

APPENDIX C
SITE-SPECIFIC HEALTH AND SAFETY PLAN

Remedial Investigation/Feasibility Study
Astoria Area-Wide Petroleum Site
Astoria, Oregon

Prepared by

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1.0 INTRODUCTION

This site-specific Health and Safety Plan (HASP) has been prepared by *EnviroLogic Resources, Inc.* to guide field activities that will be conducted at the Astoria Area-Wide site in Astoria, Oregon (Figure C-1). All personnel are advised that this field project may result in exposure to chemical and physical hazards. The requirements in this HASP are designed to minimize the risk of chemical exposure or physical injuries by a combination of personal protective equipment (PPE), engineering controls, and safe work practices.

This HASP presents the protocols that will be required to provide for worker health and safety during the investigative activities to be conducted at the Astoria Area-Wide site. Specifically, this plan presents:

- A description of known existing site conditions;
- A description of the project health and safety organization;
- Safety rules and procedures;
- Criteria for hazard and risk analysis;
- A description of levels of personal protection and required equipment;
- Air monitoring procedures;
- Emergency response information;
- Training requirements; and
- Requirements for routine health care and health monitoring.

The requirements outlined in this plan are considered the minimum health and safety requirements due to potential site contamination. All fieldwork will be performed in accordance with Occupational Safety and Health Administration (OSHA) Standard 29 CFR 1910-120, which regulates hazardous waste site operations; as well as Oregon requirements outlined in the Oregon Administrative Rules (OAR 437). This plan does not address physical worker safety issues that may be associated with excavation, trenching, and shoring (OAR 437-03, Subdivision P) or work in confined spaces (OAR 437-02, Subdivision E).

1.1 WORK AND CHEMICALS COVERED BY THE HASP

Environmental activities planned for the Astoria Area-Wide site and covered by this HASP will occur during May 2002 through January 2004, and periodically thereafter as necessary. Field investigations covered by this health and safety plan may include:

- Sampling and analyzing soil through various techniques (i.e., drilling, GeoProbe[®], test pits) in and adjacent to areas previously reported to be contaminated with petroleum products, or where previous site activities suggest the potential for contamination;
- Installing monitoring wells and sampling and analyzing ground water in areas down-gradient of previously identified soil or ground-water contamination and/or where previous hydrogeologic characterization is considered insufficient;
- Abandoning existing wells when needed;
- Measuring water levels periodically to evaluate flow directions and piezometric head gradients; and
- Conducting tests in selected monitoring wells to evaluate aquifer properties and potential contaminant migration pathways.

This health and safety plan does not cover site activities that are limited to walking across any exclusion zone designated in this plan when the activities noted above are not in progress in that exclusion zone, and if the activities in progress in any other exclusion zone do not represent a reasonable risk of exposure.

Petroleum-related chemicals are the only expected constituents of concern at the site. Table C-1, in Section 4.2, lists the potential constituents of concern, with their maximum previously detected concentrations (if known) and health-based exposure information. The symptoms listed as a result of exposure are generally associated with acute (short term) exposures to high concentrations of a constituent. Such symptoms may not be associated with the lower level exposure that would be the most likely exposure scenario encountered during site work. Lack of these symptoms does not indicate that exposure is not occurring. Also, symptoms of exposure are not available for some of the constituents. Therefore, use of prescribed protective equipment and monitoring instruments in

accordance with this plan is required in order for exposure to these constituents to be kept as low as possible.

1.2 HASP APPLICABILITY AND ADHERENCE

All individuals performing fieldwork at the Astoria Area-Wide site must read, understand, and comply with this health and safety plan. All PRP consultants have the primary responsibility for site safety of their own personnel. All PRP consultants must provide their own employees with all applicable training, medical testing, and PPE required in this HASP and may choose to adopt their own HASP as long as it meets the minimal requirements presented in this HASP. If any information presented in this plan is unclear, the reader should contact the site safety officer for clarification prior to participating in any field activity. Once the information has been read and understood, the individual must sign the Acknowledgment (Attachment C-1), which will then be placed in the job file.

Similarly, all responsible parties consultants and subcontractors for *EnviroLogic Resources'* must prepare their own health and safety plan that is at least as protective as this plan, or they may adopt this plan as their own. Copies of an acknowledgment form similar to that provided as Attachment C-1 must be provided to *EnviroLogic Resources'* site health and safety officer prior to the commencement of field activities.

Activities conducted as part of this investigation shall be conducted without creating health and safety risks for nearby workers or the public. All onsite personnel shall be attentive to the potential for release of contaminated materials associated with field activities and shall immediately bring all such matters to the attention of the appropriate site safety officer. Decontamination procedures and other elements of the field procedures (e.g., access to/from work areas by heavy equipment) have been developed to be protective of both worker and public health and safety.

Failure to comply with the requirements of this plan are grounds for immediate dismissal.

1.3 RESPONSIBLE INDIVIDUALS

Safety during the field investigations will be the responsibility of the *EnviroLogic Resources'* project manager and the designated site safety officer. The site safety officer, or designee, will be present at the site at all times during field activities related to the investigation. For particular field events,

EnviroLogic Resources may designate a representative of the potentially responsible party where the field work is being conducted to act as a local site safety officer.

1.4 HASP MODIFICATIONS

This plan is flexible, and allows unanticipated site-specific problems to be addressed, while providing adequate and suitable worker protection. The plan may be modified at any time, based on the judgment of the respective site safety officer or the project safety officer, as appropriate. Minor changes to the plan regarding day-to-day activities (e.g., location of decontamination station, etc.) may be made by the site safety officer. Substantive changes to procedures (e.g., monitoring frequency, etc.) must also receive the concurrence of both the site safety officer and the project safety officer. Any modifications to the plan will be documented using Attachment C-2 (Modification to Health and Safety Plan) and will be presented to the onsite team during a safety briefing.

2.0 SITE ORGANIZATION AND OPERATION

The areas of the site to be investigated and the type of activities involved in the investigation are diverse. Additionally, the distribution of contamination at the site is non-uniform in nature. These factors preclude the use of a single work zone boundary.

The designated level of protection for each work area onsite may be downgraded (C to D) if monitoring data obtained prior to or during work activities indicate that such a downgrade is appropriate. Conversely, the level of protection must be upgraded if monitoring conducted during work activities so indicates (Section 7 presents air monitoring action levels). Figure C-1 should be regarded only as an indication of the general work area, actual boundaries may vary slightly with work activity requirements and appropriate exclusion zones will be designated for each work area.

2.1 WORK ZONES

Each work area will consist of an exclusion zone, and a support zone. Each zone in each work area will be established on an activity-by-activity basis prior to initiation of work and will be clearly delineated (marked by tape, fencing, or suitable barrier).

Exclusion Zone: The outer perimeter of each work area defines the outer perimeter of the exclusion zone for that work area. Only authorized field personnel will be allowed in each exclusion zone. The initial level of protection required in the exclusion zone may be adjusted as conditions change. Levels of protection are discussed in more detail in Section 5.

Support Zone: Located adjacent to the exclusion zone, the support zone is where all personnel will suit up in specified personal protective equipment before entering the work area defined by the exclusion zone. The support zone includes clean equipment storage and personnel resting and eating facilities.

2.2 SITE SECURITY

Many of the areas in which field activities will occur are restricted-access industrial areas. For work activities that are conducted in areas with public access, the work area will be blocked off and posted to prevent potential exposure to the public.

