B&L Woodwaste Site
Pierce County, Washington

Engineering Design Report (EDR) Addendum 1

Phase 1 Part 1 Remediation Design Report

Barrier Wall and Interceptor Trench

Appendix 1H
Health and Safety Plan

FINAL

B&L Woodwaste Site
Pierce County, Washington

Engineering Design Report (EDR) Addendum 1: Appendix 1H

Health and Safety Plan Phase 1 Part 1 Cleanup Action

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July 2009

FINAL

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1.0 Plan Objectives and Applicability

This Health and Safety Plan (HASP) has been written to comply with the standards prescribed by the Occupational Safety and Health Act (OSHA) and the Washington Industrial Safety and Health Act (WISHA).

The purpose of this HASP is to establish protection standards and mandatory safe practices and procedures for all personnel involved with the construction, operation, and monitoring of the subsurface barrier wall and interceptor trench system on the B&L Property (Property) at the B&L Woodwaste Site (Site). This HASP assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may occur during field work activities. The plan consists of Site descriptions, a summary of work activities, an identification and evaluation of chemical and physical hazards, monitoring procedures, personnel responsibilities, a description of Site zones, decontamination and disposal practices, emergency procedures, and administrative requirements.

The provisions and procedures outlined by this HASP apply to all contractors, subcontractors, oversight personnel, and all other persons involved with the field work activities described herein. All such persons are required to read this HASP and indicate that they understand its contents by signing the Health and Safety Officer/Site Supervisors' (HSO/SS) copy of this plan.

It should be noted that this HASP is based on information that was available as of the date indicated on the title page. It is possible that additional hazards that are not specifically addressed by this HASP may exist at the work Site, or may be created as a result of on-site activities. It is the firm belief of Floyd|Snider and AMEC Geomatrix, Inc. (AMEC) that active participation in health and safety procedures and acute awareness of on-site conditions by all workers is crucial to the health and safety of everyone involved. Should project personnel identify a site condition that is not addressed by this HASP and have any questions or concerns about site conditions, they should immediately notify the HSO/SS and an addendum will be provided to this HASP.

The HSO/SS has field responsibility for ensuring that the provisions outlined herein adequately protect worker health and safety and that the procedures outlined by this HASP are properly implemented. In this capacity, the HSO/SS will conduct regular site inspections to ensure that this HASP remains current with potentially changing site conditions. The HSO/SS has the authority to make health and safety decisions that may not be specifically outlined in this HASP, should site conditions warrant such actions. In the event that the HSO/SS leaves the Site while work is in progress, an alternate Site Safety Officer (SSO) will be designated. Personnel responsibilities are further described in Section 4.0.

This HASP has been reviewed by the Project Manager (PM) and the HSO/SS prior to commencement of work activities. All Floyd|Snider and AMEC personnel shall review the plan and be familiar with on-site health and safety procedures. A copy of the HASP will be on-site at all times.

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2.0 Emergency Contacts and Information

2.1 DIAL 911

In the event of any emergency, DIAL 911 to reach fire, police, and first aid.

2.2 HOSPITAL AND POISON CONTROL

Nearest Hospital Location and Telephone: **(Refer to Figure 1H.1 for directions and map to the hospital.)**	**Tacoma General Hospital** **315 Martin Luther King Jr. Way** **Tacoma, WA 98405-4234** **(253) 403-1000**
Washington Poison Control Center:	**(800) 222-1222**

2.3 PROVIDE INFORMATION TO EMERGENCY PERSONNEL

All Floyd|Snider and AMEC project personnel should be prepared to give the following information:

Information to give to Emergency Personnel	
Site Location: **(Refer to Figure 1H.2 for directions and map to the Site.)**	B&L Woodwaste Site 2206 6th Ave. or 552 Fife Way, Milton/Fife, WA (Unincorporated Pierce County) **Landfill area:** the entrance is located ¼ mile north of intersection between 20th Street East and Fife Way. Enter from Fife Way and drive around the east side of the Landfill to Puget Power Road and the entrance to the Site.
Number that you are calling from:	Look on the phone you are calling from.
Describe accident and/or incident and numbers of personnel needing assistance.	Type of Accident Type(s) of Injuries

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3.0 Background Information

3.1 SITE BACKGROUND

Floyd|Snider and AMEC will conduct all field activities on behalf of the Washington State Department of Ecology (Ecology) at the B&L Woodwaste Site located at 552-817 Fife Way, Milton/Fife, WA (Unincorporated Pierce County). Groundwater impacted by arsenic is present beneath the Landfill and adjacent wetlands area. Site background information is discussed in detail in the Engineering Design Report (EDR).

3.2 SCOPE OF WORK

This scope of work is Phase 1 Part 1 of the 2008 Final Cleanup Action Plan (CAP) remedy. Floyd|Snider and AMEC will conduct the following field work activities:

- Excavation and backfill of test trenches.
- Construction of a subsurface barrier wall along the perimeter of the Landfill.
- Construction of groundwater interceptor trenches.
- Construction of stormwater infiltration ponds.
- Installation of piezometers within and outside the limits of the Landfill.
- Measurement of groundwater elevations at installed piezometers.

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4.0 Primary Responsibilities

4.1 PROJECT COORDINATOR

The Project Coordinator (PC) will approve this HASP and any amendments, thereof, and will ultimately be responsible for full implementation of all elements of the HASP.

4.2 PROJECT MANAGER

The Project Manager (PM) will have overall responsibility for the completion of the project, including the implementation and review of this HASP. The PM will review health and safety issues as needed and as consulted, and will have authority to allocate resources and personnel to safely accomplish the field work.

The PM will direct all Floyd|Snider and AMEC personnel involved in field work at the Site. If project scope changes, the PM will notify the HSO/SS so that the appropriate addendum will be included in the HASP. The PM will ensure that all Floyd|Snider and AMEC personnel on-site have received the required training, are familiar with the HASP, and understand the procedures to follow should an accident and/or incident occur on-site.

4.3 HEALTH AND SAFETY OFFICER AND SITE SUPERVISOR

The HSO/SS will advise the PM and project personnel on all potential health and safety issues of the field investigation and remedial activities to be conducted at the Site. The HSO/SS will specify required exposure monitoring to assess Site health and safety conditions, modify the Site HASP based on field assessment of health and safety accidents and/or incidents, and recommend corrective action if needed. The HSO/SS will report all accidents and/or incidents to the PM. If the HSO/SS observes unsafe working conditions by Floyd|Snider and AMEC personnel or any contractor personnel, the HSO/SS will suspend all work until the hazard has been addressed.

4.4 SITE SAFETY OFFICER

The Site Safety Officer (SSO) may be a person dedicated to this task, to assist the HSO/SS during field work activities. The SSO will ensure that all personnel have appropriate personal protective equipment (PPE) on-site and PPE is properly used. The SSO will assist the HSO/SS in field observation of Floyd|Snider, AMEC, and contractor personnel safety. If a health or safety hazard is observed, the SSO shall suspend all work activity. The SSO will conduct on-site safety meetings daily before work commences. All health and safety equipment (e.g., air monitoring instrument) will be calibrated daily and records kept in the daily field logbook. The SSO may perform exposure monitoring if needed and will ensure that equipment is properly maintained.

4.5 FLOYD|SNIDER AND AMEC PROJECT PERSONNEL

All Floyd|Snider and AMEC project personnel involved in field work activities will take precautions to prevent accidents and/or incidents from occurring to themselves and others in the work areas. Employees will report all accidents and/or incidents or other unsafe working conditions to the HSO/SS or SSO immediately. Employees will inform the HSO/SS or SSO of any physical conditions that could impact their ability to perform field work.

4.6 TRAINING REQUIREMENTS

All Floyd|Snider and AMEC project personnel must comply with applicable regulations specified in the Washington Administrative Code (WAC) Chapter 296-843, Hazardous Waste Operations Training (HAZWOPER), administered by the Washington State Department of Labor and Industries (L&I). Project personnel will be 40-hour HAZWOPER trained and maintain their training with an annual 8-hour refresher. Personnel with limited tasks and minimal exposure potential will be required to have 24-hour training and a site hazard briefing and be escorted by a trained employee. Personnel with defined tasks that do not include potential contact with disturbed site soils or waste, groundwater, or exposures to visible dust (e.g., surveying) are not required to have any level of hazardous waste training beyond a site emergency briefing and hazard orientation by HSO/SS. Floyd|Snider and AMEC project personnel will fulfill the medical surveillance program and respiratory protection program requirements.

In addition to the 40-hour course and 8-hour refreshers, the HSO/SS will have completed an 8-hour HAZWOPER Supervisor training as required by WAC 296-843-20015. At least one person on-site during field work will have current CPR/First Aid certification. All field personnel have a minimum of 3 days of hazardous materials field experience under the direction of a skilled supervisor. Documentation of all required training will be maintained in a 3-ring binder on-site and kept either in the HSO/SS vehicle or equipment storage bin.

Additional site-specific training that covers on-site hazards, PPE requirements, use and limitations, decontamination procedures, and emergency response information as outlined in this HASP will be given by the HSO/SS before on-site work activities begin. Daily health and safety meetings will be documented on the ***Daily Tailgate Safety Meeting*** form included in this HASP as Attachment 1H.A.

4.7 MEDICAL SURVEILLANCE

All Floyd|Snider and AMEC field personnel are required to participate in their respective company's medical surveillance program, which includes annual audiometric and physical examinations for employees involved in HAZWOPER projects. The program requires medical clearance before respirator use or participating in HAZWOPER activities. Medical examinations must be completed before conducting field work activities and on an annual basis.

5.0 Hazard Evaluation and Risk Analysis

In general, there are three broad hazard categories that may be encountered during site work: chemical exposure hazards, fire/explosion hazards, and physical hazards. Sections 5.1 through 5.3 discuss the specific hazards that fall within each of these broad categories.

5.1 CHEMICAL EXPOSURE HAZARDS

The following subsections describe chemical hazards associated with the test trench excavation, barrier wall, and interceptor trench installation (Section 5.1.1), and piezometer installation (Section 5.1.2). Potential routes of exposure are described in the following paragraph. Chemical exposure hazards are not anticipated when measuring groundwater elevations because there will be no contact with contaminated materials during these tasks.

Potential routes of exposure include inhalation, dermal contact, ingestion, and eye contact. The primary route of exposure during site work is inhalation of dust from contaminated soil, with a lesser likelihood of ingestion of contaminated soil and groundwater. Short-term inhalation exposure to elevated arsenic is unlikely to cause noticeable effects beyond upper respiratory tract irritation. Long-term exposure, or brief exposure to very high levels can cause swelling of the face, nausea, vomiting, stomach pain, or diarrhea. Other effects of significant exposures include internal bleeding, nerve damage, weakness, or loss of sensation in the hands, feet, arms, or legs, and long-term exposure to small amounts of arsenic (greater than six months) has been linked to bladder cancer, lung cancer, cardiovascular disease, and diabetes.

Inhalation of volatile arsenic species (e.g., dimethyl and trimethyl arsine) associated with organics in the wetlands is considered highly unlikely. When new areas of excavation are opened, the site HSO/SS will be alert for disagreeable garlic/onion odors that would indicate volatile arsenic species. Further details on air monitoring are provided in Section 6.0. Lead and copper are also present in the landfill but at levels that would not pose an inhalation hazard.

5.1.1 Test Trench Excavation, Barrier Wall, and Interception Trench Installation

Activities associated with test trench excavation and barrier wall installation will begin with the removal of topsoil above the Landfill cap and trench excavation. Arsenic concentrations above established cleanup levels are not anticipated during topsoil excavation activities.

During excavation of the test trenches and barrier wall trench, groundwater arsenic concentrations as high as 3,000 ppb may be encountered. Higher groundwater arsenic concentrations are anticipated along the north, west, and south edges of the Landfill (Drawing N-1 of Addendum 1). Groundwater arsenic concentrations of less than 5 ppb are expected on the east side of the Landfill (Drawing N-1 of Addendum 1).

Wood waste and copper reverberatory slag (slag), a shiny black granular material, may be encountered during test trench and barrier wall excavation activities. If wood waste or slag is encountered during barrier wall trench excavation, it may contain arsenic concentrations above

cleanup levels. Based on existing site characterization data, the highest concentration in landfill fill boring samples was 1,150 mg/kg for arsenic, 1,630 mg/kg for copper, and 860 mg/kg for lead. Arsenic drives the dust inhalation and ingestion hazard. The 95 percent upper confidence limit on the arithmetic mean arsenic concentration of waste within the Landfill was 860 mg/kg, 1,368 mg/kg for lead and 1,927 mg/kg for copper based on the distribution of 9 samples. All other soils at the Site outside of the Landfill are expected to have arsenic concentrations below cleanup levels.

