

**Site Specific
Health and Safety Plan (HASP)**

Romic Phase I Facility Closure Activities
Former Romic Environmental Technologies Facility
2081 Bay Road
East Palo Alto, California

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Foreword

DECON Environmental Services, Inc. (the Contractor) has been contracted by *Bay Enterprises* (the Client) to perform Phase I Facility Decontamination and Closure Activities at the former Romic Environmental Technologies hazardous waste treatment, storage and disposal facility located at 2081 Bay Road, East Palo Alto, California. The Site Specific Health and Safety Plan (HASP) has been developed to serve as a functional stand-alone document to be used by governmental agencies, onsite personnel and community members to verify that health and safety concerns associated with the above project are properly addressed. The HASP shall provide onsite management teams with detailed health and safety information to allow for efficient implementation of all health and safety functions at the project site. The HASP shall also provide onsite personnel with appropriate health and safety guidance as well as be the basis for employee training for hazards specific to individual work tasks. The Contractor shall not deviate from the guidelines, policies and procedures outlined in the HASP. A reference copy of the HASP shall be maintained at the project site at all times.

The foundation of the Contractor's safety management system is built upon top management's commitment to employee safety. The Contractor continuously integrates safety into operations on a daily basis and provides continuous training and support to all personnel. All Contractor employees are expected to perform their assigned tasks safely with a high degree of alertness to the hazards of the workplace. Each employee is expected to participate in the elimination and control of potential hazards and to encourage the safe behavior of others. Each employee shall be expected to work safely in accordance with the HASP and California OSHA Health and Safety Standards. It is the Contractor's role to establish these safety commitments as its highest priority and to communicate safety expectations in a visible and inspiring manner.

1.0 Site Background / History / Work Plan

The following Sections 1.1 through 1.2 briefly discuss project site background and history as well as the Contractor's work plan and technical approach for facility decontamination and closure activities associated with the Romic Phase I Facility Closure Project.

1.1 Site / Facility Background

In 2001, an internationally recognized consulting firm (Environ Corporation) conducted a risk assessment for the Romic Facility. The risk assessment considered (among other things) fugitive and routine emissions from Romic's many operations and additional included non-routine releases (spills and accidental releases). The assessment estimated risks to offsite receptors for all released scenarios. The findings of this assessment indicated that risks and hazards from Romic's operations were negligible, including those associated with accidental releases such as a tank rupture, or tanker spill. Of relevance to this Site Decommissioning and associated Health and Safety Plan, the risk assessment evaluated risks associated with the daily activities of Romic, which involved the storage and processing of many hundreds of thousands of pounds of toxic chemicals.

It is important to note, for this decommissioning effort, all chemicals have been removed from storage and storage containment structures. The minor amount of chemicals present is those amounts associated with container residuals. Therefore, one must conclude that the chemical risks and hazards associated with operations described in this Health and Safety Plan are far below those associated with the former Romic activities conducted on Site. The primary reason for the much lower risk and hazard is simply due to the far lower mass of chemical residues present on site. Site decommissioning will largely involve the removal of residues from receptacle and operating unit surfaces. Due to the nature of work envisioned, the small amount of chemical substances present, overall chemical risk and hazard to onsite workers are considered low for this project. For offsite receptors, potential chemical risk and hazards are also considered low.

The Former Romic East Palo Alto Facility (the Facility) located at 2081 Bay Road, East Palo Alto, California was a waste treatment, storage and disposal (TSD) facility that recycled and processed industrial wastes beginning in 1956 (initial operations conducted by the Hird Chemical Corporation with Romic taking control in 1964). Industrial wastes were shipped to the Facility for recycling and treatment from various industries. The Facility also managed household hazardous wastes collected at local events and facilities.

Common wastes processed at the Facility included solvents, antifreeze, industrial wastewater and oil based chemicals. These wastes made up an estimated 95 percent of the wastes recycled and processed at the facility. Other wastes included dyes, photo processing chemicals, detergents/soaps, adhesives, metals, coatings and HHW. Various processes utilized to manage the above wastes are shown below:

PRIMARY PROCESSES Solvent Recycling Ethylene Glycol Recycling Fuel Blending Liquefaction Wastewater Treatment Neutralization Off-Site Transfer	MISCELLANEOUS MANAGEMENT PROCESSES Consolidation of Small Containers
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It is assumed that any air emissions from the Facility primarily resulted from chemical recycling and blending operations. Some additional emission may have resulted from ancillary operations including truck washing, fuel dispensing and ground water treatment. During site operations, little or no dust-generating activities occurred making volatile emissions from liquid waste handling and processing the primary concern for site risk assessments.

The Facility is completely surrounded by six- to eight-foot-high chain link fence and block walls. The fence and walls are topped with three strand barbed wire. Bilingual warning signs (in English and Spanish) are in place to alert any person approaching the facility of the danger ahead. All gates are kept closed at all times. The region immediately surrounding the site is zoned for industrial operations. Beyond this area the land use is mixed and includes industrial, commercial and residential areas. The residents are primarily to the West and the South. Wetlands and undeveloped land lie to the North, East and Southeast with the San Francisco Bay beyond this area to the East of the Facility.

1.2 Work Plan / Technical Approach

Work Flow Strategy

The Contractor's overall strategy for approaching the Romic closure will follow a logical progression through the plant. The approach is to employ several dedicated decontamination and decommissioning crews for conducting the field work. One crew will focus on building structures and the other crews will concentrate on the production areas and tank farms. The Contractor has found from previous large plant closure projects that assigning dedicated crews to areas with the same type of equipment and areas to clean can significantly increase productivity and quality on a project.

The Buildings Decontamination (BD) Crew will start with decontaminating the open warehouse buildings (north and south drum storage and sampling buildings) so they can be used for storing the tanks and equipment that are decontaminated for sale. Once these buildings have passed the clearance test, the BD Crew will continue with the decontamination of the other buildings and outlying areas. The proposed progression would be the drum and debris processing building, west storage buildings (2), truck and plant maintenance building, truck wash area, biological treatment system, laboratory building, administrative buildings, and other areas.

The Production Area and Tank Farms (PA-TF) crews will begin decontamination on the core area consisting of the tank farms and production area. Work on the core will start with the tank farms on the east side of the production area and the pipe rack running through the production area. Next will be the tank farms on the west side of the production area. Using this approach will clear all of the tanks, piping, and equipment from around the distillation columns and re-boilers in the production area; thus, providing working space around the columns which would be cleaned and removed next. The rinsate holding tanks (T-31, TF-H/HWMU #14; T-38, TF-MNO/HWMU #16; T-64, TF-G/HWMU #Q; T-M, TF-A/HWMU #8; and T-13, Bio System/HWMU #18) will be cleaned and demolished at the completion of the work area associated with the given holding tank.

The last items to be cleaned and demolished will be the storm water collection tanks and the sewer tanks. These items will be utilized during all of the other work activities thereby requiring scheduling at the end of the project.

Removal of the debris shredder will occur once the unit has been decontaminated, sampled, and cleared. The liquefaction unit will be dismantled and removed after cleaning and after the debris shredder has been removed. It will be demolished for scrap when the drum and debris processing building is demolished.

Building demolition will begin after the buildings have been cleaned, sampled, and approved for demolition. This will occur towards the end of the project so that there is ample time for all of the sold equipment to be removed, and to utilize the administrative buildings as office space for the maximum amount of time prior to their demotion. The Building demolition activities will not impact the critical path of the schedule, even placing the activity towards the end of the project since the activity has a relatively short duration.

Because of the safety concern with the type of work that is being performed (high pressure water washing and pipe and tank demolition), the Contractor intends to disconnect the power to all of the production areas and production-related buildings prior to the start of work. After the power has been disconnected it will be field-verified to assure that there are no inter-ties from the administrative buildings to the production areas. This will eliminate any lock-out/tag-out requirements and prevent any potential electrical “near-misses” or potential for accidents. Any hand work requiring power tools will be performed either using battery-powered tools or will be run off of portable generators.

Work Flow Execution

The Contractor will comply with the performance standards that are spelled out in detail in the Closure Plan Phase 1 Final for each of the activities that are being performed. The Contractor will execute the standards using equipment to enhance the performance of the decontamination activity. For example, the Contractor will use a four nozzle rotating spray bar attachment to the pressure washer for cleaning the flat concrete floors of the buildings and large secondary containments. The attachment is wheel-mounted and has a vacuum port for collecting the wash water. This approach will eliminate overspray and misting during the cleaning process and will increase the square footage production rate thereby reducing the time for cleaning a given floor compared to conventional pressure washing operations. Another example is the use of an “orbijet” nozzle (a dual nozzle rotating head attached to the pressure washer or hydroblaster) for cleaning the tanks. The Contractor will also consider using a hydroblaster operating at higher than the minimum pressures for cleaning the tanks and equipment. The Contractor's objective is to be able to clean equipment and structures sufficiently the first time to meet the designated cleanup criteria.

Hazardous Waste Management Units (HWMU) # 1, 2, 3, 4, 5, 29, 34, 35, 36, 37, 38

Decontamination of these HWMUs involves pressure washing or hydroblasting building structures, concrete floors, or flat concrete. Once electrical power and the sprinkler system have been disconnected to the building being decontaminated and cleaned, work will start at the highest elevation and work towards the floor. Spray will be directed downward, where possible, to minimize overspray and misting. All surfaces, including roof, beams, piping, lights, walls, and columns will be cleaned according to the performance standards. Towards the end of the final rinse a phase one confirmation sample will be collected from a composite from the walls and columns being rinsed. After the above-grade structure has been washed, the floor will be cleaned using the floor-cleaning attachment, collected, and transferred to one of the designated holding tanks for sampling and off site disposal. Edges of the floor around the wall and bermed entrances will be cleaned using the standard pressure washing techniques with localized direct vacuuming of the water. After the floor has been cleaned, the designated concrete chip samples will be collected.

Drum Crushing Units (HWMU #33)

The drum crushing units will be decontaminated by pressure washing and handled as either sold items or scrap metal. These units will be cleaned before the north storage building is cleaned.

Tank Farms A, B, C, D, G, H, I, J, L, M, N, O, Q, R, Vacuum Pots (HWMU #24), Thin Film Evaporators (HWMU #26), and Liquid Extraction Unit (HWMU #27)

Cleaning of the tank farms starts with a visual inspection of each tank, any connecting piping, and the secondary containment area. Comments will be noted regarding staining and evidence of leaks and, if necessary, spray paint will be used to "mark" areas beneath leaks or stains that may not be obvious. Marking will provide the cleaning crew with locations where the decontamination efforts may have to be concentrated. Additionally, the interior of the tanks will be inspected for residual liquids, sludge, and solids. Tanks containing significant interior deposits will be tagged to identify that an additional level of effort may be required for cleaning.

The first step in preparing the tank to be cleaned will be to disconnect any plant piping connected to the tank. Many of the product storage tanks have small pipe spools for connecting flex hose to the tanks. These pieces will remain with the tank and not be disconnected. They will be used for draining the cleaning fluids from the tank. Any tank that is insulated will have the insulation removed at this time.

Once preparation has been completed for a given tank farm (or suite of tanks to be cleaned), the exterior surfaces of the tank and piping will be pressure washed according to the performance criteria. Final rinsate samples will be collected from each tank exterior during the final rinse phase. The interior of the smaller diameter tanks (less than four feet) will be cleaned using an orbijet nozzle attached to a pressure washer or hydroblaster. Tanks less than 12 feet in diameter will be cleaned with the orbijet attached to a hydroblaster. Tanks larger than 12 feet in diameter will be entered using standard confined space procedures and cleaned. The cleaning will be performed according to the performance standards. Rinsate will be removed from the tank using a vacuum truck connected to the bottom drain valve. A final rinsate sample will be collected from each tank during the final rinsing phase.

The last step will be to clean the bottom of the tank (for flat-bottom tanks resting directly on concrete. This will be done after the results from the exterior and interior rinsate analysis have been received and the tank has met the cleanup standards but prior to relocating the tank to the storage area or scraping the tank. The tank will be disconnected from its pad and lifted with a crane approximately two to three feet in the air. The bottom will be cleaned using a pressure washer with a ninety degree tip on the end of the wand. This will allow the cleaning to be done safely without having to get underneath the tank or setting the tank on its side. Flat bottom tanks that are being scrapped will be cleaned using this same approach and then set back in the containment on dunnage or staged in an area designated for tank demolition using a sheer. The final step will be to clean and sample the secondary containment structure.

Pipe Rack and Chemical Transfer Piping

The majority of the inter-plant chemical transfer piping runs from the tank farms to the distillation columns via an overhead pipe rack with some piping running along the ground surface. There is one pipe trench from the production area to tank farm Q that runs across the driveway and is covered with steel plates. The Contractor's approach to removing the overhead pipe rack will be to use an excavator-mounted sheer to cut the pipe runs into manageable sections and bring entire sections to the ground and place the sections in one of the now-empty containment areas. Once on the ground, the pipes will be separated from the rack and the chemical piping will be segregated from electrical conduits and non-hazardous pipes (cooling water, steam, domestic water, air). The chemical piping will be relocated to a decontamination station where the piping will be placed on a rack and cleaned using a line mole. (If the ends of the pipe have been crimped by the sheer such that the line mole cannot be inserted into the pipe, the crimped pipe end will be cut off.) Water generated from this cleaning operation will be collected in a tote or small tank and transferred to a rinsate holding tank. Sampling and analysis will be performed according to the Sampling Plan and performance cleaning criteria for piping.

In order to use this approach safely and effectively, it is critical that all of the chemical transfer lines are drained and empty. The Contractor will connect the vacuum truck line to each of the lines where they have been cut at the tank farms and pull a vacuum on the lines. The other open end of the line where it has been disconnected at the distillation column will be checked to verify that air is being pulled through the pipe. If no air is being drawn into the pipe, the line will be re-traced to find out why (closed valve, check valve, etc.). The Contractor will also trace each piping run and identify low points in the pipe with either spray paint or marking tape. The pipe at these locations will be either drilled or cut to verify that there are no free liquids in these low points. If free liquids are encountered, they will be vacuumed out of the pipe at the low point. This approach will ensure that there are no free liquids remaining in the chemical transfer piping.

Production Area – Fractionation (HWMU #23) (Distillation Columns, Reboilers, Condensers, etc.)

Removing the tank farms and pipe rack will open up the space around the distillation columns (10), re-boilers (6), condensers (10), heat exchangers, and other equipment associated with the Production Area. This will make it significantly safer to access the tops of the columns using man lifts from the east side of the columns and away from the power lines. (All elevated work will be performed off of man lifts in a safe manner.) The open space will also facilitate the cleaning process. The columns and associated tanks will be cleaned according to the performance standards. Once all of the columns have been cleaned and cleared, a crane will be used to remove the steel platforms, condensers, and the columns themselves. This will reduce the crane cost and facilitate a smooth work flow for removing the columns. Several of the columns will have to be separated and lifted in sections. Steel framework, platforms, and supports, as well as any suspended equipment, will be supported by the crane while the piece is disconnected or cut free.

Debris Shredder (HWMU #31), Liquefaction (HWMU #28), and Drum and Debris Building

The exterior of the equipment and the drum and debris P\process building will be cleaned at the same time starting on the second floor and working downwards. Since the second floor is open grating and the first floor is bermed, wash water will be collected from the first floor. Once the exterior surfaces have been cleaned, the equipment will be taken apart in pieces, starting at the top, and the interior surfaces cleaned as they are accessed. Again, water will be collected from the first floor. After the large sections of the equipment have been opened up, cleaned, and removed from the building, a final cleaning of the building floor will be performed.

Biological Treatment System (HWMU #18)

Plastic balls and solids including the sand in the sand filters will be removed from the tanks and the tanks will be cleaned and sampled, both inside and out, according to the performance standards. After meeting the cleanup criteria and assuming the system is not sold, an excavator-mounted shear will size-reduce the tanks and place the tanks into bins or trailers for recycling as scrap metal. Once the tanks, piping, equipment, and metal structure have been removed, the secondary containment will be cleaned and sampled.