3.0 SAFETY RULES AND PROCEDURES

Safety is the responsibility of every individual involved in project efforts. Whether in the office or in the field, properly followed procedures are essential for personal safety and to minimize injuries or accidents involving equipment. Potential hazards while working at the site include, but are not limited to:

- Exposure to toxic and/or hazardous chemicals;
- Physical hazards from use of drilling, sampling, and testing equipment;
- Physical hazards from heavy equipment; and
- Physical hazards from working conditions (e.g., heat stress, hypothermia);

3.1 SAFETY RULES

All personnel working in the field will follow the rules and procedures listed below:

- All personnel will conduct themselves in a professional manner at all times.
- No personnel will be admitted into an operational exclusion zone without safety equipment in proper working condition and requisite training.
- All personnel must comply with the established safety procedures. Anyone working onsite for one of the responsible parties, or under contract with *EnviroLogic Resources*, who does not comply with this health and safety plan may be immediately dismissed from the site.
- Working while under the influence of intoxicants, narcotics, or controlled substances is prohibited. Personnel should not take prescription drugs if the potential for contact with toxic substances exists, unless approved by a physician.
- Firearms, ammunition, fireworks, and explosives are prohibited.
- Climbing or standing on machinery (other than drill rigs or service trucks) or equipment is prohibited unless authorized by the site safety officer.
- Long hair must be contained inside a hard hat. Facial hair that interferes with proper operation and fit of respiratory protection gear is not allowed when working under Level C or stricter.

- A team system will be used within an exclusion zone. During site operations, each worker is a safety backup for his/her team partners and should make all personnel aware of dangerous situations that may develop. Subcontractors may act as teammates when the work requires only one consultant staff member in order to be completed satisfactorily.
- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in an exclusion zone.
- Smoking or consumption of food and beverages is allowed only within designated areas in the support zones.
- Disposable clothing will be used whenever necessary and appropriate to minimize the risk of cross contamination.
- The number of personnel and the amount of equipment in contaminated areas will be minimized to allow for efficient site operations.
- Only trained and authorized personnel will collect samples.
- Contact with contaminated or potentially contaminated material should be avoided. Efforts will be made to stage site activity upwind of investigative equipment, activities, and materials.
- Proper decontamination procedures must be followed before leaving an exclusion zone and the site, unless medical emergencies dictate otherwise (Section 3.2.3). All decontamination residual materials, and any other potentially contaminated materials, will be handled properly and kept onsite or at a designated secure stockpile area.
- Only approved work clothes or equipment will be allowed within the exclusion zones.
- Exchange of personal protective equipment will not be allowed.

3.2 SAFETY PROCEDURES

Safety procedures to be used in the conduct of the work are presented below.

3.2.1 Before Starting Work

Prior to beginning investigation activities, review site information updates. These updates will be provided by the site safety officer and will provide any new information concerning:

- Scope of work;
- Expected hazards;
- Special conditions;
- Sampling procedures;
- Location of phones;
- Emergency medical information;
- Level of personal protection required;
- Finish eating and extinguish smoking materials prior to suiting up. ;
- Attend safety briefing and worker question and answer period, if applicable;
- Check safety gear and equipment. Suit up as required to begin activities; and
- Measure and delineate exclusion zone (unless established previously).

3.2.2 Activities in the Exclusion Zone

For all activities in the exclusion zone the following will apply:

- At a minimum personal protective equipment of Level D (modified) (Section 5) will be worn.
- For activities capable of creating volatile airborne contamination, levels of personal protective equipment will be adjusted according to results of work zone air monitoring (Section 6).
- Whenever possible, personnel will be stationed upwind of field activities capable of creating airborne contamination.
- If any physical discomfort is experienced (e.g., abnormalities, nausea, lightheadedness), immediately stop work, tell the other team members, and leave the area.
- If any personal protective equipment fails, immediately leave the area.
- One person must never be left alone in an exclusion zone.

- Use maximum care in handling samples. If the sampling site is not accessible using gear available (i.e., water too high, slippery or steeply sloped surface, holes, etc.), confer with the *EnviroLogic Resources* project manager and/or site safety officer, as appropriate, to arrange an alternate sampling site or appropriate equipment/procedures to obtain samples safely.
- Immediately wipe off spills and dirt from sampling containers.

3.2.3 Decontamination Procedures for Exiting the Exclusion Zone

All personnel and equipment must be properly decontaminated before entering a support zone from an exclusion zone. All contaminated equipment and materials will leave only through the contamination reduction zone or will be contained onsite; any potentially contaminated materials to be stockpiled will be kept in designated, secure locations.

3.2.3.1 Routine Decontamination Procedures

A decontamination area will be set up in the contamination reduction zone at the border of each exclusion zone. Prior to leaving the exclusion zone:

- Portable sampling equipment will be washed or placed in/on plastic for vehicle transport to equipment decontamination area.
- Drilling rig auger flights and Geoprobe® push rods and sampling probes will be placed on a trailer for transport to the decontamination area.
- Drill cuttings will be brushed and/or washed off the drill rig before moving to the decontamination area, to minimize transport of potentially contaminated materials from the exclusion zone.

In the contaminant reduction zone, sampling, drilling, and other equipment will be decontaminated as follows:

- Sampling equipment will be decontaminated as outlined in the work plan.
- All heavy equipment must be thoroughly decontaminated prior to leaving the site, with particular care taken in decontaminating those parts of the heavy equipment that have come in direct contact with contaminants, such as tracks, tires, shovels, grapples, and scoops.

High-pressure hot water cleaning will be used for these, aided by physical scrubbing with disposable brushes when necessary to loosen caked materials. All portions of the equipment, including the undercarriage, chassis, and cab, will also be inspected and cleaned as necessary.

- Any vehicle used for transportation in an exclusion zone will be equipped with seat covers that can be easily wiped down. All such vehicles must be decontaminated prior to leaving the exclusion zone. Decontamination will include at a minimum high pressure washing of the exterior and, as necessary, wet wiping the interior and scrubbing of the exterior.
- Personal protective equipment will be removed and washed and/or containerized prior to leaving the contaminant reduction zone.
- Certain parts of contaminated respirators, such as the harness assembly or cloth components, are difficult to decontaminate. If grossly contaminated, they will be discarded. Rubber components will be soaked in soap and water and scrubbed with a brush. Respirators will be sanitized by rinsing in a detergent solution followed by a clear rinse, then hung to dry.

3.2.3.2 Emergency Decontamination Procedures

In case of an emergency, gross contamination procedures will be speedily implemented if possible. If a life-threatening injury occurs and the injured person cannot undergo decontamination procedures without incurring additional injuries or risk, he or she will be transported wrapped in plastic sheeting if time allows and if consistent with the injury. The medical facility will be: 1) informed that the injured person has not been decontaminated, and 2) given information regarding the most probable contaminants.

3.2.4 Disposal of Contaminated Fluids and Materials

All equipment and materials used for decontamination or personal protection will be cleaned or collected for appropriate disposal. All non-disposable equipment will be decontaminated onsite. Disposables will be containerized. Contaminated liquids will be collected in storage tanks or containers and stockpiled in a secure location. Storage and/or disposal will be conducted in accordance with the work plan.

3.2.5 Housekeeping

Work areas will be kept as clean and orderly as possible at all times. Ordinary refuse will be placed in suitable rubbish bins or trash containers at the site. The storage or introduction of extraneous materials will be minimized in the exclusion zone to minimize the decontamination load and reduce possibilities for cross contamination.

