APPENDIX C

CONSTRUCTION QUALITY ASSURANCE HEALTH AND SAFETY PLAN

Terminal 117 Cleanup
Port of Seattle and City of Seattle

CONSTRUCTION QUALITY ASSURANCE SITE HEALTH AND SAFETY PLAN RESIDENTIAL YARDS AREA

Lower Duwamish Waterway Superfund Site
Terminal 117 Early Action Area

City of Seattle

NOVEMBER 30, 2012

CONSTRUCTION QUALITY ASSURANCE
SITE HEALTH AND SAFETY PLAN

Residential Yards Area
Lower Duwamish Superfund Site
T-117 Early Action Area
Seattle, WA

Prepared for
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700 Fifth Avenue
Seattle, WA 98104

Prepared by

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November 30, 2012

CONTENTS

LIST OF ATTACHMENTS

ACRONYMS AND ABBREVIATIONS

CFR	Code of Federal Regulations
CHSM	corporate health and safety manager
City	City of Seattle
CPR	cardiopulmonary resuscitation
CQAP	construction quality assurance plan
EAA	early action area
EPA	U.S. Environmental Protection Agency
HASP	health and safety plan
HAZWOPER	hazardous waste operations and emergency response
IDLH	immediately dangerous to life and health
Integral	Integral Consulting Inc.
MINIRAM	Miniature Real-Time Aerosol Monitor
NTCRA	non-time critical removal action
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
PEL	permissible exposure limit
PPE	personal protective equipment
Port	Port of Seattle
QA	quality assurance
QC	quality control
RADR	removal action design report
RAWP	removal action work plan
ROW	right of way
Settlement Agreement	Administrative Settlement Agreement and Order on Consent
SHSO	site health and safety officer
STEL	short-term exposure limit
T-117	Terminal 117
WISHA	Washington Industrial Safety and Health Act

SITE HEALTH AND SAFETY PLAN APPROVAL

This site health and safety plan has been reviewed and approved for construction quality assurance and soil sampling at Terminal 117 Early Action Area, Phase 2, Residential Yards cleanup.

Project Manager	Date 12-10-12
Corporate Health and Safety Manager	Date 12-10-12

SITE HEALTH AND SAFETY PLAN ACKNOWLEDGMENT

In the absence of an appropriate subcontractor or consultant health and safety plan, and with the written approval of Integral Consulting Inc. (Integral) corporate health and safety manager (CHSM), the subcontractor or consultant may utilize the Integral site health and safety plan (HASP), provided there is written concurrence from the subcontractor or consultant that they will directly administer the plan for its employees. The Integral site HASP is a minimum standard for the site and will be strictly enforced for all Integral personnel, or its subcontractors or consultants where applicable.

I have reviewed this HASP prepared by Integral, dated November 30, 2012, for the Terminal 117 (T-117) early action area (EAA) construction quality assurance activities associated with the residential yards cleanup area. I understand the purpose of the plan, and I consent to adhere to its policies, procedures, and guidelines while an employee of Integral, or its subcontractors or consultants. I have had an opportunity to ask questions regarding this plan, which have been answered satisfactorily by Integral.

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1 INTRODUCTION

It is the policy of Integral Consulting Inc. (Integral) to provide a safe and healthful work environment that is compliant with applicable regulations. No aspect of the work is more important than protecting the health and safety of all workers.

Health and safety concerns and procedures are addressed in separate but related health and safety plans (HASPs) developed for construction workers, government and construction quality assurance (QA) oversight workers, and the community at large. The primary objective of these site HASPs is to provide general health and safety provisions to protect workers (construction, government, and contractors) and the public from potential hazards during site sampling and oversight activities associated with the Residential Yards Area Removal Action Design Report (RADR; Integral 2012a) for the Terminal 117 (T-117) early action area (EAA) located in Seattle, Washington. The construction contractor will develop its own site-specific HASP (construction HASP) to be included in the removal action work plan (RAWP) to address construction worker health and safety during the performance of the yard removal activities. A community HASP is provided in Appendix D of the RADR to address the health and safety of the residents and community at large. This construction QA HASP has been prepared to address the health and safety of personnel involved in construction QA oversight.

Workplace health and safety regulations within the state of Washington, with a few exceptions, are covered by the Washington Industrial Safety and Health Act (WISHA), which is a statute composed of Revised Code of Washington 49.17 and other codes that relate to occupational safety and health. The Division of Safety and Health of the Washington State Department of Labor and Industries administers WISHA. WISHA is the state equivalent of the federal government's Occupational Safety and Health Act, which is administered by the Occupational Safety and Health Administration (OSHA). This HASP follows both WISHA and OSHA hazardous waste operations and emergency response and applicable regulations in 29 CFR 1910 and 29 CFR 1926.

Attachments to this HASP provide a site-specific map (Attachment 1) and specific routes to the hospital or to the Community Health Center from the site (Attachments 2 and 3), regulatory notices (Attachment 4), safety procedures (Attachment 5), material safety data sheets (Attachment 6), and a near-miss incident report form (Attachment 7).

This HASP has been prepared to identify potential site hazards to the extent possible based on information available to Integral. Integral cannot guarantee the health or safety of any person entering this site. Because of the potentially hazardous nature of this site and the activity occurring thereon, it is not possible to discover, evaluate, and provide protection for all possible hazards that may be encountered. Strict adherence to the health and safety guidelines set forth herein will reduce, but not eliminate, the potential for injury and illness at this site. The health

and safety guidelines in this plan were prepared specifically for this site and should not be used on any other site without prior evaluation by trained health and safety personnel.

A copy of this HASP must be in the custody of the field crew during field activities. All individuals performing fieldwork must read, understand, and comply with this plan before undertaking field activities. Once the information has been read and understood, the individual must sign the site Health and Safety Plan Acknowledgment form provided as part of this plan. The signed form will become part of the project file.

This plan may be modified at any time based on the judgment of the Integral site health and safety officer (SHSO) in consultation with the project manager and Integral corporate health and safety manager (CHSM) or designee. Any modification will be presented to the onsite team during a safety briefing and will be recorded in the field logbook. Any changes to this HASP must be submitted to the U.S. Environmental Protection Agency (EPA) within 24 hours.

1.1 PROJECT OBJECTIVES AND METHODS

The primary objectives of the construction QA activities are to provide QA, quality control (QC), and documentation of construction-related sampling and oversight activities within the T-117 Residential Yards cleanup areas (Attachment 1). The primary removal activities for the Residential Yards cleanup areas of the site will include excavation of all contaminated soils and backfill with clean material to near original grades. Most plants and grasses will be removed from yard removal areas, while trees and large shrubs will usually stay. Following replacement of soils removed, replanting of similar plants and grasses will occur.

Soil samples will be collected in areas where the positioning of underground utilities precluded sample collection during spring 2012 pre-design confirmation sampling. Once these areas are excavated, soil samples will be collected by hand using stainless steel spoons along the bottom of the exposed areas per the pre-design quality assurance project plan (Integral 2012b).

Additional details on the objectives and methods are presented in the construction quality assurance plan (CQAP) for the Residential Yards area (Integral 2012c).

1.2 ORGANIZATION

This HASP covers two field activities: construction QA oversight and soil sample collection. Chemical and physical hazard evaluations are presented in Sections 2 and 3, respectively. Specific health and safety guidelines associated with each task, including a brief description of the work, are discussed in Section 11 (Task-Specific Safety Procedure Summary). This HASP does not cover any construction-related activities, including site preparation, soil excavation,

backfill, and site restoration. The contractor's construction HASP covers all construction-related activities.

1.3 ROLES AND RESPONSIBILITIES

All Integral personnel, subcontractors, consultants, and visitors on this site must comply with the requirements of this HASP and also abide by the contractor's health and safety procedures specified in the construction HASP. The specific responsibilities and authority of management, safety and health, and other personnel on this site are detailed in the following paragraphs.

1.3.1 Site Health and Safety Officer

The SHSO has full responsibility and authority to implement this HASP and to verify compliance. He or she reports to the project manager and is onsite or readily accessible to the site during all work operations. The SHSO is responsible for assessing site conditions and directing and controlling emergency response activities. The specific responsibilities of the SHSO include the following:

- Managing the safety and health functions on this site
- Serving as the onsite point of contact for safety and health concerns
- Assessing site conditions for unsafe acts and conditions and ensuring corrective action
- Ensuring that all onsite Integral employees, subcontractors, and governmental oversight personnel and visitors understand and follow this HASP
- Ensuring that daily work schedules and tasks are reasonable for the required levels of effort and weather conditions
- Confirming local emergency response phone numbers and locations
- Conducting and documenting the initial and daily or periodic health and safety briefings
- Evaluating and modifying the level of protective apparel and safety equipment, based on site conditions
- Ensuring that the field team observes all necessary decontamination procedures.

If the SHSO determines that site conditions are unsafe, he or she has the authority to suspend field operations until the problem is corrected. The SHSO can modify HASP procedures in the field. Any changes must be documented in the field logbook, and field staff must be immediately informed of the change. EPA and Integral's project manager and CHSM must be notified by phone or e-mail within 24 hours of any changes to this HASP.

1.3.2 Project Manager

The project manager has overall responsibility to ensure that personnel working onsite are safe. The specific responsibilities of the project manager include:

- Ensuring that this HASP is developed prior to the fieldwork or site visit
- Reviewing and approving this HASP prior to the fieldwork or site visit
- Ensuring employee understanding of and compliance with this HASP.

1.3.3 Corporate Health and Safety Manager

The CHSM provides guidance to the project manager and SHSO on HASP preparation and reviews and approves the HASP. The CHSM also serves as an arbitrator if there is a conflict between the project manager, SHSO, and field personnel. In addition, the CHSM[1] conducts periodic unannounced audits of Integral field operations to ensure compliance with this HASP.

1.3.4 Field Personnel

All Integral personnel, subcontractors, and government oversight personnel on this site are responsible for reading and complying with this HASP, using the proper personal protective equipment (PPE), reporting unsafe acts and conditions, and following the work and safety and health instructions of the project manager and SHSO. All Integral personnel, subcontractors, or consultants can and are encouraged to suspend field operations if they believe conditions have become unsafe.

1.4 SITE DESCRIPTION

The T-117 project site is an EAA within the Lower Duwamish Waterway Superfund site in Seattle and Tukwila, Washington. The City of Seattle (City) plans to conduct a non-time-critical removal action (NTCRA) to address contaminants of concern in residential soil. This site HASP has been prepared to accompany the CQAP, which is a required design element under the Administrative Settlement Agreement and Order on Consent (Settlement Agreement; USEPA 2011) for the NTCRA at T-117.

The T-117 EAA includes the following cleanup areas: Sediment area, Upland area, and Adjacent Streets and Residential Yards area. The cleanup will be conducted in two coordinated phases: the Sediment and Upland Areas cleanup (Phase 1) to be performed by the Port of Seattle (Port) and the Adjacent Streets and Residential Yards cleanup (Phase 2) to be performed

[1] The audit task may be delegated to an office health and safety representative by the CHSM.

by the City (Attachment 1 – Site Map). In addition, Phase 2 is being conducted in two steps as follows:

- The Residential Yards portion of the cleanup, which includes the cleanup of portions of eight[2] residential yards, portions of the roadway planting strips on S. Cloverdale Street, and portions of the alleyway between S. Cloverdale Street and S. Donovan Street.