High Temperature Unit and Boilers (HWMU #25)

The DowTherm coolant will be drained, containerized, profiled and disposed of off site or recycled. The HTU will be flushed internally with an aqueous degreasing agent. The exterior of the unit and boilers will be cleaned according to the performance standards. Once it meets the cleanup standards, it will be dismantled using an excavator-mounted shear. Piping and miscellaneous controls will be removed from the exterior of the boilers and they will be moved using a forklift and placed directly on a flatbed for transport to the scrap metal recycler or buyer. After all of the equipment has been removed, the structure and floor will be cleaned and sampled.

Truck Wash Station (HWMU #34)

The truck wash station will be cleaned starting with the overhead rack and working down to the ground. The piping from the tank to the wash rack will be disconnected and cleaned. The tank, scrubber, and ducting will also be cleaned and sampled. Once the rack, tanks, and equipment has met the cleanup criteria it will be demolished using the shear. After everything has been removed, the concrete surfaces will be cleaned and sampled.

Laboratory Building (HWMU #40)

The Contractor will first remove the ceiling tiles and dispose as hazardous waste followed by the removal of the exhaust and HVAC ducting, scrubber, and exhaust stack. The Contractor will tape plastic over the ends of the duct sections, relocate the ducting to the pipe washing station, and clean the ducting according to the performance criteria for cleaning pipes. Once the ducting has been removed, the Contractor will demolish the fume hoods, non-metallic wet benches, and grossly-contaminated surface sections, and relocate the pieces to the pipe decontamination station for cleaning using pressure washing. The floor mats and chemical containment trays will be removed and disposed of as hazardous waste. The next step will be to clean the laboratories by wiping down all surfaces in the labs with an aqueous cleaning solution according to the performance standard. The final step will be to pressure wash and sample the roof and north wall of the laboratory where there is staining on the wall. The laboratory will be sampled according to the performance standard. Once the building has met the cleanup criteria, it will be demolished using an excavator with a thumb. The Contractor intends to recycle as much of the non-hazardous demolition debris from the buildings as possible and has recycling outlets for all wood, carpet, plastic, and concrete.

Storm Water Tanks (HWMU #42)

The rainwater tanks will be entered using confined space entry procedures and the tanks will be cleaned and sampled. The piping will be disconnected and cleaned. Once the tanks have met the acceptance criteria, they will be demolished using a shear.

Sewer Tanks (HWMU #41)

The sewer tanks will be entered using confined space entry procedures through the top of the tanks. Each compartment (each tank is a three-compartment tank) will be entered and the tanks will be cleaned and sampled. The piping and pumps will be disconnected and cleaned. Once the tanks have met the acceptance criteria, they will be demolished using a shear.

Building 6 – Maintenance Shop (HWMU #38)

The Contractor will decontaminate the locker room and concrete entrance ways by pressure washing, collecting the rinsate and consolidating it with other rinsate, and sampling according to the performance standard for the administrative buildings. The Contractor will also clean the concrete floors in the truck maintenance area and plant maintenance area, consolidate the rinsate, and sample the areas according to the performance standard for similar building structures and floors (HWMU # 1 or 2).

Administrative Buildings and Modular Trailer Units (HWMU #39)

The locker rooms and concrete entranceways associated with each of the administrative buildings will be pressure washed according to the performance standards and the rinsate will be collected and consolidated with other rinsate in one of the storage tanks. The furniture will be moved to one side of each room, the carpet will be steam cleaned, furniture re-located to the cleaned area, and the remaining carpeted area will be steam cleaned. All water collected from the steam cleaning operations will be consolidated with other rinsate. Sampling will be conducted

according to the performance standard. Once the buildings have been cleaned and cleared, they will be demolished using an excavator with a thumb. The Contractor intends to recycle as much of the non-hazardous demolition debris from the buildings as possible and has recycling outlets for all wood, carpet, plastic, and concrete.

Miscellaneous Equipment and Materials (HWMU #43)

The Contractor will establish a decontamination station for the miscellaneous equipment and materials adjacent to the pipe decontamination station. All of the small items will be evaluated as to whether they require decontamination, and, if so, relocated to this decontamination station. The evaluation procedure will include any equipment that contains hazardous materials such as oil or fuel. Equipment containing these constituents will be drained of any liquids which will be containerized for offsite disposal. The reservoir will be flushed with a degreasing solution and the solution will be containerized for offsite disposal.

Items not requiring decontamination will be segregated by material type (metal, plastic, wood, etc.) for offsite recycling or disposal as non-hazardous waste.

The cooling towers will be cleaned in place and sampled. If the media does not meet the cleanup criteria, it will be removed and disposed of as hazardous waste and the steel framework will be re-cleaned and re-sampled. Once the steel meets the cleanup criteria, the cooling towers will be demolished with a shear.

The large equipment requiring decontamination will be taken to a designated location such as the truck wash rack (before it is cleaned) and cleaned and sampled according to the performance standards.

Other equipment identified in the miscellaneous non-permitted equipment systems will be decontaminated according to the performance standards and disposed of as either scrap metal or sold items.

Truck Loading and Unloading Areas and Non Containment Concrete Area (HWMU #36 & HWMU #37)

The 17 concrete areas associated with the truck loading and unloading areas and the non containment concrete pad will be cleaned using a floor cleaning attachment for the pressure washer and sampled according to the performance standards.

Asbestos Abatement

Asbestos surveys were conducted on all of the buildings and throughout the plant. With the exception of Building 1, all of the buildings do not contain any asbestos. Building 1 contains approximately 26,800 square feet of joint compound containing trace to 2% Chrysotile asbestos in a non-friable state and 60 square feet of non-friable vinyl floor covering in a janitor's closet where the backing on the floor covering contains 70% chrysotile asbestos.

In the Plant, the insulation on the oil heater tank south of the boilers contains 130 square feet of friable insulation containing 15% chrysotile asbestos and 64 square feet of non-friable insulation containing 60% chrysotile asbestos. Cooling Tower 1 contains 6.370 square feet of non-friable transite panels containing 20% chrysotile asbestos.

All of the asbestos will be abated prior to the demolition of any piece of equipment or building (Building 1) being demolished or removed from the property. The cooling tower and oil heater tank will be decontaminated prior to the asbestos abatement work.

Subcontractors

The Contractor plans on using one primary subcontractor, Belfor Environmental Services, to supply labor to supplement the Contractor's labor force. Other subcontractors include waste transporters for transporting hazardous and non-hazardous wastes off site, and transporting scrap metal to the recycling facility. Additional subcontractors will include a crane subcontractor for providing lifting services associated with removing the distillation columns, tanks, and other equipment.

1.2.1 Known or Suspected Hazardous Waste Disposal Onsite

Over its course of operation the Facility managed and processed waste streams such as solvents, still bottoms, acids, caustics, lab packs, wastewaters, and sludges. The facility managed wastes in containers and tank systems utilizing various process options, including solvent recycling, alternative fuel blending, liquefaction, water treatment, and corrosive treatment. Refer to *Figure 1* for a Facility Site Plan indicating the location of the Facility's hazardous waste management units (HWMU).

In general, the waste streams handled by Facility process equipment can be grouped into six categories:

1. Fuels
2. Solvents for reclamation
3. Antifreeze for ethylene glycol recovery
4. Aqueous wastes
5. Corrosive wastes for neutralization
6. Organic solids

Fuels

This category was comprised of liquid and semi-solid wastes, organic in nature exhibiting energetic (BTU) content. The following waste codes represent the bulk of the wastes in the fuels category:

Federal	California State
D001, D004-D011, D018, D019, D021-D030, D032-D036, D038, D040, F001-F005, F037, F038, U002	211, 212, 213, 214, 221, 222, 223, 241, 251, 252, 331, 551, 611, 741

Solvents for Reclamation

This category was comprised of liquid wastes, organic in nature with recoverable quantities of saleable solvents. The following waste codes represent the bulk of the wastes in the solvents for reclamation category:

Federal	California State
D001, D035, D039, F001-F005	211, 212, 213, 214, 741

Antifreeze for Ethylene Glycol Recovery

This liquid waste category was comprised primarily of water and ethylene glycol, with small amounts of contaminants. This waste stream was processed through distillation and the recovered ethylene glycol was sold as product. The aqueous waste from this process was

removed and treated in the Facility's biological treatment system and subsequently discharged to POTW. The following waste codes represent the bulk of the wastes in this category:

Federal	California State
D008	133, 134, 135

Aqueous Wastes

These were liquid wastes with substantial amounts (typically >50%) of water, with organic contaminants. These wastes were processed at the facility through distillation. The resulting water with reduced organic content was polished through the Facility's biological treatment system and subsequently discharged to POTW. The contaminants removed from the water were fuel blended. The following waste codes represent the bulk of the wastes in this category:

Federal	California State
D001, D035, F001-F005, F039	121, 122, 123, 131, 132, 133, 134, 135, 214, 222, 223, 241, 291, 331, 551, 561

Corrosive Wastes for Neutralization

These were liquid wastes exhibiting a high or low pH, contaminated with metals and small amounts of organics. These wastes were neutralized in tanks or shipped off-site for treatment. When treated on-site, the resulting aqueous waste streams were further treated through the Facility's biological treatment system and subsequently discharged to POTW. The following waste codes represent the bulk of the wastes in this category:

Federal	California State
D002, D004, D005, D006, D007, D008, D009, D010, D011	121, 122, 123, 131, 132, 133, 134

Organic Solids

These were solids wastes, organic in nature and/or contaminated with organics. These wastes were shipped off-site to solid fuel blending/burning facilities. The following waste codes represent the bulk of the wastes in this category:

Federal	California State
F001-F005, F037, F038, F039	281, 291, 331, 352, 461, 491

Hazardous waste determination and characterization will be made at the advent of waste generation from closure activities. Determination shall be based on waste generated from the following sources.

1. Solids, sludges and liquids that are likely to be encountered during initial phases of decontaminating or disassembling tanks, process distillation systems, piping, chillers and waste collection systems.
2. Spent decontamination solutions and rinse water used for pressure washing during decontamination.
3. Demolition material determined not suitable for decontamination.
4. Personal protective equipment (PPE) and contaminated materials used for the decommissioning or decontamination of equipment and other various media.

Waste determination shall consist of collecting representative samples from one or more of the above waste categories after they have been appropriately containerized and staged pending analysis.

Provisions of 40 CFR Subpart B (Criteria for Identifying the Characteristics of Hazardous Waste) shall apply for the determination of RCRA regulated waste streams as well as the provisions of CCR Title 22, Article 3, Section 66261.20 and Article 4, section 66261.30 for determination as California Hazardous Waste.

Provisions of CCR Title 22, 66261.3(a)(2)(B), section 66261.3(a)(2)(D), section 66261.3(a)(2)(E), or section 66261.3(c)(2) shall apply for the determination as a California Extremely Hazardous Waste.

Provisions of CCR Title 22, 66261.120 through 66261.126 shall apply for waste determined to meet the criteria of a California Special Waste.

Provisions of CCR Title 22 Article 1 shall apply for the determination of recyclable materials generated during the course of closure activities.

Quantities of waste generated as a result of closure activities shall be contingent upon on or more of the following factors.

1. Determination of what specific equipment is deemed suitable for decontamination.
2. Assessment of the amount of solid, sludge, or liquid waste residue encountered during initial inspection of each piece of equipment.
3. Determination of the type of decontamination method(s) deemed necessary for adequate decontamination of any one piece of equipment.
4. Determination of the amount of decontamination solutions and rinse applied collectively for the adequate decontamination of facility equipment and surfaces.
5. Ability and the degree of repeated reuse of decontamination wash water.

2.0 Key Personnel and Responsibilities

The following key personnel have been assigned to manage specific tasks for the duration of the project. A Contractor Project Team Organizational Chart is included as *Figure 5* in this HASP.

Onsite:

Name	Responsibility	Contact
Christopher Kwoka	<i>Sr. Project Manager / Engineer</i>	(510) 773-9136 mobile
Jason Costello	<i>Site Safety Officer</i>	(510) 750-2099 mobile
Sean Orman	<i>Superintendent</i>	(510) 385-5612 mobile
Susan Rigmaiden	<i>Community Relations Liaison</i>	(510) 774-7051 mobile
Robert Harvey	<i>Leadman</i>	--
Ceasar Lopez	<i>Leadman</i>	--
Eleazar Valdez	<i>Leadman</i>	--
Jose Banuelos	<i>Leadman</i>	--

Offsite:

Name	Responsibility	Contact
Bill Belk	<i>Principal / EH&S Quality Assurance</i>	(925) 930-7337 office
Dan Hernandez	<i>Environmental Health & Safety (CIH)</i>	(408) 292-3266 office
Suzana Dzaja	<i>Waste Management Specialist</i>	(510) 732-6444 ext. 326

The Contractor has assigned Mr. Christopher Kwoka, the Contractor’s Chief Executive Officer to be the project’s Sr. Project Manager and Project Principal Engineer. Mr. Kwoka will provide technical input and oversight as well as assure resources are available to Mr. Sean Orman to execute the project. Mr. Belk will act as the Quality Director and EH&S Principal for the project. Mr. Dan Hernandez will provide health and safety oversight as the Site H&S Manager and Certified Industrial Hygienist (CIH). He will be supported onsite by Mr. Costello as the Site H&S Officer. Ms. Susan Rigmaiden will act as the East Palo Alto Community Relations Liaison. The Leadmen for this project will be Mr. Harvey, Mr. Lopez, Mr. Valdez and Mr. Banuelos. Beneath the Supervisor level will be various decontamination and waste management technicians and support staff. Waste management responsibility will fall under Ms. Suzana Dzaja, the Contractor’s Waste Management Specialist.

2.1 Site Safety Officer (SSO)

The ROMIC project Site Safety Officer (SSO) shall be responsible for onsite management and implementation of the Health and Safety Plan (HASP), daily monitoring, reporting, and tracking. Key responsibilities of the SSO are outlined in greater detail in the following section.

2.1.1 SSO Onsite Responsibilities

The SSO shall be responsible for preparing all site specific health and safety documentation prior to commencing Phase I site closure activities. Once the project begins, the SSO shall be onsite at all times to conduct safety meetings, manage and implement policies and procedures outlined in the HASP, and perform task specific activity hazard analysis (AHAs) on an ongoing basis. The SSO shall be responsible for continual monitoring, tracking and reporting of employee and job site safety conditions. The SSO shall have the authority to enforce all health and safety policies and procedures and to stop operations if personnel and /or community safety and health are jeopardized.

Table 2-1: Summary of Key SSO Responsibilities

Daily	Weekly	Monthly
Organize all employee morning “Tool Box” / “Tail Gate” safety meetings	Organize and host site manager’s safety round table.	Review personnel training documentation
Review heavy equipment and power tool inspection checklists prepared by individual operators	Review health and safety plan and previous task specific AHAs for changes / modifications	Conduct a 1-hour all employee health and safety meeting including Contractor Injury & Illness Prevention Plan (IIPP) refresher training.
Inspect facility health and safety equipment	Perform formal site audit and post audit report for employee review and comment.	
Calibrate personnel and environmental exposure monitoring equipment		

Daily	Weekly	Monthly
Track and record personnel and environmental exposure monitoring data		
Assist with confirmation sampling and record keeping		
Perform site walk-throughs and create/implement task specific AHAs.		

Each morning prior to commencing work, the SSO shall organize an all hands daily “Tool Box” / “Tail Gate” health and safety meeting. “Tool Box” / “Tail Gate” safety meetings shall recap guidelines outlined in the HASP, discuss new hazards documented on AHA forms, and reinforce a general understanding of safe working practices. Group participation in daily safety meetings shall be mandatory. All contractor employees, including project management and supervisory personnel shall take in active role in presenting safety topics. All Contractor personnel, subcontractor’s, and client representatives shall be required to review and sign “Tool Box” / “Tail Gate” health and safety documentation before entering any work areas and/or exclusion zones at the project site. All health and safety documentation including the HASP, AHA forms, safety meeting forms, equipment inspection checklists, personnel and environmental exposure monitoring data and special permits will be maintained on site and will be available for review at all times during operations.