The interceptor trench will be installed on the upgradient (south and east) side of the Landfill. The presence of widespread wood waste or slag is not expected during installation of the interceptor trench, but site personnel should be prepared in case it is encountered. Groundwater contour maps and numerical modeling indicate that the depth of the interceptor trench could be lower than the water table at the time of excavation. Therefore, dissolved arsenic concentrations from 5 to 200 µg/L may be encountered along the south side of the Landfill. Groundwater arsenic concentrations of less than 5 ppb are anticipated east of the Landfill. Based on available information, elevated arsenic levels are not expected while excavating the interceptor trench. However, to ensure no unexpected arsenic exposures occur, dust monitoring will be performed and air sampling for arsenic will occur if action levels for dust are exceeded, as described in Section 6.0.

5.1.2 Piezometer Installation

To monitor head gradients across the barrier wall, eleven interior and eight exterior piezometers will be installed along the barrier wall alignment. Groundwater arsenic concentrations of < 2 to 5,000 ppb are anticipated during piezometer installation due to localized areas of groundwater contamination near the footprint of the Landfill. Observed groundwater flow paths and groundwater analytical samples suggest elevated arsenic concentrations will be encountered in exterior borings advanced during the installation of PZ-1a through PZ-6a (Drawing N-1 of Addendum 1). These proposed borings are located along the north, west, and south sides of the Landfill (Drawing N-1 of Addendum 1). In these locations, groundwater arsenic concentrations could range from 50 to 3000 µg/L. Exterior borings are not anticipated to intersect widespread wood waste or slag.

Borings advanced during interior piezometer installation may encounter groundwater arsenic concentrations as high as 5,000 ppb due to the presence of saturated wood waste and slag. If these materials are encountered during piezometer installation, soils may contain arsenic concentrations above cleanup levels.

Dust generated during piezometer installation will be monitored as described in Section 6.0.

5.2 FIRE AND EXPLOSION HAZARDS

Flammable and combustible liquid hazards may occur from fuels and lubricants brought to the property to support heavy equipment and occasional use of portable generators. When on-site storage is necessary, such material will be stored in containers approved by the Department of Transportation (DOT) in a location not exposed to strike hazards and provided with secondary

containment. A minimum 2-A:20-B fire extinguisher will be located within 25 feet of the storage location, and where refueling occurs. Transferring of flammable liquids (e.g., gasoline) will occur only after making positive metal to metal connection between the containers. A bonding strap may be necessary to achieve this. Storage of ignition and combustible materials will be kept away from storage and fueling operations.

The possibility of a flammable or explosive release of methane is considered remote because the Landfill has passed the methanogenic phase of decomposition. Site features, including the cap and limits of wood waste, are well-established and appear on Site drawings. The Site HSO/SS will remain vigilant for signs of methane release during all drilling activities.

For piezometer installation activities conducted within the limits of wood waste, appropriate air monitoring will be conducted. Further detail on air monitoring is provided in Section 6.0.

5.3 PHYSICAL HAZARDS

When working in or around any hazardous or potentially hazardous substances or situations, all site personnel should plan all activities before starting any task. Site personnel shall identify health and safety hazards involved with the work planned and consult with the HSO/SS as to how the task can be performed in the safest manner, and if personnel have any reasons for concern or uncertainty.

All field personnel will adhere to general safety rules including wearing appropriate PPE, hard hats, safety vests, and safety glasses. Eating, drinking, and/or use of tobacco or cosmetics will be restricted in all work areas. Personnel will prevent splashing of liquids containing chemicals and minimize dust emissions.

The following table summarizes a variety of physical hazards that may be encountered on the Site during work activities. For convenience, these hazards have been categorized into several general groupings with recommended preventative measures.

Hazard	Cause	Prevention
Head strike	Falling and/or sharp objects, bumping hazards.	Hard hats will be worn by all personnel at all times when overhead hazards exist, such as during drilling activities and around large, heavy equipment.
Foot/ankle twist, crush, slip/trip/fall and chemical exposure	Sharp objects, dropped objects, uneven and/or slippery surfaces, chemical exposure.	Steel-toed boots must be worn at all times on-site while heavy equipment is present. Pay attention to footing on uneven or wet terrain and do not run. Keep work areas organized and free from unmarked trip hazards.

Hazard	Cause	Prevention
Hand cuts, splinters and chemical contact	Hands or fingers pinched or crushed, chemical hazards including dermal exposure to nitric acid, colorimetric field testing hazard chemical spills, or reagents. Cut or splinters from handling sharp/rough objects and tools.	***Nitrile*** safety gloves will be worn to protect the hands from dust and chemicals. Leather or cotton outer gloves will be used when handling sharp-edged rough materials or equipment. See preventive measures for mechanical hazards below.
Eye damage from flying materials	Sharp objects, poor lighting, exposure due to flying debris or splashes.	Safety glasses will be worn at all times on site. If a pressure washer is used to decontaminate heavy equipment, a face shield will be worn over safety glasses or goggles.
Electrical hazards	Underground utilities, overhead utilities. Electrical cord hazards. Incorrect grounding of the portable generator.	Utility locator service will be used prior to any investigation to locate all underground utilities. Visual inspection of work areas prior to starting work. Whenever possible, avoid working under overhead high voltage lines. The HSO/SS is responsible for documenting a determination of the voltage and minimum approach distance to any potentially energized electrical distribution line. Lines will be confirmed to be de-energized when minimum approach distances cannot be met as referenced in WAC 296-24-960. This should be discussed during the tailgate safety meetings. Make sure that no damage to extension cords occurs. If an extension cord is used, make sure it is the proper size for the load that is being served and rated SJOW or STOW (an "-A" extension is acceptable for either) and inspected prior to use for defects. The plug connection on each end should be of good integrity. Insulation must be intact, and extend to the plugs at either

Hazard	Cause	Prevention
Electrical hazards (continued)		end of the cord. Only qualified electricians will work on exposed energized conductors operating at more than 50 volts to ground. All portable power tools will be inspected for defects before use and must either be a double-insulated design or grounded with a ground-fault circuit interrupter (GFCI). Maintain and operate portable generators in accordance with the manufacturer's use and safety instructions and the following: • Always plug electrical appliances and tools directly into the generator, using the appliance manufacturers supplied cords. Use heavy-duty extension cords that contain a grounding conductor (3-wire flexible cord and 3-pronged cord connectors). • Use GFCIs on all generators. • Visually inspect the equipment before use; remove defective equipment from service; mark or tag it as unsafe for use.
Mechanical hazards	Heavy equipment such as drill rigs, service trucks, mowing equipment, saws, drills, etc.	Ensure the use of competent operators, backup alarms, regular maintenance, daily mechanical checks, and proper guards. Subcontractors will supply their own HASP. All project personnel will wear high visibility vests around equipment, making eye contact with operator and obtaining a clear OK before approaching or working within swing radius of heavy equipment, staying clear of swing radius. Obey on-site speed limits.
Noise damage to hearing	Machinery creating more than 85 decibels TWA, less than 115 decibels continuous noise, or peak at less than 140 decibels.	Wear earplugs or protective ear covers when a conversational level of speech is difficult to hear at a distance of three feet; when in doubt, a sound level meter may be used on-site to document noise exposure.

Hazard	Cause	Prevention
Falling into excavations	Elevated and/or slippery or uneven surfaces, including wetland pits, surface water, and mud. Trips caused by poor "house keeping" practices.	Guardrails or fall protection devices are required on elevated surfaces greater than 4 feet to the level below, if approached by persons not immediately involved in the excavation (note that flagging would not be adequate). As specified in the Washington Industrial Safety and Health Act (WISHA) Regional Directive 30.25, workers directly involved in the slurry wall excavation process are exempt from fall protection requirements. Workers within approximately 5 feet of the trench will be observed by an assigned buddy. If a worker falls into the trench, which will be filled with the bentonite slurry (density of slurry mixture is greater than sea water), the worker's buoyancy will be high and the worker will remain afloat, facilitating rescue as initiated by the buddy.
Strains from improper lifting	Injury due to improper lifting techniques, overreaching/ overextending, lifting overly heavy objects.	Use proper lifting techniques and mechanical devices where appropriate. The proper lifting procedure first involves testing the weight of the load by tipping it. If in doubt, ask for help. Do not attempt to lift a heavy load alone. Take a good stance and plant your feet firmly with legs apart, one foot farther back than the other. Make sure you stand on a level area with no slick spots or loose gravel. Use as much of your hands as possible, not just your fingers. Keep your back straight, almost vertical. Bend at the hips, holding load close to your body. Keep the weight of your body over your feet for good balance. Use large leg muscles to lift. Push up with one foot positioned in the rear as you start to lift. Avoid quick, jerky movements and twisting motions. Turn the forward foot and point it in the direction of the eventual movement. Never try to lift more than you are accustomed to.

Hazard	Cause	Prevention
Inhalation exposures	Dust.	No volatile organic species are anticipated. Airborne dust levels are not expected to exceed action levels. If air monitoring indicates a potential hazard from airborne arsenic dust, a respiratory protection addendum will be developed for this HASP. **Further detail on air monitoring is provided in Section 6.0.**
Heat exposure	High temperatures exacerbated by PPE, dehydration.	Workers will ensure adequate hydration, shade, and breaks when temperatures are elevated. **Further detail on heat stress in provided in Section 5.3.1.**
Accidents due to inadequate lighting	Improper illumination.	Work will proceed during daylight hours only, or under sufficient artificial light.

5.3.1 Heat Stress

To avoid heat-related illness, current regulations in WAC 296-62-095 through 296-62-09570 will be followed during all outdoor work activities. Floyd|Snider and AMEC Geomatrix will identify and evaluate temperature, humidity and other environmental factors associated with heat-related illness including but not limited to the provision of rest breaks that are adjusted for environmental factors, and encourage frequent consumption of drinking water. Drinking water will be provided and made readily accessible in sufficient quantity to provide at least one quart per employee per hour. All Floyd|Snider and AMEC Geomatrix personnel will be informed and trained for responding to signs or symptoms of possible heat-related illness and accessing medical aid.

Employees showing signs or demonstrating symptoms of heat-related illness must be relieved from duty and provided with a sufficient means to reduce body temperature, including rest areas or temperature controlled environments (i.e., air conditioned vehicle). Any employee showing signs or demonstrating symptoms of heat-related illness must be carefully evaluated to determine whether it is appropriate to return to work or if medical attention is necessary.

Any incidence of heat-related illness must be immediately reported to the employer directly through the HSO/SS.

The signs, symptoms, and treatment of heat stress include the following:

Condition	Signs/Symptoms	Treatment
Heat Cramps	Painful muscle spasms and heavy sweating	Increase water intake, rest in shade/cool environment.
Heat Syncope	Brief fainting and blurred vision	Increase water intake, rest in shade/cool environment.

Condition	Signs/Symptoms	Treatment
Dehydration	Fatigue, reduced movement, headaches.	Increase water intake, rest in shade/cool environment.
Heat Exhaustion	Pale and clammy skin, possible fainting, weakness, fatigue, nausea, dizziness, heaving sweating, blurred vision, body temperature slightly elevated.	Lie down in cool environment, increase water intake, loosen clothing. Call 911 for ambulance transport if symptoms continue once in cool environment.
Heat Stroke	Cessation of sweating, skin hot and dry, red face, high body temp, unconsciousness, collapse, convulsions, confusion or erratic behavior, life threatening condition.	**Medical Emergency!! Call 911** for ambulance transport. Move victim to shade and immerse in water.

If Site temperatures are forecast to exceed 85 degrees Fahrenheit and physically demanding Site work will occur in impermeable clothing, the HSO/SS will promptly consult with a certified industrial hygienist (CIH) and a radial pulse monitoring method will be implemented to ensure that heat stress is properly managed among the affected workers. The following heat index chart indicates the relative risk of heat stress:

Temperature (°F)

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution Extreme Caution Danger Extreme Danger

5.3.2 Sunburn Hazards

Skin exposure to ultraviolet radiation can result in sunburn. Site personnel will use long-sleeved shirts, hats, and sunscreen as needed to protect against sunburn.

5.3.3 Cold Stress

Field work will be conducted in summer months and therefore it is unlikely that cold stress will be a health and safety concern for this field investigation.

However, should field work be conducted in the colder months of the year and/or near a body of water, exposure to moderate levels of cold can cause the body's internal temperature to drop to a dangerously low level, causing hypothermia. Symptoms of hypothermia include slow, slurred speech, mental confusion, forgetfulness, memory lapses, lack of coordination, and drowsiness.

To prevent hypothermia, site personnel will stay dry and avoid exposure. Site personnel will be encouraged to wear sufficient clothing in layers such that outer clothing is wind- and waterproof and inner layers retain warmth (wool or polypropylene), if applicable. Site personnel will keep hands and feet well protected at all times.

5.3.4 Biohazards

Bees and other insects may be encountered during the field work tasks. Persons with allergies to bees will make the HSO/SS aware of their allergies and will avoid areas where bees are identified. Controls such as repellents, hoods, nettings, masks, or other personal protection may be used. Report any insect bites or stings to the HSO/SS and seek first aid if necessary.