- The Adjacent Streets portion of the cleanup, which includes cleanup within the rights-of-way (ROWs) of 16th Avenue S., 17th Avenue S., Dallas Avenue S., and S. Donovan Street; and construction of new stormwater infrastructure in this area.

The Residential Yards cleanup will begin in fall 2012 and the Adjacent Street cleanup will be conducted in 2014. This HASP is developed to keep workers safe while conducting construction QA and oversight during the Residential Yards cleanup.

The primary activities for the Residential Yards include excavation of contaminated soils and backfilling with clean material. Contaminated soils are those found in prior investigations to contain polychlorinated biphenyls (PCBs) at concentrations exceeding 1.0 mg/kg. The Residential Yards cleanup will remove soil having PCB concentrations statistically above the cleanup level of 1.0 mg/kg. Wherever PCB cleanup occurs, co-located polychlorinated dibenzo-*p*-dioxins and polychlorinated dibenzofurans will also be removed.

General site information is summarized below:

- **Owners/tenants:** City of Seattle and private landowners and tenants
- **Site history:** Much of the PCB contamination at the site is associated with historical industrial activities that involved asphalt manufacturing in the T-117 Upland Study area. Asphalt manufacturing operation included the use of recycled oils, some of which contained PCBs and were released to the surrounding environment. Asphalt manufacturing activities ceased in the early 1990s.
- **Current site use:** Residential neighborhood
- **Hazardous waste site:** Yes
- **Industrial waste site:** No
- **Topography (if applicable):** Personnel will be working in residential area within private lots and public ROWs. The area is relatively flat.

[2] Portions of seven residential yards are being cleaned up to address PCB concentrations greater than 1.0 parts per million. An additional removal at the front yard of 1430 S. Donavan Street is being planned to address dioxin/furan concentrations greater than 50 parts per trillion toxic equivalency (ppt TEQ) based on an EPA directive provided in its September 5, 2012, letter.

- **Site access:** The overall T-117 site includes all areas within the T-117 EAA. This encompasses not only the individual yards, roadway planting strips, and the southern alleyway, but also the contractor's staging area and portions of the ROWs from which cleanup activities will be observed. The site will be accessed via vehicle. Parking will be within designated areas.
- **Nearest drinking water/sanitary facilities:** The contractor is required to provide drinking water and sanitary facilities for all site workers, including EPA and City personnel performing construction oversight. These facilities will be located within the construction staging area, to the east of 17th Avenue S.
- **Nearest telephone:** Cell phone of SHSO is (253) 370-5894
- **Size of site:** The overall T-117 is 15.2 acres. The Residential Yards study area is approximately 5.3 acres.
- **Pathways for hazardous substance dispersion:** airborne dust, absorption, ingestion.

A detailed site map is provided in Attachment 1 to this HASP.

1.5 CONSTRUCTION ACTIVITIES

Construction activities that are expected to be performed during the Residential Yards cleanup include transport of equipment and materials by truck, surveying, clearing of vegetation, demolition of concrete and asphalt, salvage of pavers and other yard appurtenances, excavation (by equipment and by hand), spraying of water for dust suppression, equipment decontamination, placement of backfill, compaction, setting concrete forms, placing and finishing concrete, restoring salvaged appurtenances and planting vegetation. Oversight of excavation activities, sampling soil in the landscaping strips, and decontamination of sampling equipment and personnel present potential chemical hazards, which are evaluated in Section 2. In addition, oversight of all of the work presents potential physical hazards, which are evaluated in Section 3.

1.6 KEY CONTACTS

	Name (Affiliation)	Work Telephone	Cell Phone
Remedial Project Manager	Piper Peterson (EPA)	(206) 553-4951	(206) 719-0740
Project Manager	Linda Baker (Integral)	(206) 230-9600	(206) 719-3421
SHSO	Eric Pilcher (Integral)	(206) 230-9600	(253) 370-5894
CHSM	Eron Dodak (Integral)	(503) 943-3614	(503) 407-2933
Project Coordinator	Mary Mitchener (City of Seattle)	(206) 826-4421	(206) 369-3132

2 CHEMICAL HAZARD EVALUATION

Potentially hazardous chemicals known to exist at the site are primarily PCBs and dioxins/furans. In addition to chemicals present at the site, Liquinox or Alconox detergent will be used to decontaminate sampling equipment and will be brought onsite by Integral or its contractors. Material safety data sheets for Liquinox/Alconox detergent are in Attachment 6 of this HASP. The chemicals of concern, applicable chemical properties, and potential exposure routes are presented in the following sections.

The following table lists the historical site maximum constituent concentrations for constituents at the T-117 EAA. The table also lists the chemical properties and OSHA permissible exposure limit (PEL), short-term exposure limit (STEL), and immediately dangerous to life and health (IDLH) level. Some chemicals used during equipment decontamination or sample preservation may volatilize and enter the field crew's breathing zone and be inhaled. Breathing zone air can be monitored to ensure that the chemicals do not exceed the PEL. If any of the chemicals exceed the PEL, immediate action is required (e.g., don respirators, leave site) as designated in Section 5 (Air Monitoring) in this HASP.

Chemical Properties

Chemical of Concern	Concentration (site maximum or range expected)	Medium	OSHA PEL (ppm)	OSHA STEL (ppm)	OSHA IDLH (ppm)	Odor Threshold (ppm)	IP (eV)	Carcinogen or Other Hazard
PCDD/PCDF (2,3,7,8-TCDD TEQ)	90 ng/kg maximum detected [a]	Soil	--	--	--	NA	--	Ca, --
Total polychlorinated biphenyls (PCBs), Aroclor 1254 and 1242	480 mg/kg maximum detected [b]	Soil	0.5 and 1.0 mg/m^3	0.001 mg/m^3	5 mg/m^3	NA (mild hydrocarbon odor)	--	Ca, TWA 0.001 mg/m^3

Notes:

--	= none established
2,3,7,8-TCDD TEQ	= toxic equivalents of dioxin form: 2,3,7,8-TCDD
Ca	= carcinogen
IDLH	= immediately dangerous to life and health
IP(eV)	= ionization potential (electron volts)
mg/kg	= milligrams per kilogram
mg/m^3	= milligrams per cubic meter
ng/kg	= nanograms per kilogram
NA	= not available
P	= poison
PCDD/PCDF	= polychlorinated dibenzo-*p*-dioxin and polychlorinated dibenzofuran
PEL	= permissible exposure limit
pg/g	= picograms per gram
ppm	= parts per million
STEL	= short-term exposure limit
TWA	= time weighted average

[a] The maximum confirmed concentration of PCDD/PCDF detected in the Residential Yards cleanup area is 83 ng/kg and the maximum in the Adjacent Streets is 90 ng/kg.

[b] The maximum confirmed concentration of total PCBs detected in the Residential Yards cleanup area is 31 mg/kg and the maximum in the Adjacent Streets is 480 mg/kg.

2.1 CHEMICAL CHARACTERISTICS AND EXPOSURE ROUTES

The table below summarizes the chemical characteristics and potential chemical exposure routes at the site.

	Likely	Possible	Unlikely
Potential Chemical Exposure Routes at the Site:			
Inhalation		X[a,b]	
Ingestion		X[a,b]	
Skin absorption		X[a,b]	
Skin contact		X[a,b]	
Eye contact		X[a,b]	
Chemical Characteristics:			
Corrosive			X
Flammable			X
Ignitable			X
Reactive			X
Volatile			X
Radioactive			X
Explosive			X
Biological agent			X
Particulates or fibers			X
If likely, describe:	Not Applicable		

Notes:
Chemical exposure risk will be reduced through the use of nitrile gloves, safety glasses, and following the decontamination procedures presented in this HASP.
[a] Decontamination chemicals
[b] Soil

2.2 PROPOSED CHEMICAL HAZARD SAFETY PROCEDURES

The risk of exposure to chemical hazards from soil and decontamination chemicals can be reduced through the proper use of PPE (detailed in Section 4) and following decontamination procedures (detailed in Section 9).

3 PHYSICAL HAZARD EVALUATION AND GUIDELINES

The following table presents possible physical hazards that are expected to be present during field activities (i.e., construction QA and soil sampling activities) and proposed safety procedures.

Possible Hazard	Yes	No	Proposed Safety Procedure
Heavy equipment	X		Stay back a minimum of 15 ft from operating equipment; wear safety vests and hard hats; ear protection as needed, safety glasses; and coordinate and maintain eye contact with equipment operator.
Material handling	X		Lift properly; seek assistance if necessary; do not overfill coolers or boxes. Seek assistance if drums must be moved.
Vehicle traffic	X		Wear high visibility reflective vests while working at site
Confined spaces		X	Integral personnel are not trained or authorized to enter confined spaces under any circumstances. Only qualified and properly trained subcontractors are allowed to enter confined spaces.
Adverse weather	X		Seek shelter during electrical storms; work in adverse weather conditions only with proper training and equipment.
Sun exposure	X		Wear light, reflective clothing and head protection; apply sun screen to exposed skin.
Work in remote areas		X	Use buddy system; carry radio and/or cellular/satellite phone; bring sufficient equipment in case of accident or injury (first aid kit, shelter if appropriate).
Biohazard		X	Avoid contact with potential biological or infectious materials; wear impermeable gloves, disposable coveralls, and respirator, as appropriate; wash hands and face as soon as possible after contact and before eating or drinking. Use disinfectants as necessary..
Plant/animal hazards	X		Know local hazards and take appropriate precautions. Use insect repellent if mosquitoes are persistent. Residents will be advised to keep pets inside or on a leash and under direct supervision during the cleanup of their yards. In the event an unsecured animal enters a work zone, work will be halted until the animal is retrieved and secured. If an animal's owner cannot be identified, animal control may be called, if necessary.
Uneven terrain/tripping/ slipping/ falls	X		Use caution, wear properly fitting shoes or boots, and keep work area orderly. Exercise caution when walking on wet surfaces (due to rain or dust suppression activities).

Possible Hazard	Yes	No	Proposed Safety Procedure
Heights		X	Integral personnel are not trained or authorized to work at heights greater than 6 ft above ground surface under any circumstances. Qualified subcontractors must use fall protection (harness, lanyard, or proper railings) when working above 6 ft above ground surface. All fall protection equipment needs to be inspected annually and replaced every 5 years.
Noise	X		Wear ear protection when working around heavy equipment and other noise sources generating noise greater than 85 decibels. Noise monitoring will be conducted during initial operation of equipment to determine if and where hearing protection will be required.
Excavations	X		Do not enter excavations greater than 3 ft in depth without evaluation by a qualified person and implementation of applicable trenching and excavation safeguards as required by law.
Heat stress	X		Follow heat stress information (Attachment 3). *Note:* potential for heat stress will depend on season and location of the site.
Cold/hypothermia	X		Keep warm and dry; bring changes of clothes; do not work in extreme conditions without proper equipment and training. Follow cold stress information (Attachment 3). *Note:* potential for cold/hypothermia will depend on season and location of the site.
Falling objects	X		Wear hard hats near overhead hazards.

Summary of potential physical hazards posed by proposed site activities:

Activity	Potential Hazard
Construction Quality Assurance	Heavy equipment, material handling, vehicle traffic, adverse weather, plant/animal hazards, uneven terrain/tripping, noise, excavations, heat stress, cold/hypothermia, falling objects
Decontamination	Material handling, uneven terrain/tripping, slippery surface
Soil Sampling	Heavy equipment, material handling, vehicle traffic, adverse weather, plant/animal hazards, uneven terrain/tripping, noise, excavations, heat stress, cold/hypothermia, falling objects
Sample handling/mobilization	Material handling, uneven terrain/tripping, heat stress, cold/hypothermia

4 PERSONAL PROTECTIVE EQUIPMENT AND SAFETY EQUIPMENT

The following sections address PPE and safety equipment required for completing the field activities.