The SSO shall ensure all heavy equipment and power tools are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Heavy equipment checklists shall posted with the equipment for the operator(s) to review for the remainder of the day. Power tool inspection checklists will be turned into the SSO and maintained in an inspection checklist binder. The SSO shall also inspect personnel and environmental exposure monitoring equipment each morning to ensure proper calibration and operation. Calibration records shall be maintained with employee and environmental exposure data reports for reference.

Each day during site operations, the SSO shall conduct site walk-throughs to ensure site safety conditions and employee safe work practices meet and/or exceed guidelines outlined in the HASP. When performing site walk-throughs the SSO shall:

- Monitor individual work tasks and create or modify AHA documentation based on observed changes to the work environment that affect environmental and employee health and safety conditions. New and/or modified AHA documentation shall be incorporated in the next day’s “Tool Box” / “Tail Gate” safety meeting.
- Inspect eye and body wash stations, first aid supply stations, fire suppression equipment, employee and equipment decontamination stations and hazardous materials and hazardous waste storage areas.
- Observe and record data from personnel and environmental exposure monitoring equipment.
- Ensure emergency evacuation routes and personnel staging areas are clear and free from obstructions.
- Enforce proper housekeeping and ensure employee work stations, shower and locker rooms and break rooms remain clean and sanitary.

At least once each week, the SSO shall organize and host a site manager's safety round table to discuss observed site safety conditions and employee safe work practices from the previous week's work activities. AHA documentation shall be reviewed for changes and/or modifications and manager input shall be documented and incorporated into daily "Tool Box" / "Tail Gate" safety meetings.

Once each week the SSO will conduct a formal site safety audit and document results on a Contractor's Site Safety Audit Report Form (SSARF). At a minimum the SSARF shall address the following topics:

- General Work Site Safety
- Personal Protective Equipment
- Hazard Communication
- Heavy Equipment and Power Tool Safe Operating Practices
- Housekeeping
- Hazardous Waste Management / Storage
- Elevated / Overhead Work Safety Standards
- Hot Work Safety Standards
- Lock Out Tag Out
- Electrical Safety
- Confined Space Entry

The results of each week's site safety audit report shall be discussed during the next following "Tool Box" / "Tail Gate" safety meeting and a copy of the SSARF shall be posted in the break room for employee review and comment.

At least once a month the SSO shall organize and host a one hour all employee health and safety meeting highlighting an OSHA standard and/or regulatory topic relevant to work tasks performed at the project site. The monthly meeting shall include Contractor IIPP refresher training and an all employee round table discussion of observed site safety conditions and general safe work practices.

Emergency response practice drills shall be conducted at least once before the start of any new work activity, or work activity performed in a new area or structure, to ensure employee familiarization with the contingency plan procedures outlined in *Section 10.0* of this HASP. The drills shall also assist in ensuring that Contractor personnel can respond effectively to emergencies through the implementation of defined emergency procedures, and the proper use of available emergency equipment and emergency systems, including, where applicable:

- Communication and alarm systems
- Response to fires or explosions
- Accidental spill/release response

- Shutdown of operations

The Contractor shall invite the Menlo Park Fire Department to oversee and participate in emergency response practice drills conducted at the project site.

3.0 Job Hazard Analysis / Summary

All onsite personnel will be required to follow the guidelines outlined in the HASP. The HASP addresses project work area environmental, chemical and physical hazards based on initial site assessments, pre-job hazard analysis, and site specific health and safety criteria provided to the Contractor by the Client prior to commencing work activities. It is anticipated that chemical and physical hazards may change as original tasks evolve and/or new tasks are added to the scope of work. The SSO shall continually perform activity hazard analysis (AHAs) to determine presence of additional hazards. New hazards will be documented on AHA forms and immediately reported to affected personnel. Daily "Tool Box" / "Tail Gate" safety meetings shall recap all guidelines outlined in the HASP, cover additional health and safety hazards documented on AHA forms, and reinforce a general understanding of safe work practices at the project site.

3.1 Task Specific Activity Hazard Analysis (AHA)

The Contractor's work plan and proposed technical approach has been broken down into sixteen (16) individual tasks that in combination make up the overall proposed scope of work for Romic Phase I facility decontamination and closure activities.

- 1) Decontamination of hazardous waste management units (HWMU) # 1, 2, 3, 4, 5, 29, 34, 35, 36, 37, 38
- 2) Decontamination of drum crushing units (HWMU #33)
- 3) Decontamination of tank farms A, B, C, D, G, H, I, J, L, M, N, O, Q, R, vacuum pots (HWMU #24), thin film evaporators (HWMU #26), and liquid extraction unit (HWMU #27)
- 4) Decontamination of pipe rack and chemical transfer piping
- 5) Decontamination of production area – fractionation (HWMU #23) (distillation columns, reboilers, condensers, etc.)
- 6) Decontamination of debris shredder (HWMU #31), liquefaction (HWMU #28), and drum and debris building
- 7) Decontamination of biological treatment system (HWMU #18)
- 8) Decontamination of high temperature unit and boilers (HWMU #25)
- 9) Decontamination of truck wash station (HWMU #34)
- 10) Decontamination and demolition of laboratory building (HWMU #40)
- 11) Decontamination and demolition of storm water tanks (HWMU #42)

- 12) Decontamination of sewer tanks (HWMU #41)
- 13) Demolition of Building 6 – maintenance shop (HWMU #38)
- 14) Demolition of administrative buildings and modular trailer units (HWMU #39)
- 15) Decontamination of truck loading and unloading areas and non-containment concrete area (HWMU #36 & HWMU #37)

The Contractor shall create AHA documentation for each site task and operation identified above based on initial site assessment and preliminary hazard evaluation performed prior to conducting work activities at the project site. Detailed AHA forms addressing health and safety hazards and safe work practices for individual work tasks are included as *Attachment A* in this HASP.

3.2 General Hazard Evaluation

Physical hazards to be expected on this site may include but are not limited to confined space entry, chemical exposure, powered hand held equipment, working in close proximity to heavy equipment, electrical hazards, pressurized systems, heat and cold stress, sharp edges, dust, falling objects, slip, trip, and fall hazards. Any number of these hazards may be present in any combination throughout this project. At each work location for each task, the SSO shall perform daily inspections to identify specific physical hazards prior to beginning work. New hazards will be documented on AHA forms and immediately reported to affected personnel. An all employee discussion of newly identified hazards shall be incorporated into the daily “Tool Box” / “Tail Gate” health and safety meetings.

There will be no smoking at anytime outside of designated break areas. Protecting individual established work zones from unauthorized entry will further minimize hazards. Personnel will maintain appropriate distances from operating equipment, and adhere to the personal protective equipment (PPE) requirements outlined in *Section 5.0* of this HASP. Personnel shall adhere to the Contractor’s standard operating procedures included as *Attachment B* of this HASP. The Contractor shall employ proper engineering controls to ensure that work areas are well ventilated during demolition operations. Further AHAs will be based on the daily scheduled activities and the risk assessments associated with each individual work activity as viewed by the SSO.

Biological Hazards – Personnel shall take precautions against insects, snakes, rats, and any other insect or animal life that may be indigenous to a work location. Potential biological hazards may exist in interstitial spaces (rodents and pigeons). Good common sense and appropriate PPE will minimize the possibility of exposure to most of these hazards. The accumulation of pigeon feces on floor surfaces is an ongoing concern at the project site. Whenever possible, personnel shall attempt to clean soiled surfaces in the immediate work area prior to commencing work activities. Soiled surfaces shall be wetted to eliminate generation of dust and then scraped with flat edge shovels. Pigeon feces will be containerized in lined 55-gallon drums for later disposal as hazardous waste. At a minimum, work areas with excessive pigeon feces shall be wetted with a mild bleach solution at frequent intervals during each work shift to prevent airborne dust contamination and to reduce potential bacterial and viral levels. For any animal feces clean up activities at the project site, the standard practice shall be to wet soiled surfaces first to eliminate generation of dust and the aerosolization of any viral components of the feces such as hantavirus that causes hantavirus pulmonary syndrome (HPS). The use of HEPA vacuums and/or any other dry methods of feces clean up shall be prohibited as the risk of spreading aerosols is much greater. An HPS fact sheet taken from the Center or Disease Control’s website is included as *Attachment H* of the HASP.

Confined Spaces – Confined spaces at the project site may include concrete vaults and chemical storage tanks. Confined space entry activities will only be conducted when supervised by a certified confined space entry expert, and in strict accordance with the Contractor's confined space entry standard operating procedures included in *Section 11.0* of this HASP. When confined space entry is required, detailed procedures will be followed. Only trained and experienced personnel will be permitted to conduct confined space entry activities. All confined space entries will conform to all applicable State and Federal requirements.

Fire Protection and Prevention - Considerable care will be used to minimize and mitigate spark-generating activities. The Contractor will maintain a fire watch during all activities where the potential for sparking exists. The potential fire hazards on this site will be minimized by the experienced supervision of the SSO and Contractor Project Management staff. Fire hazard estimations will be based on the scheduled activities and the risk assessments associated with each activity as viewed by the SSO. Contingency planning for an emergency resulting from fire and/or explosion is addressed in *Section 10.0* of this HASP.

Heat Illness - The potential for heat related illnesses are a factor when performing work activities in chemical resistant, non-breathable PPE especially in summer months where elevated temperatures are likely. When the body is unable to cool itself by sweating, several heat induced illnesses such as heat stress or heat exhaustion or the more severe heat stroke can occur and result in serious injury or illness or even death. High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; certain medications; and inadequate tolerances for hot workplaces are all factors which can lead to heat stress and heat related illness. All personnel shall adhere to the Contractor's Heat Illness Prevention Program included in *Section 15.0* of this HASP for work activities performed outdoors where environmental risk factors for heat illness are present.

Irritant Fumes - In general, solvent fumes and/or fumes of other volatile organic compounds, may be present during specific work activities. These fumes may or may not be detectable as faint to strong odors, and may irritate mucous membranes and respiratory tract. Site visitors, contractors, regulators, etc., are to be escorted by the SSO at all times. All personnel shall adhere to PPE and respiratory protection requirements outlined in *Section 5.0* of this HASP.

Overhead Power Lines - Overhead power lines are present in multiple locations at the project site. Warning signs reading "Danger Overhead Power Lines" and indicating highest potential voltage at each location shall be posted at all times in areas where vehicle traffic, heavy equipment and personnel are permitted to pass under areas where overhead power lines are situated. Prior to the start of work, the SSO in conjunction with the equipment operator(s) shall designate and mark safe routes where cranes and other aerial lifting devices can travel beneath power lines. Personnel working on site shall be aware of the locations of all overhead power lines and shall adhere to the proper clearances and safe work distances outlined in the tables below. Based on initial assessment of the location of overhead power lines at the project site the Contractor shall implement engineering controls to prevent the need to operate heavy equipment and aerial lifting devices under or immediately adjacent to overhead power lines. In general, it is the Contractor's policy that no personnel shall be permitted to perform any work function in proximity to energized overhead power lines or to enter upon any land, building, or other premises and engage excavation, demolition, construction, repair, or store any tools, machinery, equipment, or materials beneath and/or immediately adjacent to energized overhead power lines unless danger from accidental contact has been effectively mitigated.

Slip, Trip, and Fall – There may be areas at the project site with unstable, uneven flooring, open fixed facility trenches and vaults, fixed ladder systems and other trip and fall hazards including concrete berms and floor mounted brackets and studs. Also it is anticipated that some floor areas may become wet after pressure washing activities. Working personnel shall take extreme caution while working around these areas slip, trip, and fall hazards. The SSO shall assess

surface conditions daily and if necessary, restrict access to areas that pose immediate health and safety risks.

The following table summarizes general hazards and control methods associated with the Romic Phase I Facility Closure Project. The table addresses basic work area environmental, chemical and physical hazards based on initial site assessment, pre-job hazard analysis, and site specific health and safety criteria provided the Contractor by the Client. It is anticipated that chemical and physical hazards may change as original tasks evolve and/or new tasks are added to the scope of work. Over the course of the project, the SSO will continually perform AHAs to determine presence of additional hazards. New hazards will be documented on AHA forms and immediately reported to affected personnel.

Table 3-1: General Hazard Evaluation and Control Methods

Description of Job or Task	Potential Occupational Safety/Health Hazard	Preventative Safe Work Conditions, Safe Work Practices, or PPE
Trained and qualified Contractor personnel may be required to perform permit required confined space entry activities when decontaminating HWMU chemical storage tanks, sewer tanks, and storm water collection tanks.	Slip, trip and fall, limited egress, lack of oxygen, chemical exposure, and fire and explosion hazards may be associated with confined space entry activities.	Confined space entry activities will only be conducted when supervised by a trained and qualified Confined Space Supervisor, and in strict accordance with the Contractor's confined space entry standard operating procedures included in <i>Section 11.0</i> of this HASP. Only trained and experienced personnel will be permitted to conduct confined space entry activities. All confined space entries will conform to all applicable California OSHA requirements.
Qualified and experienced Contractor personnel will utilize boomlifts and scissor lifts to access elevated areas at the project site	Working in Close Proximity to Heavy Equipment	Level D PPE including gloves, eye protection, steel toe boots, and hard hats shall be required at all times. Operating personnel shall adhere to the safe operating practices for heavy equipment operation included in <i>Section 15.0</i> of this HASP. Personnel not directly involved with elevated / overhead work will maintain safe distances from operating equipment at all times.

Description of Job or Task	Potential Occupational Safety/Health Hazard	Preventative Safe Work Conditions, Safe Work Practices, or PPE
Overhead power lines are present in multiple locations at the project site.	Electrocution resulting in serious bodily injury and death may occur if proper engineering controls and overhead power line clearances are not recognized.	Warning signs reading “Danger Overhead Power Lines” and indicating highest potential voltage at each location shall be posted at all times in areas where vehicle traffic, heavy equipment and personnel are permitted to pass under areas where overhead power lines are situated. Prior to the start of work, the SSO in conjunction with the equipment operator(s) shall designate and mark safe routes where cranes and other aerial lifting devices can travel beneath power lines. Personnel working on site shall be aware of the locations of all overhead power lines and shall adhere to the proper clearances and safe work distances outlined in <i>Section 16.0</i> of the HASP.
Contractor personnel may utilize pneumatic tools and torch cutting equipment when dismantling and decommissioning process equipment.	Cutting, pinching, skin burns, and eye damage from glare are hazards associated with improper operation of torch cutting equipment. Air tool systems may present significant health hazards if not properly inspected before each use. Cutting, pinching and major bodily harm may result improper use of pneumatic tools or an accidental release of pressurized air due to ruptured hoses and fittings.	Workers shall inspect, test, and determine safe operating condition of all power tools prior to use. Continued, periodic inspections shall be performed assure safe operating condition and proper maintenance. Personnel performing hot work activities shall adhere to safe operating practices for torch cutting outlined in <i>Section 15.0</i> of this HASP. Air tool systems shall be inspected before each use to check for worn fittings and compromised hoses. Pneumatic power tools should be secured to the hose or whip in a positive manner to prevent accidental disconnection. Safety clips or retainers should be securely installed and maintained on pneumatic impact tools to prevent attachments from being accidentally expelled. The manufacturer’s safety operating pressure for all fittings should not be exceeded.