3.2.6 Visitors

Authorized visitors will only be allowed to observe operations from the support zone or beyond, and must obey all instructions of the site safety officer and/or *EnviroLogic Resources*' representative. Representatives from the Oregon Department of Environmental Quality (DEQ), the Oregon OSHA, and U.S. Environmental Protection Agency (EPA) must also possess appropriate health and safety equipment at the time of the visit, and have a health and safety plan at least as stringent as this plan, or adopt this plan as their own.

4.0 POTENTIAL HAZARDS

The potential exists for both physical and chemical hazards during planned site activities. These hazards are explained below.

4.1 PHYSICAL HAZARDS

The working conditions at the site could involve (but may not be limited to) the following potential physical hazards: moving or falling objects, weather-related hazards, electrical hazards, and vehicular traffic. Moving or falling objects are hazards present in the vicinity of operating drilling rigs. Steel-toed boots, and safety glasses will be worn at all times. Appropriate weather gear should be worn. Clearance from overhead power lines will be checked during rig up and rig down. In addition, several of the properties are operating facilities and hazards related to material movement and shipping may be present. If the operators of the facility have specific safety policies, these are herein incorporated by reference, once received by *EnviroLogic Resources*.

PHYSICAL HAZARD EVALUATION

Noise levels > 85 dB Wear ear protection during drilling and excavation	Heavy lifting	Excavation hazards Keep clear of excavation equipment.	Moving equipment Be alert for vehicles.
Unstable surface	Slips/Trips	Fall hazards	High temperatures
Low temperatures	Repetitive motion activities (soft tissue)	High particulate levels Use a dust monitor if applicable	Sharp objects (needles, glass, etc.)
Silica dust	Falling objects	Flying objects	

4.2 CHEMICAL HAZARDS

This section describes the potential site chemicals of concern and the hazards associated with them. Petroleum distillate fuels are mixtures of aliphatic and aromatic hydrocarbons, the constituent

concentrations of which can vary significantly dependent upon the crude feedstock, refining process, and seasonal variations. The predominant types of compounds in fuels are paraffins (e.g., pentane, hexane), naphthenes (e.g., cyclohexane) and aromatics (e.g., benzene, toluene, polycyclic aromatics). Gasoline contains about 80 percent paraffins, 6 percent naphthenes, and 14 percent aromatics. JP-1 and 4 contain up to 48 percent paraffin, 38 percent naphthenes, and 20 percent aromatics. Fuel oils and certain jet fuels (JP-3 and 5) contain about 10 percent paraffin, up to 23 percent naphthenes, and up to 78 percent non-volatile aromatic hydrocarbons. To improve their burning properties, compounds such as tetraethyl-lead, methyl tertbutyl ether (MTBE) and ethylene dibromide (EDB) are often added to automotive and aviation fuels.

Petroleum distillate fuels exhibit relatively low acute inhalation and dermal toxicity. Concentrations of 160 to 270 ppm gasoline vapor have been reported to cause eye, nose, and throat irritation in people after several hours of exposure. Levels of 500 to 900 ppm have been reported to cause irritation and dizziness in one hour and 2,000 ppm has been reported to cause mild anesthesia in 30 minutes. Gasoline, kerosene, and some jet fuels will cause severe eye irritation on contact with the eye and low to moderate skin irritation on contact with the skin. Methanol can be toxic by either skin or inhalation exposure, and is unique in that it attacks the optic nerve. Methanol blindness can be irreversible.

Ingestion of 10 to 15 grams (2 to 3 teaspoons) of gasoline has caused death in children. In adults, ingestion of 20 to 50 grams may produce severe symptoms of poisoning. The most dangerous aspect of ingestion of these motor fuels is the development of chemical pneumonia from the aspiration of gasoline or other fuels aspirating into the lungs. Aspiration of very small quantities of these motor fuels into the lungs is often fatal. Some gasoline additives, such as ethylene dichloride, ethylene dibromide, and tetraethyl- and tetramethyl-lead are highly toxic materials; however, their concentrations in gasoline are so low that their contribution to the overall toxicity of gasoline is negligible in most instances.

Benzene is a minor component of petroleum distillate fuels with concentrations ranging from non-detectable to 5%, with gasoline typically at 1%. Benzene has been classified a known human carcinogen by the American Conference of Governmental Industrial Hygienists (ACGIH) based on the increased incidence of leukemia in certain oil refinery workers.

Petroleum distillate fuels are flammable. Under certain conditions, this property presents a greater risk than toxicity. Six of the fuels covered by this procedure are classified by the Federal Department of Transportation as flammable liquids as all six typically have flash points of 100 degrees F or less. These fuels are gasoline, gasohol, Jet B, JP-1, JP-4, and No. 1 fuel oil. Lower explosive limits of the fuels range from 0.6 to 1.4 percent (6,000 to 14,000 ppm).

Chemical components of petroleum products may be found in the subsurface when drilling and sampling. These may include volatile organic compounds (VOCs), volatile aromatic hydrocarbons (BTEX), polycyclic aromatic hydrocarbons (PAHs), and metals. Potential exposure routes during field activities are through inhalation, skin, and eye contact. To a lesser degree, ingestion of contaminants and direct contact with the circulatory system (through cuts, abrasions, etc.) could also occur.

Dermal hazards could arise if product (liquid or vapors) comes into contact with the hand or body (skin) during field activities. A low hazard level exists where there is no contact, and when proper dermal protection is worn. The use of protective clothing and chemical-resistant gloves is required at all times when handling potentially or known contaminated soil and/or groundwater.

Respiratory hazards related to the above-listed chemicals might arise if vapors, gases, dust, or mist are released into the breathing zone during drilling and/or sampling. VOCs are central nervous system depressants that produce similar symptoms in victims via skin absorption or inhalation of moderate vapor-phase concentrations. General symptoms of exposure, both acute and chronic, may include euphoria, headache, weakness, dizziness, nausea, narcosis, and possibly coma. Certain constituents are also skin and eye irritants, while benzene is a suspected carcinogen.

PAHs have the lowest OSHA Permissible Exposure Limits (PELs) (0.2 part per million [ppm]). However, the chemical properties (i.e., low vapor pressures, etc.) of these heavier PAHs are such that they do not readily volatilize. Also, the hydrocarbon fuels that contain these heavier PAHs (fuel oils [diesel] and certain jet fuels [JP-3 and 5] contain about 10 percent paraffin, up to 23 percent naphthenes, and up to 78 percent non-volatile aromatic hydrocarbons. As these PAHs have such a low potential for volatilization, the action levels on Table G-2 are based on benzene, which has the lowest OSHA PEL of the volatile constituents (1 ppm).