4.1 PERSONAL PROTECTIVE EQUIPMENT

Based on the hazards identified above in Sections 2 and 3, the following table identifies the PPE required for site activities.

Site Activity	Level of Protection	
	Initial	Contingency [a]
Construction QA	D	MD
Soil sampling	D	MD
Sample handling	D	MD
Decontamination	D	MD

[a] Based on unexpected change in site conditions (e.g., adverse weather conditions). If the generation of excessive visible soil dust particles cannot be curtailed by spraying with deionized water, work will stop and workers must leave the area.

Each level of protection will incorporate the following PPE:

Level D	X	Long pants and shirt or work coveralls, hard hat, latex or nitrile gloves under work gloves, eye protection, reflective safety vest, and steel-toed and steel-shanked boots are required. Hearing protection is required as needed.
Level MD	X	Same as Level D with addition of rain gear.

4.2 RESPIRATOR AND RESPIRATOR CARTRIDGE INFORMATION

Is there potential for a respirator to be donned during fieldwork? Yes _____ No X

4.3 SAFETY EQUIPMENT

The following safety equipment will be onsite during the proposed field activities.

Air Monitoring (check the items required for this project)

- [ ] OVM
- [ ] LEL/O_2 meter
- [ ] H_2S meter
- [ ] Detector pump and tubes (e.g., benzene)
- [ ] Air sampling pumps
- [ ] MINIRAM (particle monitors)
- [ ] Radiation meter
- [X] Other: Visual observation

First Aid Kit (mandatory, including absorbent compress, adhesive bandages, adhesive tape, antiseptic, burn treatment, medical exam gloves, sterile pad, CPR shield, triangle bandage, scissors [for cutting off the PPE from an injured person])
(check additional items required for the site)

- [X] Emergency blanket
- [X] Insect repellent
- [X] Sunscreen
- [ ] Other:

Other (check the items required for this project)

- [X] Eyewash
- [X] Drinking water
- [ ] Fit test supplies
- [X] Fire extinguisher (excavators and field support vehicles)
- [ ] Stopwatch for monitoring heart rate for heat stress monitoring[3]
- [ ] Thermoscan® thermometer for heat stress monitoring
- [ ] Survival kit[4]
- [ ] Personal flotation device
- [ ] Cool vests
- [ ] Windsock
- [X] Cellular phone
- [ ] Radio sets
- [X] Global positioning system
- [X] Other: Air horn

[3] Heart rate monitoring requires special training.
[4] Consult the CHSM for guidance for site-specific survival kits.

5 AIR MONITORING

During construction activities, dust suppression measures such as water sprays will be used to prevent soil particles from becoming airborne. Air monitoring will initially be limited to visual observation. However, more stringent monitoring may be required if there are complaints from residents or if the contractor is unable to suppress visual dust following a warning from the oversight team.

5.1 INTRODUCTION

Personal air monitoring involves collection of samples within the breathing zone of the field personnel to better understand exposures, ensure appropriate levels of PPE, and document compliance with regulation. Such samples may be full shift for comparison to PELs (or other applicable occupational exposure limits) or short term, for comparison to STELs. Some chemicals in soil or aqueous media may volatilize or become aerosolized and be inhaled by field personnel. Because none of the chemicals of concern at the site may volatilize and pose an inhalation hazard, no photoionization detectors will be used to monitor air during oversight and QA activities.

Breathing zone air can be monitored to ensure that the chemicals do not exceed a regulatory or project-specific action level (generally 50 percent of the PEL). Integral commonly uses dust meters (e.g., MINIRAM [miniature real-time aerosol monitor]) for monitoring particle constituents. In practice, the air directly in the field personnel's breathing zone is monitored with the dust meter for 10–15 seconds. The highest reading is recorded in the project logbook and checked against the site-specific action level in the table below. If any of the constituents exceed the action level presented in Section 5.4, immediate action is required (e.g., don respirators, leave site) as designated.[5]

The following sections provide general guidance on the selection and calibration of dust meters, which are typically rented for Integral field projects.

5.2 DUST METERS

It is critical that the dust meter is capable of measuring the concentrations of airborne dust that are at or below the site-specific action levels presented below. **Be sure that the meter arrives at least a day prior to the start of the fieldwork so field personnel can familiarize themselves with the operation of the meter and confirm that it was not damaged during shipping.** Field

[5] Note that the MINIRAM cannot identify chemicals. The MINIRAM detects total particles of sufficient diameter to be detected.

personnel must also read the operation manual to become familiar with its operation prior to use in the field.

The dust meter must be field checked (i.e., zeroed) daily in accordance with the manufacturer's specifications, which are provided in the operation manual. A dust meter field check typically involves zeroing the meter with ambient or filtered air. Be sure that all the required zeroing and operational equipment/supplies are provided with the dust meter. Record dust meter field check data in the field logbook.

5.3 ACTION LEVELS

The following action levels have been established to determine appropriate actions to be taken during site investigation activities:

Instrument	Observation	Action[a]	Comments
Dust meter	5 mg/m^3 (resp)	Initiate engineering controls (spray with deionized water)	If engineering controls fail leave site.

Note:

[a] Maintain, calibrate, and field check all air monitoring equipment in accordance with the manufacturer's recommendations.

6 HEALTH AND SAFETY TRAINING AND MEDICAL MONITORING

The following sections present requirements for health and safety training and medical monitoring.

6.1 HEALTH AND SAFETY TRAINING AND MEDICAL MONITORING

State and federal laws establish training requirements for workers at uncontrolled hazardous waste sites (including areas where accumulations of hazardous waste create a threat to the health and safety of an individual, the environment, or both). Integral and subcontractor personnel are required to complete the following training requirements prior to working at the site.

6.1.1 Training Requirements

Level of Training	24-hour	40-hour[a]	Supervisor[b]	First Aid/CPR[c]	Medical Monitoring
Integral Field Personnel					
SHSO		X	X	X	X
Field Supervisor		X	X	X	X
Field Lead		X		X	X

Notes:

[a] Must have current OSHA 8-hour refresher if it has been more than a year since the OSHA 40-hour training.

[b] At least one person onsite must be OSHA HAZWOPER supervisor trained if this is a hazardous waste site.

[c] At least one member of each team of two or more people onsite must have current first aid/CPR certification.

[d] Integral subcontractors and consultants may have requirements that are more stringent than those listed above. These are minimum training and monitoring requirements required to work on this site.

6.1.2 Site Safety Meetings

Site safety meetings must be held before beginning new tasks or when new staff enters the site. Site safety meetings should be held at a minimum of once a week and should be held daily on complex or high hazard projects. Tailgate safety meetings must occur every morning during

review of the day's work plan, covering specific hazards that may be encountered. Additional meetings will be held at any time health and safety concerns are raised by any of the personnel or an accident has occurred. Attendance and topics covered at any safety meeting are to be documented in the field logbook.

6.2 MEDICAL MONITORING

OSHA requires medical monitoring for personnel potentially exposed to chemical hazards in concentrations in excess of the PEL for more than 30 days per year and for personnel who must use respiratory protection for more than 30 days per year. Integral requires medical monitoring for all employees potentially exposed to chemical hazards.

Will personnel working at this site be enrolled in a medical monitoring program?	Yes X	No _____

7 EMERGENCY RESPONSE PLAN

The following sections discuss emergency recognition and prevention, emergency response and notification, emergency decontamination, and site communications.

7.1 EMERGENCY RECOGNITION AND PREVENTION

It is the responsibility of all personnel to monitor work at the site for potential safety hazards. All personnel are required to immediately report any unsafe conditions to the SHSO. The SHSO is responsible to immediately take steps to remedy any unsafe conditions observed at the work site.

The following are examples of some emergency situations that could occur during the T-117 EAA construction quality assurance field activities:

- Slips, trips, and falls (on sloped areas, steel stairs, wet or muddy soil, etc.)
- Lacerations from mature vegetation and construction debris (in soil, waste piles, etc.)
- The air monitoring action level is exceeded
- Entrainment of clothes or objects in moving equipment or parts
- Serious injury or illness (e.g., physical injury, heart attack)
- Collision of pedestrian with an automobile
- Severe thunderstorm with lightning.

Immediate actions will be taken by the field team under the leadership of the SHSO in response to these emergencies.

7.2 EMERGENCY RESPONSE AND NOTIFICATION

If an emergency at the site warrants it, all personnel must immediately evacuate the affected work area and report to the SHSO at the predetermined emergency assembly location:

Field vehicle

In case of injury, field personnel should take precautions to protect the victim from further harm and notify local or facility emergency services. The victim may require decontamination prior to treatment if practicable—requirements will vary based on site conditions.

Emergency medical care will be provided by:

- [X] Local emergency medical provider (i.e., fire department)
- [ ] Facility emergency medical provider
- [ ] First aid-trained field staff (for remote areas only)

Local Resources	Name	Telephone	Notified Prior to Work (Yes/No)?
Fire	Seattle Fire Department	911	No[a]
Police	Seattle Police Department	911	No[a]
Ambulance	Seattle	911	No
Hospital	Highline Medical Center Emergency Services	(206) 431-5314	No
Site phone	Eric Pilcher; SHSO	(253) 370-5894	Yes
Health Center	Sea Mar Community Health Center	(206) 762-3730 (open Mon. – Sat. 8:00 AM to 5:00 PM)	No

Notes:
[a] Fire and Police departments will be notified prior to work requiring street closure.

The SHSO must confirm that the hospital listed is still in operation and that it has an emergency room. Maps in Attachment 2 provide route to hospital and in Attachment 3 for route to the health center. **It is required that the SHSO drive to the hospital so that the directions are practiced and understood prior to initiating fieldwork.**

Corporate Resources	Name	Work Telephone	Cell Phone
Integral CHSM [a]	Eron Dodak	(503) 943-3614	(503) 407-2933
Integral President	Lucinda Jacobs	(206) 957-0328	(206) 999-3061
Integral Human Resources Manager	Amy Logan	(720) 465-3312	NA
Medical Consultant	Dr. Calvin Jones (HealthForce Partners)	(425) 806-5700	NA
Integral Project Manager	Linda Baker	(206) 957-0314	(206) 719-3421
Integral SHSO	Eric Pilcher	(206) 957-0337	(253) 370-5894

Notes:

[a] If the CHSM cannot be reached, call Ian Stupakoff–Office: (360)705-3534, ext. 20; Cell: (360)259-2518. If Ian Stupakoff cannot be reached, call David Livermore–Office: (503)943-3613; Cell: (503)806-4665. If David Livermore cannot be reached, call Barbara Trenary–Office: (206) 248-9645; Cell: (206) 849-0882.

The SHSO (Eric Pilcher), project manager (Linda Baker), and the CHSM (Eron Dodak) are the only people who may call the emergency local phone numbers listed above, with the exception of 911. In case of serious injuries, death, or other emergency, the Integral CHSM must be

notified ***immediately*** at the phone numbers listed above. The Integral CHSM will notify the project manager and Integral's president. The project manager will notify the client and EPA.