Site personnel will maintain a safe distance from any urban wildlife encountered, including raccoons and rodents, to preclude a bite from a sick or injured animal. Personnel will be gloved and will use tools to lift covers from catch basins and monitoring wells.

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6.0 Site and Air Monitoring

The following sections describe Site monitoring techniques and equipment that are to be used during Site field activities. The HSO/SS, or a designated alternate, is responsible for Site control and air monitoring activities.

6.1 SITE MONITORING

The HSO/SS will visually inspect the work site at least daily to identify any new potential hazards. If new potential hazards are identified, immediate measures will be taken to eliminate or reduce the risks associated with these hazards.

6.2 AIR MONITORING

Air monitoring using a photoionization detector (PID) will not be performed, as the Site contaminants are not volatile. While work is being conducted within the limits of wood waste and on the Landfill, and if indications of organic vapors are noted, an H_2S/LEL meter will be used to screen new excavation areas and borings. Significant exposure to dust containing arsenic is unlikely in the areas for test trench and barrier wall excavation because they are anticipated to be outside the Landfill. Significant exposure to dust containing arsenic is also unlikely during piezometer installation because the soil borings will generate a relatively small amount of cuttings. Based on the arsenic levels found within the Landfill (a very conservative assumption), dust generated from excavations outside it is unlikely to contain a hazardous level of arsenic. However, an action level for sustained levels of dust exposure in the breathing zone of site workers has been established to guard against any risk of arsenic exposure above the permissible exposure limit (PEL).

Offsite receptors are unlikely to be exposed to any arsenic contained in fugitive dust liberated during soil boring within the Landfill, because few borings are anticipated in that area and ground disturbance should be very limited. Excavation work for the trenches and grading for ponds outside the Landfill, in contrast, could generate significant fugitive dust. However, this is unlikely to create an exposure hazard due to elevated arsenic because arsenic contaminated soils are not expected outside the Landfill. Therefore, a perimeter dust exposure level is established to control exposures to fugitive dust from soil excavations. The applicable ambient air quality standard for total suspended particulate per WAC 173-400-100(1) is 150 micrograms per cubic meter ($\mu g/m^3$), averaged over 24 hours. Site work will not occur for more than 12 hours per day, thus adhering to this criterion for the duration of excavation and providing a substantial margin to protect offsite receptors from adverse effects due to earthwork. The air monitoring action levels are presented in the table below.

Air Monitoring Action Levels

Dust Reading (mg/m^3 above background)	Action
Levels in Work Area	
No visible dust > 5 min. in work area	Continue periodic observation for dust.
Visible dust > 5 min. in work area	Implement dust monitoring using instrumentation (below).
Levels in Breathing Zone of Site Workers (PELs: 10 mg/m^3 dust, 0.01 mg/m^3 arsenic over 8 hrs)	
<1.3 mg/m^3 >5 min. in Breathing Zone	Continue periodic monitoring (each new area/every 2 hours).
≥1.3 mg/m^3 >5 min. in Breathing Zone	Initiate or improve dust suppression, or reduce excavation rate. Monitor exposed personnel more frequently.
>2.6 mg/m^3 >5 min. in Breathing Zone	Improve dust suppression, consult CIH for possible personal exposure monitoring for arsenic.
Levels at Downwind Perimeter of Site (NAAQS: 150 $\mu g/m^3$ over 24 hrs)	
<0.15 mg/m^3 at downwind perimeter	Continue periodic monitoring (every 2 hours).
≥0.15 mg/m^3 at downwind perimeter	Initiate or improve dust suppression, or reduce excavation rate. Monitor upwind/downwind ambient concentrations more frequently. If downwind levels over duration of work day exceed upwind perimeter by 0.15 mg/m^3, stop work and consult CIH for possible high volume ambient air monitoring.

The HSO/SS will visually observe for the presence of dust in the work area, and depending on the results will implement dust suppression controls (water application, work pacing, equipment speed limits) and measure dust levels using a TSI AM510 personal particulate monitor (or equivalent) with no size selective inlet.

The action levels are conservative action levels based on maximum detected arsenic concentrations in Site soils. The HSO/SS, through consultation with a CIH, may revise these action levels based on analytical results of air sampling for arsenic, up to a maximum of 10 mg/m^3. The maximum particulate concentration at which work may proceed at the Site without use of respirators is 10 mg/m^3. All air monitoring equipment will be calibrated on a daily basis according to manufacturer specifications.

7.0 Hazard Analysis by Task

The following section identifies potential hazards associated with each task listed in Section 3.2 of this HASP. Tasks have been grouped according to the types of potential hazard associated with them.

Task	Potential Hazard
Remove topsoil and pitrun from Landfill cap to construct temporary stormwater control berm	Exposure to loud noise; overhead hazards; head, foot, ankle, hand, and eye hazards; electrical and mechanical hazards; lifting hazards; dust inhalation hazards; fall hazards; heat exposure hazards; biological hazards.
Excavation and backfill of test trenches; excavation of trench and backfill with slurry	Exposure to loud noise; overhead hazards; head, foot, ankle, hand, and eye hazards; electrical and mechanical hazards; lifting hazards; dust inhalation hazards; potential dermal exposure to arsenic in groundwater, soil, slag, and wood waste; fall hazards; heat exposure hazards.
Mixing of soil, bentonite, and water to make slurry	Exposure to loud noise; head, foot, ankle, hand, and eye hazards; electrical and mechanical hazards; lifting hazards; dust inhalation hazards; potential dermal exposure to arsenic in groundwater and soil; fall hazards; heat exposure hazards.
Excavation of trench and installation of pipe, lift stations, and cleanouts	Exposure to loud noise; head, foot, ankle, hand, and eye hazards; electrical and mechanical hazards; lifting hazards; dust inhalation hazards; fall hazards; heat exposure hazards.
Removing soil from bottom of north infiltration pond	Exposure to loud noise; head, foot, ankle, hand, and eye hazards; electrical and mechanical hazards; lifting hazards; inhalation hazards; potential exposure to dust; fall hazards; heat exposure hazards; biological hazards.
Excavation of soil and construction of berm for west infiltration pond	Exposure to loud noise; overhead hazards; head, foot, ankle, hand, and eye hazards; electrical and mechanical hazards; lifting hazards; dust inhalation hazards; potential dermal exposure to arsenic in groundwater and soil; fall hazards; heat exposure hazards.

Task	Potential Hazard
Installation of piezometers	Exposure to loud noise; overhead hazards; head, foot, ankle, hand, and eye hazards; electrical and mechanical hazards; lifting hazards; dust inhalation hazards; potential dermal exposure to arsenic in groundwater, soil, slag and wood waste; fall hazards; heat exposure hazards.
Measurement of groundwater elevations from piezometers	Chemical hazards include potential dermal or eye exposure to arsenic in groundwater. Physical hazards include slip, trip, or fall hazards; heat exposure hazards; and biological hazards.

8.0 Personal Protective Equipment

All work involving heavy equipment, including excavation, berm construction, drilling and well installation will proceed in Level D Personal Protective Equipment (PPE), which shall include hard hat, steel-toed boots, hearing protection, eye protection, gloves, and sturdy cotton outer work clothing (if personnel will not contact soils or dust) or removable cotton outer clothing (if personnel will contact soils or dust).

All personnel will be properly fitted and trained in the use of PPE. The level of protection will be upgraded by the HSO/SS whenever warranted by conditions present in the work area. The HSO/SS will periodically inspect equipment such as gloves, hard hats, and respirators for defects.

For all work involving potential exposure to groundwater, workers will wear nitrile gloves and Level D PPE. Some areas may require the use of hip-waders to prevent dermal contact with arsenic-contaminated surface water and sediment.

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9.0 Site Control

The Site is located in a relatively isolated area. Pedestrians and other unauthorized personnel will not be allowed in the work area. Access to the work Site will be restricted to designated personnel. The purpose of site control is to minimize the public's potential exposure to Site hazards, to prevent vandalism in the work area and access by children and other unauthorized persons, and to provide adequate facilities for workers. A daily field log will be maintained by the HSO/SS. The field log will include a list of all personnel on-site and visitors.

Temporary perimeter fencing and locked gates will prevent after-hour access to the Landfill. Temporary construction fencing, signage, or other appropriate control measures will be maintained in all work areas to limit access during and after work hours.

Work areas will be accessible by the Interurban Trail, a paved bicycle and pedestrian access trail that runs between the Landfill and the wetland area. Temporary fencing will be established along the Interurban Trail adjacent to the B&L Property to keep the public out of work areas. It may be necessary to close the Interurban Trail during work area mobilization and demobilization to ensure public safety.

Work area controls and decontamination areas will be provided to limit the potential for chemical exposure associated with Site activities. The support zone (SZ) for the Site includes all areas outside the work area and decontamination areas. An exclusion zone (EZ) and contamination reduction zone (CRZ) and SZ will be set up for work being conducted within the limits of the Landfill (edge of wood waste) only. Only authorized personnel shall be permitted access to the EZ/CRZ. For work being conducted outside the limits of the Landfill and portions of the work area that do not have known arsenic contamination in soil, the EZ/CRZ around work locations will be demarcated with cones and/or barrier hazard tape as needed to effectively limit unauthorized access.

Because dermal transfer and ingestion are the main exposure routes, no cosmetics application, smoking and/or eating may occur in the EZ within the limits of the Landfill. All hands must be washed before exiting the work areas. Portable restrooms with hand sanitizer will be provided on the Site.

All Site work will occur in teams and the primary means of communication on-site and with off-site contacts will be via cell phones. An agreed-upon system of alerting via air horns and/or vehicle horns may be used around heavy equipment to signal an emergency if shouting is ineffective.

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10.0 Decontamination

Decontamination procedures will be strictly followed to prevent off-site spread of arsenic contaminated soil or water. Decontamination effectiveness will be assessed by visual inspection by the HSO/SS. Decontamination water, drummed soil, and PPE will be collected and containerized on-site, labeled until hazardous waste characterization occurs, and disposed of in accordance with applicable regulations.

10.1 PERSONNEL/HAND EQUIPMENT DECONTAMINATION PROCEDURES

The CRZ will be equipped with a decontamination station including plastic sheeting, paper towels, trash bags, small broom, wash tub, rinse tub, Alconox detergent, long-handle brush and bucket, and water sprayer. The following decontamination procedures will be followed:

1. Brush off residual soils at exit from EZ; drop equipment on plastic sheeting.
2. Wash and rinse outer gloves; remove them (may be reused on same project).
3. Wipe down equipment with soapy water-moistened paper towels, followed by clean water-moistened paper towels; place trash in bag.
4. Remove inner gloves and place in trash bag.

10.2 DECONTAMINATION PROCEDURES FOR HEAVY EQUIPMENT

Heavy equipment will be swept off at a CRZ when leaving an EZ and proceeding through the support zone. In addition, heavy equipment will be swept off and/or pressure-washed or hand washed with a minimum amount of soapy water to achieve visible cleanliness prior to leaving the Site.

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11.0 Emergency Response and Contingency Plan

This section defines the emergency action plan for the Site. It will be rehearsed with all Site personnel and reviewed with visitors upon their initial Site visit, and whenever the plan is modified or the HSO/SS believes that Site personnel are unclear about the appropriate emergency actions.

A muster point of refuge will be identified by the HSO/SS and communicated to the field team each day. This point will be clear of adjacent hazards and preferably up- or cross-wind for the entire day. In an emergency, all site personnel and visitors will evacuate to the muster point for roll call versus the daily Site log. It is important that each person on Site understand their role in an emergency, and that they remain calm and act efficiently to ensure everyone's safety.

After each emergency is resolved, the entire project team will meet and debrief on the incident—the purpose is not to fix blame, but to improve the planning and response to future emergencies. The debriefing will review the sequence of events, what was done well, and what can be improved. The debriefing will be documented in a written format and communicated to the PM. Modifications to the emergency plan will be approved by the PM.

Reasonably foreseeable emergency situations include medical emergencies, accidental release of hazardous materials (such as gasoline, or diesel) or hazardous waste, and general emergencies such as vehicle accident, fire, thunderstorm, and earthquake. Expected actions for each potential incident are outlined below.

11.1 MEDICAL EMERGENCIES

In the event of a medical emergency, the following procedures should be used.

1. Stop any imminent hazard if you can safely do it.

2. Remove ill, injured, or exposed person(s) from immediate danger if moving them will clearly not cause them harm, and no hazards exist to the rescuers.

3. Evacuate other on-site personnel to a safe place in an upwind or cross-wind direction until it is safe for work to resume.

   If serious injury or life-threatening condition exists, call **911** for paramedics, fire department, and police.

   Clearly describe the location, injury, and conditions to the dispatcher. Designate a person to go to the Site entrance and direct emergency equipment to the injured person(s). Provide the responders with a copy of this HASP to alert them to chemicals of potential concern.