Description of Job or Task	Potential Occupational Safety/Health Hazard	Preventative Safe Work Conditions, Safe Work Practices, or PPE
<p>Contractor personnel will utilize high pressure water washing equipment to effectively wash and decontaminate exterior and interior surfaces of distillation columns, tank systems and other process equipment and piping.</p>	<p>Bruising, cutting, tearing and major bodily harm are hazards associated with improper operation and lack of experience and training regarding use of concentrated high pressure water. Ground surfaces and footing areas may become wet and present potential slip, trip and fall hazards. Environmental and personnel chemical exposure (dermal and inhalation) due to overspray are hazards associated with high pressure water washing.</p>	<p>Personnel operating high pressure water washing equipment shall adhere to the safe operating protocols and procedures outlined in <i>Section 15.0</i> of this HASP. Only trained (experienced) personnel shall operate high pressure washing equipment. The operator shall insure that all electrical controls are either fail safe, low voltage, or protected with an approved ground fault circuit interrupter. At no time shall the operator operate the equipment above the manufacturers rated pressure maximum. The operator shall always increase pressure slowly until required working pressure is reached. High pressure water can puncture splash suits and other personal protective clothing. At no time shall the operator point the pressure washer nozzle in the direction of other personnel. Water spray will be directed downward to minimize misting and overspray.</p>
<p>Contractor personnel will be working in elevated areas as well as on or around uneven surfaces.</p>	<p>Slip, trip, and fall</p>	<p>Boom lift and scissor lift cages shall serve as passive fall arrest systems. Active fall arrest systems will be utilized by all workers performing work activities at elevations greater than six (6) feet where no passive fall arrest systems (railings, platforms, etc.) exist. Personnel working in elevated areas shall adhere to standard operating procedures for fall protection outlined in <i>Section 15.0</i> of this HASP.</p>

Description of Job or Task	Potential Occupational Safety/Health Hazard	Preventative Safe Work Conditions, Safe Work Practices, or PPE
<p>Contractor personnel may utilize fixed, enclosed ladder systems to access elevated areas on the distillation columns and tank systems. Contractor personnel may also utilize portable ladders to access lesser elevated areas at the work site.</p>	<p>Slip, trip and fall are hazards associated with improper use of fixed and portable ladder systems.</p>	<p>Active fall arrest systems will be utilized by all workers performing work activities on ladders at elevations greater than six (6) feet. Personnel utilizing ladders shall adhere to safe work practices for fixed and portable ladders outlined in <i>Section 15.0</i> of this HASP.</p>
<p>Contractor personnel may be working in elevated areas where the potential for dropped objects exists.</p>	<p>Cutting, crushing and struck-by hazards are associated with contact from falling objects.</p>	<p>Level D Modified PPE including Tyvek suits, gloves, eye protection, steel toe boots, and hard hats shall be required at all times. Work activities shall not be performed immediately below man lift equipment or any other elevated area where overhead work is in progress. Workers shall maintain general awareness of immediate work environment at all times.</p>
<p>Contractor personnel will be process systems and equipment with the potential to have sharp edges.</p>	<p>Cuts and lacerations</p>	<p>Level D Modified PPE including Tyvek suits, gloves, eye protection, steel toe boots, and hard hats shall be required at all times. Workers shall maintain general awareness of immediate work environment at all times. Kevlar, puncture resistant gloves will be provided to employees handling objects with sharp edges.</p>
<p>Contractor personnel may be performing work in chemical resistant, non-breathable PPE and/or working in areas where elevated temperatures are likely.</p>	<p>Heat induced illnesses such as heat stress or heat exhaustion or the more severe heat stroke can occur and result in serious injury or illness or even death.</p>	<p>For work activities performed in areas where environmental risk factors for heat illness are present, personnel shall adhere to policies outlined in the heat illness prevention program included in <i>Section 15.0</i> of this HASP.</p>

3.3 Chemical Hazard Evaluation

Potential chemical hazards anticipated onsite during Phase I closure activities have been evaluated based on qualitative risk assessment documentation taken from the following source:

- *Human Risk Assessment and Ecological Risk Assessment For Romic's East Palo Alto Facility, Section 3.0, Appendix A* – Prepared for Romic Environmental Technologies, Corp. by Environ Corporation – February 19, 2001.
http://www.dtsc.ca.gov/HazardousWaste/Projects/upload/Romic_HRA_Part-1.pdf

Chemical hazards addressed in this section have been adopted from the above reference and were based on selection criteria and methodology recommended by the USEPA and DTSC specifically for treatment, storage and disposal (TSD) facilities. The selection process recommended by the DTSC was a three step process:

1. Develop a master list of chemicals to be considered for qualitative risk assessment.
2. Use DTSC preliminary screening criteria to evaluate the chemicals and identify a subset of chemicals that may be addressed in qualitative risk assessment.
3. Use DTSC refined criteria to identify a final list of chemicals to be addressed.

Appendix A of the above reference document describes the chemical selection processes for qualitative risk assessment in greater detail and has been included as *Attachment F* of this HASP.

In 2001, preliminary screening for qualitative risk assessment of chemical hazards at the Romic Facility was conducted consistent with recommendations provided by the DTSC (1991) draft guidelines for assessing risks from TSD facilities. The preliminary screen resulted in a list of chemicals that was too long to manage efficiently and subsequently was subjected to a more refined screen considering toxicology, concentration and volatility. A concentration-toxicity screen comparable to that described in the USEPA's Risk Assessment Guideline for Superfund (USEPA 1989) was recommended by the DTSC (1991) and was used to eliminate low concentration chemicals present in the process stream at the Romic Facility. In summary, the concentration-toxicity screen served to identify specific chemicals that, based on concentration and toxicity, were most likely to contribute significantly to exposure risks.

The following tables indicate potential chemical hazards anticipated at the project site based on qualitative risk assessment data taken from the above reference document:

Table 3-2: Organic Chemical Hazards (OELs)

Chemical	PEL (ppm)	STEL (ppm)	TLV (ppm)	REL (ppm)	IDLH (ppm)
1,1,1-Trichloroethane	350	450 20 (skin)	350	10	100
1,1-Dichloroethene	100	20	5	--	--
1,2,4-Trimethylbenzene	25	--	25	25	--
1,2-Dichlorobenzene	50	50	25	--	--
1,2-Dichloroethane	50	--	10	1	50
1,3,5-Trimethylbenzene	--	--	25	25	--
1,4-Dichlorobenzene	10	110	10	--	150
1,4-Dioxane	100 (skin)	--	20	1	500
2-Butanone	200	300	200	200	3,000
2-Ethoxyethanol	5 (skin)	--	5	0.5 (skin)	500
2-Nitropropane	10	--	10	--	100
4-Methyl-2-Propanone	--	300	200	--	--

Chemical	PEL (ppm)	STEL (ppm)	TLV (ppm)	REL (ppm)	IDLH (ppm)
Acetaldehyde	25	25	100	--	2,000
Acetone	500	750	750	250	2,500
Acetonitrile	40 (skin)	60 (skin)	20	20	500
Acrylic Acid	--	--	2 (skin)	2 (skin)	50
Acrylonitrile	2 (skin)	--	2 (skin)	10 (skin)	85
Benzene	1 (skin)	5 (skin)	10	.1	500
Carbon Disulfide	4 (skin)	12 (skin)	10 (skin)	1	500
Carbon Tetrachloride	2 (skin)	10 (skin)	5 (skin)	2	300
Chlorobenzene	10	--	10	--	1000
Chloroform	2	2	10	2	500
Cumene	50 (skin)	--	50 (skin)	50 (skin)	900
Cyclohexane	300	--	300	300	1300
Cyclohexanol	50 (skin)	--	50 (skin)	50 (skin)	400
Diacetonealcohol	50	--	50	50	1800
Dichlorofluoroethane	--	--	500	--	--
Diethylamine	5 (skin)	15 (skin)	5	10	200
Diethylaminoethanol	10 (skin)	--	10 (skin)	10 (skin)	100
Diisobutylketone	25	--	25	25	500
D-Limonene					
Dimethylformamide	10 (skin)	--	10 (skin)	10 (skin)	500
Epichlorohydrin	.05 (skin)	--	2 (skin)	--	75
Ethylacrylate	5 (skin)	25 (skin)	5	--	300
Ethylbenzene	100	125	100	100	800
Ethyleneoxide	1	5	1	.1	800
Formaldehyde	.75	2	.3	.1	20
Gasoline	300	500	--	--	--
Hexachloroethane	1 (skin)	--	1 (skin)	1 (skin)	300
Hexane	500	1000	500	50 (skin)	1100
Hydrazine	.01 (skin)	--	1 (skin)	.03	50
Isopropyl Alcohol	400	500	400	400	2000
M-Cresol	5 (skin)	--	5 (skin)	2.3	250
Methacrylate	10 (skin)				
Methanol	200 (skin)	250 (skin)	200	--	--
Methyl Isobutylketone	50	75	50	--	500
Methylmethacrylate	50	100	50	100	1000
Methylenechloride	25	125	50	--	2300
Methyl N-amylketone	50	--	50	100	800
Methyl-Tert-Butylether	40	--	50	--	--
Napthelene	10	15	10	10	250
N-Butylacetate	150	200	150	150	1700
N-Butylalcohol	50 (skin)	50 (skin)	20	50 (skin)	1400
N-Heptane	400	500	400	85	750
N-Hexane	50 (skin)	--	50	50	1100
Nitrobenzene	1 (skin)	--	1 (skin)	1 (skin)	200
Phenol	5 (skin)	--	5 (skin)	5 (skin)	250
Propylene Dichloride	75	110	75	--	400
Propylene Oxide	2	--	200	--	400
Pyridine	5	--	5	5	1000
Styrene	50 (skin)	100 (skin)	50	50	700
Tetrachloroethene 1,1,2,2	1 (skin)	--	5 (skin)	5 (skin)	100

Chemical	PEL (ppm)	STEL (ppm)	TLV (ppm)	REL (ppm)	IDLH (ppm)
Tetrahydrofuran	200	250	200	200	2000
Toluene	50 (skin)	150 (skin)	50 (skin)	100	500
Toluenediisocyanate	.005	.02	.005	--	2.5
Trichloroethene	25	100	100	--	1000
Triethylamine	1 (skin)	15	5	--	200
Urethane	--	--	--	--	--
Vinyl Acetate	10	15	--	4	--
Vinyl Chloride	1 (skin)	--	5	--	--
Xylene	100	150	100	100	900

Table 3-3: Inorganic Chemical Hazards (OELs)

Chemical	PEL	STEL	TLV	REL	IDLH
Ammonia	25	35	25	25	300
Arsenic	.010 mg	--	.01 mg	.002 mg	5 mg
Bromine	.1	.3	.1	.1	3
Chlorine	.5	1	.5	.5	10
Hydrochloric Acid	5	--	2	--	--
Hydrofluoric Acid	3	6	3	--	--
Hydrogen Sulfide	10	15	10	10	100
Nitric Acid	2	4	2	2	25
Osmium Tetroxide	.002 mg	.0006 mg	.0002 mg	.0002 mg	1 mg
Phosphine	.3	1	.3	.3	50
Phosphoric Acid	1 mg	3 mg	1 mg	1 mg	1000 mg
Sulfuric Acid	1 mg	3 mg	1 mg	1 mg	15 mg

Table 3-4: Characteristic Information for General Chemical Categories

Exposure Substance	Physical State	Characteristics
acids / alkalines	solid residues / dilute liquids	Can be destructive to all human tissue, producing severe burns. Eye contact causes severe permanent injury. Skin contact causes irritation and, if not removed immediately, severe burns with scarring. Inhalation of the dust or mist, vary from mild irritation to destructive burns. Pneumonitis may occur. Ingestion causes severe burns of the mouth, throat and stomach, and may be fatal or induce coma. Symptoms include nausea, vomiting, diarrhea, abdominal pain, bleeding, and tissue ulceration.

Exposure Substance	Physical State	Characteristics
aliphatic hydrocarbons	liquid / solid residues	Colorless liquid with a hydrocarbon odor. Vapors are heavier than air and may travel along the ground or be moved by ventilation and ignited by heat, pilot lights, other flames and ignition sources at locations distant from material handling point. Flammable. Reacts with strong oxidants, causing fire and explosion hazard. Substance can be absorbed into the body by inhalation of its vapor and through the skin.
corrosive amines	liquid / solid residues	Pale, yellow liquid with characteristic amine odor. Corrosive. Eye contact may cause tearing, stinging, and swelling. Damage to the cornea including blindness can occur. Swallowing may be harmful or fatal. Skin contact may cause redness, burning and swelling. Inhalation may include severe irritation and burns to the nose. Inhalation of concentrated mists or fumes may be harmful or fatal.
corrosive gasses	gas	Corrosive, toxic. Will burn eyes, nose and mouth. May cause lacrimation, rhinorrhea, coughing, choking, substernal pain, nausea, and vomiting, headaches, dizziness and syncope. May develop pulmonary edema, pneumonia, hypoxemia, and dermatitis.
cyanide solutions	solid residues / dilute liquids	Toxic. Incompatible with acid. Inhalation may cause irritation to eyes, skin, upper respiratory system, asphyxiation, weakness, headache, confusion, nausea, vomiting, increased respiratory rate, and slow gasping respiration. Ingestion may cause thyroid and blood changes, and death.
dust, total	solid / solid residues	Nuisance; may cause sneezing, coughing or itchy eyes. Irritation eyes, skin, throat, upper respiratory system.
flammable gasses	gas	Flammable. May be irritating to respiratory system. May cause anesthesia, drowsiness, narcosis, asphyxiation, headache, tachypnea, nausea, vomiting, abdominal pain, diarrhea, thirst, weakness, dizziness, confusion, hallucinations, cyanosis, pulmonary edema, chest tightness, difficulty breathing, angina, and syncope.
flammable solvents	solid residues / dilute liquids	Flammable. Incompatible with oxidizers. Inhalation may cause irritation to eyes, nose and throat. Ingestion may cause headache, dizziness, and central nervous system depression. Skin contact may cause dermatitis, nausea, vomiting, and abdominal pain. Target organs: eyes, skin, respiratory system, kidneys, liver, gastro intestinal tract, central nervous system.

Exposure Substance	Physical State	Characteristics
heavy metals	solid residues / dilute liquids	Heavy gray ductile metal that may be yellow or reddish depending on levels of impurity. Poison by ingestion. Moderately toxic by intraperitoneal route. It is a suspected carcinogen of the lungs and kidneys. Human systemic effects by ingestion and inhalation: loss of appetite, anemia, malaise, insomnia, headache, irritability, muscle and joint pains, tremors, flaccid paralysis without anesthesia, hallucinations and distorted perceptions, muscle weakness, gastritis and liver changes.
lubricants / oils	liquid	Combustible. Chronic skin exposure may cause acne or exposure may cause acne or epitheliomata.
organochlorine pesticides	solid residues / dilute liquids	Non combustible, white/tan crystallized solids that can be dissolved in flammable liquids. Camphor-like odor in solid or liquid form. Incompatible with iron and rust. Prevent eye and skin contact. Toxic. Target organs include the central nervous system and the liver. Exposure symptoms may include: nausea, vomiting, tremors, convulsions, and liver damage.
reactive gasses	gas	Reactive, extreme fire hazard. Exposure can cause skin burns resulting in eye lesions and loss of sight. May cause lacrimation, coughing and choking. May develop pulmonary edema, pneumonia and dermatitis.
solvents / VOCs	solid residues / dilute liquids	Flammable. Incompatible with oxidizers. Inhalation may cause irritation to eyes, nose and throat. Ingestion may cause headache, dizziness, and central nervous system depression. Skin contact may cause dermatitis, nausea, vomiting, and abdominal pain. Target organs: eyes, skin, respiratory system, kidneys, liver, gastro intestinal tract, and central nervous system.
toxic / oxidizing gasses	gas	Fire danger and highly toxic. Irritating or burning to eyes, nose, throat and respiratory system. May cause bronchial and laryngeal spasms, lacrimation, coughing, choking, nausea, vomiting, headache, dizziness, syncope, pneumonia, hypoxemia, rhinorrhea, substernal pain, chest pain, pulmonary edema, pink frothy sputum, skin burns, vesiculation, and dermatitis.