7.3 EMERGENCY DECONTAMINATION PROCEDURES

In case of an emergency, if possible, gross decontamination procedures will be promptly implemented. If a life-threatening injury occurs and the injured person cannot undergo decontamination procedures onsite, then the medical facility will be informed that the injured person has not been decontaminated and given information regarding the most probable chemicals of concern. Decontamination procedures should not be implemented if there is not a reasonable possibility that the injured party requires such intervention.

Decontamination procedures will be used only if practical and if they will not further injure the person or delay treatment. Decontamination procedures should not be implemented if there is not a reasonable possibility that the injured party requires such intervention. The SHSO will make the determination on whether or not to decontaminate the injured person. The following steps will be followed for decontaminating injured personnel while onsite:

- If it will not injure the person further, cut off PPE using scissors or scrub or wipe the gross contamination from the injured person's PPE (e.g., Tyvek® coveralls, work boots) with a Liquinox® or Alconox® solution followed by a rinse with tap or deionized/ distilled water. If wiping or scrubbing action may risk further injuring the person, place contaminated PPE in properly labeled garbage bags and dispose appropriately.
- Remove PPE if feasible without further injuring the person.

7.4 SITE COMMUNICATIONS

Each field team will carry a cell phone or satellite phone that is in good working order. If there is any type of emergency that requires the site to be evacuated (e.g., severe thunderstorm with lightening, chemical release), the field team leader will blow the air horn three times. When the horn sounds, all personnel will meet at the predetermined emergency assembly location, provided the muster point is in safe territory. All other emergency notifications that do not require evacuation (e.g., a person falling from a truck) will be conducted using a cell or satellite phone. Emergency phone numbers are listed above in Section 7.2.

7.5 BUDDY SYSTEM

The buddy system will be used at the site at all times. The buddy system is a system of organizing employees into field teams in such a manner that each employee of the field team is

designated to be observed by at least one other employee in the field team. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

8 WORK ZONES

Work zones are defined as follows:

Contamination reduction zone	Area between the exclusion and support zones that provides a transition between contaminated and clean zones
Exclusion zone	Any area of the site where hazardous substances are present, or are reasonably suspected to be present, and pose an exposure hazard to personnel
Support zone	Any area of the site, so designated, that is outside the exclusion and contamination reduction zones

Site control measures in work zones are described below for each type of field activities.

8.1 CONSTRUCTION QUALITY ASSURANCE

Exclusion zone: An approximate 12-ft radius around the excavation area will be marked with orange traffic cones or caution tape. Only properly equipped and trained (i.e., wearing modified level D protective clothing) personnel will be allowed in this area.

Contamination reduction zone: All decontamination activities will occur inside a contamination reduction zone.

Support zone: All areas outside the exclusion and contamination reduction zones.

Controls to be used to prevent entry by unauthorized persons: Orange traffic cones or caution tape will demarcate the area and no unauthorized personnel will be allowed into the exclusion/contamination reduction zones.

Anticipated exclusion and contamination reduction zones, specific to each individual property, are indicated on the construction drawings (Appendix A1 to the RADR; Integral 2012a). The field office trailer, which will also serve as the break area, and sanitary facilities will be indicated on the contractor's site plan to be submitted with the RAWP.

8.2 SOIL SAMPLING

Exclusion zone: An approximate 12-ft radius around the sample area will be marked with orange traffic safety cones or caution tape. A second exclusion zone will be set up surrounding the sample processing area. This area will be marked with orange traffic cones or caution tape.

Only properly equipped and trained (i.e., wearing modified level D protective clothing) personnel will be allowed in this area.

Contamination reduction zone: All decontamination activities will occur within contamination reduction zones.

Support zone: All areas outside the exclusion and contamination reduction zones.

Controls to be used to prevent entry by unauthorized persons: Orange traffic cones or caution tape will demarcate the area and no unauthorized personnel will be allowed into the exclusion/contamination reduction zones.

9 EQUIPMENT DECONTAMINATION AND PERSONAL HYGIENE

9.1 EQUIPMENT DECONTAMINATION PROCEDURES

To minimize or prevent personal exposure to hazardous materials, all personnel working in the exclusion zone and contaminant reduction zone will comply with the following decontamination procedures:

- All personnel will wash soil and chemicals from their raingear or Tyvek coveralls before leaving the exclusion zone.
- All gloves, Tyvek, rain gear, and rubber boots will be removed prior to entering the field vehicle.

Decontamination equipment required at the site includes the following:

- Buckets or tubs
- Laboratory grade distilled/deionized water
- Site water
- Scrub brushes (long-handled)
- Liquinox or Alconox detergent
- Plastic bags
- Foil
- Paper towels
- Garbage bags
- Clean garden sprayer

All non-disposable components of the sampling equipment (e.g., stainless steel spoons and bowls used for sample composting) that contact the soil will be decontaminated using the following steps:

1. Rinse with site water/tap water
2. Wash with Alconox or Liquinox detergent
3. Rinse with site water/tap water
4. Rinse with distilled/deionized water using a garden sprayer (compositing and soil sampling equipment only)
5. Allow to air dry
6. Wrap up compositing soil sampling equipment in aluminum foil.

Decontamination wastewater containing excess soil will be collected in plastic tubs and transferred into 55-gal drums and disposed of in accordance with applicable regulations.[6]

9.2 PERSONAL HYGIENE

The following personal hygiene practices will be used at the site to reduce exposure to chemicals.

- Long hair will be secured away from the face so it does not interfere with any activities.
- All personnel leaving potentially contaminated areas will wash their hands, forearms, and faces in the contaminant reduction zone prior to entering any clean areas or eating areas.
- Personnel leaving potentially contaminated areas will shower (including washing hair) and change to clean clothing as soon as possible after leaving the site.
- No person will eat, drink, or chew gum or tobacco in potentially contaminated areas. Single portion drink containers and drinking of replacement fluids for heat stress control will be permitted only in support areas.
- Smoking is prohibited for Integral personnel and subcontractors in all areas of the site because of the potential for contaminating samples and for the health of the field team.

[6] Integral personnel are not allowed to sign hazardous waste manifests. Hazardous waste manifests must be signed by the client or client's attorney.

10 VEHICLE SAFETY, SPILL CONTAINMENT, AND SHIPPING INSTRUCTIONS

10.1 VEHICLE SAFETY

Integral's vehicle safety program requires the following:

- Cell phone usage while driving is not allowed, including the use of hands-free devices. If it not feasible to wait to use the cell phone until arriving at your destination, pull off the road and park in a safe location to use the cell phone. Do not pull to the side of the road to use a cell phone because this significantly increases the risk of a rear-end collision.
- All vehicles are to be operated in a safe manner and in compliance with local traffic regulations and ordinances.
- Drivers are to practice defensive driving and drive in a courteous manner.
- Drivers are required to have a valid driver's license and liability insurance (per local state laws).
- Seat belts are to be worn by the driver and all passengers.
- No persons are allowed to ride in the back of any trucks or vans, unless equipped with seatbelts.
- Vehicles are to be driven in conformance with local speed limits.
- Personnel who are impaired by fatigue, illness, alcohol, illegal or prescription drugs, or who are otherwise physically unfit, are not allowed to drive or work on Integral field sites.
- Personnel are to avoid engaging in other distractions such as changing radio stations while driving.
- Motor vehicle accidents are to be reported to the responsible law enforcement agency, the Integral human resources manager, and the Integral CHSM on the same day of occurrence. Documentation of damage should be photographed.
- Personnel who have experienced work-related vehicle accidents or citations may be required to complete a defensive driving program.

10.2 SPILL CONTAINMENT

Bulk chemicals will not be used at this site. No equipment used for construction QA, oversight, or additional sampling will be refueled on site.

10.3 SHIPPING INFORMATION

Federal laws and international guidelines place restrictions on what materials may be shipped by passenger and cargo aircraft. In addition, 49 CFR regulates labeling, manifesting, and shipment of all packages containing potentially hazardous materials. In the course of this field investigation, the following items will be shipped to and from the site as shown below:

Item	Hazardous Constituent	Quantity	Packaging	How Shipped
Samples	None	±40 solid matrix samples	Coolers	Field vehicle
Other	None			

A 24-hour emergency response number (on any shipping documents such as a Uniform Hazardous Waste Manifest, Shipper's Declaration of Dangerous Goods, etc.) is required for shipments of all dangerous or hazardous goods. Integral does not have a 24-hour emergency contact number for dangerous or hazardous goods shipment. No dangerous or hazardous goods may be shipped by Integral until an account is set up with a 24-hour emergency response service, such as CHEM-TEL (1-813-248-0573). If any hazardous or dangerous goods need to be shipped for a project, they must be shipped directly to the site by the supplier. Any hazardous or dangerous goods that are not used in the course of the field effort must remain at the site.

The samples will be prepared and labeled for shipment in accordance with the sampling and analysis plan developed for the site.

Air shipment of equipment with lithium batteries is required to note the presence of these batteries. Warning labels are available from the equipment rental agency and can be copied.

11 TASK-SPECIFIC SAFETY PROCEDURE SUMMARY

11.1 CONSTRUCTION QUALITY ASSURANCE

Always wear steel toed boots, nitrile gloves, a hard hat, safety glasses, and reflective high visibility vest when doing any work around excavation activities. Keep in eye contact with heavy equipment operators at all times during excavation. Hearing protection should be used as necessary.

Avoid getting soil on your clothes or skin. If it is necessary for personnel to approach heavy equipment during the excavation event, then they will comply with the client's safety requirements for the site (e.g., wear hard hats and safety glasses).

11.2 SOIL SAMPLING AND DECONTAMINATION

Avoid getting soil and decontamination chemicals on your clothes or skin. Exercise care when lifting, assembling, and decontaminating equipment. Keep in eye contact with the excavator operators. Keep equipment organized.

Before sampling begins, if area appears dusty, surface soils slated for sampling will be wetted down using a garden sprayer filled with potable or distilled water. If it is necessary to kneel, new 6-mil plastic sheeting will be placed on the ground adjacent to station so the sampling personnel can kneel on the ground without contacting the soils. If any visible dust is observed during sampling activities, the soils will be wetted down again. Once the sampling is completed, the plastic sheeting and disposable gloves will be disposed of properly.

Integral personnel will wear hard hats, safety glasses, nitrile gloves, traffic safety vests, and steel-toed boots at all times during sampling. The exclusion zone around the soil sampling area will be marked with orange traffic cones or caution tape and personnel will police the area to make sure no unauthorized personnel enter the exclusion zone. Avoid getting soil and sample preservatives (nitric and hydrochloric acid) on your clothes or skin. Exercise care when lifting, assembling, and decontaminating equipment. Keep equipment organized. If location is near a road, look at both ends of the street and check for oncoming traffic before crossing.

Avoid splashing during sampling equipment or personnel decontamination and containerization of decontamination fluids.

12 REFERENCES

Integral. 2012a. Removal action design report, residential yards study area, Lower Duwamish Waterway Superfund site, T-117 early action area, Draft. Seattle, WA. Prepared for City of Seattle. Integral Consulting Inc., Seattle, WA.

Integral. 2012b. Quality assurance project plan, pre-design sampling adjacent streets and residential yards study area, Lower Duwamish Superfund site, T-117 early action area, Seattle, WA. Prepared for City of Seattle. Integral Consulting Inc., Seattle, WA.

Integral. 2012c. Construction quality assurance plan, residential yards study area, Lower Duwamish Superfund site, T-117 early action area, Draft. Seattle, WA. Prepared for City of Seattle. Integral Consulting Inc., Seattle, WA.