4. Trained personnel may provide first aid/cardiopulmonary resuscitation if it is necessary and safe to do so. Remove contaminated clothing and PPE only if this can be done without endangering the injured person.

5. Call the PM and PC.

6. Immediately implement steps to prevent recurrence of the accident.

A map showing the nearest hospital location is attached to this HASP (refer to Section 2 for number and address).

11.2 ACCIDENTAL RELEASE OF HAZARDOUS MATERIALS OR WASTES

1. Evacuate all on-site personnel to a safe place in an upwind direction until the HSO/SS determines that it is safe for work to resume.

2. Instruct a designated person to contact the PM or PC and confirm a response.

3. Contain the spill, if it is possible and can be done safely.

4. If the release is not stopped, contact 911 to alert the fire department.

5. Contact the Washington State Emergency Response Commission at 1-800-258-5990 to report the release.

6. Initiate cleanup.

7. The PM and PC will coordinate follow-up written reporting to the Washington State Department of Ecology in the event of a reportable release of hazardous materials or wastes.

11.3 GENERAL EMERGENCIES

In the case of fire, explosion, earthquake, or imminent hazards, work shall be halted and all on-site personnel will be immediately evacuated to a safe place. The local police/fire department shall be notified if the emergency poses a continuing hazard by calling 911.

In the event of a thunderstorm, outdoor work will be discontinued until the threat of lightning has abated. During the incipient phase of a fire, the available fire extinguisher(s) may be used by persons trained in putting out fires, if it is safe for them to do so. Contact the fire department as soon as feasible.

11.4 EMERGENCY COMMUNICATIONS

In the case of an emergency, an air horn or car horn will be used as needed to signal the emergency. One long (5-second) blast will be given as the emergency/stop work signal. If the

air horn is not working, a vehicle horn and/or overhead waving of arms will be used to signal the emergency. In any emergency, all personnel will evacuate to the designated refuge area and await further instruction.

11.5 EMERGENCY EQUIPMENT

The following minimum emergency equipment will be readily available on-site and functional at all times:

- First Aid Kit—Contents approved by the HSO/SS, including two bloodborne pathogen barriers.
- Sorbent material sufficient to contain the volume of the largest single container of hazardous materials (e.g., gas and diesel) brought on site.
- Portable fire extinguisher (2-A:10 B/C min).
- Two spare sets of PPE suitable for entering the EZ.
- A copy of the current HASP.

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12.0 Administrative

12.1 MEDICAL SURVEILLANCE

Personnel involved with field activities must be covered under their employer's medical surveillance program that includes annual physical examinations and certification to wear respiratory protective equipment. These medical monitoring programs must be in compliance with all applicable worker health and safety regulations.

12.2 RECORD KEEPING

The HSO/SS, or a designated alternate, will be responsible for keeping daily logs of workers and visitors present at the work Site, attendance lists of personnel present at Site health and safety meetings, accident reports, and signatures of all personnel who have read this HASP.

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13.0 Approvals

_____	7/20/09
Project Manager	Date
_____	7/20/09
Project Health & Safety Officer	Date

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14.0 Signature Page

I have read this Heath and Safety Plan and understand its contents. I agree to abide by its provisions and will immediately notify the HSO/SS if Site conditions or hazards not specifically designated herein are encountered.

Name (Print)	Signature	Date	Company/Affiliation

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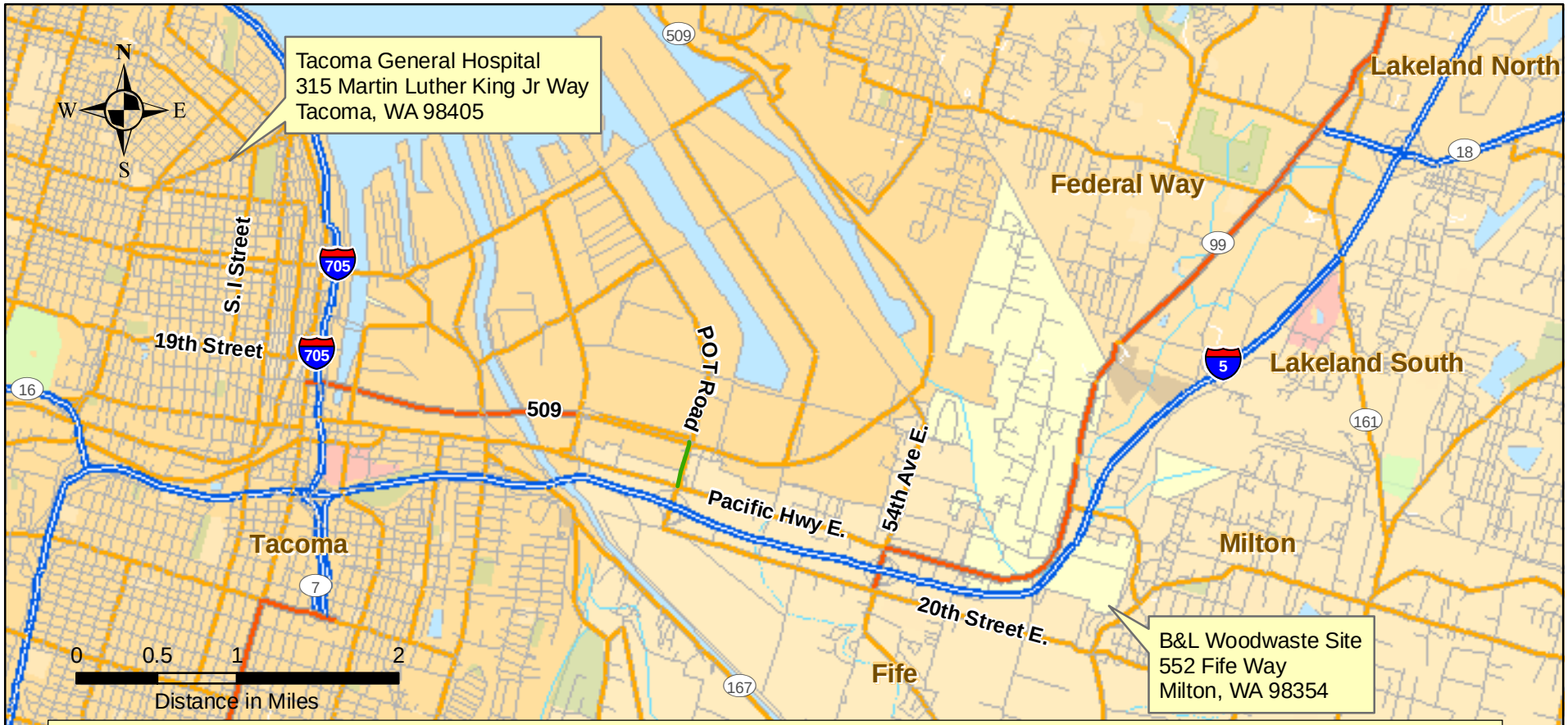
B&L Woodwaste Site
Pierce County, Washington

Engineering Design Report (EDR)
Addendum 1: Appendix 1H

Health and Safety Plan
Phase 1 Part 1 Cleanup Action

Figures

FINAL



Directions to Hospital from B&L Woodwaste Site:

1. Depart B&L Woodwaste Site
2: Go East on 6th Ave toward Fife Way < 0.1 mile(s) < 1 minute
3: Make sharp right on Fife Way 0.2 mile(s) < 1 minute
4: Bear right on Milton Way < 0.1 mile(s) < 1 minute
5: Turn right on Yuma St (20th St E) < 0.1 mile(s) < 1 minute
6: Bear right on 20th St E 1.3 mile(s) 2 minute(s)
7: Turn right on 54th Ave E 0.3 mile(s) < 1 minute
8: Turn left on STHY 99 (Pacific Hwy E) 1.3 mile(s) 2 minute(s)
9: Turn right on Port Of Tacoma Rd 0.3 mile(s) < 1 minute
10: Turn left on S Frontage Rd (STHY 509) 0.6 mile(s) < 1 minute
11: Continue on STHY 509 1.8 mile(s) 1 minute(s)
12: Turn right on Pacific Ave 0.1 mile(s) < 1 minute
13: Turn left on S 19th St 0.5 mile(s) < 1 minute
14: Turn right on S I St 1.2 mile(s) 1 minute(s)
15: Turn left on S 3rd St 0.1 mile(s) < 1 minute
16: Turn right on Martin Luther King Jr Way (S K St) < 0.1 mile(s) < 1 minute
17: Arrive at Tacoma General Hospital.

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B&L Woodwaste Site
Pierce County, Washington

Figure 1H.1
Route to Hospital Map

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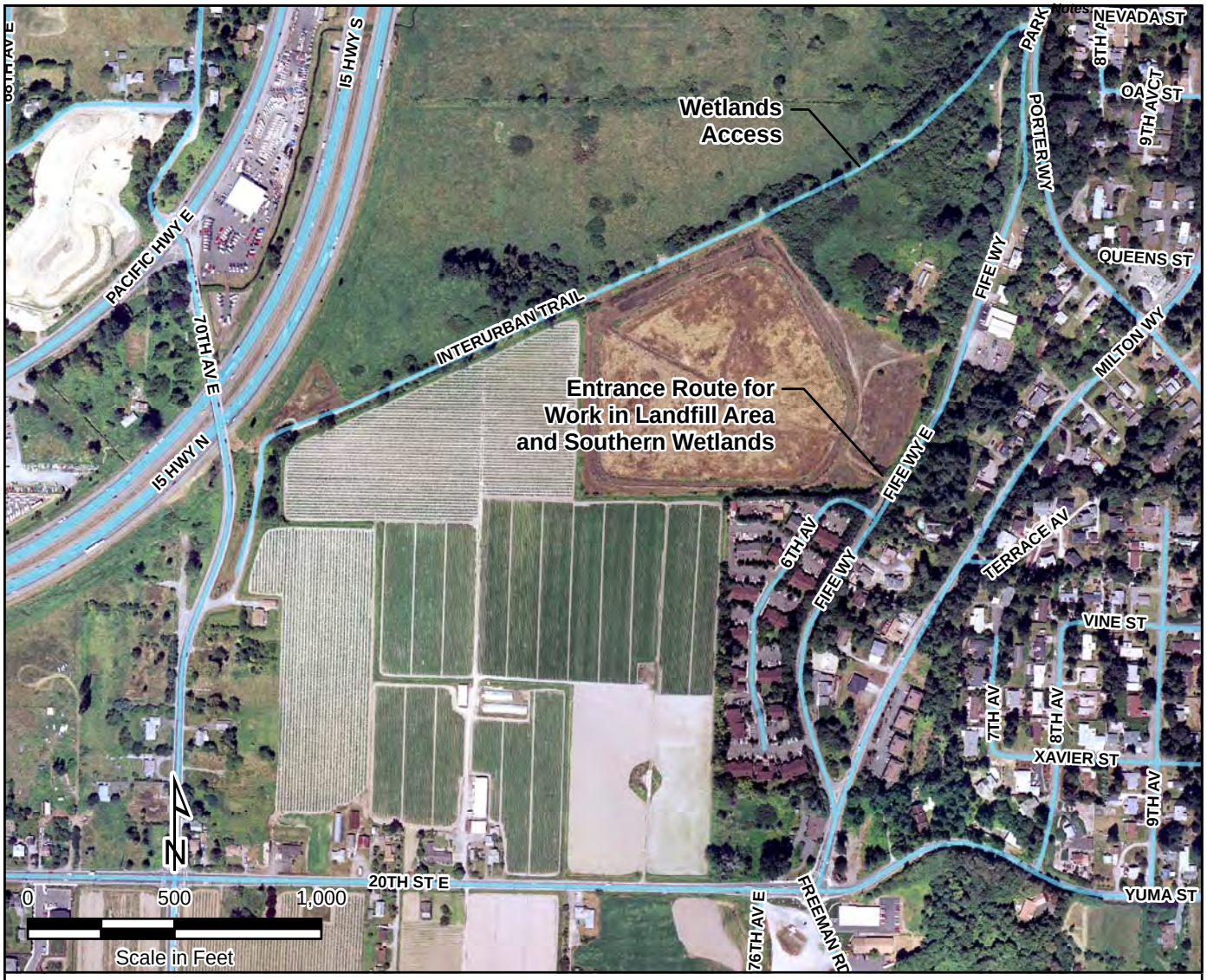

Directions to B&L Woodwaste Site:

- Landfill entrance is located 1/4 mile north of the intersection between 20th Street East and Fife Way.
- For work in the Landfill area and southern part of the wetlands, the entrance is located 1/4 mile north of the intersection between 20th Street East and Fife Way. Enter from Fife Way and drive around the east side of the Landfill to Puget Power Road and the wetlands.
- For work in the northern part of the wetlands, enter the wetlands from Fife Way on the unimproved 12th Street East roadway, located 1/2 mile north of the Landfill entrance, at the intersection of Fife Way with Porter Way.

