000 TLVs and BEIs - Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. Cincinnati : American Conference of Governmental Industrial Hygienists (ACGIH), 2000 - page 176. Adopted from Saskatchewan Labour "Cold Conditions Guidelines for Outside Workers"