ATTACHMENT 1

SITE MAP

Dallas Ave S
8500
8519
8523
8525
South Park Marina
8529
1410
1412
1420
1424
1440
8603
T-117 Upland
S Cloverdale St
1415
1417
1421
1425
1429
1445
8601
8609
14th Ave S
16th Ave S
8602
8617
17th Ave S
8620
1412
1418
1426
1430
1438
1442
1446
1450
S Donovan St
1433
Boeing South Park

- T-117 EAA Boundary
- Alleyway and Landscape Strip Excavation Areas
- Residential Yard Excavation Area
- Tax parcels
- 2574 Buildings with addresses

Background imagery is for reference purposes only, courtesy of the City of Seattle and dated 2009.

0 25 50 100
Feet

N

S:\se\A0006 Lower Duwamish Various\A0006 15H T117\Working MXDs\60pctDesign\Fig2 Excavation Yards 10292012.mxd 10/29/2012 2:27:45 PM

integral consulting inc.

Attachment 1. Site Map
Soil Excavation Boundaries for Residential Yards
Lower Duwamish Superfund Site - Terminal 117 Early Action Area

ATTACHMENT 2

HIGHLINE MEDICAL CENTER
HOSPITAL ROUTE MAP

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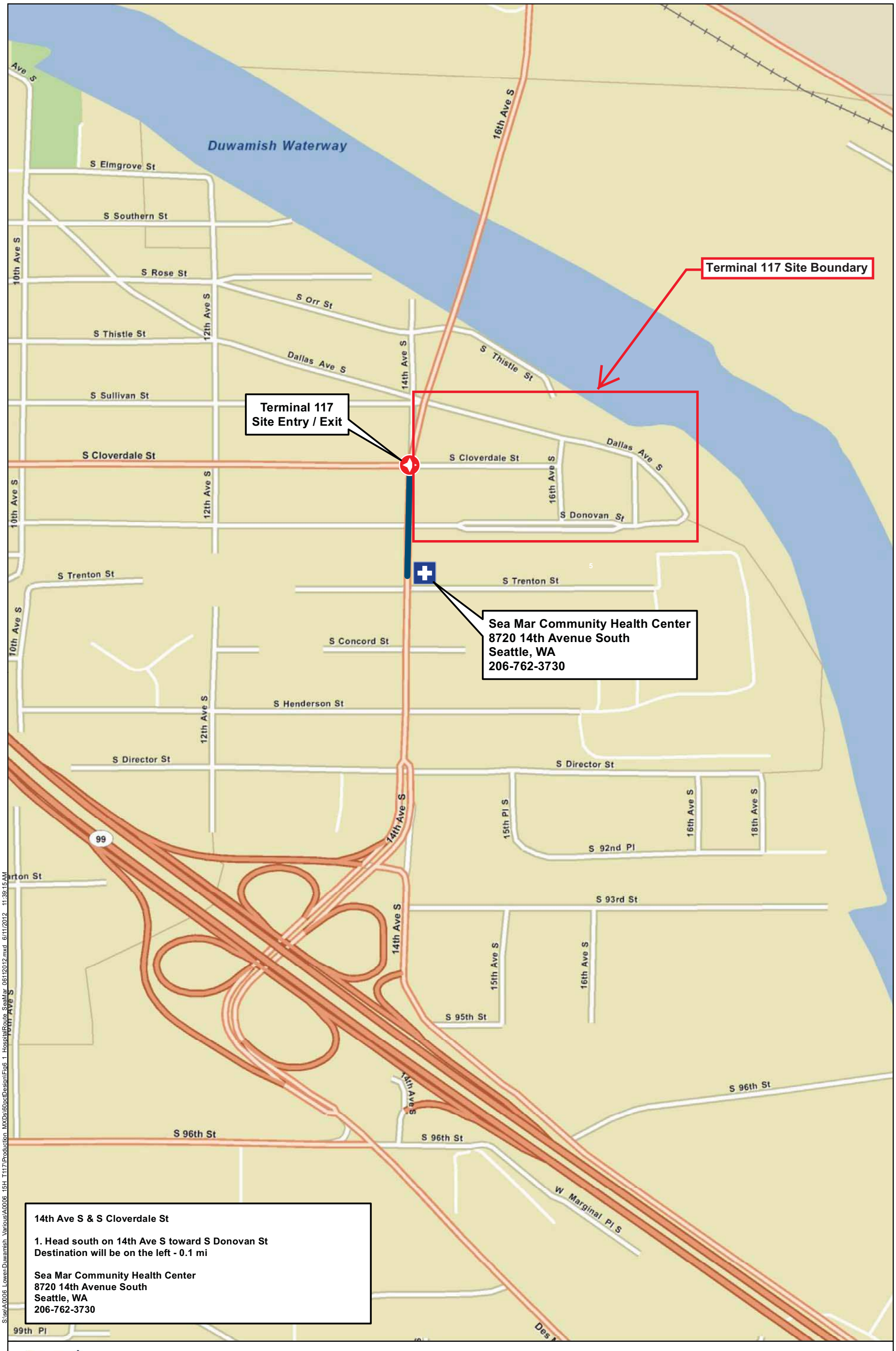
Attachment 2
Highline Medical Center Hospital Route Map

S:\se\A0006_Lower-Duwamish_Various\A0006_15H_T117\Production_MXDs\60pctDesignFig6_2_HospitalRoute_Highline_06112012.mxd 6/11/2012 12:04:57 PM

ATTACHMENT 3

SEA MAR COMMUNITY HEALTH CENTER ROUTE MAP



14th Ave S & S Cloverdale St

1. Head south on 14th Ave S toward S Donovan St
Destination will be on the left - 0.1 mi

Sea Mar Community Health Center
8720 14th Avenue South
Seattle, WA
206-762-3730

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integral consulting inc.

Attachment 3
Sea Mar Community Health Center Route Map

ATTACHMENT 4

REGULATORY NOTICES

You Have a Right to a Safe and Healthful Workplace.

IT'S THE LAW!

- You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.
- You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in the inspection.
- You can file a complaint with OSHA within 30 days of discrimination by your employer for making safety and health complaints or for exercising your rights under the *OSH Act*.
- You have a right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violation.
- Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.
- You have the right to copies of your medical records or records of your exposure to toxic and harmful substances or conditions.
- Your employer must post this notice in your workplace.

The *Occupational Safety and Health Act of 1970 (OSH Act),* P.L. 91-596, assures safe and healthful working conditions for working men and women throughout the Nation. The Occupational Safety and Health Administration, in the U.S. Department of Labor, has the primary responsibility for administering the *OSH Act.* The rights listed here may vary depending on the particular circumstances. To file a complaint, report an emergency, or seek OSHA advice, assistance, or products, call 1-800-321-OSHA or your nearest OSHA office: • Atlanta (404) 562-2300 • Boston (617) 565-9860 • Chicago (312) 353-2220 • Dallas (214) 767-4731 • Denver (303) 844-1600 • Kansas City (816) 426-5861 • New York (212) 337-2378 • Philadelphia (215) 861-4900 • San Francisco (415) 975-4310 • Seattle (206) 553-5930. Teletypewriter (TTY) number is 1-877-889-5627. To file a complaint online or obtain more information on OSHA federal and state programs, visit OSHA's website at **www.osha.gov**. If your workplace is in a state operating under an OSHA-approved plan, your employer must post the required state equivalent of this poster.

1-800-321-OSHA

www.osha.gov

U.S. Department of Labor • Occupational Safety and Health Administration • OSHA 3165

Usted Tiene el Derecho a un Lugar de Trabajo Seguro y Saludable.

¡LO ESTABLECE LA LEY!

- Tiene el derecho de notificar a su empleador o a la OSHA sobre cualquier peligro en su lugar de trabajo. Puede pedir a la OSHA que mantenga su nombre en reserva.
- Tiene el derecho de solicitar una inspección de la OSHA si considera que existen condiciones peligrosas y poco saludables en su lugar de trabajo. Usted o su representante puede participar en la inspección.
- Puede presentar un reclamo a OSHA durante un plazo de 30 días si su empleador lo discrimina por presentar reclamos de seguridad y sanidad o por ejercer sus derechos de acuerdo con la Ley.
- Tiene el derecho de ver las citaciones de la OSHA enviadas a su empleador. Su empleador debe colocar las citaciones en un lugar visible en el sitio de la supuesta infracción o cerca de él.
- Su empleador debe corregir los peligros en el lugar de trabajo dentro del plazo indicado en la citación y debe certificar que dichos peligros se hayan reducido o eliminado.
- Tiene el derecho de recibir copias de su historial médico o de los registros de su exposición a sustancias o condiciones tóxicas y peligrosas.
- Su empleador debe colocar este aviso en un lugar visible de su lugar de trabajo.

La Ley de Seguridad y Salud Ocupacionales de 1970 (la Ley), P.L. 91-596, garantiza condiciones ocupacionales seguras y saludables para los hombres y las mujeres que desempeñen algún trabajo en toda la Nación. La Administración de Seguridad y Salud Ocupacionales (OSHA), dependiente del Departamento del Trabajo de los Estados Unidos, es la responsable principal de supervisar la Ley. Los derechos que se indican en este documento pueden variar según las circunstancias particulares. Para presentar un reclamo, informar sobre una emergencia o pedir consejo, asistencia o productos de la OSHA, llame al 1-800-321-OSHA o a la oficina de la OSHA más cercana a usted: • Atlanta (404) 562-2300 • Boston (617) 565-9860 • Chicago (312) 353-2220 • Dallas (214) 767-4731 • Denver (303) 844-1600 • Ciudad de Kansas (816) 426-5861 • Nueva York (212) 337-2378 • Filadelfia (215) 861-4900 • San Francisco (415) 975-4310 • Seattle (206) 553-5930. El número TTY es 1-877-889-5627. Para presentar un reclamo en línea u obtener más información sobre los programas federales y estatales de la OSHA, visite el sitio Web de la OSHA en www.osha.gov. Si su lugar de trabajo se encuentra en un estado que funciona según un plan aprobado por la OSHA, su empleador debe colocar en un sitio visible el equivalente estatal de este afiche.

1-800-321-OSHA

www.osha.gov

Departmento del Trabajo de los E.E. UU. • Administracíon de Seguridad y Salud Ocupacionales • OSHA 3167

ATTACHMENT 5

SAFETY PROCEDURES FOR HEAT STROKE OR HYPOTHERMIA

FROSTBITE

What happens to the body:

Freezing in deep layers of skin and tissue; pale, waxy-white skin color; skin becomes hard and numb; usually affects fingers, hands, toes, feet, ears, and nose.

What to do: (land temperatures)

- Move the person to a warm, dry area. Don't leave the person alone.
- Remove wet or tight clothing that may cut off blood flow to the affected area.
- **Do not** rub the affected area because rubbing damaged the skin and tissue.
- Gently place the affected area in a warm water bath (105°) and monitor the water temperature to **slowly** warm the tissue. Don't pour warm water directly on the affected area because it will warm the tissue too fast, causing tissue damage. Warming takes 25-40 minutes.
- After the affected area has been warmed, it may become puffy and blister. The affected area may have a burning feeling or numbness. When normal feeling, movement, and skin color have returned, the affected area should be dried and wrapped to keep it warm. **Note:** If there is a chance the affected area may get cold again, do not warm the skin. If the skin is warmed and then becomes cold again, it will cause severe tissue damage.
- Seek medical attention as soon as possible.