TABLE C-1

SUMMARY OF ANTICIPATED CHEMICAL HAZARDS
(Soil and Ground Water)

COMPOUND	Odor Threshold (ppm)	OSHA PEL/ TLV TWA (ppm)	OSHA STEL (ppm)	OSHA IDLH (ppm)	LEL (%)	IP (eV)	Other hazards
Total TPH	NA	NA	NA	NA	NA	NA	C,E,F,P
Volatile Petroleum Constituents							
Benzene	12	1	5	250	1.2	9.24	C,E,F,P
1,2-Dibromoethane		20	50	100	NA	9.45	P
1,2-Dichloroethane				{50}	6.2	11.05	P
				NIOSH			
Ethylbenzene	NA	100	125	800	0.8	8.76	F,P
Methyl-t-butyl Ether		40	200	--	NA	NA	NA
Toluene	0.17-2.9	100	150	500	1.1	8.82	E,F,P,R
Xylenes	0.62-5.4	100	150	900	0.9	8.44-8.56	F,P
Polyaromatic Hydrocarbons		mg/m ³					
Acenaphthene		--	--	--	NA	NA	
Anthracene		0.2	--	80	0.6	Vary	C,P
Benz[a]anthracene		--	--	--	NA	NA	C,P
Benzo[b]fluoranthene		0.2	--	--	NA	NA	C,P
Benzo[k]fluoranthene		0.2	--	--	NA	NA	C,P
Benzo[a]pyrene		0.2	--	80	Vary	Vary	C,P
Chrysene		0.2	--	80	Vary	Vary	C,P
Fluoranthene		0.2	--	--	NA	NA	
Fluorene		--	--	--	2.6	10.37	
Indeno[1,2,3- cd]pyrene		0.2	--	--	NA	NA	C,P
Naphthalene	12.0-14.68	10	15	250	0.9	8.12	E,F,P

Notes: Because PAHs have such a low potential for volatilization, the action levels on Table C-2 are based on benzene, which has the lowest OSHA PEL of the volatile constituents (1 ppm).

--	-	none established	NA	-	not available
C	-	carcinogen	P	-	poison
GW	-	groundwater	IDLH	-	immediately dangerous to life and health
PEL	-	permissible exposure level	*	-	5 minute maximum in 3 hours
IP (eV)	-	ionization potential	SC	-	suspected carcinogen
N/A	-	not applicable	STEL	-	short-term exposure level
F	-	flammable	R	-	Reactive
COR	-	Corrosive	E	-	Explosivity

Values are either from the American Conference of Governmental Industrial Hygienists Threshold Limit Value (TLV) or the OSHA PEL, whichever is most stringent. The TLV is the time-weighted average (TWA) concentration for a 40-hour week or 8-hour work shift, to which all workers may be repeatedly exposed without adverse effect. The PEL is the OSHA permissible exposure limit, and is also a TWA. The Short-Term Exposure Limit (STEL) is the concentration at which workers can be continually exposed for a short period of time. Exposures at the STEL should not be longer than 15 minutes and should not be repeated more than four times in an 8-hour period, unless noted. There should be at least one hour between each 15-minute exposure at the STEL.

4.3 ANALYSIS OF SITE HAZARDS AND RISKS

Results of previous investigations at the Astoria Area-Wide site have identified petroleum product chemicals as the contaminants of concern. The planned activities will involve physical hazards inherent with working outside and in the presence of heavy equipment. In addition, activities conducted within the vicinity of active bulk storage involve explosive hazards.

There is a potential for field personnel to become exposed to contaminants in the defined work areas. Dermal, inhalation, and incidental ingestion exposures are possible. The general risk of exposure on the site is low to moderate.

Current soil and ground-water contamination could lead to dermal contact during intrusive activities, such as excavation, drilling, and soil or ground-water sampling. Dermal protection, as defined in

Section 5, will, therefore, be required for any such activities. Volatilization of a few identified contaminants could pose risk of inhalation exposures. Action levels and the associated respiratory protection for potential inhalation exposures will be based initially on constituent concentrations presented in Table C-1 and will be adjusted thereafter based on air monitoring data to be collected during field activities (Section 6).

5.0 CONTROL OF HAZARDS

The control of identifiable hazards is primarily through safe work habits and proper preparation to lessen risk of injury.

5.1 GENERAL SAFE WORK PRACTICES

Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in the work zone. All personnel should exit the work area and thoroughly wash their hands and faces with mild soap and water before eating or drinking. Absolutely no smoking is allowed in work areas.

5.2 TRAINING AND SAFE WORK PRACTICES

All field personnel for this project will have attended a 40-hour health and safety training course for conducting work at hazardous waste sites and annual 8-hour training updates. This course satisfies the initial training requirements of 29 CFR 1910.120 (OSHA regulation of hazardous waste site activities). Subcontractors are responsible for training of their employees.

Explosion proof or intrinsically safe equipment must be used in areas designated as hazardous (potentially explosive). At least one class ABC fire extinguisher will be placed in a safe area. One first aid kit will be placed in a safe area.

5.3 LEVELS OF PROTECTION

The EPA defined personal protective equipment levels of protection in their 1984 Standard Operating Guide. Only Level D and Level C should be necessary while performing field activities at the Astoria Area-Wide site. If more stringent protection is required, that information will be communicated in a site update.

Level D protection is required during all field activities. It may become necessary during the course of the work to upgrade to Level C in the immediate work area. This decision will be determined by the site Health and Safety Officer. Protective safety equipment for Levels D and C include the following:

Level D - Mandatory

- Steel-toed boots
- Approved hard hat
- Approved safety glasses with side shields, splash shield, or chemical splash goggles
- Long pants

Level D - At discretion of Site Health & Safety Officer

- Tyvek coveralls, or
- Plastic-coated Tyvek coveralls

Level C

- All required Level D protective equipment, and
- Air-purifying cartridge-equipped respirator (half- or full-face respirators)

Air-purifying respirators are to be used only in conjunction with air monitoring in the breathing zone and with strict adherence to action levels listed in Section 7. It is anticipated that respirators will provide adequate protection for the conditions that will be encountered during site activities. However, if action levels exceed a respirators capacity, the work will be suspended until monitoring indicates conditions are once again safe for work in approved respirators.

5.4 RESPIRATOR USE AND MAINTENANCE

Respirators issued to individuals will be cleaned and disinfected at least daily, if used. Where respirators are used by more than one person, the respirator will be cleaned and disinfected after each use. Respirators will be inspected during cleaning, and any necessary repairs will be made at that time. Damaged respirators will not be worn. After cleaning, respirators will be placed in clean, plastic bags and stored in a clean location convenient to work areas.

6.0 AIR MONITORING

Air monitoring and visual observations of the site are required to determine the effectiveness of the engineering controls, to re-evaluate levels of protection, and determine if site conditions have changed. At a minimum, monitoring will be done at the beginning of the work shift and periodically as described below. Air monitoring will be conducted during all activities within the activity zone, including drilling, excavation, sampling, and decontamination of equipment. By comparing the information obtained from the monitoring with the action levels described below, the safety of environmental conditions in the work zone will be assessed.

6.1 AIR MONITORING EQUIPMENT

A photoionization detector (PID), equipped with a 10.6 eV bulb, will be used to monitor for nonspecific volatile compounds in all work zones during the sampling program. Additionally, in the active tank farm areas, a combustible gas indicator (CGI) and an oxygen meter will be used to monitor explosive conditions.

6.2 AIR MONITORING PROCEDURES

Prior to initially entering the work area, monitoring will be conducted at the boundary of the work area and proceed inward to establish the level of protection needed for the planned activities. If appropriate, explosive conditions will be assessed following the procedures described in Section 6.4.

All air monitoring for VOCs will be performed at shoulder height (in the breathing zone). During periodic monitoring, readings will be taken in the breathing zone on those workers most likely to be exposed to potential hazardous concentrations of contaminants.

Initial air monitoring will be used to establish the appropriate level of respiratory protection (action levels are provided in Table C-2). The level of PPE may be modified based on subsequent monitoring results. The PPE requirements established through the monitoring program will apply to the area within a 30-ft radius of where the contaminants are measured.