FLOYD | SNIDER strategy • science • engineering AMEC Geomatrix	**B&L Woodwaste Site** **Pierce County, Washington**	Figure 1H.2 Directions to B&L Woodwaste Site

File: F:\projects\B&L RIM\GIS\MXD\Figure 1H.2 (Directions to Site with Aerial).mxd
6/29/2009

B&L Woodwaste Site
Pierce County, Washington

Engineering Design Report (EDR)
Addendum 1: Appendix 1H

Health and Safety Plan
Phase 1 Part 1 Cleanup Action

Attachments

FINAL

B&L Woodwaste Site Health and Safety Plan
ATTACHMENT 1H.A
Daily Tailgate Safety Meeting

Date: _____ Time: _____

Project Name: B&L Woodwaste Site Remedial Investigation

Location: B&L Woodwaste Site, 2206 6th Ave or 552 Fife Way in Milton, Washington

Meeting Conducted by: _____

Topics Discussed:

Physical Hazards: _____

Chemical Hazards: _____

Personal Protection: Modified Level D PPE (hard hat, safety glasses, hearing protection, steel-toed shoes, nitrile gloves).

Decontamination: _____

Special Site Considerations: No smoking is allowed within the limits of the landfill. All employees must wash hands before leaving the work areas for breaks and/or lunch. All contractors should have spill kits (i.e., sorbent pads) of their own in all vehicles and/or heavy machinery in case of an emergency.

_____

_____

On-site Emergency Contact: HSO/SS Emergency Dispatch 911

Hospital: Tacoma General Hospital, 315 Martin Luther King Jr. Way,
Tacoma, Washington 98405

Tailgate Safety Meeting Attendees

Name/Company (printed)	Signature

Conducted by: _____ _____ _____

Name Signature Date

Material Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

CHEVRON REGULAR UNLEADED GASOLINE

Product Number(s): CPS201000 [See Section 16 for Additional Product Numbers]
Synonyms: Calco Regular Unleaded Gasoline

Company Identification
Chevron Products Company
Marketing, MSDS Coordinator
6001 Bollinger Canyon Road
San Ramon, CA 94583
United States of America

Transportation Emergency Response
CHEMTREC: (800) 424-9300 or (703) 527-3887
Health Emergency
ChevronTexaco Emergency Information Center: Located in the USA. International collect calls accepted. (800) 231-0623 or (510) 231-0623
Product Information
Technical Information: (510) 242-5357

SPECIAL NOTES: This MSDS applies to: Federal Reformulated Gasoline, California Reformulated Gasoline, Wintertime Oxygenated Gasoline, Low RVP Gasoline and Conventional Gasoline.

SECTION 2 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	CAS NUMBER	AMOUNT
Gasoline	86290-81-5	100 %volume
Benzene	71-43-2	0.1 - 4.9 %volume
Ethyl benzene	100-41-4	0.1 - 3 %volume
Naphthalene	91-20-3	0.1 - 2 %volume
Ethanol	64-17-5	0 - 10 %volume
Methyl tert-butyl ether (MTBE)	1634-04-4	0 - 15 %volume
Tertiary amyl methyl ether (TAME)	994-05-8	0 - 17 %volume
Ethyl tert-butyl ether (ETBE)	637-92-3	0 - 18 %volume

Motor gasoline is considered a mixture by EPA under the Toxic Substances Control Act (TSCA). The refinery streams used to blend motor gasoline are all on the TSCA Chemical Substances Inventory. The appropriate CAS number for refinery blended motor gasoline is 86290-81-5. The product specifications of motor gasoline sold in your area will depend on applicable Federal and State regulations.

SECTION 3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

- EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE
- HARMFUL OR FATAL IF SWALLOWED - MAY CAUSE LUNG DAMAGE IF SWALLOWED
- VAPOR HARMFUL
- CAUSES SKIN IRRITATION
- CAUSES EYE IRRITATION
- LONG-TERM EXPOSURE TO VAPOR HAS CAUSED CANCER IN LABORATORY ANIMALS
- KEEP OUT OF REACH OF CHILDREN
- TOXIC TO AQUATIC ORGANISMS

****

IMMEDIATE HEALTH EFFECTS
Eye: Contact with the eyes causes irritation. Symptoms may include pain, tearing, reddening, swelling and impaired vision.
Skin: Contact with the skin causes irritation. Skin contact may cause drying or defatting of the skin. Symptoms may include pain, itching, discoloration, swelling, and blistering. Contact with the skin is not expected to cause an allergic skin response. Not expected to be harmful to internal organs if absorbed through the skin.
Ingestion: Because of its low viscosity, this material can directly enter the lungs, if swallowed, or if subsequently vomited. Once in the lungs it is very difficult to remove and can cause severe injury or death.
Inhalation: The vapor or fumes from this material may cause respiratory irritation. Symptoms of respiratory irritation may include coughing and difficulty breathing. Breathing this material at concentrations above the recommended exposure limits may cause central nervous system effects. Central nervous system effects may include headache, dizziness, nausea, vomiting, weakness, loss of coordination, blurred vision, drowsiness, confusion, or disorientation. At extreme exposures, central nervous system effects may include respiratory depression, tremors or convulsions, loss of consciousness, coma or death.

DELAYED OR OTHER HEALTH EFFECTS:
Reproduction and Birth Defects: This material is not expected to cause birth defects or other harm to the developing fetus based on animal data.
Cancer: Prolonged or repeated exposure to this material may cause cancer. Gasoline has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC).

Contains benzene, which has been classified as a carcinogen by the National Toxicology Program (NTP) and a Group 1 carcinogen (carcinogenic to humans) by the International Agency for Research on Cancer (IARC).
Contains ethylbenzene which has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC).
Contains naphthalene, which has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC).

Whole gasoline exhaust has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC).

Risk depends on duration and level of exposure. See Section 11 for additional information.

SECTION 4 FIRST AID MEASURES

Eye: Flush eyes with water immediately while holding the eyelids open. Remove contact lenses, if worn, after initial flushing, and continue flushing for at least 15 minutes. Get medical attention if irritation persists.
Skin: Wash skin with water immediately and remove contaminated clothing and shoes. Get medical attention if any symptoms develop. To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.
Ingestion: If swallowed, get immediate medical attention. Do not induce vomiting. Never give anything by mouth to an unconscious person.
Inhalation: Move the exposed person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if breathing difficulties continue.
Note to Physicians: Ingestion of this product or subsequent vomiting may result in aspiration of light hydrocarbon liquid, which may cause pneumonitis.

SECTION 5 FIRE FIGHTING MEASURES

See Section 7 for proper handling and storage.

FIRE CLASSIFICATION:
OSHA Classification (29 CFR 1910.1200): Flammable liquid.

NFPA RATINGS: Health: 1 Flammability: 3 Reactivity: 0

FLAMMABLE PROPERTIES:
Flashpoint: (Tagliabue Closed Cup) < -45 °C (< -49 °F)
Autoignition: > 280 °C (> 536 °F)
Flammability (Explosive) Limits (% by volume in air): Lower: 1.4 Upper: 7.6

EXTINGUISHING MEDIA: Dry Chemical, CO2, AFFF Foam or alcohol resistant foam if >15% volume polar solvents (oxygenates).

PROTECTION OF FIRE FIGHTERS:
Fire Fighting Instructions: Use water spray to cool fire-exposed containers and to protect personnel. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.
Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in the vicinity of the spill or released vapor. If this material is released into the work area, evacuate the area immediately. Monitor area with combustible gas indicator.
Spill Management: Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. All equipment used when handling the product must be grounded. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.
Reporting: Report spills to local authorities and/or the U.S. Coast Guard's National Response Center at (800) 424-8802 as appropriate or required. This material is covered by EPA's Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Petroleum Exclusion. Therefore, releases to the environment may not be reportable under CERCLA.

SECTION 7 HANDLING AND STORAGE

Precautionary Measures: READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL. This product presents an extreme fire hazard. Liquid very quickly evaporates, even at low temperatures, and forms vapor (fumes) which can catch fire and burn with explosive violence. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches. Never siphon gasoline by mouth.
Use only as a motor fuel. Do not use for cleaning, pressure appliance fuel, or any other such use. Do not store in open or unlabeled containers. Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Do not breathe vapor or fumes. Wash thoroughly after handling. Keep out of the reach of children.
Unusual Handling Hazards: WARNING! Do not use as portable heater or appliance fuel. Toxic fumes may accumulate and cause death.
General Handling Information: Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.
Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating an accumulation of electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents'. Improper filling of portable gasoline containers creates danger of fire. Only dispense gasoline into approved and properly labeled gasoline containers. Always place portable containers on the ground. Be sure pump nozzle is in contact with the container while filling. Do not use a nozzle's lock-open device. Do not fill portable containers that are inside a vehicle or truck/trailer bed.

General Storage Information: DO NOT USE OR STORE near heat, sparks or open flames. USE AND STORE ONLY IN WELL VENTILATED AREA. Keep container closed when not in use.
Container Warnings: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:
Consider the potential hazards of this material (see Section 3), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

ENGINEERING CONTROLS:
Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below the recommended exposure limits.

PERSONAL PROTECTIVE EQUIPMENT
Eye/Face Protection: No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields as a good safety practice.
Skin Protection: No special protective clothing is normally required. Where splashing is possible, select protective clothing depending on operations conducted, physical requirements and other substances in the workplace. Suggested materials for protective gloves include: Chlorinated Polyethylene (or Chlorosulfonated Polyethylene), Nitrile Rubber, Polyurethane, Viton.
Respiratory Protection: Determine if airborne concentrations are below the recommended exposure limits. If not, wear an approved respirator that provides adequate protection from measured concentrations of this

material, such as: Air-Purifying Respirator for Organic Vapors.
When used as a fuel, this material can produce carbon monoxide in the exhaust. Determine if airborne concentrations are below the occupational exposure limit for carbon monoxide. If not, wear an approved positive-pressure air-supplying respirator.
Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.

Occupational Exposure Limits:

Component	Limit	TWA	STEL	Ceiling	Notation
Benzene	ACGIH_TLV	.5 ppm	2.5 ppm		Skin A1
Benzene	OSHA_PEL	1 ppm	5 ppm		
Benzene	OSHA_Z2	10 ppm		25 ppm	
Ethanol	ACGIH_TLV	1000 ppm			A4
Ethanol	OSHA_PEL	1000 ppm			
Ethyl benzene	ACGIH_TLV	100 ppm	125 ppm		A3
Ethyl benzene	OSHA_PEL	100 ppm	125 ppm		
Ethyl tert-butyl ether (ETBE)	ACGIH_TLV	5 ppm			
Gasoline	ACGIH_TLV	300 ppm	500 ppm		A3
Gasoline	OSHA_PEL	300 ppm	500 ppm		
Methyl tert-butyl ether (MTBE)	ACGIH_TLV	50 ppm			A3
Naphthalene	ACGIH_TLV	10 ppm	15 ppm		Skin A4
Naphthalene	OSHA_PEL	10 ppm	15 ppm		
Tertiary amyl methyl ether (TAME)	CHEVRON		50 ppm		

Refer to the OSHA Benzene Standard (29 CFR 1910.1028) and Table Z-2 for detailed training, exposure monitoring, respiratory protection and medical surveillance requirements before using this product.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Attention: the data below are typical values and do not constitute a specification.

Color: Colorless to yellow
Physical State: Liquid
Odor: Petroleum odor
pH: NA
Vapor Pressure: 5 psi - 15 psi (Typical) @ 37.8°C (100°F)
Vapor Density (Air = 1): 3 - 4 (Typical)
Boiling Point: 37.8°C (100°F) - 204.4°C (400°F) (Typical)
Solubility: Insoluble in water; miscible with most organic solvents.
Freezing Point: NA
Melting Point: NA
Specific Gravity: 0.7 g/ml - 0.8 g/ml @ 15.6°C (60.1°F)
Viscosity: <1 SUS @ 37.8°C (100°F)

SECTION 10 STABILITY AND REACTIVITY

Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.
Incompatibility With Other Materials: May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Hazardous Decomposition Products: None known (None expected)
Hazardous Polymerization: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

IMMEDIATE HEALTH EFFECTS
Eye Irritation: The Draize eye irritation mean score in rabbits for a 24-hour exposure was: 0/110.
Skin Irritation: For a 4-hour exposure, the Primary Irritation Index (PII) in rabbits is: 4.8/8.0.
Skin Sensitization: This material did not cause sensitization reactions in a Modified Buehler guinea pig test.
Acute Dermal Toxicity: 24 hour(s) LD50: >3.75g/kg (rabbit).
Acute Oral Toxicity: LD50: >5 ml/kg (rat)
Acute Inhalation Toxicity: 4 hour(s) LD50: >2000ppm (rat).