How to Protect Workers

- Recognize the environmental and workplace conditions that lead to potential cold-induced illnesses and injuries.
- Learn the signs and symptoms of cold-induced illnesses/injuries and what to do to help the worker.
- Train workers about cold-induced illnesses and injuries.
- Select proper clothing for cold, wet, and windy conditions. Layer clothing to adjust to changing environmental temperatures. Wear a hat and gloves, in addition to underwear that will keep water away from the skin (polypropylene.)
- Take frequent short breaks in warm, dry shelters to allow the body to warm up.
- Perform work during the warmest part of the day.
- Avoid exhaustion or fatigue because energy is needed to keep muscles warm.
- Use the buddy system (work in pairs.)
- Drink warm, sweet beverages (sugar water, sports-type drinks.) **Avoid drinks with caffeine** (coffee, tea, or hot chocolate) **or alcohol**.
- Eat warm, high-calorie foods like hot pasta dishes.

Workers are at increased risk when…

- They have predisposing health conditions such as cardiovascular disease, diabetes, and hypertension.
- They take certain medications. Check with your doctor, nurse, or pharmacy and ask if medicines you take affect you while working in cold environments.
- They are in poor physical condition, have a poor diet, or are older.

HYPOTHERMIA - (Medical Emergency)

What happens to the body:

Normal body temperature (98.6°F/37°C) drops to or below 95°F/35°C; fatigue or drowsiness; uncontrolled shivering; cool, bluish skin; slurred speech; clumsy movements; irritable, irrational, or confused behavior.

What to do: (land temperatures)

- Call for emergency help (i.e., ambulance or 911).
- Move the person to a warm, dry area. Don't leave the person alone.
- Remove wet clothing and replace with warm, dry clothing or wrap the person in blankets.
- Have the person drink warm, sweet drinks (sugar water or sports-type drinks) if he is alert. **Avoid drinks with caffeine** (coffee, tea, or hot chocolate) **or alcohol**.
- Have the person move his arms and legs to create muscle heat. If he is unable to do this, place warm bottles or hot packs in the armpits, groin, neck, and head areas. **Do not** rub the person's body or place him in a warm water bath. This may stop his heart.

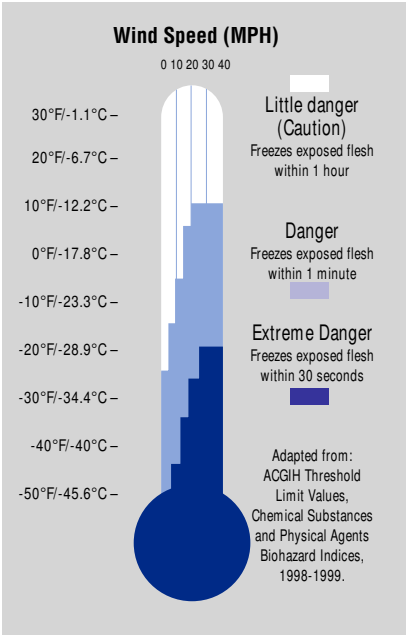
What to do: (water temperatures)

- Call for emergency help (i.e., ambulance or 911). Body heat is lost up to 25 times faster in water.
- **Do not** remove any clothing. Button, buckle, zip, and tighten any collars, cuffs, shoes, and hoods because the layer of trapped water closest to the body provides a layer of insulation that slows the loss of heat. Keep the head out of the water and put on a hat or hood.
- Get out of the water as quickly as possible or climb on anything floating. **Do not** attempt to swim unless a floating object or another person can be reached because swimming or other physical activity uses body heat and reduces survival time by about 50 percent.
- If getting out of the water is not possible, wait quietly and conserve body heat by folding arms across the chest, keeping thighs together, bending knees, and crossing ankles. If another person is in the water, huddle together with chests held closely.

THE COLD STRESS EQUATION

LOW TEMPERATURE + WIND SPEED + WETNESS = INJURIES & ILLNESS

When the body is unable to warm itself, serious cold-related illnesses and injuries may occur, and permanent tissue damage and death may result. **Hypothermia** can occur when *land temperatures* are **above** freezing or *water temperatures* are below 98.6°F/37°C. Cold-related illnesses can slowly overcome a person who has been chilled by low temperatures, brisk winds, or wet clothing.



Oregon Occupational Safety & Health Division
440-3336E-S (9/03)

HEAT EXHAUSTION

What happens to the body:

Headaches, dizziness, or light-headedness, weakness, mood changes, irritability or confusion, feeling sick to your stomach, vomiting, fainting, decreased and dark-colored urine, and pale, clammy skin.

What should be done:

- Move the person to a cool shaded area. Don't leave the person alone. If the person is dizzy or light-headed, lay him on his back and raise his legs about 6-8 inches. If the person is sick to his stomach, lay him on his side.
- Loosen and remove heavy clothing.
- Have the person drink some cool water (a small cup every 15 minutes) if he is not feeling sick to his stomach.
- Try to cool the person by fanning him. Cool the skin with a cool spray mist of water or wet cloth.
- If the person does not feel better in a few minutes call for emergency help (ambulance or call 911.)

(If heat exhaustion is not treated, the illness may advance to heat stroke.)

HEAT STROKE - A Medical Emergency

What happens to the body:

Dry, pale skin (no sweating); hot red skin (looks like a sunburn); mood changes; irritability, confusion, and not making any sense; seizures or fits, and collapse (will not respond).

What should be done:

- Call for emergency help (i.e., ambulance or 911.)
- Move the person to a cool, shaded area. Don't leave the person alone. Lay him on his back and if the person is having seizures, remove objects close to him so he won't hit them. If the person is sick to his stomach, lay him on his side.
- Remove heavy and outer clothing.
- Have the person drink some cool water (a small cup every 15 minutes) if he is alert enough to drink anything and not feeling sick to his stomach.
- Try to cool the person by fanning him or her. Cool the skin with a cool spray mist of water, wet cloth, or wet sheet.
- If ice is available, place ice packs in armpits and groin area.

How to Protect Workers

- Learn the signs and symptoms of heat-induced illnesses and what to do to help the worker.
- Train workers about heat-induced illnesses.
- Perform the heaviest work during the coolest part of the day.
- Slowly build up tolerance to the heat and the work activity (usually takes up to 2 weeks.)
- Use the buddy system (work in pairs.)
- Drink plenty of cool water (one small cup every 15-20 minutes.)
- Wear light, loose-fitting, breathable (like cotton) clothing.
- Take frequent short breaks in cool, shaded areas (allow your body to cool down.)
- Avoid eating large meals before working in hot environments.
- Avoid caffeine and alcoholic beverages (these beverages make the body lose water and increase the risk of heat illnesses.)

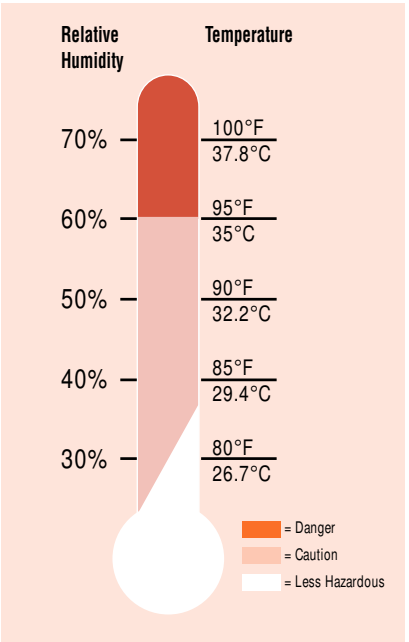
Workers are at increased risk when…

- They take certain medications. Check with your doctor, nurse, or pharmacy to see if medicines you take affect you when working in hot environments.
- They have had a heat-induced illness in the past.
- They wear personal protective equipment.

THE HEAT EQUATION

HIGH TEMPERATURE + HIGH HUMIDITY + PHYSICAL WORK = HEAT ILLNESS

When the body is unable to cool itself through sweating, **serious** heat illnesses may occur. The most severe heat-induced illnesses are **heat exhaustion** and **heat stroke**. If actions are not taken to treat heat exhaustion, the illness could progress to heat stroke and **death**.



Oregon Occupational Safety & Health Division
440-3333E-S(9/03)

ATTACHMENT 6

MATERIAL SAFETY DATA SHEETS

ALCONOX MSDS

Section 1 : MANUFACTURER INFORMATION

Product name: Alconox

Supplier: Same as manufacturer.

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Manufacturer emergency phone number: 800-255-3924.
813-248-0585 (outside of the United States).

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Supplier MSDS date: 2005/03/09

D.O.T. Classification: Not regulated.

Section 2 : HAZARDOUS INGREDIENTS

C.A.S.	CONCENTRATION %	Ingredient Name	T.L.V.	LD/50	LC/50
25155-30-0	10-30	SODIUM DODECYLBENZENESULFONATE	NOT AVAILABLE	438 MG/KG RAT ORAL 1330 MG/KG MOUSE ORAL	NOT AVAILABLE
497-19-8	7-13	SODIUM CARBONATE	NOT AVAILABLE	4090 MG/KG RAT ORAL 6600 MG/KG MOUSE ORAL	2300 MG/M3/2H RAT INHALATION 1200 MG/M3/2H MOUSE INHALATION
7722-88-5	10-30	TETRASODIUM PYROPHOSPHATE	5 MG/M3	4000 MG/KG RAT ORAL 2980 MG/KG MOUSE ORAL	NOT AVAILABLE
7758-29-4	10-30	SODIUM PHOSPHATE	NOT AVAILABLE	3120 MG/KG RAT ORAL 3100 MG/KG MOUSE ORAL >4640 MG/KG RABBIT DERMAL	NOT AVAILABLE

Section 2A : ADDITIONAL INGREDIENT INFORMATION

Note: (supplier).
CAS# 497-19-8: LD50 4020 mg/kg - rat oral.
CAS# 7758-29-4: LD50 3100 mg/kg - rat oral.

Section 3 : PHYSICAL / CHEMICAL CHARACTERISTICS

Physical state: Solid

Appearance & odor: Almost odourless.
White granular powder.

Odor threshold (ppm): Not available.

Vapour pressure (mmHg): Not applicable.

Vapour density (air=1): Not applicable.

By weight: Not available.

Evaporation rate (butyl acetate = 1): Not applicable.

Boiling point (°C): Not applicable.

Freezing point (°C): Not applicable.

pH: (1% aqueous solution).
9.5

Specific gravity @ 20 °C: (water = 1).
0.85 - 1.10

Solubility in water (%): 100 - > 10% w/w

Coefficient of water\oil dist.: Not available.

VOC: None

Section 4 : FIRE AND EXPLOSION HAZARD DATA

Flammability: Not flammable.

Conditions of flammability: Surrounding fire.

Extinguishing media: Carbon dioxide, dry chemical, foam.
Water
Water fog.

Special procedures: Self-contained breathing apparatus required.
Firefighters should wear the usual protective gear.

Auto-ignition temperature: Not available.

Flash point (°C), method: None

Lower flammability limit (% vol): Not applicable.

Upper flammability limit (% vol): Not applicable.

Not available.

Sensitivity to mechanical impact: Not applicable.

Hazardous combustion products: Oxides of carbon (COx).
Hydrocarbons.

Rate of burning: Not available.

Explosive power: None

Section 5 : REACTIVITY DATA

Chemical stability: Stable under normal conditions.