6.3 FREQUENCY OF AIR MONITORING

Air monitoring will be performed at the beginning of each day, before the startup of any work tasks, to identify ambient conditions. During work tasks, periodic monitoring will be performed at a minimum of once every 30 minutes. Additional monitoring will be performed whenever work begins at a different location, when meteorological conditions such as wind direction or ambient temperature demonstrate a sustained and noticeable change, or when vapors from either drilling or sampling are detected by site workers.

6.4 WORK CONDUCTED IN THE ACTIVE TANK FARM AREAS

In the active tank farm areas, prior to initiating work activities and during intrusive activities, the potential for explosive conditions will be monitored using a combustible gas indicator (CGI). Calibrate the CGI prior to each day's activities according to manufacturer's instructions. Monitor initially during all drilling and excavation work and record levels in the health and safety logbook at least every ½ hour. Set the alarm to auditory. If odor, taste, or discomfort is detected by the crew, monitor continuously, or if any of the action levels noted in Table C-2 are exceeded, monitoring is to be done continuously. If explosive conditions are identified at any time, work activities will cease and the area will be evacuated. Re-entry will only be allowed following progressive monitoring inward from the boundary of the work area that indicates that explosive conditions have been mitigated. Mitigation measures may include use of fans to dissipate vapors.

6.5 MAINTENANCE AND CALIBRATION OF MONITORING EQUIPMENT

All personnel who will be using monitoring equipment will be briefed on the operation, limitations, and maintenance of these devices. All maintenance and calibration procedures will be conducted in accordance with the manufacturers guidelines by a designated individual familiar with the devices. Field personnel will only perform routine maintenance (e. g., changing batteries or lamps). The manufacturer or equipment supplier will perform any additional maintenance.

Air-monitoring equipment will be inspected and calibrated before the start of the shift. Failure of any of the equipment listed below must be reported to the site health and safety officer immediately. Work in the exclusion zone is not to continue beyond the monitoring cycle if equipment is not working properly.

6.6 RECORDKEEPING

A project field book documenting air-monitoring results will be kept each day for the duration of the job. In the field book, the calibration and maintenance records, and air monitoring results with the type and time of monitoring will be recorded.

In addition to routine air monitoring, field screening of soil samples with the PID will be conducted to better understand the degree of hazard associated with the materials being sampled. The results of field screening will also be recorded in the field book or in test pit/boring logs, as appropriate, in the same manner as outlined above.

7.0 AIR MONITORING ACTION LEVELS

Air monitoring results for inhalation risk and explosive conditions will be used to evaluate the work zone. If inhalation risk action levels are exceeded, respiratory protection will be required. If explosive conditions are present, mitigation measures will be necessary before work can commence or continue.

7.1 INHALATION RISK ACTION LEVELS

Air quality monitoring will be conducted by site personnel when performing invasive field activities. Action levels for potential air contaminants have been developed that will require employees to upgrade their level of personal protective equipment prior to the possibility of significant exposure. The toxicity action levels on Table C-2 are set to comply with Occupational Safety and Health Administration (OSHA) Permissible Exposure Levels which may be encountered on the site. Workers must be evacuated from the area when organic vapor concentrations exceeding respiratory protective equipment protection factors are encountered.

TABLE C-2
AIR MONITORING PROCEDURES AND TOXICITY ACTION LEVELS

Instrument	Reading^a	Action^b	Comments
OVM	Detection of 1 ppm (above ambient) or greater in breathing zone sustained for 2 minutes	Drager test for benzene. If 1 ppm benzene detected with Drager tube, upgrade to level C	Try ventilating area, always work upwind
Drager tube test (benzene)	Over 1 ppm benzene sustained in breathing zone	After upgrade to Level C, continue to monitor breathing zone with Drager tube. If 10 ppm or greater benzene , leave exclusion zone. Return only if levels decrease to below 10 ppm.	Try ventilating area, always work upwind
OVM	Detection of 10 ppm (above ambient) in breathing zone sustained for 2 minutes and determined not to be benzene	Upgrade to Level C and continue to monitor breathing zone with Drager tube. If 50 ppm, leave exclusion zone. Return only if levels decrease to below 50 ppm.	Try ventilating area, always work upwind

7.1.1 Outside Active Tank Farm Areas

The organic vapor action levels for field activities outside the active tank farm area are shown on Table C-2. Benzene has the lowest PEL (1 ppm) for any of the volatile contaminants previously found at the site (Table C-1). If benzene is not present, the PEL for naphthalene (associated with diesel) is 10 ppm, and the action level for this hydrocarbon constituent is set to account for this and other constituents that

may be present. While monitoring with the PID, any consistent readings in the breathing zone that are at the levels specified in Table C-2 above the upwind background level sustained in the breathing zone for 2 minutes shall be the action level for donning half-face air purifying respirators equipped with organic vapor/particulate cartridges. Cartridges will be replaced either immediately upon any indication of break through or as shown on the respirator cartridge change chart below.

7.1.2 Within Active Tank Farm Areas

The organic vapor action levels for field activities inside the active tank farm area are shown on Table C-2. Benzene has the lowest OSHA PEL (1 ppm) for any of the volatile contaminants expected at the site (Table C-1). If benzene is not present, the PEL for naphthalene (associated with diesel) is 10 ppm. The action level for this hydrocarbon constituent is set accordingly.

While monitoring with the PID, readings in the breathing zone at the levels specified in Table C-2 shall be the action level for donning half-face air purifying respirators equipped with organic vapor/particulate cartridges. Cartridges will be replaced either immediately upon any indication of break through. Action levels are provided in Table C-2.

Note: Project personnel are not permitted to deviate from the specified levels of protection without the prior approval of the site safety officer.

If organic vapor concentrations return to below the action levels on Table C-2, the level of personal protective equipment will be downgraded to Level D protection. The downgrade must be approved by the site safety officer.

7.2 EXPLOSIVE CONDITIONS ACTION LEVELS

Explosive conditions will be monitored with a CGI and oxygen meter as described in Section 6.4. Results will be used to identify explosive conditions according to the following:

TABLE C-3
EXPLOSIVE CONDITION LEVELS

PARAMETER	ACTION LEVEL	ACTION
CGI	$\leq 10\%$ LEL	None.
	$> 10\%$ LEL	Explosive conditions present. Stop work, secure area. Take mitigative measures, if appropriate.
Oxygen Level	< 19.5	Stop work and evacuate area immediately. Take mitigative measures, if appropriate.
	$> 19.5, < 23.5$	None, continue monitoring
	> 23.5	Remove and shut-off ignition sources.

The CGI alarm must be set to sound at the action level. For this work it is highly recommended that hexane or methane to a pentane standard be used for calibration. When measurements with a CGI indicate the presence of combustible gas levels equal to or exceeding the explosivity action level in the work area, the following action must be taken:

1. Extinguish all possible ignition sources in the work area and shut down all powered equipment.
2. Move personnel at least 100 feet away from work area.
3. Contact site manager immediately.
4. Contact the health and safety coordinator or officer responsible for the field work.
5. At the instruction of the site health and safety coordinator or officer and after waiting 15 minutes for organic vapors to dissipate, the site safety officer may use the CGI to, cautiously and with prudence, approach the worksite to determine the extent and concentration of organic emissions. The SSO shall not enter (or allow any personnel to enter) any area where CGI readings exceed the explosivity action level, nor shall the site safety officer make any approach if there is possibility of fire or explosion.

6. Personnel may reenter the work area only by clearance from the SSO after the cause of the emission has been determined and the source abated.
7. Prepare incident report and submit to the HSC.