ADDITIONAL TOXICOLOGY INFORMATION:
Gasolines are highly volatile and can produce significant concentrations of vapor at ambient temperatures. Gasoline vapor is heavier than air and at high concentrations may accumulate in confined spaces to present both safety and heath hazards. When vapor exposures are low, or short duration and infrequent, such as during refuelling and tanker loading/unloading, neither total hydrocarbon nor components such as benzene are likely to result in any adverse health effects. In situations such as accidents or spills where exposure to gasoline vapor is potentially high, attention should be paid to potential toxic effects of specific components. Information about specific components in gasoline can be found in Sections 2, 8 and 15 of this MSDS. More detailed information on the health hazard of specific gasoline components can be obtained calling the Chevron Emergency Information Center (see Section 1 for phone numbers).

NEUROTOXICITY: Pathological misuse of solvents and gasoline, involving repeated and prolonged exposure to high concentrations of vapor is a significant exposure on which there are many reports in the medical literature. As with other solvents, persistent abuse involving repeated and prolonged exposures to high concentrations of vapor has been reported to result in central nervous system damage and eventually, death. In a study in which ten human volunteers were exposed for 30 minutes to approximately 200, 500 or 1000 ppm concentrations of gasoline vapor, irritation of the eyes was the only significant effect observed, based on both subjective and objective assessments. In an inhalation study, groups of 6 Fischer rats (3 male. 3 female) were exposed to 2056 ppm of wholy vaporized unleaded gasoline for 6 hours perday, 5 day per week for up to 18 months. Histopathology of the peripheral nervous system and spinal cord revealed no distal axonal neuropthy of the type associated with exposure to n-hexane even though gasoline contained 1.9% n-hexane. The authors concluded that gasoline treatment may have amplified the incidence and prominence of some naturally occurring age-related (subclinical) in the nervous system. BIRTH DEFECTS AND REPRODUCTIVE TOXICITY: An inhalation study with rats exposed to 0, 400 and 1600 ppm of wholly vaporized unleaded gasoline, 6 hours per day on day 6 through 16 of gestation, showed no teratogenic effects nor indication of toxicity to either the mother

or the fetus. Another inhalation study in rats exposed to 3000, 6000, or 9000 ppm of gasoline vapor, 6 hours per day on day 6 through 20 of gestation, also showed no teratogenic effects nor indications of toxicity to either the mother or the fetus.

CHRONIC TOXICITY/CANCER: Wholly vaporized unleaded gasoline was used in a 3 month inhalation study. Groups of 40 rats (20 males, 20 female) and 8 squirrel monkeys (4 male, 4 female) were exposed 6 hours per day and 5 days per week for 13 weeks to 384 or 1552 ppm gasoline. One group of each species served as unexposed controls. The initial conclusion of this study was that inhalation of gasoline at airborne concentrations of up to 1522 ppm caused no toxicity in rats or monkeys. However, further histopathological examination of male rat kidneys on the highest dose group revealed an increased incidence and severity of regenerative epithelium and dilated tubules containing proteinaceous deposits. Lifetime inhalation of wholly vaporized unleaded gasoline at 2056 ppm has caused increased liver tumors in female mice. The mechanism of this response is still being investigated but it is thought to be an epigenetic process unique to the female mouse.

This exposure also caused kidney damage and eventually kidney cancer in male rats. No other animal model studied has shown these adverse kidney effects and there is no physiological reason to believe that they would occur in man. EPA has concluded that mechanism by which wholly vaporzied unleaded gasoline causes kidney damage is unque to the male rat. The effects in that species (kidney damage and cancer) should not be used in human risk assesment. In their 1988 review of carcinogenic risk from gasoline, The International Agency for Research on Cancer (IARC) noted that, because published epidemiology studies did not include any exposure data, only occupations where gasoline exposure may have ocurred were reviewed. These included gasoline service station attendants and automobile mechanics. IARC also noted that there was no opportunity to separate effects of combustion products from those of gasoline itself. Although IARC allocated gasoline a final overall classification of Group 2B, i.e. possibly carcinogenic to humans, this was based on limited evidence in experimental animals plus supporting evidence including the presence in gasoline of benzene and 1, 3-butadiene. The actual evidence for carcinogenicity in humans was considered inadequate.

MUTAGENICITY: Gasoline was not mutagenic, with or without activation, in the Ames assay (Salmonella typhimurium), Saccharamyces cerevisesae, or mouse lymphoma assays. In addition, point mutations were not induced in human lymphocytes. Gasoline was not mutagenic when tested in the mouse dominant lethal assay. Administration of gasoline to rats did not cause chomosomal aberrations in their bone marrow cells. EPIDEMIOLOGY: To explore the health effects of workers potentially exposed to gasoline vapors in the marketing and distribution sectors of the petroleum industry, the American Petroleum Institute sponsored a cohort mortality study (Publication 4555), a nested case-control study (Publication 4551), and an exposure assessment study (Publication 4552). Histories of exposure to gasoline were reconstructed for cohort of more than 18,000 employees from four companies for the time period between 1946 and 1985. The results of the cohort mortality study indicated that there was no increased mortality from either kidney cancer or leukemia among marketing and marine distribution employees who were exposed to gasoline in the petroleum industry, when compared to the general population. More importantly, based on internal comparisons, there was no association between mortality from kidney cancer or leukemia and various indices of gasoline exposure. In particular, neither duration of employment, duration of exposure, age at first exposure, year of first exposure, job category, cumulative exposure, frequency of peak exposure, nor average intensity of exposure had any effect on kidney cancer or leukemia mortality. The results of the nested case-control study confirmed the findings of the original cohort study. That is, exposure to gasoline at the levels experienced by this cohort of distribution workers is not a significant risk factor for leukemia (all cell types), acute myeloid leukemia, kidney cancer or multiple myeloma.

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY

The 96 hour(s) LC50 for rainbow trout (Oncorhynchus mykiss) is 2.7 mg/l.
The 48 hour(s) LC50 for water flea (Daphnia magna) is 3.0 mg/l.
The 96 hour(s) LC50 for sheepshead minnow (Cyprinodon variegatus) is 8.3 mg/l.
The 96 hour(s) LC50 for mysid shrimp (Mysidopsis bahia) is 1.8 mg/l.
This material is expected to be toxic to aquatic organisms. Gasoline studies have been conducted in the laboratory under a variety of test conditions with a range of fish and invertebrate species. An even more extensive database is available on the aquatic toxicity of individual aromatic constituents. The majority of published studies do not identify the type of gasoline evaluated, or even provide distinguishing characteristics such as aromatic content or presence of lead alkyls. As a result, comparison of results among studies using open

and closed vessels, different ages and species of test animals and different gasoline types, is difficult.

The bulk of the available literature on gasoline relates to the environmental impact of monoaromatic (BTEX) and diaromatic (naphthalene, methylnaphthalenes) constituents. In general, non-oxygenated gasoline exhibits some short-term toxicity to freshwater and marine organisms, especially under closed vessel or flow-through exposure conditions in the laboratory. The components which are the most prominent in the water soluble fraction and cause aquatic toxicity, are also highly volatile and can be readily biodegraded by microorganisms.

ENVIRONMENTAL FATE
This material is expected to be readily biodegradable. Following spillage, the more volatile components of gasoline will be rapidly lost, with concurrent dissolution of these and other constituents into the water. Factors such as local environmental conditions (temperature, wind, mixing or wave action, soil type, etc), photo-oxidation, biodegradation and adsorption onto suspended sediments, can contribute to the weathering of spilled gasoline.

The aqueous solubility of non-oxygenated unleaded gasoline, based on analysis of benzene, toluene, ethylbenzene+xylenes and naphthalene, is reported to be 112 mg/l. Solubility data on individual gasoline constituents also available.

SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

DOT Shipping Name: GASOLINE
DOT Hazard Class: 3 (Flammable Liquid)
DOT Identification Number: UN1203
DOT Packing Group: II

SECTION 15 REGULATORY INFORMATION

SARA 311/312 CATEGORIES:
1. Immediate (Acute) Health Effects: YES
2. Delayed (Chronic) Health Effects: YES
3. Fire Hazard: YES
4. Sudden Release of Pressure Hazard: NO
5. Reactivity Hazard: NO

REGULATORY LISTS SEARCHED:

4_I1=IARC Group 1 15=SARA Section 313

4_I2A=IARC Group 2A	16=CA Proposition 65
4_I2B=IARC Group 2B	17=MA RTK
05=NTP Carcinogen	18=NJ RTK
06=OSHA Carcinogen	19=DOT Marine Pollutant
09=TSCA 12(b)	20=PA RTK

The following components of this material are found on the regulatory lists indicated.

Benzene	15, 16, 17, 18, 20, 4_I1, 5, 6
Ethanol	17, 18, 20
Ethyl benzene	15, 17, 18, 20, 4_I2B
Gasoline	17, 18, 20
Methyl tert-butyl ether (MTBE)	15, 17, 18, 20, 9
Naphthalene	15, 16, 17, 18, 20, 4_I2B
Tertiary amyl methyl ether (TAME)	9

CERCLA REPORTABLE QUANTITIES(RQ)/SARA 302 THRESHOLD PLANNING QUANTITIES(TPQ):

Component	Component RQ	Component TPQ	Product RQ
Benzene	10 lbs	None	186 lbs
Ethanol	100 lbs	None	1961 lbs
Ethyl benzene	1000 lbs	None	34964 lbs
Methyl tert-butyl ether (MTBE)	1000 lbs	None	7513 lbs
Naphthalene	100 lbs	None	4000 lbs

CHEMICAL INVENTORIES:
CANADA: All the components of this material are on the Canadian DSL or have been notified under the New Substance Notification Regulations, but have not yet been published in the Canada Gazette.
UNITED STATES: All of the components of this material are on the Toxic Substances Control Act (TSCA) Chemical Inventory.

WHMIS CLASSIFICATION:
Class B, Division 2: Flammable Liquids
Class D, Division 2, Subdivision A: Very Toxic Material - Carcinogenicity
Class D, Division 2, Subdivision B: Toxic Material - Skin or Eye Irritation

SECTION 16 OTHER INFORMATION

NFPA RATINGS: Health: 1 Flammability: 3 Reactivity: 0

(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, *- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

Additional Product Number(s): CPS201023, CPS201054, CPS201055, CPS201075, CPS201090, CPS201105, CPS201106, CPS201120, CPS201121, CPS201122, CPS201126, CPS201128, CPS201131, CPS201136, CPS201141, CPS201142, CPS201148, CPS201153, CPS201158, CPS201161, CPS201162, CPS201168, CPS201181, CPS201185, CPS201186, CPS201188, CPS201216, CPS201217, CPS201218, CPS201236, CPS201237, CPS201238, CPS201266, CPS201267, CPS201268, CPS201277, CPS201278, CPS201279, CPS201286, CPS201287, CPS201289, CPS201296, CPS201297, CPS201298, CPS201849, CPS201850, CPS201855, CPS201856, CPS201857, CPS204000, CPS204001, CPS204002, CPS204003, CPS204010, CPS204011, CPS204022, CPS204023, CPS204046, CPS204047, CPS204070, CPS204071, CPS204088, CPS204089, CPS204104, CPS204105, CPS204116, CPS204117, CPS204140, CPS204141, CPS204164, CPS204165, CPS204188, CPS204189, CPS204200, CPS204201, CPS204212, CPS204213, CPS204224, CPS204225, CPS204248, CPS204249, CPS204272, CPS204273, CPS204290, CPS204291, CPS204322, CPS204323, CPS204324, CPS204350, CPS204352, CPS204354, CPS204356, CPS204358, CPS204359, CPS204364, CPS204365, CPS204370, CPS204371, CPS204376, CPS204377, CPS204382, CPS204383, CPS204388, CPS204389, CPS204394, CPS204395, CPS204400, CPS204401, CPS204406, CPS204407, CPS204412, CPS204413, CPS204418, CPS204419, CPS204424, CPS204425, CPS204430, CPS204431, CPS204436, CPS204437, CPS204442, CPS204446, CPS204450, CPS204454, CPS204458, CPS204462, CPS204466, CPS204467, CPS204484, CPS204485, CPS204502, CPS204503, CPS204520, CPS204521, CPS204538, CPS204539, CPS204556, CPS204557, CPS204574, CPS204575, CPS204592, CPS204593, CPS204610, CPS204611, CPS204628, CPS204629, CPS204646, CPS204647, CPS204664, CPS204665, CPS204682, CPS204690, CPS204691, CPS204696, CPS204697, CPS204702, CPS204703, CPS204708, CPS204709, CPS204721, CPS204722, CPS204727, CPS204728, CPS241765

REVISION STATEMENT: This revision updates the following sections of this Material Safety Data Sheet: Section 1 (Product Codes). This Material Safety Data Sheet has been prepared using the ProSteward MSDS system.