Table 3-5: Characteristic Information for Specific Chemicals

Exposure Substance	Physical State	Characteristics
1,1,1- trichloroethane	liquid	Physical state; appearance: Clear, colorless liquid with a mild chloroform-like odor. Physical dangers: Requires inhibitor content to prevent corrosion of metals. Chemical dangers: May produce carbon monoxide, carbon dioxide, hydrogen chloride and phosgene when heated to decomposition. Incompatible with open flames, welding arcs, nitrogen tetroxide, oxygen and other reactive metals. Must avoid insufficient inhibitor, incompatibles, heat, flame and ignition sources. Routes of exposure: Substance can be absorbed into the body by inhalation of its vapor and by ingestion.
1,1- dichloroethene	liquid	Physical state; appearance: Oily liquid with a slight chloroform like odor. Chemical dangers: Reactive with oxidizing agents, alkalis and corrosive in presence of aluminum. Will attack some forms of plastic and rubber. Routes of exposure: Absorbed through skin, eye contact, inhalation and by ingestion.
1,2,4- trimethylbenzene	liquid	Physical state; appearance: Clear, colorless liquid with no aromatic odor. Chemical dangers: Incompatible materials, ignition sources, excess heat & strong oxidizing agents. Hazardous decomposition products are carbon monoxide & carbon dioxide. Routes of exposure: Harmful if inhaled; causes eye, skin, and respiratory tract irritation.
1,2- dichlorobenzene	liquid	Physical state; appearance: Colorless to yellowish liquid with a pleasant odor. Chemical dangers: May emit oxides of carbon and hydrogen chloride gas when heated to decomposition and incompatible with strong oxidizers, aluminum or aluminum alloys. Routes of exposure: May be absorbed through the skin.
1,2-dichloroethane	liquid	Physical state; appearance: Colorless heavy liquid with a chloroform-like odor. Chemical dangers: Emits toxic fumes of phosgene, hydrogen chloride, acetylene, and vinyl chloride when heated to decomposition and reacts with aluminum or magnesium powder, oxidizing agents, reducing agents, organic peroxides. Routes of exposure: May be absorbed through the skin.

Exposure Substance	Physical State	Characteristics
1,3,5-trimethylbenzene	liquid	Physical state; appearance: Clear, colorless liquid with a characteristic odor. Chemical danger: Carbon dioxide and carbon monoxide may form when heated. Reacts with nitric acid and strong oxidizers. Routes of exposure: Causes eye, skin, and respiratory tract irritation.
1,4- dichlorobenzene	solid	Physical state; appearance: White crystals with a moth-ball like odor. Chemical danger: May produce carbon monoxide, carbon dioxide, hydrogen chloride and phosgene when heated to decomposition and reacts with oxidizing agents, aluminum and its alloys. Routes of exposure: May be absorbed by the skin, toxic if swallowed and inhalation of dust can irritate the nose and throat.
1,4 dioxane	liquid	Physical state; appearance: Clear, colorless solution with a faint ether-like odor. Physical dangers: Stable in closed containers under nitrogen at room temperatures. Chemical dangers: Reacts with air to form explosive peroxides under certain conditions; exposure to sunlight accelerates this formation. Not compatible with silver perchlorate, oxidizing agents & sulfur trioxide. Routes of exposure: Highly toxic by inhalation. Easily absorbed through lungs and can cause skin and eye irritation.
2-butanone	liquid	Physical state; appearance: Clear, colorless liquid with a sharp mint-like odor. Chemical dangers: Reacts with oxidizing materials, caustics, amines, ammonia & strong bases. Attacks many plastics, resins and rubber. Routes of exposure: Can be absorbed through skin with possible systemic effects.
2-ethoxyethanol	liquid	Physical state; appearance: Clear, colorless liquid with a mild, pleasant odor. Chemical dangers: Avoid distilling to dryness and excessive temperatures or prolonged reflux. Reacts with strong oxidizers, strong acids, strong bases, copper and aluminum. Routes of exposure: May be absorbed through skin with possible systemic effects.
2-nitropropane	liquid	Physical state; appearance: Clear, light yellow liquid with an unpleasant odor. Chemical dangers: Avoid incompatible materials, ignition sources, excess heat; reacts with Strong oxidizing agents, strong reducing agents, strong acids, strong bases and amines. Routes of exposure: Harmful if inhaled and absorbed through the skin.

Exposure Substance	Physical State	Characteristics
4-methyl-2-propanone	liquid	Physical state; appearance: Clear, colorless liquid with a slight camphor odor. Chemical dangers: May form explosive peroxides in air. Reacts with aldehydes, Nitric acid, perchloric acid, strong oxidizers and a violent reaction with potassium-tert-butoxide. Routes of exposure: Substance can be absorbed into the body by inhalation, ingestion and through the skin.
acetaldehyde	liquid	Physical state; appearance: Clear, colorless liquid with a pungent, fruity odor. Chemical dangers: Unstable in air. Forms explosive peroxides on prolonged storage and exposure to air. Reacts with strong oxidizing agents, strong reducing agents, acids and strong bases. Avoid ignition sources, exposure to air & heat. Routes of exposure: Substance can be absorbed into the body by inhalation, ingestion and through the skin.
acetone	liquid	Physical state; appearance: Clear, colorless, volatile liquid with a fragrant mint-like odor. Chemical dangers: Stable liquid unless high temperatures, ignition sources, temperatures above 220°C. Reacts with strong acids and strong oxidizing agents. Routes of exposure: Inhalation, skin or eye contact.
acetonitrile	liquid	Physical state; appearance: Clear, colorless liquid with a sweetish, ethereal odor. Chemical dangers: Avoid ignition sources, excess heat and exposure to moist air or water. Reacts with strong oxidizing agents, strong reducing agents and strong acids. Routes of exposure: Substance can be absorbed into the body by inhalation, ingestion and through the skin.
acrylic acid	liquid	Physical state; appearance: Clear, colorless liquid with an acrid odor. Chemical dangers: Extremely reactive or incompatible with oxidizing agents, acids, alkalis. Reactive with moisture. Slightly corrosive in presence of steel, aluminum, zinc, and copper. Routes of exposure: Substance can be absorbed into the body by inhalation, ingestion and through the skin.

Exposure Substance	Physical State	Characteristics
acrylonitrile	liquid	Physical state; appearance: Clear, colorless liquid with a pungent odor. Chemical dangers: Unstable substance. May polymerize violently or explosively. May explode if heated in closed container. Reacts with acids, metals, amines, bases, halogens, peroxides, combustible materials and oxidizing materials Routes of exposure: Can be absorbed into the body by inhalation, ingestion and through skin.
ammonia	gas	Physical state; appearance: Colorless, compressed liquefied gas, with pungent odor. Physical dangers: The gas is lighter than air. Chemical dangers: Shock-sensitive compounds are formed with mercury, silver and gold oxides. The substance is a strong base and it reacts violently with acid and is corrosive. Reacts violently with strong oxidants and halogens. Attacks copper, aluminum, zinc and their alloys. Dissolves in water evolving heat. Routes of exposure: The substance can be absorbed into the body by inhalation.
ammonium hydroxide	solid residues / dilute liquids	Physical state; appearance: Very volatile, colorless solution of ammonia in water, with pungent odor. Chemical dangers: Reacts with many heavy metals and their salts forming explosive compounds. Attacks many metals forming flammable/explosive gas (hydrogen). The solution in water is a strong base, it reacts violently with acids. Routes of exposure: The substance can be absorbed into the body by inhalation of its vapor or aerosol and by ingestion.
arsenic	solid residues	Physical state; appearance: Grey, metallic-looking crystals that are odorless. Chemical dangers: Toxic fumes are formed when heated. Reacts violently with strong oxidants and halogens causing fire and explosion hazard. Reacts with nitric acid, hot sulfuric acid. Toxic arsine gas may be formed in contact with acid or acidic substances and certain metals, such as galvanized or light metals. Routes of exposure: Can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.
benzene	liquid	Physical state; appearance: Clear, colorless liquid with a characteristic odor. Chemical dangers: Reacts violently with oxidants and halogens causing fire and explosion hazard. Vapors are heavier than air and may travel along the ground. Routes of exposure: Can be absorbed into the body by inhalation and through the skin.

Exposure Substance	Physical State	Characteristics
bromine	liquid	Physical state; appearance: Dark, reddish-brown fuming liquid with a pungent odor. Chemical dangers: Corrosive. Emits fumes of bromine and bromides upon thermal decomposition; reacts with steam or water to produce toxic and corrosive fumes of hypobromous acid and hydrogen bromide. Attacks most metals, reacting violently with aluminum, titanium, mercury, and potassium. Avoid moisture, heat, flames, ignition sources and incompatibles. Avoid direct sunlight. Routes of exposure: Can be absorbed into the body by inhalation, ingestion and through the skin.
cadmium	solid residues / dusts	Physical state; appearance: Soft blue-white metal lumps or grey powder that is malleable. Chemical dangers: Dust explosion possible if in powder or granular form, mixed with air. Reacts with acids giving off flammable hydrogen gas. Dust reacts with oxidants, hydrogen azide, zinc, selenium or tellurium, causing fire and explosion hazard. Routes of exposure: Can be absorbed into the body by inhalation of its aerosol and by ingestion.
calcium hydroxide	solid residues / dusts	Physical state; appearance: White, odorless crystals or powder. Chemical dangers: Substance decomposes on heating producing calcium oxide. The solution in water is a medium strong base. Reacts violently with acids. Attacks many metals in presence of water forming flammable/explosive gas. Routes of exposure: Can be absorbed into the body by inhalation of its aerosol and by ingestion.
carbon disulfide	liquid	Physical state; appearance: Clear, colorless liquid with a strong garlic type odor. Chemical dangers: Heat and sunlight can contribute to instability. Containers may burst when heated. Contact with strong oxidizers and chemically active metals, chlorine, nitrogen oxides and azides may cause fire and explosions. Routes of exposure: Can be absorbed by body through skin, eyes (vapors), inhalation and ingestion.

Exposure Substance	Physical State	Characteristics
carbon monoxide	gas	Physical state; appearance: Colorless compressed gas that is odorless and tasteless. Physical dangers: Gas mixes well with air, explosive mixtures are easily formed. The gas penetrates easily through walls and ceilings. Chemical dangers: In the presence of finely dispersed metal powders the substance forms toxic and flammable carbonyls. May react violently with oxygen, acetylene, chlorine, fluorine and nitrous oxide. Routes of exposure: Can be absorbed into the body by inhalation.
carbon tetrachloride	liquid	Physical state; appearance: Clear, colorless liquid with a distinct odor. Chemical dangers: Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat. Reacts with combustible materials, metal salts, peroxides, halogens, oxidizing materials, metals, bases and amines. Avoid excessive heat, fire and flames. Routes of exposure: Can be absorbed into the body by inhalation, ingestion and through the skin.
chlorine	gas	Physical state; appearance: Greenish-yellow gas, with pungent odor. Physical dangers: The gas is heavier than air. Chemical dangers: Reacts violently with many organic compounds, ammonia and finely divided metals causing fire and explosion hazard. Attacks many metals in presence of water. Attacks plastic, rubber and coatings. Routes of exposure: Can be absorbed into the body by inhalation.
chlorobenzene	liquid	Physical state; appearance: clear, colorless liquid with a faint, almond like odor. Chemical dangers: Reacts with oxidizing agents, dimethyl sulfoxide, silver perchlorate and silver chromate. Avoid heat, flames and ignition sources. Routes of exposure: Substance can be absorbed into the body by inhalation, ingestion and through the skin.
chloroform	liquid	Physical state; appearance: clear, colorless with a sweet, fruity odor - ethereal odor. Chemical dangers: sensitive to light, will react with strong caustics and chemically active metals, avoid light, heat, air. Routes of exposure: May be absorbed through skin.

Exposure Substance	Physical State	Characteristics
chromium	solid residues	Physical state; appearance: blue-white to steel gray, brittle, hard, odorless solid. Physical dangers: Dust explosion possible if in powder or granular form, mixed with air. Chemical dangers: Reacts violently with strong oxidants such as hydrogen peroxide, causing fire and explosion hazard. Reacts with diluted hydrochloric and sulfuric acids. Incompatible with alkalis and alkali carbonates. Routes of exposure: Can be absorbed into the body by inhalation of its aerosol and by ingestion.
chromium (hexavalent)	solid residues	Physical state; appearance: Clear, orange liquid with no odor. Chemical dangers: Avoid contact with acids and oxidizers and extreme temperatures. Routes of exposure: Substance can be absorbed into the body by inhalation, ingestion and through the skin.
cobalt	solid residues	Physical state; appearance: Silver-gray or blueish white or black solid with no reported odor. Chemical dangers: Flammable solid. Can be explosive when exposed to heat or flames. Stable under normal temperature and pressure. Avoid incompatible chemicals, ignition sources, dust generation, strong acids and oxidizers. Routes of exposure: Can be absorbed into the body by inhalation, through the skin and by ingestion.
copper	solid residues / dusts	Physical state; appearance: Reddish, lustrous, malleable, odorless solid. Chemical dangers: Shock-sensitive compounds are formed with acetylenic compounds, ethylene oxides and azides. Reacts with strong oxidants like chlorates, bromates and iodates, causing explosion hazard. Routes of exposure: Can be absorbed into the body by inhalation and by ingestion.
cumene	liquid	Physical state; appearance: Clear, colorless liquid with a sharp penetrating aromatic odor. Chemical dangers: When stored peroxidizable compounds can form and accumulate peroxides which may explode when subjected to heat or shock. Reacts with oxidizing agents, nitric acid, nitrites and sulfuric acid; avoid ignition sources, excess heat and prolonged exposure to air. Routes of exposure: Substance can be absorbed into the body by inhalation, ingestion and through the skin.

Exposure Substance	Physical State	Characteristics
cyclohexane	liquid	Physical state; appearance: Clear, colorless with a sweetish - chloroform-like odor. Chemical dangers: Stable at room temperature in sealed containers and reacts with strong oxidizers, heat and sources of ignition. Routes of exposure: Substance can be absorbed into the body by inhalation, ingestion and through the skin.
cyclohexanol	liquid	Physical state; appearance: Colorless to slight yellow with a camphor or menthol odor. Chemical dangers: Combustible liquid and vapor which under normal temperatures and pressures is stable; reacts with oxidizing agents. Avoid ignition sources, moisture and excess heat. Routes of exposure: Substance can be absorbed into the body by inhalation, ingestion and through the skin.
cyclohexanone	liquid	Physical state; appearance: Clear, colorless, to slightly yellow, oily liquid. Odor is similar to acetone and peppermint. Chemical dangers: Stable under ordinary conditions and storage. Carbon dioxide and carbon monoxide may form when heated to decomposition. Incompatible with strong oxidizing agents. May cause spontaneous ignition and violent reaction. May attack plastics, resins and rubber. Avoid heat, flames, ignition sources and incompatible chemicals. Routes of exposure: Substance can be absorbed into the body by inhalation, ingestion and through the skin.
diacetone alcohol	liquid	Physical state; appearance: Clear, colorless liquid with a faint pleasant odor. Chemical dangers: Stable at room temperature in closed containers; reacts with oxidizing agents. Avoid ignition sources and excess heat. Routes of exposure: Absorbed through skin.
dichlorofluoroethane	liquid	Physical state; appearance: Clear water-white mobile liquid with slight ethereal odor. Chemical dangers: Stable chemical; reacts with alkali metals, strong acids and bases. Avoid contact with open flame and heat. Routes of exposure: Substance can be absorbed into the body by inhalation.
diesel fuel	liquid	Physical state; appearance: Clear to straw yellow liquid with a kerosene odor. Chemical dangers: Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources. Keep away from strong oxidizers. Routes of exposure: Substance can be absorbed into the body by inhalation, ingestion and through the skin.