Conditions of instability: None known.

Hazardous polymerization: Will not occur.

Incompatible substances: Strong acids.
Strong oxidizers.

Hazardous decomposition products: See hazardous combustion products.

Section 6 : HEALTH HAZARD DATA

Route of entry: Skin contact, eye contact, inhalation and ingestion.

Effects of Acute Exposure

Eye contact: May cause irritation.

Skin contact: Prolonged contact may cause irritation.

Inhalation: Airborne particles may cause irritation.

Ingestion: May cause vomiting and diarrhea.
May cause abdominal pain.
May cause gastric distress.

Effects of chronic exposure: Contains an ingredient which may be corrosive.

LD50 of product, species & route: > 5000 mg/kg rat oral.

LC50 of product, species & route: Not available for mixture, see the ingredients section.

Exposure limit of material: Not available for mixture, see the ingredients section.

Sensitization to product: Not available.

Carcinogenic effects: Not listed as a carcinogen.

Reproductive effects: Not available.

Teratogenicity: Not available.

Mutagenicity: Not available.

Synergistic materials: Not available.

Medical conditions aggravated by exposure: Not available.

First Aid

Skin contact: Remove contaminated clothing.
Wash thoroughly with soap and water.
Seek medical attention if irritation persists.

Eye contact: Check for and remove contact lenses.
Flush eyes with clear, running water for 15 minutes while holding eyelids open: if irritation persists, consult a physician.

Inhalation: Remove victim to fresh air.
Seek medical attention if symptoms persist.

Ingestion: Dilute with two glasses of water.
Never give anything by mouth to an unconscious person.
Do not induce vomiting, seek immediate medical attention.

Section 7 : PRECAUTIONS FOR SAFE HANDLING AND USE

Leak/Spill: Contain the spill.
Recover uncontaminated material for re-use.
Wear appropriate protective equipment.
Contaminated material should be swept or shoveled into appropriate waste container for disposal.

Waste disposal: In accordance with municipal, provincial and federal regulations.

Handling procedures and equipment: Protect against physical damage.
Avoid breathing dust.
Wash thoroughly after handling.
Keep out of reach of children.
Avoid contact with skin, eyes and clothing.
Launder contaminated clothing prior to reuse.

Storage requirements: Keep containers closed when not in use.
Store away from strong acids or oxidizers.
Store in a cool, dry and well ventilated area.

Section 8 : CONTROL MEASURES

Precautionary Measures

Gloves/Type:

Neoprene or rubber gloves.

Respiratory/Type:

If exposure limit is exceeded, wear a NIOSH approved respirator.

Eye/Type:

Safety glasses with side-shields.

Footwear/Type: Safety shoes per local regulations.

Clothing/Type: As required to prevent skin contact.

Other/Type: Eye wash facility should be in close proximity.
Emergency shower should be in close proximity.

Ventilation requirements: Local exhaust at points of emission.

Monsanto
Material Safety Data

POLYCHLORINATED BIPHENYLS (PCBs)

Emergency Phone No.
(Call Collect)
314-694-1000

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: POLYCHLORINATED BIPHENYLS (PCBs)
Aroclor® Series 1016, 1221, 1232, 1242, 1248, 1254, 1260, 1262, 1268
Therminol® FR Series

MSDS Number: M00018515 Date: 12/95

Chemical Family: Chlorinated Hydrocarbons
Chemical Name: Polychlorinated biphenyls
Synonyms: PCBs, Chlorodiphenyls, Chlorinated biphenyls

Trade Names/Common Names:

PYRANOL® and INERTEEN® are trade names for commonly used dielectric fluids that may have contained varying amounts of PCBs as well as other components including chlorinated benzenes.

ASKAREL is the generic name for a broad class of fire resistant synthetic chlorinated hydrocarbons and mixtures used as dielectric fluids that commonly contained about 30 - 70% PCBs. Some ASKAREL fluids contained 99% or greater PCBs and some contained no PCBs.

PYDRAUL® is the trade name for hydraulic fluids that, prior to 1972, may have contained varying amounts of PCBs and other components including phosphate esters.

The product names/trade names are representative of several commonly used Monsanto products (or products formulated with Monsanto products). Other trademarked PCB products were marketed by Monsanto and other manufacturers. PCBs were also manufactured and sold by several European and Japanese companies. Contact the manufacturer of the trademarked product, if not in this listing, to determine if the formulation contained PCBs.

In 1972, Monsanto restricted sales of PCBs to applications involving only closed electrical systems, (transformers and capacitors). In 1977, all manufacturing and sales were voluntarily terminated. In 1979, EPA restricted the manufacture, processing, use, and distribution of PCBs to specifically exempted and authorized activities.

MONSANTO COMPANY, 800 N. LINDBERGH BLVD., ST. LOUIS, MO 63167

FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT
Call CHEMTREC - Day or Night - 1-800-424-9300 Toll free in the continental U.S., Hawaii, Puerto Rico, Canada, Alaska, or Virgin Islands. For calls originating elsewhere: 202-483-7616 (collect calls accepted)

For additional nonemergency information, call: 314-694-3344.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemically, commercial PCBs are defined as a series of technical mixtures, consisting of many isomers and compounds that vary from mobile, oily liquids to white crystalline solids and hard noncrystalline resins. Technical products vary in composition, in the degree of chlorination, and possibly according to batch.

The mixtures generally used contain an average of 3 atoms of chlorine per molecule (42% chlorine) to 5 atoms of chlorine per module (54% chlorine). They were used as components of dielectric fluids in transformers and capacitors. Prior to 1972, PCB applications included heat transfer media, hydraulic, and other industrial fluids, plasticizers, carbonless copy paper, paints, inks, and adhesives.

Component	CAS No.
chlorinated biphenyl	1336-36-3
Aroclor 1016	12674-11-2
Aroclor 1221	11104-28-2
Aroclor 1232	11141-16-5
Aroclor 1242	53469-21-9
Aroclor 1248	12672-29-6
Aroclor 1254	11097-69-1
Aroclor 1260	11096-82-5
Aroclor 1262	37324-23-5
Aroclor 1268	11100-14-4

There are also CAS Numbers for individual PCB congeners and for mixtures of Aroclor® products.

PCBs are identified as hazardous chemicals under criteria of the OSHA Hazard Communication Standard (29 CFR Part 1910.1200). PCBs have been listed in the International Agency for Research on Cancer (IARC) Monographs (1987)-Group 2A and in the National Toxicology Program (NTP) Annual Report on Carcinogens (Seventh).

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Appearance and Odor: PCB mixtures range in form and color from clear to amber liquids to white crystalline solids. They have a mild, distinctive odor and are not volatile at room temperature. Refer to Section 9 for details.

WARNING!
CAUSES EYE IRRITATION
MAY CAUSE SKIN IRRITATION

PROCESSING AT ELEVATED TEMPERATURES MAY RELEASE VAPORS OR FUMES WHICH MAY CAUSE RESPIRATORY TRACT IRRITATION

POTENTIAL HEALTH EFFECTS

Likely Routes of Exposure: Skin contact and inhalation of heated vapors

Eye Contact: Causes moderate irritation based on worker experience.

Skin Contact: Prolonged or repeated contact may result in redness, dry skin and defatting based on human experience. A potential exists for developing chloracne. PCBs can be absorbed through intact skin.

Inhalation: Due to the low volatility of PCBs, exposure to this material in ambient conditions is not expected to produce adverse health effects. However, at elevated processing temperatures, PCBs may produce a vapor that may cause respiratory tract irritation if inhaled based on human experience.

Ingestion: No more than slightly toxic based on acute animal toxicity studies. Coughing, choking and shortness of breath may occur if liquid material is accidentally drawn into the lungs during swallowing or vomiting.

Other: Numerous epidemiological studies of humans, both occupationally exposed and nonworker environmentally exposed populations, have not demonstrated any causal relationship between PCB exposure and chronic human illnesses such as cancer or neurological or cardiovascular effects. PCBs at high dosage can cause skin symptoms; however, these subside upon removal of the exposure source.

Refer to Section 11 for toxicological information.

4. FIRST AID MEASURES

IF IN EYES, immediately flush with plenty of water for at least 15 minutes. If easy to do, remove any contact lenses. Get medical attention. Remove material from skin and clothing.

IF ON SKIN, immediately flush the area with plenty of water. Wash skin gently with soap as soon as it is available. Get medical attention if irritation persists.

IF INHALED, remove person to fresh air. If breathing is difficult, get medical attention.

IF SWALLOWED, do NOT induce vomiting. Rinse mouth with water. Get medical attention. Contact a Poison Control Center. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

NOTE TO PHYSICIANS: Hot PCBs may cause thermal burn. If electrical equipment arcs between conductors, PCBs or other chlorinated hydrocarbon dielectric fluids may decompose to produce hydrochloric acid (HCl), a respiratory irritant. If large amounts are swallowed, gastric lavage may be considered.

5. FIRE FIGHTING MEASURES

Flash Point: 284 degrees F (140 degrees C) or higher depending on the chlorination level of the Aroclor product

Fire Point: 349 degrees F (176 degrees C) or higher depending on the chlorination level of the Aroclor product

NOTE: Refer to Section 9 for individual flash points and fire points.

Extinguishing Media: Extinguish fire using agent suitable for surrounding fire. Use dry chemical, foam, carbon dioxide or water spray. Water may be ineffective. Use water spray to keep fire-exposed containers or transformer cool.

PCBs are fire-resistant compounds. They may decompose to form CO, CO2, HCl, phenolics, aldehydes, and other toxic combustion products under severe conditions such as exposure to flame or hot surfaces.

Dielectric fluids having PCBs and chlorinated benzenes as components have been reported to produce polychlorinated dibenzo-p-dioxins (PCDDs) and furans (PCDFs) during fire situations involving electrical equipment. At temperatures in the range of 600-650 degrees C in the presence of excess oxygen, PCBs may form polychlorinated dibenzofurans (PCDFs). Laboratory studies under similar conditions have demonstrated that PCBs do not produce polychlorinated dibenzo-p-dioxins (PCDDs).

Federal regulations require all PCB transformers to be registered with fire response personnel.

If a PCB transformer is involved in a fire-related incident, the owner of the transformer may be required to report the incident. Consult and follow appropriate federal, state and local regulations.

Fire Fighting Equipment: Fire fighters and others exposed to products of combustion should wear self-contained breathing apparatus. Equipment should be thoroughly decontaminated after use.

6. ACCIDENTAL RELEASE MEASURES

Cleanup and disposal of liquid PCBs and other PCB items are strictly regulated by the federal government. The regulations are found at 40 CFR Part 761. Consult these regulations as well as applicable state and local regulations prior to any cleanup or disposal of PCBs, PCB items, or PCB contaminated items.

If PCBs leak or are spilled, the following steps should be taken immediately:

All nonessential personnel should leave the leak or spill area.

The area should be adequately ventilated to prevent the accumulation of vapors.

The spill/leak should be contained. Loss to sewer systems, navigable waterways, and streams should be prevented. Spills/leaks should be removed promptly by means of absorptive material, such as sawdust, vermiculite, dry sand, clay, dirt or other similar materials, or trapped and removed by pumping or other suitable means (traps, drip-pans, trays, etc.).

Personnel entering the spill or leak area should be furnished with appropriate personal protective equipment and clothing as needed. Refer to Section 8 for personal protection equipment and clothing.