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV	-	Threshold Limit Value	TWA	-	Time Weighted Average
STEL	-	Short-term Exposure Limit	PEL	-	Permissible Exposure Limit
			CAS	-	Chemical Abstract Service Number
NDA	-	No Data Available	NA	-	Not Applicable
<=	-	Less Than or Equal To	>=	-	Greater Than or Equal To

Prepared according to the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the ANSI MSDS Standard (Z400.1) by the ChevronTexaco Energy Research & Technology Company, 100 Chevron Way, Richmond, California 94802.

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

MATERIAL SAFETY DATA SHEET

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Diesel Fuel; SYNONYMS: Diesel Fuel #1 - LS Dyed; Diesel Fuel #2 – DSL2, Off-Road, On-Road, HS–Dyed, LS–Dyed, LS-Undyed, LS Diesel; Winter Blend; Fuel Oil #2 - Diesel Fuel Oil, No. 2 Diesel Fuel Oil, Non-Hwy Dyed; Diesel Fuel – Premium, Super, Supreme, Powerblend, Non-Taxed LS Dyed; Additized; Russian Summer; Arctic; -10 and –35 F pour point depressed diesel; Lago;Burner Oil; Aleyska Turbine Fuel; Distillate - Mid; No. 2; Marine – Marine Gas Oil, MGO, DFM; Navy Fuel; F76; Marine Diesel Fuel (MDO); Intermediate Marine Fuel IF-30 to IF-460; IMF; RR Diesel Fuel - No. 40, No. 35, RR Power Fuel HS Off-Road; CARB Diesel Fuel - On-Road, Off-Road, Tax Exempt Blends, TF3, 10%; EPA - LS Diesel Fuel Dyed, Undyed, Off-Road HS Dyed

GENERAL USE: Fuel

PRODUCT DESCRIPTION: Liquid. Color varies, clear, yellow (pale to straw), red, blue, blue-green color. Petroleum odor.

MANUFACTURER'S NAME Tesoro Petroleum Companies, Inc.	DATE PREPARED: May 23, 2002 SUPERSEDES: New	Page 1 of 5
ADDRESS (NUMBER, STREET, P.O. BOX) 300 Concord Plaza Drive	TELEPHONE NUMBER FOR INFORMATION Tesoro Call Center (877) 783-7676	
(CITY, STATE AND ZIP CODE) COUNTRY San Antonio, TX 78216-6999 USA	EMERGENCY TELEPHONE NUMBER Chemtrec (800) 424-9300	
DISTRIBUTOR'S NAME Same		
ADDRESS (NUMBER, STREET, P.O. BOX)	TELEPHONE NUMBER FOR INFORMATION	
(CITY, STATE AND ZIP CODE) COUNTRY	EMERGENCY TELEPHONE NUMBER	

SECTION 2 - HAZARDOUS INGREDIENTS

HAZARDOUS COMPONENTS	CAS #	% (by volume)	OSHA PEL PPM	OSHA PEL MG/M^3	ACGIH TWA PPM	ACGIH TWA MG/M^3	SARA TITLE III	RQ LBS
Contains or May Contain:								
Diesel Fuel #2	68476-34-6	0 - 100	not established					
Fuel Oil #2	68476-30-2	0 - 100	not established					
Tower Residues, atmospheric	64741-45-3	0 - 100	not established					
Residues (petroleum), Vacuum	64741-56-6	0 - 100	not established					
Heavy catalytically cracked distillate (e,f,g)	64741-61-3	0 - 100		0.2		0.2		
Light thermally cracked distillate (h)	64741-59-9	0 - 100	not established					
Catalytically cracked clarified oil (e,g)	64741-62-4	0 - 100		0.2		0.2		
Xylene (mixed) (a,b,c)	1330-20-7	0 - 1.1	100	435	100		Yes	1000
Trimethylbenzene 1,2,4 (a)	95-63-6	0 - 1.2	25	125			Yes	
Nonane	111-84-2	0 - 1.1	200	1050	200			
Sulfur, precipitated	7704-34-9	0 - 5.0		15				
Naphthalene (a,b,c,d)	91-20-3	0 - 1	10	50	10		Yes	100
Red Dye	not specified	Trace						

(a,c) See Section 15

(b) Indicates that the Resource Conservation and Recovery Act (RCRA) has determined the waste for this chemical is listed as hazardous and must be handled according to regulations in 40 CFR 260-281.

(d) Product is listed or defined as a marine pollutant in IMDG Code or 49 CFR 172.101 Appendix B, List of Marine Pollutants and must be classified as an Environmentally Hazardous Substance, Class 9, in addition to any other defined hazards for this product.

(e) California Prop 65, Safe Drinking Water and Toxic Enforcement Act of 1986, chemicals known to the state to cause cancer or reproductive toxicity. A person in the course of doing business must warn others who may consume, come into contact with, or otherwise be exposed to this chemical.

(f) IARC has determined that residual fuels are possibly carcinogenic to humans. Handling procedures and safety precautions in the MSDS should be followed to minimize employee's exposure.

(g) IARC has determined there is sufficient evidence for the carcinogenicity of catalytically cracked oils.

(h) Kidney damage may result following aspiration pneumonitis. The results of animal bioassays on middle distillate fuels show that prolonged dermal contact produces a weak to moderate carcinogenic activity.

SECTION 3 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Various colored liquid, potentially hazardous vapors. Flammable as defined by DOT and TDG. May be classified by DOT as Combustible. Classified as Combustible by OSHA. Can cause eye and skin irritation upon contact. Inhalation of vapors can cause anesthetic effect leading to death in poorly ventilated areas. Hazard symbols for this product - F, XI Risk Phrases - R10 20 36 38

POTENTIAL HEALTH EFFECTS

INHALATION: High concentrations are irritating to the respiratory tract; may cause headache, dizziness, nausea, vomiting and malaise.

SKIN: Brief contact may cause slight irritation; prolonged contact may cause moderate irritation or dermatitis.

EYES: High vapor concentration or contact may cause irritation and discomfort.

INGESTION: May result in vomiting; aspiration of vomitus into the lungs must be avoided; DO NOT induce vomiting. Minute amounts aspirated into the lungs can produce severe lung injury, chemical pneumonitis, pulmonary edema or death.

CARCINOGENICITY NTP? No IARC MONOGRAPHS? No OSHA REGULATED? No

This product contains a mixture of petroleum hydrocarbons called middle distillates. Because of this broad description, many products are considered middle distillates yet they are produced by a variety of different petroleum refining processes. Toxicology data developed on some middle distillates found that they caused positive responses in some mutagenicity tests and caused skin cancer when repeatedly applied to mice over their lifetime.

SECTION 4 - FIRST AID MEASURES

INHALATION: Remove affected person to fresh air; provide oxygen if breathing is difficult; if affected person is not breathing, administer CPR and seek emergency medical attention.

SKIN: Remove contaminated clothing; wash affected area with soap and water; launder contaminated clothing before reuse; if irritation persists, seek medical attention.

EYES: Remove contact lenses. Flush eyes with clear running water for 15 minutes while holding eyelids open; if irritation persists, seek medical attention.

INGESTION: DO NOT induce vomiting; if vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into lungs; seek immediate medical attention. Vomiting may be induced only under the supervision of a physician.

SECTION 5 - FIRE FIGHTING MEASURES

FLASH POINT (METHOD USED) 100 - 199° F (38 - 93º C) TCC	FLAMMABLE LIMITS LEL: 0.3% UEL: 10.0% AUTOIGNITION TEMPERATURE: 350 - 625°F	NFPA CLASS: **II**

GENERAL HAZARDS: Product is considered combustible. Products of combustion include compounds of carbon, hydrogen and oxygen, including carbon monoxide.

EXTINGUISHING MEDIA
Carbon dioxide, water fog, dry chemical, chemical foam

FIRE FIGHTING PROCEDURES
Firefighters must wear full facepiece self - contained breathing apparatus in positive pressure mode. Do not use solid stream of water since stream will scatter and spread fire. Fine water spray can be used to keep fire - exposed containers cool.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Closed containers can explode due to buildup of pressure when exposed to extreme heat. Do not use direct stream of water on pool fires as product may reignite on water surface. Caution - Material is combustible!

HAZARDOUS COMBUSTION PRODUCTS
Smoke, fumes, oxides of carbon

SECTION 6 - ENVIRONMENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: COMBUSTIBLE. Evacuate and ventilate area; confine and absorb into absorbent; place material into approved containers for disposal; for spills in excess of allowable limits (RQ) notify the National Response Center (800) 424 - 8802; refer to CERCLA 40 CFR 302 and SARA Title III, Section 313 40 CFR 372 for detailed instructions concerning reporting requirements. Do not discharge into lakes, ponds, streams or public waters.

SECTION 7 - HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: This material is combustible. It should be stored in tightly closed containers in a cool, well ventilated area. Vapor may form explosive mixtures in air. All sources of ignition should be controlled. This material may be classified as COMBUSTIBLE by DOT unless transported by vessel or aircraft. Refer to 49 CFR 173.120. Keep this and other chemicals out of reach of children. Avoid inhaling concentrated fumes or vapors.

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS

The use of local exhaust ventilation is recommended to control emissions near the source. Provide mechanical ventilation of confined spaces. Use explosion-proof ventilation equipment. See Section 2 for Component Exposure Guidelines.

PERSONAL PROTECTION:

RESPIRATORY PROTECTION (SPECIFY TYPE): None required while threshold limits (Section 2) are kept below maximum allowable concentrations; if TWA exceeds limits, NIOSH approved respirator must be worn. Refer to 29 CFR 1910.134 or European Standard EN 149 for complete regulations.

PROTECTIVE GLOVES: Neoprene or rubber gloves with cuffs.

EYE PROTECTION: Protective eyeglasses or chemical safety goggles. Refer to 29 CFR 1910.133 or European Standard EN166.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: Safety eyebath nearby

WORK / HYGIENIC PRACTICES: Practice safe workplace habits. Minimize body contact with this, as well as all chemicals in general.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

VAPOR PRESSURE (PSIA) < 0.5 PSIA @ 100º F	VAPOR DENSITY (AIR = 1) > 1
SPECIFIC GRAVITY @ 60º F (WATER = 1) 0.78 - 0.955	EVAPORATION RATE (WATER = 1) < 1
SOLUBILITY IN WATER Negligible, below 1.0%	FREEZING POINT - 51º F (- 46º C)
pH Not determined	APPEARANCE AND ODOR Liquid,.clear, yellow (pale to straw), red, blue, blue-green, petroleum odor.
BOILING RANGE 30 - 806° F (1.1 - 430° C)	PHYSICAL STATE Liquid
VISCOSITY 1.7 - 40.0 cS @ 100°F	VOLATILE ORGANIC COMPOUNDS (Total VOC's) 6.75 lbs / gallon

SECTION 10 - STABILITY AND REACTIVITY

STABILITY UNSTABLE: STABLE: XXX	CONDITIONS TO AVOID: Extreme temperatures, open flames
INCOMPATIBILITY (MATERIALS TO AVOID): Strong oxidizers, strong acids	
HAZARDOUS DECOMPOSITION OR BYPRODUCTS: Decomposition will not occur if handled and stored properly. In case of a fire, oxides of carbon, hydrocarbons, fumes, and smoke may be produced.	
HAZARDOUS POLYMERIZATION MAY OCCUR: WILL NOT OCCUR: XXX	CONDITIONS TO AVOID: None

SECTION 11 - TOXICOLOGICAL INFORMATION

Hazardous Ingredients (All products may not be listed if information is not available)	%	CAS #	LD50 of Ingredient (Species and Route)	LC50 of Ingredient (Species)
Contains or May Contain:				
Diesel Fuel #2	0 - 100	68476-34-6	Not established	Not established
Fuel Oil #2	0 - 100	68476-30-2	Not determined	Not determined
Tower Residues, atmospheric	0 - 100	64741-45-3	Not established	Not established
Residues (petroleum), Vacuum	0 - 100	64741-56-6	Not established	Not established
Heavy catalytically cracked distillate (e,f,g)	0 - 100	64741-61-3	Not established	Not established
Light thermally cracked distillate (h)	0 - 100	64741-59-9	Not established	Not established
Catalytically cracked clarified oil (e,g)	0 - 100	64741-62-4	Not established	Not established
Xylene (mixed) (a,b,c)	0 - 1.1	1330-20-7	4300 mg / kg Oral - rat	5000 ppm / 4H Inhalation - rat
Trimethylbenzene 1,2,4 (a)	0 - 1.2	95-63-6	5 gm / kg Oral - mouse	18 gm / m3 / 4H Inhalation - rat
Nonane	0 - 1.1	111-84-2	218 mg / kg Oral - mouse	3200 ppm / 4H Inhalation - rat
Sulfur, precipitated	0 - 5.0	7704-34-9	Not available	Not available
Naphthalene (a,b,c,d)	0 - 1	91-20-3	1780 mg / kg Oral - rat	Not established
Red Dye	Trace	not specified	Not determined	Not determined

SECTION 12 - ECOLOGICAL INFORMATION

No data are available on the adverse effects of this material on the environment. Neither COD nor BOD data are available. Release of this product should be prevented from contaminating soil and water and from entering drainage and sewer systems. U.S.A. regulations require reporting spills of this material that could reach any surface waters. The toll free number for the U.S. Coast Guard National Response Center is (800) 424-8802. Naphthalene (91-20-3) one of the ingredients in this mixture is classified as a Marine Pollutant.