Exposure Substance	Physical State	Characteristics
diethylamine	liquid	Physical state; appearance: Clear, colorless liquid with an ammonia odor. Chemical dangers: Corrosive and extremely flammable liquid and vapor; reacts with strong oxidizers, acids, cellulose nitrate, some metals and dicyanofuroxan. Avoid heat, flames and ignition sources. Routes of exposure: Substance can be absorbed into the body by inhalation, ingestion and through the skin.
diethylaminoethanol	liquid	Physical state; appearance: Amber/white liquid with an amine odor. Chemical dangers: Flammable liquid; reacts with strong oxidizers (perchlorates, nitrates, peroxides), strong acids, and halogens. Avoid heat and sources of ignition. Container is hazardous when empty because it retains vapor and product residue. Routes of exposure: Substance can be absorbed into the body by inhalation, ingestion and through the skin.
diisobutyl ketone	liquid	Physical state; appearance: Clear, colorless liquid with a mild odor. Chemical dangers: Flammable liquid; reacts with strong oxidizers. May attack some forms of plastic, rubber and coatings. Avoid heat, flames and ignition sources. Routes of exposure: Can be absorbed through by inhalation, skin and by ingestion.
D-limonene	liquid	Physical state; appearance: Clear, almost colorless liquid with a citrus-like odor. Chemical dangers: Substance is a flammable liquid and vapor. Oxidizes to a film in air, oxidation behavior similar to that of rubber or drying oils; reacts with strong oxidizing agents. Avoid ignition sources, excess heat and prolonged exposure to air. Routes of exposure: Can be absorbed through the skin and vapor to the eyes.
dimethylformamide	liquid	Physical state; appearance: Clear, colorless liquid with a fishy, pungent odor. Chemical dangers: A flammable liquid or vapor that reacts with reducing agents, acids, alkali metals, halogenated agents, nitrates, metal oxides and chloroformates. Avoid ignition sources, excess heat and incompatible materials. Routes of exposure: Can be absorbed through by inhalation, skin and by ingestion.

Exposure Substance	Physical State	Characteristics
epichlorohydrin	liquid	Physical state; appearance: Colorless liquid with a chloroform-like odor. Chemical dangers: An unstable, flammable liquid and vapor. May violently polymerize and result in fire and explosion. Substance is water reactive and also reacts with strong oxidizers, strong acids, caustic, mercaptans, zinc, aluminum, and chlorides of iron. Avoid heat, flames and ignition sources. Routes of exposure: Can be absorbed through by inhalation, skin and by ingestion.
ethyl acrylate	liquid	Physical state; appearance: Colorless liquid with an unpleasant odor. Chemical dangers: A flammable liquid and vapor which should never be stored under an inert gas atmosphere, but should always be stored under an atmosphere containing 5-21% oxygen by volume. Reacts with strong oxidizing agents, strong acids, amines, peroxides, chlorosulfonic acid, moisture and strong alkalies. Avoid Light, ignition sources, excess heat and loss of inhibitor. Routes of exposure: Can be absorbed through by inhalation, skin and by ingestion.
ethyl benzene	liquid	Physical state; appearance: Colorless liquid with a sweetish, gasoline-like odor. Chemical dangers: The vapor mixes well with air, explosive mixtures are easily formed. Reacts with strong oxidants, attacks plastic and rubber. Sensitive to light. Routes of exposure: Substance can be absorbed into the body by inhalation of its vapor, through the skin and by ingestion.
ethylene glycol	liquid	Physical state; appearance: Hazy green or colorless liquid with pleasant, mild odor. Chemical dangers: Strong oxidizing agents. Reacts violently with chlorosulfonic acid, oleum, sulfuric acid, perchloric acid. Causes ignition at room temperature with chromium trioxide, potassium permanganate and sodium peroxide; causes ignition at 212F(100C) with ammonium dichromate, silver chlorate, sodium chloride and uranyl nitrate. Avoid heat, flames and ignition sources. Routes of exposure: Can be absorbed into the body by inhalation and through the skin.

Exposure Substance	Physical State	Characteristics
ethylene oxide	liquefied gas	Physical state; appearance: Colorless compressed liquefied gas. Physical dangers: The gas is heavier than air and may travel along the ground. Chemical dangers: Stable when isolated, but reacts violently with water, bases, oxidizing metals, acids, alcohols, alkali metals, ammonia, chemically active metals and their salts. Highly flammable. Forms explosive mixtures with air which may be ignited by rapid compression. Routes of exposure: Can be absorbed into the body by inhalation and through the skin in water solution.
formaldehyde	liquid	Physical state; appearance: Clear, colorless liquid with a pungent odor. Chemical dangers: Stable; strong reducing agent, especially in alkaline solution. Substances to be avoided include strong bases, strong acids, strong oxidizing agents, aniline, phenol, isocyanates and anhydrides. Combustible. Light and air sensitive. Polymerizes spontaneously. Routes of exposure: Substance can be absorbed into the body by inhalation of its vapor, through the skin and by ingestion.
gasoline	liquid	Physical state; appearance: Clear, light yellow to Straw-colored liquid with an aromatic hydrocarbon odor. Chemical danger: Flammable. Keep away from strong oxidizers and avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources. Routes of exposure: Substance can be absorbed into the body by inhalation of its vapor, through the skin and by ingestion.
hexachloroethane	crystals	Physical state; appearance: Colorless crystals with a camphor odor. Chemical dangers: Substance decomposes on heating above 300°C producing toxic and corrosive fumes, phosgene and hydrogen chloride. Reacts violently with zinc, aluminum powder and sodium. Attacks iron in the presence of moisture. Routes of exposure: Can be absorbed into the body by inhalation and through the skin by ingestion.
hexane	liquid	Physical state; appearance: Clear, colorless liquid with a light odor. Chemical dangers: Heat will contribute to instability; reacts with strong oxidizers. Avoid heat, flames and ignition sources. Routes of exposure: Can be absorbed into the body by inhalation of its vapor, through the skin and by ingestion.

Exposure Substance	Physical State	Characteristics
hydrazine	liquid	<p>Physical state; appearance: Colorless, fuming and hygroscopic liquid with a pungent odor.</p> <p>Chemical dangers: Corrosive, flammable liquid and vapor. Substance is a strong reducing agent and is a medium strong base that reacts violently with oxidants, many metals, metal oxides and porous materials causing fire and explosion hazard.</p> <p>Routes of exposure: Can be absorbed into the body by inhalation of its vapor, through the skin and by ingestion.</p>
hydrochloric acid	liquid / solid residues	<p>Physical state; appearance: Clear, colorless to slight yellow liquid with a strong pungent odor.</p> <p>Chemical dangers: Corrosive. When heated to decomposition, emits toxic hydrogen chloride fumes and will react with water or steam to produce heat and toxic and corrosive fumes. Thermal oxidative decomposition produces toxic chlorine fumes and explosive hydrogen gas. Highly reactive with strong bases, metals, metal oxides, hydroxides, amines, carbonates and other alkaline materials. Reacts also with cyanides, sulfides, sulfites, and formaldehyde. Avoid heat and direct sunlight.</p> <p>Routes of exposure: The substance can be absorbed into the body by inhalation, ingestion, and skin contact.</p>
hydrofluoric acid	liquid / solid residues	<p>Physical state; appearance: Colorless fuming liquid, with acid odor.</p> <p>Chemical dangers: Reacts with certain metals to generate flammable and potentially explosive hydrogen gas. Attacks glass and other silicon containing compounds. Reacts with silica to produce silicon tetrafluoride, a hazardous colorless gas.</p> <p>Routes of exposure: The substance can be absorbed into the body by inhalation, ingestion, and skin contact.</p>
hydrogen sulfide	gas	<p>Physical state; appearance: Colorless gas with offensive rotten egg odor.</p> <p>Chemical dangers: Dangerously reactive when mixed with concentrated nitric acid or other strong oxidizing agents. Vapors will ignite spontaneously when mixed with vapors of chlorine, oxygen difluoride or nitrogen trifluoride.</p> <p>Routes of exposure: The substance can be absorbed into the body by inhalation, ingestion, and skin contact.</p>

Exposure Substance	Physical State	Characteristics
isopropyl alcohol	liquid	Physical state; appearance: Clear, colorless liquid with rubbing alcohol odor. Chemical dangers: Reacts with strong oxidizing agents, strong acids, strong bases, amines, ammonia, ethylene oxide, isocyanates, acetaldehyde, chlorine and phosgene. Attacks some forms of plastics, rubbers, and coatings, aluminum at high temperatures. Avoid heat, flames and ignition sources. Routes of exposure: Absorbed through skin, vapors to eyes and by inhalation.
lead	solid residues	Physical state; appearance: Bluish-white, silvery, gray solid with no odor. Physical dangers: Dust explosion possible if in powder or granular form, mixed with air. Chemical dangers: When heated, toxic fumes are formed. Reacts with hot concentrated nitric acid, boiling concentrated hydrochloric and sulfuric acids. Attacked by pure water and by weak organic acids in the presence of oxygen. Routes of exposure: Can be absorbed into the body by inhalation of its aerosol and by ingestion.
m-cresol	liquid	Physical state; appearance: Colorless to yellow liquid with a characteristic odor. Chemical dangers: Darkens on exposure to air or light; reacts with oxidizing agents and bases. Avoid heat, flame, ignition sources, light, and air. Routes of exposure: Can be absorbed into the body by inhalation of its vapor, through the skin and by ingestion.
methanol	liquid	Physical state; appearance: Clear, colorless liquid with a characteristic odor. Chemical dangers: Harmful vapor; reacts with strong oxidizing agents such as nitrates, perchlorates or sulfuric acid. Will attack some forms of plastics, rubber, and coatings. Avoid heat, flames and ignition sources. Routes of exposure: Can be absorbed into the body by inhalation and through the skin, and by ingestion.
methyl isobutyl ketone	liquid	Physical state; appearance: Clear, colorless liquid with a sweet, camphor-like odor. Chemical dangers: May form explosive peroxides in air; reacts with Strong oxidizing agents, strong reducing agents and strong bases. Violent reaction with Potassium-tert-butoxide. Avoid Ignition sources, excess heat and confined spaces Routes of exposure: Can be absorbed into the body by inhalation and through the skin, and by ingestion.

Exposure Substance	Physical State	Characteristics
methyl methacrylate	liquid	Physical state; appearance: Clear, colorless liquid with a sweet, sharp odor. Chemical dangers: Vapor is heavier than air and may travel along the ground. The vapor mixes well with air and explosive mixtures are easily formed. Reacts with strong acids, strong bases and oxidants. Avoid insufficient inhibitor, incompatibles, heat, flame and ignition sources. Routes of exposure: Can be absorbed into the body by inhalation, through the skin and by ingestion.
methylene chloride	liquid	Physical state; appearance: Clear, colorless liquid with a chloroform-like odor. Chemical dangers: Vapor is heavier than air; contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes. Reacts violently with metals such as aluminum, magnesium, sodium, potassium, lithium, strong bases and oxidants. Attacks some forms of plastics, rubber and coatings. Avoid moisture, heat, flames and ignition sources. Routes of exposure: Can be absorbed into the body by inhalation, through the skin and by ingestion.
methyl n-amyl ketone	liquid	Physical state; appearance: Colorless liquid with a characteristic odor. Chemical dangers: Flammable; reacts with oxidizing materials. Attacks some forms of plastics. Avoid extreme heat and other ignition sources. Routes of exposure: Can be absorbed into the body by inhalation of its vapor.
methyl tert-butyl ether	liquid	Physical state; appearance: Clear, colorless liquid with a hydro-carbon like, unpleasant odor. Chemical dangers: Vapor is heavier than air; reacts with oxidizers and acids. Avoid heat, flames and ignition sources. Routes of exposure: Can be absorbed into the body by inhalation and by ingestion.
naphthalene	solid, crystals	Physical state; appearance: White crystals with a moth ball odor. Chemical dangers: Combustible; highly reactive with oxidizing agents. Melted naphthalene will attack some forms of plastics, rubber, and coatings. Avoid heat, sparks, flames and other ignition sources. Routes of exposure: Absorbed through skin, dermal contact. Eye contact, inhalation and ingestion.

Exposure Substance	Physical State	Characteristics
n-butyl acetate	liquid	Physical state; appearance: Clear, colorless liquid with an ester-like, sweet, fruity odor. Chemical dangers: Substance decomposes slowly on contact with air or moisture producing acetic acid and n-butanol. Reacts violently with strong oxidants. Avoid ignition sources, excess heat and confined spaces. Routes of exposure: Can be absorbed into the body by inhalation of its vapor and by ingestion.
n-butyl alcohol	liquid	Physical state; appearance: Clear, colorless liquid with a mildly alcoholic odor. Chemical dangers: Flammable; reacts with strong oxidants, such as chromium trioxide causing fire hazard. Attacks some plastic and rubber. Avoid heat, flames and ignition sources. Routes of exposure: Can be absorbed into the body by inhalation of its vapor, through the skin and by ingestion.
n-heptane	liquid	Physical state; appearance: Clear, colorless liquid with a mild gasoline-like odor. Chemical dangers: Vapor is heavier than air; Reacts violently with strong oxidants. Attacks many plastics. Avoid heat, flames and ignition sources. Routes of exposure: Can be absorbed into the body by inhalation of its vapor and by ingestion.
n-hexane	liquid	Physical state; appearance: Volatile colorless liquid with a faint peculiar odor. Chemical dangers: Vapor is heavier than air; reacts with strong oxidants causing fire and explosion hazard. Avoid light, ignition sources and excess heat. Routes of exposure: Can be absorbed into the body by inhalation of its vapor, through the skin and by ingestion.
nitrobenzene	liquid	Physical state; appearance: Pale yellow to brown oily liquid with an almond odor. Chemical dangers: Combustible liquid and vapor; reacts violently with strong oxidants and reducing agents, causing fire and explosion hazard. Attacks many plastics. Forms explosive substances or mixtures with many organic and inorganic compounds. Avoid heat, flame, ignition sources and freezing conditions. Routes of exposure: Can be absorbed into the body by inhalation and through the skin.

Exposure Substance	Physical State	Characteristics
nickel	solid residues	Physical state; appearance: Silvery, lustrous solid with no odor. Physical dangers: Dust explosion possible if in powder or granular form, mixed with air. Chemical dangers: Reacts violently, in powder form, with titanium powder and potassium perchlorate, and oxidants such as ammonium nitrate, causing fire and explosion hazard. Reacts slowly with non-oxidizing acids and more rapidly with oxidizing acids. Toxic gases and vapors may be released in a fire involving nickel. Routes of exposure: Can be absorbed into the body by inhalation of the dust and by ingestion.
nitric acid	liquid / solid residues	Physical state; appearance: Colorless to yellow liquid with a pungent odor. Chemical dangers: Oxidizer. Reacts with 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. Avoid high temperatures, light and confined spaces. Routes of exposure: Can be absorbed into the body by inhalation of its vapor and by ingestion.
osmium tetroxide	solid	Physical state; appearance: Colorless, to pale yellow solid with a pungent, chlorine-like odor. Chemical dangers: Substance may react violently with some organic compounds or reducing agents; reacts with hydrochloric acid causes formation of chlorine gas. A strong catalyst and contact with easily oxidized organic materials may cause fires and explosions. Avoid heat and dusting. Routes of exposure: Can be absorbed into the body by inhalation, ingestion, and skin contact.
phenol	solid	Physical state; appearance: Colorless solid with a sharp, sweetish odor. Chemical dangers: Vapor is heavier than air; light sensitive. Hygroscopic: absorbs moisture or water from the air. Reacts with strong oxidizing agents, bases, aluminum, halogens, magnesium, nitric acid, zinc, calcium hypochlorite and lead. Avoid light, ignition sources, dust generation, excess heat and exposure to moist air or water. Routes of exposure: Can be absorbed into the body rapidly by inhalation of its vapor, through the skin and by ingestion.