8.0 EMERGENCY PROCEDURES

The potential hazards associated with the activities to be performed at the site are both physical and chemical, and their potential severity should not be underestimated. The site health and safety officer will conduct a safety meeting before commencement of work on each working day to inform and remind all workers of site-specific hazards and the emergency plan. Any site updates will also be discussed at this time.

If a life-threatening emergency occurs, immediately start emergency response actions. If necessary and appropriate follow the modified decontamination procedures described in Section 3.2.3.2.

8.1 EMERGENCY NOTIFICATION PROCEDURES

In the case of any emergency, the site safety officer is to be notified immediately. If the situation is life threatening and notification of the site safety officer would delay emergency response, field personnel may initiate the appropriate emergency contacts prior to notifying the site safety officer. The site safety officer will then:

- 1) Call appropriate emergency services numbers (ambulance, fire, etc.) if not already done and provide the following information:
 - Name and location of person reporting
 - Nature and location of accident/incident
 - Name and affiliation of injured party
 - Description of injuries
 - Status of medical aid effort
 - Details of any chemicals involved
 - Summary of the accident, including the suspected cause and the time it occurred a temporary control measures taken to minimize further risk

Note: *This information is not to be released under any circumstances to parties other than the site safety officer, project safety officer, EnviroLogic Resources project manager, PRP representatives, and bona fide emergency response team members.*

- 2) Call the *EnviroLogic Resources'* project manager and the Port of Astoria (contact numbers are listed in Table C-4) and provide information noted in Item 1 above.
- 3) The site safety officer will complete a written accident/incident report using Attachment C-3, within 24 hours, sending copies. to each of the project managers.

8.2 RESOURCES IN CASE OF EMERGENCY

Resources to be used in cases of emergency include:

- **List of Emergency Contacts:** Table C-4 includes both the appropriate emergency services (top of table) and the appropriate project contacts (bottom of table).
- **Nearest Phone:** As of the date of this plan, telephones are located at the Port office. The site health and safety officer will also have a mobile phone. The location of this phone will be communicated during tail-gate meetings. In addition, telephones will likely be available at each of the operating facilities at the site.
- **Onsite Emergency Equipment:** An first aid kit and a type ABC portable fire extinguisher will accompany each field vehicle.
- **Offsite Emergency Services:** Phone numbers for offsite emergency services are listed in Table C-4. *Copies of this table must be located in each vehicle.*

8.3 EMERGENCY CONTACT NUMBERS

In the event of fire, explosion, injury, or other accident, contact an appropriate site emergency response group. Site emergency telephone numbers are below:

TABLE C-4

EMERGENCY CONTACT NUMBERS

CONTACT	NUMBER
PARAMEDICS	911
FIRE DEPARTMENT	911

HOSPITAL EMERGENCY CENTER

Columbia Memorial Hospital

(503) 325-4321

POISON CONTROL CENTER

(800) 523-2222 or (415) 476-6600

*Health & Safety Coordinator EnviroLogic
Resources, Inc.*

(503) 768-5121

PORT OF ASTORIA

(503) 325-4521

8.4 ROUTE TO HOSPITAL

DIRECTIONS	DISTANCE
1: Start out going Northeast on MARINE DR/US-101 towards OREGON COAST HWY.	0.10 miles
2: Stay straight to go onto MARINE DR/US-30.	0.93 miles
3: Turn RIGHT onto 8TH ST/US-30 E.	0.06 miles
4: Turn LEFT onto COMMERCIAL ST/US-30 E.	0.41 miles
5: COMMERCIAL ST/US-30 E becomes MARINE DR/US-30.	0.38 miles
6. Turn RIGHT on 20 th ST	
7. Turn LEFT on EXCHANGE ST	
Total Estimated Time:	Total Distance:
7 minutes	1.87 miles

(Reference Figure C-2)

9.0 NON-LIFE THREATENING EMERGENCIES

In emergency situations which **are not** life threatening, normal decontamination procedures should be followed when possible. However, decontamination procedures may be modified according to the specific circumstances. Outer protective clothing should be removed if doing so would not cause delays or aggravate the injury. Respirators should only be removed: 1) if the victim has stopped breathing, or 2) after the victim has been removed from a breathing hazard area.

9.1 INJURIES AND ILLNESS

Non-life threatening bodily injuries which occur as a result of an accident during operations at the site will be handled in the following manner:

- The victim will be administered to by an individual who holds current first-aid certification, if necessary; or
- The local paramedics and the local hospital (Columbia Memorial Hospital) will be notified as appropriate, depending on the nature of the emergency. Emergency contact numbers are listed in Table C-4, in Section 8.3.

9.1.1 Heat Stress

Heat-related illnesses can occur at any time when protective clothing is worn. Workers wearing semi-permeable or impermeable encapsulating clothing should be monitored for heat stress through regular checks of heart rate and by more comprehensive monitoring when the temperature in the work area is above 55-60°F. A pulse rate in excess of 150 beats per minute may indicate heat exhaustion, although this rate will vary among workers. All personnel shall know what their baseline pulse rate is before working in elevated temperatures, so as to monitor themselves. If heat stress occurs, decontamination should be minimized and treatment begun immediately, unless the victim is obviously contaminated.

9.1.2 Cold Stress

Fieldwork may be conducted during the winter months, when site personnel may be subject to low temperatures, rain, and winds. In these conditions, field teams must be prepared to wear proper

protective clothing and to recognize symptoms of cold stress. Cold stress can be manifested as both hypothermia and frostbite.

Hypothermia is a cold-induced decrease in the core body temperature that can increase physical hazards associated with investigation activities through decreased attentiveness and manual dexterity. Hypothermia produces shivering, numbness, drowsiness, muscular weakness, and, if severe enough, death.

Frostbite results for the constriction of blood vessels in the extremities, decreasing the supply of warming blood to these areas. This drop in blood supply may result in the formation of ice crystals in the tissues, causing tissue damage. The symptoms of frostbite are white or grayish skin, blisters, or numbness.

Site personnel should review the information provided in their first aid training for response to cold stress problems.

9.1.3 Flu-Like Symptoms

Any site personnel experiencing flu-like symptoms should notify the site safety officer. Such symptoms may be sufficient cause for ceasing operations until the work area is evaluated and a "return to operations" order is given by the site safety officer.

9.2 FIRE

Fire extinguishers (ABC-type) will be kept in each vehicle and drilling rig. This equipment will be used only to respond to small fires. In the event of major fires, explosions, or fire/explosion hazard conditions, all personnel will immediately evacuate the area. The site safety officer will evaluate the need for further evacuation and/or emergency services.

9.4 SITE EVALUATION AND EVACUATION

The site safety officer will be responsible for determining if circumstances exist which require further evaluation and/or evacuation. The site safety officer should always assume worst- case conditions until proven otherwise. Specific evacuation procedures and warning signs and signals will be covered in the health and safety training session prior to beginning work.

Two levels of evacuation may be considered:

- Withdrawal from the immediate work area onsite
- Evacuation of the surrounding area

9.1.3 Evacuation of Work Zone

Withdrawal to a safe upwind location will be required under the following circumstances:

- Detection of volatile organics and/or toxic gases at concentrations above action levels for the level of protection being worn (Section 7)
- Occurrence of a minor accident. Field operations will resume after first aid and decontamination procedures have been administered
- Malfunction or failure of protective equipment, clothing, or respirator.