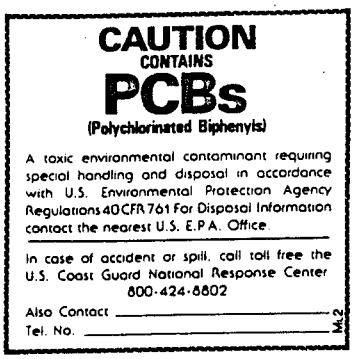
Personnel trained in emergency procedures and protected against attendant hazards should shut off sources of PCBs, clean up spills, control and repair leaks, and fight fires in PCB areas.

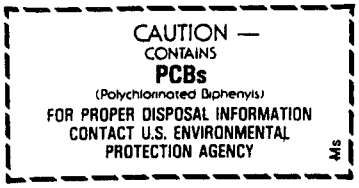
Refer to Section 13 for disposal information and Sections 14 and 15 for information regarding reportable quantity, and Section 7 for marking information.

7. HANDLING AND STORAGE

Care should be taken to prevent entry into the environment through spills, leakage, use vaporization, or disposal of liquid or containers. Avoid prolonged breathing of vapors or mists. Avoid contact with eyes or prolonged contact with skin. If skin contact occurs, remove by washing with soap and water. Following eye contact, flush with water. In case of spillage onto clothing, the clothing should be removed as soon as practical, skin washed, and clothing laundered. Comply with all federal, state, and local regulations.

Federal regulations under the Toxic Substances Control Act require PCBs, PCB items, storage areas, transformer vaults, and transport vehicles to be marked (check regulations, 40 CFR 761, for details).





Storage: The storage of PCB items or equipment (those containing 50 ppm or greater PCBs) and PCB waste is strictly regulated by 40 CFR Part 761. The storage time is limited, the storage area must meet physical requirements, and the area must be labeled.

Avoid contact with eyes.
Wash thoroughly after handling.
Avoid breathing processing fumes or vapors.
Process using adequate ventilation.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye Protection: Wear chemical splash goggles and have eye baths available where there is significant potential for eye contact.

Skin Protection: Wear appropriate protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine the appropriate type glove for a given application. Wear chemical goggles, face shield, and chemical resistant clothing such as a rubber apron when splashing is likely. Wash immediately if skin is contacted. Remove contaminated clothing promptly and launder before reuse. Clean protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash thoroughly after handling.

ATTENTION! Repeated or prolonged skin contact may cause chloracne in some people.

Respiratory Protection: Avoid breathing vapor, mist, or dust. Use NIOSH/MSHA approved equipment when airborne exposure limits are exceeded. Full facepiece equipment is recommended when airborne exposure limits are exceeded and, if used, replaces the need for face shield and/or chemical splash goggles. Consult respirator manufacturer to determine the type of equipment for a given application. The respirator use limitations specified by NIOSH/MSHA or the manufacturer must be observed. High airborne concentrations may require use of self-contained breathing apparatus or supplied air respirator. Respiratory protection programs must be in compliance with 29 CFR Part 1910.134.

ATTENTION! Repeated or prolonged inhalation may cause chloracne in some people.

Ventilation: Provide natural or mechanical ventilation to control exposure levels below airborne exposure limits (see below). If practical, use local mechanical exhaust ventilation at sources of vapor or mist, such as open process equipment.

Airborne Exposure Limits:

Product: Chlorodiphenyl (42% chlorine)

OSHA PEL: 1 mg/m^3 8-hour time-weighted average - Skin*
ACGIH TLV: 1 mg/m^3 8-hour time-weighted average - Skin*

Product: Chlorodiphenyl (54% chlorine)

OSHA PEL: 0.5 mg/m^3 8-hour time-weighted average - Skin*
ACGIH TLV: 0.5 mg/m^3 8-hour time-weighted average - Skin*

*For Skin notation see Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Government Industrial Hygienists, 1995-1996.

9. PHYSICAL AND CHEMICAL PROPERTIES

PROPERTIES OF SELECTED AROCLORS*							
PROPERTY	**1016**	**1221**	**1232**	**1242**	**1248**	**1254**	**1260**
Color (APHA)	40	100	100	100	100	100	150
Physical state	mobile oil	mobile oil	mobile oil	mobile oil	mobile oil	viscous liquid	sticky resin
Stability	inert	inert	inert	inert	inert	inert	inert
Density (lb/gal 25°C)	11.40	9.85	10.55	11.50	12.04	12.82	13.50
Specific gravity x/15.5°C	1.36-1.37 x-25°	1.18-1.19 x-25°	1.27-1.28 x-25°	1.30-1.39 x-25°	1.40-1.41 x-65°	1.49-1.50 x-65°	1.55-1.56 x-90°
Distillation range (°C)	323-356	275-320	290-325	325-366	340-375	365-390	385-420
Acidity mg KOH/g, maximum	.010	.014	.014	.015	.010	.010	.014
Fire point (°C)	none to boiling point	176	238	none to boiling point	none to boiling point	none to boiling point	none to boiling point
Flash point (°C)	170	141-150	152-154	176-180	193-196	none	none
Vapor pressure (mm Hg @ 100°F)	NA	NA	0.005	0.001	0.00037	0.00006	NA
Viscosity (Saybolt Univ. Sec. @ 100°F) (centistokes)	71-81 13-16	38-41 3.6-4.6	44-51 5.5-7.7	82-92 16-19	185-240 42-52	1800-2500 390-540	— —

NA—*Not Available*

NOTE: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

10. STABILITY AND REACTIVITY

Stability: PCBs are very stable, fire-resistant compounds.
Materials to Avoid: None
Hazardous Decomposition
Products: PCBs may decompose to form CO, CO_2, HCl, phenolics, aldehydes, and other toxic combustion products under severe conditions such as exposure to flame or hot surface.
Hazardous Polymerization: Does not occur.

11. TOXICOLOGICAL INFORMATION

Data from laboratory studies conducted by Monsanto and from the available scientific literature are summarized below.
Single exposure (acute) studies indicate:
Oral - Slightly Toxic (Rat LD50 - 8.65 g/kg for 42% chlorinated; 11.9 g/kg for 54% chlorinated)

The liquid products and their vapors are moderately irritating to eye tissues. Animal experiments of varying duration and at different air concentrations show that for similar exposure conditions, the 54% chlorinated material produces more liver injury than the 42% chlorinated material.

There are literature reports that PCBs can impair reproductive functions in monkeys. The National Cancer Institute (NCI) performed a study in 1977 using Aroclor 1254 with both sexes of rats. NCI stated that the PCB, Aroclor 1254, was not carcinogenic under the conditions of their bioassay. There is sufficient evidence in the scientific literature to conclude that Aroclor 1260 can cause liver cancer when fed to rodents at high doses. Similar experiments with less chlorinated PCB products have produced negative or equivocal results.

The consistent finding in animal studies is that PCBs produce liver injury following prolonged and repeated exposure by any route, if the exposure is of sufficient degree and duration. Liver injury is produced first, and by exposures that are less than those reported to cause cancer in rodents. Therefore, exposure by all routes should be kept sufficiently low to prevent liver injury.

Numerous epidemiological studies of humans, both occupationally exposed and nonworker environmentally exposed population, have not demonstrated any causal relationship between PCB exposure and chronic human illnesses such as cancer or neurological or cardiovascular effects. PCBs at high dosage can cause skin symptoms; however, these subside upon removal of the exposure source.

PCBs have been listed in the International Agency for Research on Cancer (IARC) Monographs (1987)-Group 2A and in the National Toxicology Program (NTP) Seventh Annual Report on Carcinogens.

12. ECOLOGICAL INFORMATION

Care should be taken to prevent entry of PCBs into the environment through spills, leakage, use, vaporization or disposal of liquid or solids. PCBs can accumulate in the environment and can adversely affect some animals and aquatic life. In general, PCBs have low solubility in water, are strongly bound to soils and sediments, and are slowly degraded by natural processes in the environment.

13. DISPOSAL CONSIDERATIONS

The disposal of PCB items or equipment (those containing 50 ppm or greater PCBs) and PCB wastes is strictly regulated by 40 CFR Part 761. For example, all wastes and residues containing PCBs (wiping cloths, absorbent material, used disposable protective gloves and clothing, etc.) should be collected, placed in proper containers, marked and disposed of in the manner prescribed by EPA regulations (40 CFR Part 761) and applicable state and local regulations.

14. TRANSPORT INFORMATION

The data provided in this section are for information only. Please apply the appropriate regulations to properly classify a shipment for transportation.

DOT Classification:	IF WEIGHT OF PCBs TO BE SHIPPED IS OVER ONE POUND, THE FOLLOWING CLASSIFICATION AND LABEL APPLY.	
DOT Label:	LIQUID:	Environmentally Hazardous Substance, liquid, n.o.s. (Contains PCB), 9, UN 3082, III
	SOLID:	Environmentally Hazardous Substance, solid, n.o.s. (Contains PCB), 9, UN 3077, III
DOT Label:	Class: 9	
DOT Reportable Quantity:	One Pound	
IMO Classification:	Polychlorinated Biphenyls, IMO Class 9, UN 2315, II IMO Page 9034, EMS 6.1-02	
IATA/ICAO Classification:	Polychlorinated Biphenyls, 9, UN2315, II	

15. REGULATORY INFORMATION

For regulatory purposes, under the Toxic Substances Control Act, the term "PCBs" refers to a chemical substance limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances which contain such a substance (40 CFR Part 761).

TSCA Inventory: not listed.

Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370): Immediate, Delayed.
SARA Section 313 Toxic Chemical(s): Listed-1993 (De Minimis concentration 0.1%.)

Reportable Quantity (RQ) under DOT (49 CFR) and CERCLA Regulations: 1 lb. (polychlorinated biphenyls) PCBs.

Release of more than 1 (one) pound of PCBs to the environment requires notification to the National Response Center (800-424-8802 or 202-426-2675).

Various state and local regulations may require immediate reporting of PCB spills and may also define spill cleanup levels. Consult your attorney or appropriate regulatory officials for information relating to spill reporting and spill cleanup.

16. OTHER INFORMATION

Reason for revision: Conversion to the 16 section format. Supersedes MSDS dated 10/88.

FOR ADDITIONAL NONEMERGENCY INFORMATION, CONTACT:

Gary W. Mappes
Manager, Product & Environmental Safety

Robert G. Kaley, II
Director, Environmental Affairs

Monsanto Company
800 North Lindbergh Boulevard
St. Louis, MO 63167
(314) 694-3344

ATTACHMENT 7

NEAR-MISS INCIDENT REPORT

Near-Miss Incident Report

(completed by field staff)

Employee: _____

Office or site location: _____

Near-Miss Incident (check one or more): Exposure ( ) Physical injury ( ) Property damage ( )

Location (city and state):_____ Project and Contract No. _____

Date of incident: _____ Time of incident: _____

Fully describe the incident, including how it happened, persons involved, if chemicals were involved in the incident, etc.:

_____

_____

_____

_____

_____

_____

_____

Was the operation being conducted under an established safety plan? (Yes / No)

If yes, attach a copy. If no, explain: _____

_____

_____ _____

Employee's signature Date

_____ _____

Project manager's signature Date

_____ _____

Site safety officer's signature Date

Corporate Health and Safety Manager Review and Comments

Corrective action/procedure changes carried out at the site:

Corrective actions to be taken to prevent similar incidents at other sites:

Corporate health and safety manager's signature

Date