Exposure Substance	Physical State	Characteristics
phosphine	powder	Physical state; appearance: White, odorless powder. Chemical dangers: Substance decomposes on heating producing highly toxic fumes of phosphorous oxides and phosphine. Reacts with strong acids and strong oxidants. Avoid heat, flames and ignition sources. Routes of exposure: Can be absorbed into the body by inhalation of its aerosol and by ingestion.
phosphoric acid	liquid / solid residues	Physical state; appearance: Viscous colorless liquid, with no odor. Chemical dangers: Contact with strong caustics can cause liberation of much heat and violent spattering. Contact with most metals causes formation of flammable and explosive hydrogen gas. Routes of exposure: The substance can be absorbed into the body by inhalation, ingestion, and skin contact.
potassium hydroxide	liquid / solid residue	Physical state; appearance: White deliquescent solid or clear, odorless liquid. Chemical dangers: Substance is a strong base; it reacts violently with acid and is corrosive in moist air toward metals such as zinc, aluminum, tin and lead forming a combustible/explosive gas. Rapidly absorbs carbon dioxide and water from air. Contact with moisture or water will generate heat. Routes of exposure: can be absorbed into the body by inhalation of its aerosol and by ingestion.
propylene dichloride	liquid	Physical state; appearance: Colorless liquid with a sweet odor. Chemical dangers: Vapor is heavier than air; substance decomposes on heating producing hydrogen chloride and phosgene. Reacts with oxidizing agents, acids, aluminum, orthodichlorobenzene + ethylene dichloride + aluminum. Will attack some forms of plastic, rubber, and coatings. Avoid ignition sources, excess heat and confined spaces. Routes of exposure: Can be absorbed into the body by inhalation and by ingestion.
propylene oxide	liquid	Physical state; appearance: Clear, colorless liquid with an ethereal odor. Chemical dangers: Volatile liquid. May polymerize violently under the influence of bases, acids and metal chlorides with fire or explosion hazard. Reacts violently with chlorine, ammonia, strong oxidants, acids causing fire and explosion hazard. Avoid heat, flames and ignition sources. Routes of exposure: Can be absorbed into the body by inhalation, through the skin and by ingestion.

Exposure Substance	Physical State	Characteristics
pyridine	liquid	Physical state; appearance: Colorless to light yellow liquid with a strong, fish-like odor. Chemical dangers: On combustion, forms toxic fumes (amines); Reacts violently with strong oxidants and strong acids. Avoid ignition sources, excess heat and confined spaces. Routes of exposure: Can be absorbed into the body by inhalation, through the skin and by ingestion.
sodium hydroxide	liquid / solid residues	Physical state; appearance: Colorless liquid, with no odor. Chemical dangers: Reacts with strong acids. Routes of exposure: The substance can be absorbed into the body by inhalation, ingestion, and skin contact.
styrene	liquid	Physical state; appearance: Colorless to yellow, oily liquid with a penetrating odor. Chemical dangers: As a result of flow, agitation, etc., electrostatic charges can be generated. This substance can form explosive peroxides. The substance may polymerize due to warming, under the influence of light and on contact with many compounds such as oxygen, oxidizing agents, peroxides and strong acids with fire or explosion hazard. Reacts violently with chlorosulfonic acid, oleum, sulfuric acid, chlorine + iron (II) chloride and can react vigorously with oxidizing materials. Dissolves rubber. Corrosive to copper and copper alloys. Incompatible with peroxides, aluminum chloride, strong acids, metallic salts, halogens, polymerization catalysts and accelerators. Avoid heat, flame, ignition sources, air and light. Routes of exposure: Can be absorbed into the body by inhalation and through the skin.
sulfuric acid	liquid / solid residues	Physical state; appearance: Colorless oily hygroscopic liquid, with no odor. Chemical dangers: The substance is a strong oxidant and reacts violently with combustible and reducing materials. The substance is a strong acid and reacts violently with bases and is corrosive to most common metals forming flammable/explosive gas (hydrogen). Reacts violently with water and organic materials with evolution of heat. Upon heating, irritating or toxic fumes (or gases) (sulfur oxides) are formed. Routes of exposure: The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.

Exposure Substance	Physical State	Characteristics
tetrachloroethene	liquid	Physical state; appearance: Clear, colorless liquid with an ethereal odor. Chemical dangers: On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes (hydrogen chloride, phosgene, chlorine). Reacts with metals such as aluminum, lithium, barium and beryllium. Avoid moisture, light and heat. Routes of exposure: Can be absorbed into the body by inhalation, through the skin and by ingestion.
tetrahydrofuran	liquid	Physical state; appearance: Colorless, mobile liquid with ether odor. Chemical dangers: Miscible in water. Stable in closed containers with oxygen and light excluded. Carbon dioxide and carbon monoxide may form when heated to decomposition. May also release toxic and irritating vapors. Tetrahydrofuran reacts violently with air on standing. Incompatible with lithium aluminum hydride, strong oxidizers, sodium aluminum hydride, and potassium hydroxide. Will attack some forms of plastics, rubbers, and coatings. Avoid light, air, heat, flame, ignition sources, and incompatible chemicals. Routes of exposure: Can be absorbed through skin, dermal contact and eye contact.
toluene	liquid	Physical state; appearance: Clear, colorless liquid with a benzene-like odor. Physical dangers: The vapor is heavier than air and may travel along the ground; distant ignition possible. As a result of flow, agitation, etc., electrostatic charges can be generated. Chemical dangers: Flammable; reacts with Heat, flame, strong oxidizers, nitric and sulfuric acids, chlorine, nitrogen tetroxide; will attack some forms of plastics, rubber, coatings. Avoid Heat, flames and ignition sources. Routes of exposure: Absorbed into the body by inhalation, through the skin and by ingestion.
toluene diisocyanate	liquid / solid (crystals)	Physical state; appearance: Colorless to pale yellow liquid or crystals with a pungent odor. Turns pale yellow on exposure to air. Chemical dangers: Substance may polymerize under the influence of bases, tertiary amines and acyl chlorides with fire or explosion hazard. On combustion, this substance forms toxic vapors and gases including nitrogen oxides and isocyanates. Reacts readily with water, acids and alcohol causing pressure rise explosion hazard. Routes of exposure: Can be absorbed into the body by inhalation of its vapor and its aerosol, and by ingestion.

Exposure Substance	Physical State	Characteristics
trichloroethylene	liquid	<p>Physical state; appearance: Clear colorless liquid with chloroform-like odor.</p> <p>Physical dangers: The vapor is heavier than air. As a result of flow, agitation, etc., electrostatic charges can be generated.</p> <p>Chemical dangers: Contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes (phosgene, hydrogen chloride, chlorine). The substance decomposes on contact with strong alkali producing dichloroacetylene , which increases fire hazard. Reacts violently with metals such as lithium, magnesium aluminium, titanium, barium and sodium. Slowly decomposed by light in presence of moisture, with formulation of corrosive hydrochloric acid.</p> <p>Routes of exposure: Can be absorbed into the body by inhalation, through the skin and by ingestion.</p>
triethylamine	liquid	<p>Physical state; appearance: Clear, colorless liquid with a strong ammonia-like odor.</p> <p>Chemical dangers: Corrosive! This substance decomposes on heating or on burning producing toxic and irritating gases including nitrogen oxides. The substance is a strong base and reacts violently with acids and is corrosive to aluminum, zinc, copper and their alloys in the presence of moisture. Reacts violently with strong oxidants causing fire and explosion hazard. Attacks some forms of plastics, rubber and coatings. Avoid heat, flame, sources of ignition and light.</p> <p>Routes of exposure: Can be absorbed into the body by inhalation, through the skin and by ingestion.</p>
urethane	solid/crystals, powder	<p>Physical state; appearance: Colorless, crystalline powder that is odorless.</p> <p>Chemical dangers: Combustible. This substance decomposes on heating or on burning producing toxic fumes (nitrogen oxides). Reacts with acids, alkalies, antipyrine, chloral hydrate, salol, thymol, camphor and menthol. Avoid dust generation and excess heat.</p> <p>Routes of exposure: Can be absorbed into the body by inhalation of its aerosol and by ingestion.</p>

Exposure Substance	Physical State	Characteristics
vinyl acetate	liquid	<p>Physical state; appearance: Clear, colorless liquid with a sweetish, sharp odor.</p> <p>Physical dangers: Vapor is heavier than air and may travel along the ground.</p> <p>Chemical dangers: Substance can readily polymerize due to warming or under the influence of light or peroxides, with fire or explosion hazard. Reacts with strong acids, ammonia, nitric acid, peroxides and sulfuric acid. Avoid ignition sources, excess heat and oxidizers.</p> <p>Routes of exposure: Can be absorbed into the body by inhalation and by ingestion.</p>
vinyl chloride	gas	<p>Physical state; appearance: Colorless, compressed liquefied gas with a faint, sweet odor.</p> <p>Chemical dangers: Gas is heavier than air; this substance will polymerize readily due to heating and under the influence of air, light, and on contact with a catalyst, strong oxidizing agents and metals such as copper and aluminum, with fire or explosion hazard. The substance decomposes on burning producing toxic and corrosive fumes (hydrogen chloride and phosgene). Reacts with metal carbide, metals, oxidizing materials and peroxides. Avoid heat, flames, sparks and other sources of ignition.</p> <p>Routes of exposure: Can be absorbed into the body by inhalation</p>
xylene	liquid	<p>Physical state; appearance: Clear, colorless liquid with a characteristic odor.</p> <p>Chemical dangers: Flammable; reacts with strong oxidizing agents and strong acids. Avoid heat, flames and ignition sources.</p> <p>Routes of exposure: Can be absorbed into the body by inhalation, through the skin and by ingestion.</p>

Table 3-6: First Aid Information for General Chemical Categories

Exposure Substance	Potential Health Effects	First Aid Measures
acids / alkalines	Can be destructive to all human tissue, producing severe burns. Eye contact causes severe permanent injury. Skin contact causes irritation and, if not removed immediately, severe burns with scarring. Inhalation of the dust or mist vary from mild irritation to destructive burns. Pneumonitis may occur. Ingestion causes severe burns of the mouth, throat and stomach, and may be fatal or induce coma. Symptoms include nausea, vomiting, diarrhea, abdominal pain, bleeding and tissue ulceration.	Inhalation - Remove to fresh air-If necessary aid breathing and seek medical attention. May require a corticosteroid preparation. Eyes - Immediately flush with water for 15 minutes, separating eyelids with fingers. Skin - Immediately flush with water for 15 minutes and wash with soap and water. Ingestion - Seek medical attention immediately.
aliphatic hydrocarbons	Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through the skin may include: stomach or intestinal upset (nausea, vomiting, diarrhea), irritation (nose, throat, airways), central nervous system depression (dizziness, drowsiness, weakness, fatigue, nausea, headache, unconsciousness). May cause mild eye irritation. Symptoms include stinging, tearing, and redness.	Inhalation - Remove to fresh air-If necessary aid breathing and seek medical attention. Eyes - Immediately flush with water for 15 minutes, separating eyelids with fingers. Skin - Wash with soap and water. Ingestion - Seek medical attention. If individual is drowsy or unconscious, do not give anything by mouth; place individual on the left side with the head down. Contact a physician, medical facility, or poison control center for advice about whether to induce vomiting.
corrosive amines	Eye contact may cause tearing, stinging, and swelling. Damage to the cornea including blindness can occur. Swallowing may be harmful or fatal. Skin contact may cause redness, burning and swelling. Inhalation may include severe irritation and burns to the nose. Inhalation of concentrated mists or fumes may be harmful or fatal.	Inhalation - Remove to fresh air-If necessary aid breathing and seek medical attention. Eyes - Immediately flush with water for 15 minutes, separating eyelids with fingers. Immediately seek medical attention. Skin - Immediately flush with water for 15 minutes and wash with soap and water. Seek medical attention. Ingestion - Seek medical attention immediately.
corrosive gasses	Will burn eyes, nose and mouth. May cause lacrimation, rhinorrhea, coughing, choking, substernal pain, nausea, and vomiting, headaches, dizziness and syncope. May develop pulmonary edema, pneumonia, hypoxemia, and dermatitis.	Inhalation - Remove to fresh air. Eyes - Immediately flush with water for 15 minutes, separating eyelids with fingers. Skin - Immediately flush with water for 15 minutes and wash with soap and water.

Exposure Substance	Potential Health Effects	First Aid Measures
cyanide solutions	Toxic. Inhalation may cause irritation to eyes, skin, upper respiratory system, asphyxiation, weakness, headache, confusion, nausea, vomiting, increased respiratory rate, and slow gasping respiration. Ingestion may cause thyroid and blood changes, and death.	<p>Inhalation - Remove to fresh air-If necessary aid breathing and seek medical attention.</p> <p>Eyes - Immediately flush with water for 15 minutes, separating eyelids with fingers.</p> <p>Skin - Immediately flush with water for 15 minutes and wash with soap and water.</p> <p>Ingestion - Seek medical attention immediately.</p>
flammable gasses	Flammable. May be irritating to respiratory system. May cause anesthesia, drowsiness, narcosis, asphyxiation, headache, tachypnea, nausea, vomiting, abdominal pain, diarrhea, thirst, weakness, dizziness, confusion, hallucinations, cyanosis, pulmonary edema, chest tightness, difficulty breathing, angina, and syncope.	<p>Inhalation - Remove to fresh air-If necessary aid breathing and seek medical attention.</p> <p>Eyes - Immediately flush with water for 15 minutes, separating eyelids with fingers.</p> <p>Skin - Immediately flush with water for 15 minutes and wash with soap and water.</p> <p>Ingestion - Seek medical attention immediately.</p>
flammable solvents	Inhalation may cause irritation to eyes, nose and throat. Ingestion may cause headache, dizziness, and central nervous system depression. Skin contact may cause dermatitis, nausea, vomiting, and abdominal pain. Target organs: eyes, skin, respiratory system, kidneys, liver, gastro intestinal tract, central nervous system	<p>Inhalation - Remove to fresh air-If necessary aid breathing and seek medical attention.</p> <p>Eyes - Immediately flush with water for 15 minutes, separating eyelids with fingers.</p> <p>Skin - Immediately flush with water for 15 minutes and wash with soap and water.</p> <p>Ingestion - Seek medical attention immediately.</p>
heavy metals	Cumulative poisons. Symptoms include headache, muscle cramps, insomnia, irritability, anemia, tremors, flaccid paralysis, malaise, hallucinations, and kidney disease.	<p>Inhalation - Remove to fresh air, restore breathing if necessary. Get medical attention.</p> <p>Eye - Flush continuously for 15 minutes. Get medical attention.</p> <p>Skin - Wash with soap and water.</p> <p>Ingestion - Remove from exposure immediately, gastric lavage may be required. Get medical attention.</p>
lubricants / oils	Combustible. Chronic skin exposure may cause acne or exposure may cause acne or epitheliomata.	<p>Inhalation - Remove to fresh air.</p> <p>Eyes - Immediately flush with water for 15 minutes, separating eyelids with fingers.</p> <p>Skin - Immediately flush with water for 15 minutes and wash with soap and water.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
organochlorine pesticides	Toxic. Avoid skin and eye contact. Target organs include: central nervous system and liver. Exposure symptoms may include: nausea, vomiting, tremors, convulsions, and liver damage.	<p>Inhalation - Remove to fresh air and give respiratory support. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.</p> <p>Eye Contact - Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Get medical attention.</p> <p>Skin Contact - Immediately flush skin with plenty of soap and water for at least 15 minutes.</p> <p>Ingestion –Get medical attention immediately.</p>
reactive gasses	Exposure can cause skin burns resulting in eye lesions and loss of sight. May cause lacrimation, coughing and choking. May develop pulmonary edema, pneumonia and dermatitis.	<p>Inhalation - Remove to fresh air-If necessary aid breathing and seek medical attention.</p> <p>Eyes - Immediately flush with water for 15 minutes, separating eyelids with fingers.</p> <p>Skin - Immediately flush with water for 15 minutes and wash with soap and water.</p> <p>Ingestion - Seek medical attention immediately.</p>
solvents / VOC's	Inhalation may cause irritation to eyes, nose and throat. Ingestion may cause headache, dizziness, and central nervous system depression. Skin contact may cause dermatitis, nausea, vomiting, and abdominal pain. Target organs: eyes, skin, respiratory system, kidneys, liver, gastro intestinal tract, central nervous system	<p>Inhalation - Remove to fresh air-If necessary aid breathing and seek medical attention.</p> <p>Eyes - Immediately flush with water for 15 minutes, separating eyelids with fingers.</p> <p>Skin - Immediately flush with water for 15 minutes and wash with soap and water.</p> <p>Ingestion - Seek medical attention immediately.</p>
Toxic / oxidizing gasses	Fire danger and highly toxic. Irritating or burning to eyes, nose, throat and respiratory system. May cause bronchial and laryngeal spasms, lacrimation, coughing, choking, nausea, vomiting, headache, dizziness, syncope, pneumonia, hypoxemia, rhinorrhea, substernal pain, chest pain, pulmonary edema, pink frothy sputum, skin burns, vesiculation, and dermatitis.	<p>Inhalation - Remove to fresh air-If necessary aid breathing and seek medical attention.</p> <p>Eyes - Immediately flush with water for 15 minutes, separating eyelids with fingers.</p> <p>Skin - Immediately flush with water for 15 minutes and wash with soap and water.</p> <p>Ingestion - Seek medical attention immediately</p>