Site personnel will use the following hand signals to communication within the work zone if respiratory protection is being used:

- Thumbs up: Okay
- Thumbs down: Not okay
- Hands on wrist: Exit exclusion zone
- Hands on throat: Cannot breath

9.1.3 Evacuation from Surrounding Areas

There are no foreseeable conditions, based on current knowledge of the site that would require evacuation of the surrounding area. The site coordinators, in consultation with the site safety officer and, as appropriate, the *EnviroLogic Resources*' project manager, will be responsible for determining if circumstances exist for area-wide evacuation, and should always assume reasonable worst-case conditions until proven otherwise. Fire and police departments must be contacted in such cases. If evacuation is necessary, it will be implemented with the assistance of the appropriate emergency response personnel.

Procedures for reporting accidents/incidents are provided in Section 8.1. They will be performed in the order indicated.

10.0 TRAINING

All personnel performing onsite investigation tasks shall have completed formal health and safety training, which complies with 29 CFR 1910.120 and Oregon Administrative Rule (OAR) Chapter 437 (certificates of successful completion of training will be maintained in job files), and shall verify on-the-job training for those tasks they are assigned to perform. All operations will be reviewed and an unfamiliar operations will be rehearsed prior to performing the actual procedures.

REQUIRED TRAINING

All employees as well as contractor employees assigned to perform field activities covered by this procedure must be currently approved for hazardous waste field work, including:

- Current medical clearance to conduct hazardous waste field work and to wear a respirator;
- Successful completion of a respirator fit test within the last 12 months for the make and model of the respirator assigned to that individual for use at that site;
- Completion of training as required by Title 29 Code of Federal Regulations (CFR) 1910.120(e), including:
 - ⇒ 40 hours of hazardous waste worker basic instruction within the last 12 months, or,
 - ⇒ 8 hours of hazardous waste worker refresher training within the last 12 months, subsequent to completion of 40 hours of basic hazardous waste worker training.

11.0 ROUTINE HEALTH CARE AND MONITORING

All persons working in an exclusion zone must have a medical evaluation to determine their baseline medical status prior to any site work. Follow-up examinations are appropriate if exposures are known or suspected to have occurred. The site safety officer will maintain documentation of medical evaluations for all site workers.

12.0 REFERENCES

- ACGIH. 1992. Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, 1991-1992. American Council of Governmental Industrial Hygienists, Cincinnati, OH.
- American Conference of Governmental Industrial Hygienists. 1992. Threshold Limit Values and Biological Exposures Indices for 1992-1993.
- OSHA. 1991. Air Contaminants - Permissible Exposure Limits. Title 29 Code of Federal Regulations, Part 1910.1000. Occupational Safety and Health Administration.
- Oregon, State of. 1990. Toxic and Hazardous Substances: Air Contaminants (1910.1000). Oregon Administrative Rules (OAR) 437-02, Subdivision Z. Department of Insurance and Finance, Oregon Occupational Safety and Health Division.
- U.S. Environmental Protection Agency. 1984. Standard Operating Safety Guides. Environmental Response Branch, Hazardous Response Support Division, November.
- U.S. Department of Health and Human Services. 1990. NIOSH Pocket Guide to Chemical Hazards.
- U.S. Department of Health and Human Services. 1985. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities. Public Health Service, Centers of Disease Control, National Institute for Occupational Safety and Health, October.
- U.S. Department of Labor, Occupational Safety and Health Administration. 1989. Hazardous Waste Operations and Emergency Response. Final Rule Federal Register 29 CFR Part 1910.

ATTACHMENT C-1

HASP ACKNOWLEDGEMENT FORM

The following have read and understand the Astoria Area-Wide site health and safety plan and agree to comply with the requirements described within:

POSITION	NAME	SIGNATURE
<i>EnviroLogic Resources, Inc.</i> Project Manager	Thomas J. Calabrese, R.G.	_____
<i>EnviroLogic Resources, Inc.</i> Health and Safety Officer	Thomas J. Calabrese, R.G.	_____
Backup HSO	Melanie Hance	_____
Site Specific Backup HSO	PRP Site Representative	

REPRESENTING	NAME	SIGNATURE	DATE
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

REPRESENTING	NAME	SIGNATURE	DATE

REPRESENTING	NAME	SIGNATURE	DATE

REPRESENTING	NAME	SIGNATURE	DATE

REPRESENTING	NAME	SIGNATURE	DATE

ATTACHMENT C-2
HASP MODIFICATION FORM

Date Modification made: _____

Modification: _____

Reasons for modification: _____

Site Personnel Briefed:

Name: _____

Date: _____

Name: _____

Date: _____

Name: _____

Date: _____

Name: _____

Date: _____

Name: _____

Date: _____

Name: _____

Date: _____

Name: _____

Date: _____

Approvals:

Site Safety Officer: _____

Manager: _____

Others: _____

ATTACHMENT C-3
EMPLOYEE EXPOSURE/INJURY INCIDENT REPORT FORM

(Attach additional page(s) if necessary)

Date: _____ Time: _____

Name: _____ Employer: _____

Site Name and Location: _____

Site Weather (clear, rain, snow, etc.): _____

Nature of Illness / Injury: _____

Symptoms: _____

Action Taken: Rest: _____ First Aid: _____ Medical: _____

Transported by: _____

Witnessed by: _____

Hospital's Name: _____

Treatment: _____

Comments: _____

What was the person doing at the time of the accident / incident? _____

Personal Protective Equipment Worn: _____

Cause of Accident / Incident: _____

What immediate action was taken to prevent recurrence? _____

Additional comments:

Employee's Signature:

Date

Supervisor's Signature:

Date

Site Safety Representative's Signature

Date

ATTACHMENT C-4
TAILGATE SAFETY MEETING FORM

This form is to be used as a guideline for briefing on-site consultant and subcontractor personnel regarding the potential hazards associated with the site. The tailgate safety meeting is a supplement to, and not a replacement for, the site-specific HSP.