SECTION 13 - DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Dispose of in accordance with Local, State, and Federal Regulations. This product may produce hazardous vapors or fumes in a closed disposal container creating a dangerous environment. Refer to "40 CFR Protection of Environment Parts 260 - 299" for complete waste disposal regulations. Consult your local, state, or Federal Environmental Protection Agency before disposing of any chemicals. Do not flush to sanitary sewer or waterway.

SECTION 14 - TRANSPORT INFORMATION

PROPER SHIPPING NAME: Diesel Fuel

DOT HAZARD CLASS / Pack Group: 3 / III
REFERENCE: 49 CFR 173.150, .203, .242
UN / NA IDENTIFICATION NUMBER: NA 1993
LABEL: Flammable
HAZARD SYMBOLS: F

IATA HAZARD CLASS / Pack Group: Not applicable
IMDG HAZARD CLASS: Not applicable
RID/ADR Dangerous Goods Code: Not applicable
UN TDG Class / Pack Group: Not applicable

Note: Transportation information provided is for reference only. Client is urged to consult CFR 49 parts 100 - 177, IMDG, IATA, EC, United Nations TDG, and WHMIS (Canada) TDG information manuals for detailed regulations and exceptions covering specific container sizes, packaging materials and methods of shipping.

SECTION 15 - REGULATORY INFORMATION

TSCA (Toxic substance Control Act)

Components of this product are listed on the TSCA Inventory.

SARA TITLE III (Superfund Amendments and Reauthorization Act)

311/312 Hazard Categories

Acute health, flammable

313 Reportable Ingredients:

(a) A "Yes" in the SARA TITLE III column in Section 2 indicates a toxic chemical subject to annual reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372.

CERCLA (Comprehensive Response Compensation and Liability Act)

(c) The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) has notification requirements for releases or spills to the environment of the Reportable Quantity (RQ for this mixture > 24,000 lbs) or greater amounts, according to 40 CFR 302.

CPR (Canadian Controlled Products Regulations)

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

IDL (Canadian Ingredient Disclosure List)

Components of this product identified by CAS number are listed on the Canadian Ingredient Disclosure List are shown in Section 2.

DSL / NDSL (Canadian Domestic Substances List / Non-Domestic Substances List)

Components of this product identified by CAS number are listed on the DSL or NDSL and may or may not be listed in Section 2 of this document. Only ingredients classified as "hazardous" are listed in Section 2 unless otherwise indicated.

EINECS (European Inventory of Existing Commercial Chemical Substances)

Components of this product identified by CAS numbers are on the European Inventory of Existing Commercial Chemical Substances.

EC Risk Phrases

R10 Flammable
R20 Harmful by inhalation
R36 Irritating to eyes
R38 Irritating to skin.
R51 Toxic to aquatic organisms.
R65 Damaging to lungs when swallowed

EC Safety Phrases

S16 Keep away from sources of ignition
S23 Do not breathe vapor
S25 Avoid contact with eyes
S28 After contact with skin, wash immediately with plenty of soap and water.
S29 Do not empty into drains
S62 If swallowed, do not induce vomiting; seek medical advice immediately and show this label.

SECTION 16 - OTHER INFORMATION

Values do not reflect absolute minimums and maximums; these values are typical which may vary from time to time.

HMIS HAZARD RATINGS				
	HEALTH	1	0 = INSIGNIFICANT	3 = HIGH
	FLAMMABILITY	2	1 = SLIGHT	4 = EXTREME
	REACTIVITY	0	2 = MODERATE	
	PERSONAL PROTECTIVE EQUIPMENT	B	Safety Glasses, Gloves	

REVISION SUMMARY:

This MSDS has been revised in the following sections: No revisions available

MSDS Prepared by: Chem-Tel, Inc.
1305 N. Florida Ave.
Tampa, Florida USA 33602
(800) 255-3924 Outside USA (813) 248-0573

DISCLAIMER: The information supplied in this data sheet is obtained from currently available sources, which are believed to be reliable. HOWEVER, THE INFORMATION IS PROVIDED WITHOUT ANY WARRANTY, EXPRESSED OR IMPLIED, REGARDING THE ACCURACY OF THE INFORMATION OR THE RESULTS TO BE OBTAINED FROM ITS USE.

Handling, storage, use or disposal of the above-referenced product is beyond our control and may occur under conditions with which we are unfamiliar. FOR THESE AND OTHER REASONS, WE DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIM ANY LIABILITY FOR DAMAGE, INJURY AND COST ARISING FROM OR RELATED TO THE USE OF THE PRODUCT.

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.

Material Safety Data Sheet

Nitric acid, 20-70%

ACC# 16550

Section 1 - Chemical Product and Company Identification

MSDS Name: Nitric acid, 20-70%
Catalog Numbers: AC124660000, AC124660010, AC124660011, AC124660025, AC124660026, AC124665000, AC124665001, AC133620000, AC133620010, AC133620011, AC133620025, AC133620026, AC424000000, AC424000025, AC424000026, AC424000250, AC424005000, AC424005001, AC613205000, A198C-212, A198C4X-212, A200-212, A200-500, A200-500LC, A200-612GAL, A200212LC, A200C-212, A200C212EA, A200C212LC, A200C4X-212, A200C4X212L, A200S-212, A200S-500, A200S212LC, A200SI-212, A206C-212, A206C4X-212, A467-1, A467-2, A467-250, A467-500, A483-212, A509-212, A509-212LC, A509-500, A509SK-212, A509SK-212LC, MCC-030822, NC9596579, S719721, S71972SC
Synonyms: Azotic acid; Engraver's acid; Aqua fortis.
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7732-18-5	Water	30-80	231-791-2
7697-37-2	Nitric acid	20-70	231-714-2

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear to yellow liquid.
Danger! May be fatal if inhaled. Causes severe eye and skin burns. Causes severe respiratory and digestive tract burns. Strong oxidizer. Contact with other material may cause a fire. Acute pulmonary edema or chronic obstructive lung disease may occur from inhalation of the vapors of nitric acid. Corrosive to metal.
Target Organs: Lungs, eyes, skin, mucous membranes.

Potential Health Effects

Eye: Causes severe eye burns. Direct contact with liquid may cause blindness or permanent eye damage.
Skin: Causes skin burns. May cause deep, penetrating ulcers of the skin. Concentrated nitric acid dyes human skin yellow on contact.

Ingestion: May cause severe and permanent damage to the digestive tract. Causes gastrointestinal tract burns. May cause perforation of the digestive tract. May cause systemic effects.
Inhalation: Effects may be delayed. Causes chemical burns to the respiratory tract. Inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema. Aspiration may lead to pulmonary edema. May cause systemic effects. May cause acute pulmonary edema, asphyxia, chemical pneumonitis, and upper airway obstruction caused by edema. Depending on the conditions, the vapor or fumes of nitric acid may actually be a mixture of nitric acid and various oxides of nitrogen. The composition may vary with temperature, humidity, and contact with other organic materials.
Chronic: Exposure to high concentrations of nitric acid vapor may cause pneuomonitis and pulmonary edema which may be fatal. Symptoms may or may not be delayed. Continued exposure to the vapor & mist of nitric acid may result in a chronic bronchitis, & more severe exposure results in a chemical pneumonitis. The vapor & mists of nitric acid may erode the teeth, particularly affecting the canines & incisors.

Section 4 - First Aid Measures

Eyes: Get medical aid immediately. Do NOT allow victim to rub eyes or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes).
Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Strong oxidizer. Contact with other material may cause fire. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. May react with metal surfaces to form flammable and explosive hydrogen gas. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products.
Extinguishing Media: Use extinguishing media most appropriate for the surrounding fire.
Flash Point: Not applicable.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 4; Flammability: 0; Instability: 0; Special Hazard: OX

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite. Do not use combustible materials such as sawdust. Provide ventilation. Evacuate unnecessary personnel. Approach spill from upwind. Use water spray to cool and disperse vapors and protect personnel.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Do not breathe dust, mist, or vapor. Do not get in eyes, on skin, or on clothing. Keep container tightly closed. Avoid contact with clothing and other combustible materials. Discard contaminated shoes. Do not use with metal spatula or other metal items. Use only with adequate ventilation or respiratory protection.
Storage: Do not store near combustible materials. Do not store in direct sunlight. Keep container closed when not in use. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from metals. Store away from alkalies. Separate from organic materials. Inspect periodically for damage or evidence of leaks or corrosion.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits. Use a corrosion-resistant ventilation system.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Water	none listed	none listed	none listed
Nitric acid	2 ppm TWA; 4 ppm STEL	2 ppm TWA; 5 mg/m3 TWA 25 ppm IDLH	2 ppm TWA; 5 mg/m3 TWA

OSHA Vacated PELs: Water: No OSHA Vacated PELs are listed for this chemical. Nitric acid: 2 ppm TWA; 5 mg/m3 TWA
Personal Protective Equipment
Eyes: Wear chemical splash goggles and face shield.
Skin: Wear butyl rubber gloves, apron, and/or clothing.
Clothing: Wear appropriate clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: clear to yellow
Odor: strong odor - acrid odor - suffocating odor
pH: 1.0 (0.1M soln)

Vapor Pressure: 51 mm Hg @ 25 deg C
Vapor Density: 2.17 (air=1)
Evaporation Rate: Not available.
Viscosity: 0.761 cps @ 25 deg C
Boiling Point: 86 deg C
Freezing/Melting Point:-42 deg C
Decomposition Temperature: Not available.
Solubility: Soluble in water.
Specific Gravity/Density:1.4
Molecular Formula:HNO3
Molecular Weight:63.01

Section 10 - Stability and Reactivity

Chemical Stability: Stable. Decomposes when in contact with air, light, or organic matter. The yellow color is due to release of nitrogen dioxide on exposure to light.
Conditions to Avoid: High temperatures, light, confined spaces.
Incompatibilities with Other Materials: Metals, reducing agents, strong bases, acetic acid, alcohols, acetone, aniline, hydrogen sulfide, metal powders, carbides, aldehydes, organic solvents, combustible materials, chromic acid, flammable liquids, cyanides, sulfides, Incompatible with many substances.
Hazardous Decomposition Products: Nitrogen oxides.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 7732-18-5: ZC0110000
CAS# 7697-37-2: QU5775000; QU5900000
LD50/LC50:
CAS# 7732-18-5:
Oral, rat: LD50 = >90 mL/kg;
.

CAS# 7697-37-2:
Inhalation, rat: LC50 = 260 mg/m3/30M;
Inhalation, rat: LC50 = 130 mg/m3/4H;
Inhalation, rat: LC50 = 67 ppm(NO2)/4H;
.

Carcinogenicity:
CAS# 7732-18-5: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 7697-37-2: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: No information found
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. No information available.
Environmental: Terrestial: During transport through the soil, nitric acid will dissolve some of the soil material, in particular, the carbonate based materials. The acid will be neutralized to some degree with adsorption of the proton also occurring on clay materials. However, significant amounts of acid are expected to remain for transport down toward the ground water table. Upon reaching the ground water table, the acid will continue to move, now in the direction of the ground water flow.
Physical: No information available.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	NITRIC ACID	NITRIC ACID
Hazard Class:	8	8
UN Number:	UN2031	UN2031
Packing Group:	II	II

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 7732-18-5 is listed on the TSCA inventory.
CAS# 7697-37-2 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
CAS# 7697-37-2: 1000 lb final RQ; 454 kg final RQ
SARA Section 302 Extremely Hazardous Substances

CAS# 7697-37-2: 1000 lb TPQ

SARA Codes

CAS # 7697-37-2: immediate, delayed, fire.

Section 313

This material contains Nitric acid (CAS# 7697-37-2, 20-70%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 7697-37-2 is listed as a Hazardous Substance under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

CAS# 7697-37-2 is considered highly hazardous by OSHA.

STATE

CAS# 7732-18-5 is not present on state lists from CA, PA, MN, MA, FL, or NJ.
CAS# 7697-37-2 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

C

Risk Phrases:

R 35 Causes severe burns.

Safety Phrases:

S 23 Do not inhale gas/fumes/vapour/spray.
S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 36 Wear suitable protective clothing.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger/Protection)

CAS# 7732-18-5: No information available.
CAS# 7697-37-2: 1

Canada - DSL/NDSL

CAS# 7732-18-5 is listed on Canada's DSL List.
CAS# 7697-37-2 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of E, C, D1A.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 7697-37-2 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 9/30/1998
Revision #16 Date: 2/11/2008

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.