Date: _____ **Time:** _____ **Project No.** _____

Client: _____ **Site Address:** _____

Safety Topics Presented

Protective Clothing/Equipment: _____

Chemical Hazards: _____

Physical Hazards: _____

Special Equipment: _____

Decontamination Procedures: _____

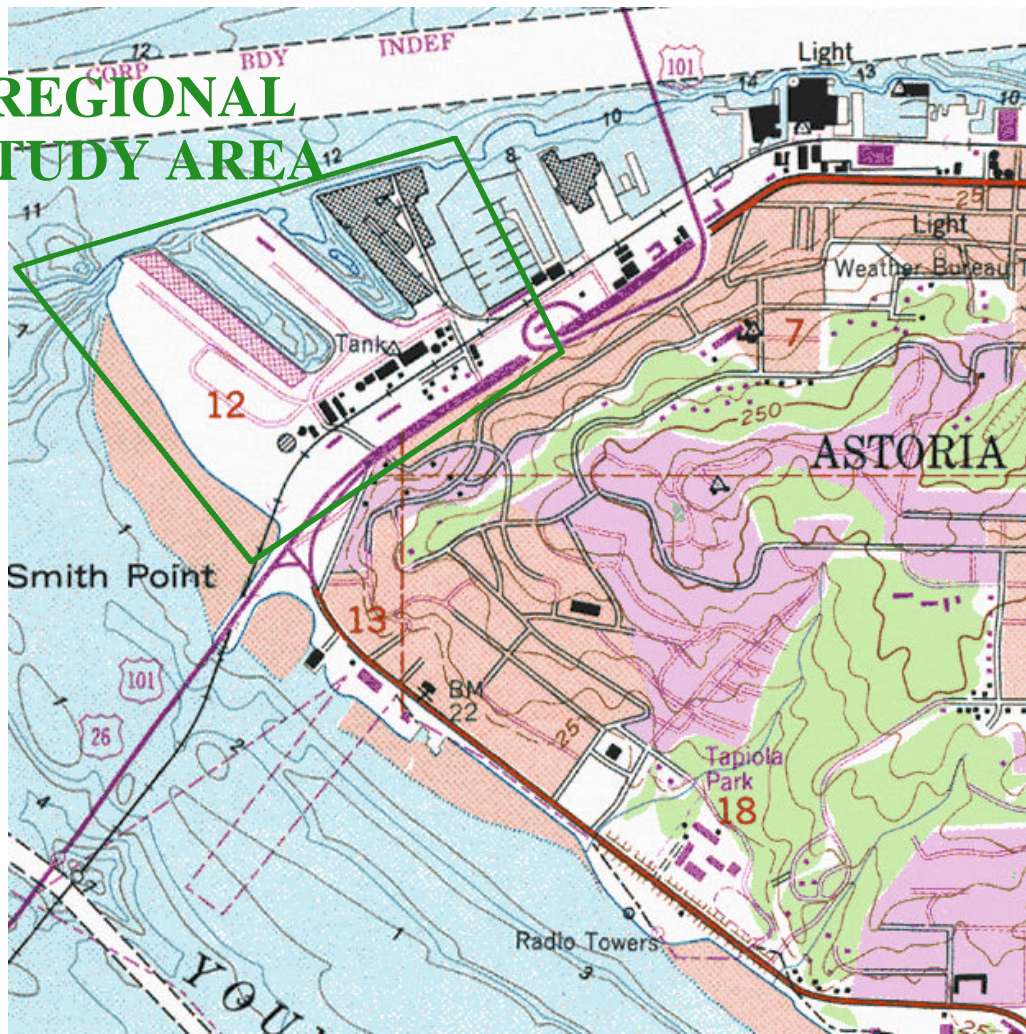
Emergency Procedures: _____

Additional Information / Comments: _____

Meeting Attendance

- | | |
|----------|-----------|
| 1. _____ | 7. _____ |
| 2. _____ | 8. _____ |
| 3. _____ | 9. _____ |
| 4. _____ | 10. _____ |
| 5. _____ | 11. _____ |
| 6. _____ | 12. _____ |

REGIONAL STUDY AREA



(from USGS, Astoria [1984], OR 7.5' Quadrangles)

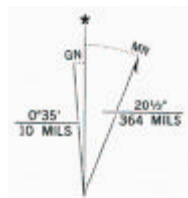
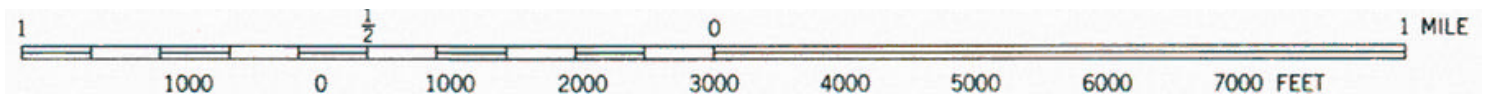


FIGURE 1

SITE LOCATION

**Remedial Investigation/Feasibility Study
Astoria Area-Wide Petroleum Site
Astoria, Oregon**

EnviroLogic Resources, Inc.

Consulting Environmental & Water Resources Scientists

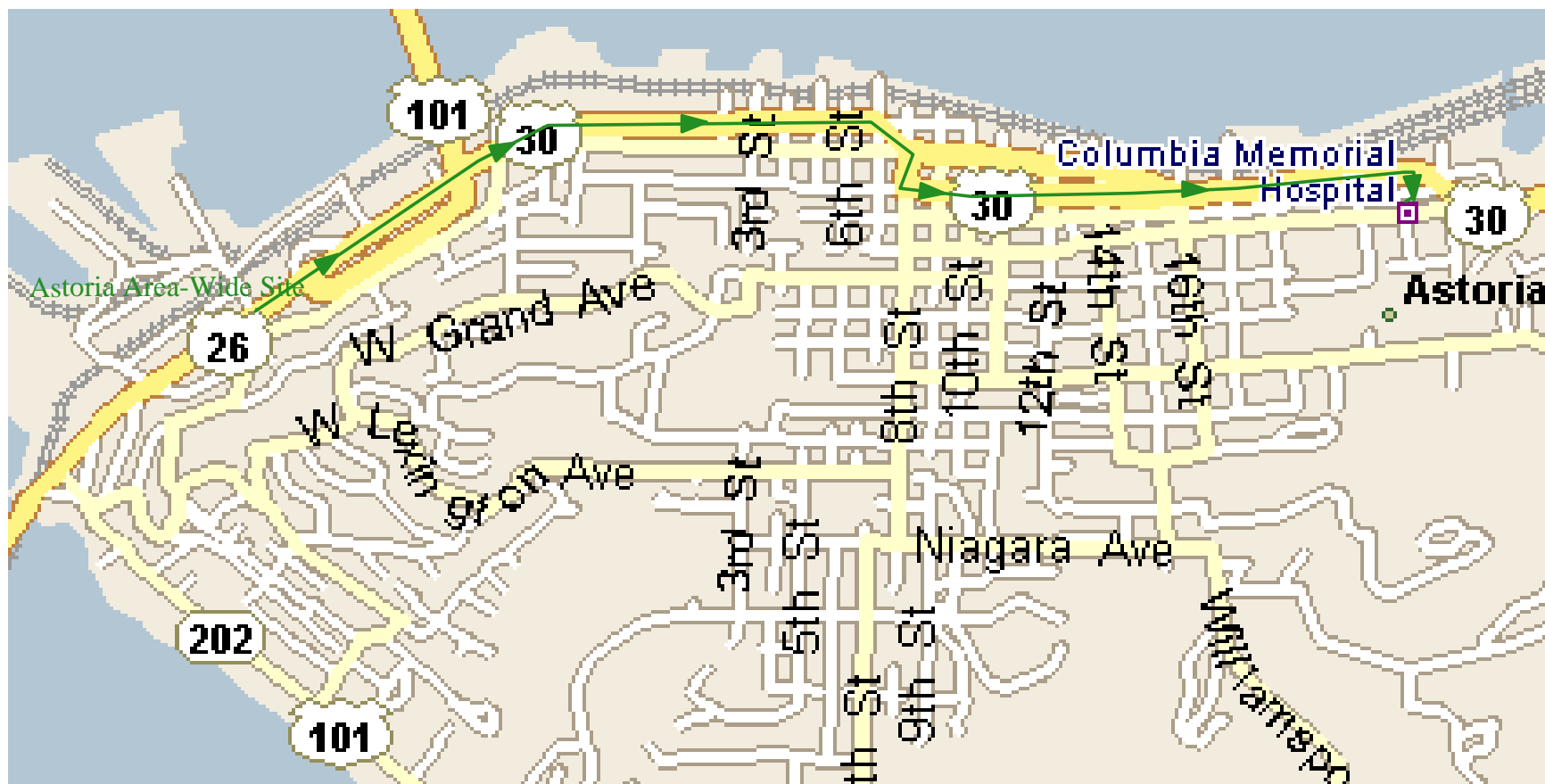


FIGURE C-2

ROUTE TO HOSPITAL

**Remedial Investigation/Feasibility Study
Astoria Area-Wide Petroleum Site
Astoria, Oregon**