Table 3-7: First Aid Information For Specific Chemicals

Exposure Substance	Potential Health Effects	First Aid Measures
1,1,1- trichloroethane	<p>Inhalation of vapors will irritate the respiratory tract. Affects the central nervous system. Symptoms include headache, dizziness, weakness, nausea. Higher levels of exposure (> 5000 ppm) can cause irregular heartbeat, kidney and liver damage, fall in blood pressure, unconsciousness and even death. Harmful if swallowed. Symptoms similar to inhalation will occur along with nausea, vomiting. Aspiration of material into the lungs can cause chemical pneumonitis which can be fatal. If aspirated, may be rapidly absorbed through the lungs and result in injury to other body systems. Contact with skin causes mild irritation and redness, especially on prolonged contact. Repeated contact may cause drying or flaking of the skin. Eye contact with liquids and vapors cause irritation. Symptoms include tearing, redness, stinging and swelling.</p>	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.</p> <p>Eye - Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.</p> <p>Skin - In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician.</p> <p>Ingestion - If swallowed, do not induce vomiting. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
1,1- dichloroethene	Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. The substance is toxic to kidneys, lungs, liver, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.	<p>Inhalation - Allow the victim to rest in a well ventilated area. Seek immediate medical attention.</p> <p>Serious Inhalation - Evacuate the victim to a safe area as soon as possible. If necessary, aid breathing, perform mouth-to-mouth resuscitation. Seek medical attention.</p> <p>Eye - Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.</p> <p>Skin - After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Cover the irritated skin with an emollient. If irritation persists, seek medical attention.</p> <p>Serious Skin Contact - Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.</p> <p>Ingestion - Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.</p>
1,2,4- trimethylbenzene	Causes eye irritation. Causes redness and pain. Causes skin irritation. May be harmful if absorbed through the skin. May cause irritation of the digestive tract. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal. May be harmful if swallowed. Harmful if inhaled. Causes respiratory tract irritation. May cause drowsiness, unconsciousness, and central nervous system depression. Prolonged or repeated skin contact may cause dermatitis. Prolonged or repeated exposure may cause nausea, dizziness, and headache.	<p>Inhalation - Get medical aid immediately. Remove from exposure and move to fresh air immediately. If necessary, aid breathing. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other respiratory medical device.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.</p> <p>Skin - Immediately flush skin with plenty of water for 15.</p> <p>Ingestion: Do not induce vomiting. Possible aspiration hazard. Get medical aid immediately. Call a poison control center.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
1,2- dichlorobenzene	Causes irritation to the respiratory tract. Can cause headache, nausea, swelling around the eyes, runny nose, loss of appetite and weight loss. Toxic! A liver and kidney poison. May cause systemic poisoning with/symptoms paralleling inhalation. Skin contact causes irritations and possibly burns if contact is repeated or prolonged. Vapors cause irritation, redness, and pain. Contact with liquid may cause burning of the eyes and tissue damage.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately</p> <p>Skin - Immediately flush skin with plenty of soap and water for 15 minutes. Get medical attention.</p> <p>Ingestion - Aspiration hazard. If swallowed, vomiting may occur spontaneously, but do not induce. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Get medical attention.</p>
1,2-dichloroethane	Inhalation of vapors irritates the respiratory tract. May cause headache, weakness, cyanosis, nausea, vomiting, and diarrhea. Causes irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea. Causes irritation, rash and blister formation. Prolonged contact can cause skin burns. Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Call a physician.</p> <p>Eye - Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately</p> <p>Skin - Wash skin with soap or mild detergent and water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician.</p> <p>Ingestion - If swallowed, do not induce vomiting. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
1,3,5-trimethylbenzene	<p>Inhalation of vapors irritates the respiratory tract. May cause sore throat, coughing, headache and nausea. Not expected to be very acutely toxic. Care should be taken due to potential irritant effects. May cause risk of chemical pneumonia from droplets entering lungs. Affects central nervous system. Causes irritation to skin. Symptoms include redness, itching, and pain. Liquid and vapor causes irritation, redness, and pain to the eye.</p>	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician. Eye - Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately Skin - In case of contact, immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician. Ingestion - If swallowed, do not induce vomiting. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.</p>
1,4- dichlorobenzene	<p>Inhalation of dust or vapors can irritate the nose and throat. May also cause headache, swelling around the eyes and runny nose. Ingestion is toxic. Swallowing can produce adverse health effects paralleling inhalation. Causes skin irritation, with a slight burning sensation. Red blotching of the skin due to allergic reactions may occur. May be absorbed through the skin; symptoms may parallel inhalation. Causes irritation, redness, and pain with eye contact.</p>	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician. Eye - Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately. Skin - Wash skin with soap or mild detergent and water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Ingestion - Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician.</p>
1,4 dioxane	<p>Highly toxic by inhalation. Easily absorbed through lungs; sore throat, abdominal pain, causes irritation to skin. Symptoms include redness, itching, and pain. Vapors cause eye irritation; splashes can cause severe soreness.</p>	<p>Inhalation - Remove to fresh air. If necessary, aid breathing. Get medical attention. Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids. Get medical attention. Skin - Immediately flush with plenty of water for 15 minutes. If necessary, aid breathing. Get medical attention. Ingestion - Induce vomiting immediately; If necessary, aid breathing. Get medical attention.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
2-butanone	Causes irritation to the nose and throat; may produce abdominal pain and nausea if swallowed. Skin exposure causes irritation, which include redness, itching, and pain. Vapors are irritating to the eyes.	<p>Inhalation - Remove to fresh air. If necessary, aid breathing. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of soap and water for 15 minutes. Get medical attention.</p> <p>Ingestion - Aspiration hazard. If swallowed, vomiting may occur spontaneously, but do not induce. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Seek medical attention.</p>
2-ethoxyethanol	Causes irritation to the respiratory tract. Symptoms may include sore throat, coughing, headache, nausea and shortness of breath. Swallowing may cause nausea, vomiting, abdominal pain, breathing difficulties, weakness. Contact with the skin may cause irritation with redness and pain. Vapors are irritating and may produce immediate pain, redness and tearing to the eye. Splashes can cause severe pain, stinging, swelling	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Ingestion - Induce vomiting immediately as directed by medical personnel. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of soap and water for 15 minutes. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.</p>
2-nitropropane	May cause eye and skin irritation. Harmful if swallowed or inhaled. May cause respiratory tract irritation.	<p>Inhalation - Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.</p> <p>Eyes - Immediately flush eyes with plenty of water for 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.</p> <p>Skin - Immediately flush skin with plenty of water for 15 minutes.</p> <p>Ingestion - Do not induce vomiting. Get medical aid immediately. Call a poison control center.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
4-methyl-2-propanone	Inhalation may cause irritation to the nose and throat. May produce abdominal pain, nausea if ingested. Aspiration into the lungs can produce severe lung damage. Contact with the skin, causes irritation which includes redness, itching, and pain. Vapors can sting and aggravate the eyes.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of soap and water for 15 minutes. Get medical attention.</p> <p>Ingestion - Aspiration hazard. If swallowed, vomiting may occur spontaneously, but do not induce. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Get medical attention.</p>
acetaldehyde	Vapors may cause eye irritation. Contact with the skin may result in skin sensitization, an allergic reaction. If ingested, gastrointestinal irritation with nausea, vomiting and diarrhea may occur. Inhalation may cause respiratory tract irritation.	<p>Inhalation - If inhaled, remove to fresh air. If necessary, aid breathing. Get medical aid.</p> <p>Eyes - Immediately flush eyes with plenty of water for 15 minutes. Get medical aid.</p> <p>Skin - Immediately flush skin with soap and plenty of water. Remove contaminated clothing and shoes. Get medical aid if symptoms occur.</p> <p>Ingestion - If swallowed, do not induce vomiting unless directed to do so by medical personnel. Get medical aid.</p>
acetone	Inhalation of vapors irritates the respiratory tract. May cause coughing, dizziness, dullness, and headache. Swallowing small amounts is not likely to produce harmful effects. Contact with the skin can cause redness, pain, drying and cracking of the skin. Vapors are irritating to the eyes.	<p>Inhalation - Remove to fresh air. If necessary, aid breathing. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention</p> <p>Skin - Immediately flush skin with plenty of water for 15 minutes.. Get medical attention.</p> <p>Ingestion - Aspiration hazard. If swallowed, vomiting may occur spontaneously, but do not induce. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Get medical attention.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
acetonitrile	<p>Inhalation effects of overexposure are often delayed, possibly due to the slow formation of cyanide anions in the body. These cyanide anions prevent the body from using oxygen and can lead to internal asphyxiation. Symptoms may include nose and throat irritation, flushing of the face, and chest tightness. This highly toxic material has insufficient warning properties to prevent personnel from working in contaminated atmospheres. Gastric irritation may occur if swallowed. May cause irritation to the skin and splashes to the eye may sting coupled with redness and pain.</p>	<p>Inhalation - If inhaled, remove to fresh air. If breathing is labored or with coughing, give 100% supplemental oxygen. If not breathing, begin artificial respiration. Do not give mouth-to-mouth resuscitation.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - If swallowed, get medical attention immediately; do not induce vomiting. If not breathing, begin artificial respiration. Do not give mouth-to-mouth resuscitation</p>
acrylic acid	<p>May be destructive to the mucous membranes and upper respiratory tract. Symptoms may include burning, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Ingestion of this substance is highly toxic! Skin contact is toxic & corrosive and may cause irritation, inflammation, burns, and skin rashes. Vapors emitted may cause eye irritation.</p>	<p>Inhalation - Remove to fresh air. If necessary, aid breathing. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of soap and water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion – Do not induce vomiting. Give large quantities of water. Get medical attention</p>
acrylonitrile	<p>May cause irritation, itching, nausea, vomiting, diarrhea, stomach pain if inhaled. Possibly severe irritation, allergic reactions & blisters may occur with skin contact. The eyes may experience tearing, burning sensations & eye damage.</p>	<p>Inhalation – Remove to fresh air, rest. Get medical attention.</p> <p>Eyes - Rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.</p> <p>Skin - Rinse with plenty of water, then remove contaminated clothes and rinse again. Get medical attention.</p> <p>Ingestion - Rinse mouth. Give a slurry of activated charcoal in water to drink. Induce vomiting (Only in conscious persons!). Get medical attention.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
ammonia	May cause burning sensation, coughing, labored breathing, shortness of breath and sore throat. Symptoms may be delayed. Exposure to eyes may cause redness, pain and severe deep burns. Dermal contact may cause redness, skin burns, pain and blisters.	Inhalation - Remove to fresh air. If necessary, aid breathing. Get medical attention. Eyes - Immediately flush with plenty of water for 15 minutes. Get medical attention. Skin – Immediately flush with plenty of water for 15 minutes. Get medical attention.
Ammonium hydroxide	Inhalation may cause burning sensation, coughing, labored breathing, shortness of breath and sore throat. Corrosive to the eyes. May cause redness, pain, blurred vision and severe deep burns. Corrosive to the skin. May cause redness, serious skin burns, pain and blisters. Ingestion may cause abdominal cramps, abdominal pain, sore throat and vomiting.	Inhalation - Remove to fresh air. If necessary, aid breathing. Get medical attention. Eyes - Immediately flush with plenty of water for 15 minutes. Get medical attention. Skin - Immediately remove contaminated clothes. Flush skin with plenty of water for 15 minutes. Get medical attention. Ingestion - Rinse mouth. Do not induce vomiting. Give plenty of water to drink. Never give anything by mouth to an unconscious person. Get medical attention.
arsenic	Highly Toxic. Exposure can cause ulceration of nasal septum, dermatitis, GI disturbances, peripheral neuropathy, respiratory irritation, and hyperpigmentation of the skin. Ingestion can be fatal.	Inhalation - Remove to fresh air-If necessary aid breathing and seek medical attention. If victim is unconscious, do not perform mouth to mouth resuscitation. Eyes - Immediately flush with water for 15 minutes, separating eyelids with fingers. Skin - Immediately flush with water for 15 minutes and wash with soap and water. Ingestion - Seek medical attention immediately. Do not induce vomiting. If victim is unconscious, do not perform mouth to mouth resuscitation.

Exposure Substance	Potential Health Effects	First Aid Measures
benzene	Highly Flammable liquid and vapor. Inhalation can be very hazardous. Can cause lung irritation, may be fatal. This material can cause birth defect. It can also cause damage to the blood, lungs and nervous system, mucous membranes, gastro-intestinal tract, upper respiratory tract, skin and eyes.	<p>Inhalation – Remove to fresh air. If necessary aid breathing and seek medical attention.</p> <p>Eyes – Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.</p> <p>Skin – Remove contaminated clothing as quickly as possible. Place victim under a deluge shower. Wash thoroughly with soap and water.</p> <p>Ingestion – Do not induce vomiting or give liquids. Examine lips and mouth to determine whether the tissues are damaged, a possible indication that the toxic material was ingested. Loosen any tight clothing and seek immediate medical attention.</p>
bromine	Causes eye burns. Lachrymator (substance which increases the flow of tears). Contact with liquid is corrosive and causes severe burns and ulceration to the skin. May cause skin rash (in milder cases), and cold and clammy skin with cyanosis or pale color. Ingestion may cause severe and permanent damage to the digestive tract. Causes gastrointestinal tract burns. Inhalation may result in irritation and to chemical pneumonitis and pulmonary edema. Causes chemical burns to the respiratory tract.	<p>Inhalation - Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. 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. Get medical attention.</p> <p>Eyes - Do not allow victim to rub or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes). Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical attention.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
cadmium	Exposure symptoms can include: Pulmonary edema, dyspnea (breathing difficulty), cough, tightness of chest, substernal pain, head ache, muscle aches, chills, nausea, vomiting, diarrhea, loss of smell, emphysema, proteinuria, and mild anemia. Target organs: Respiratory system, kidneys, prostate, and blood.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical attention.</p> <p>Eyes - Immediately flush with water for 15 minutes, separating eyelids with fingers.</p> <p>Skin - Immediately flush with water for 15 minutes and wash with soap and water.</p> <p>Ingestion – Seek medical attention immediately.</p>
Calcium hydroxide	Inhalation causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath. Can cause chemical bronchitis. Gastric irritant. Ingestion may be followed by severe pain, vomiting, diarrhea, and collapse. If death does not occur in 24 hours, esophageal perforation may occur, as evidenced by fall in blood pressure and severe pain. A narrowing of the esophagus may occur weeks, months, or years after ingestion, making swallowing difficult. Corrosive to skin. May cause severe burns and blistering, depending on duration of contact. Corrosive to eyes. May produce severe irritation and pain. May induce ulcerations of the corneal epithelium. Can cause blindness.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician immediately.</p> <p>Eye Contact - Immediately flush eyes with gentle but large stream of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Call a physician immediately.</p> <p>Skin Contact - In case of contact, wipe off excess material from skin then immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. Call a physician immediately.</p> <p>Ingestion - Do not induce vomiting. Give large quantities of water. Never give anything by mouth to an unconscious person. Call a physician immediately.</p>
carbon disulfide	Extremely hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Very hazardous in case of skin contact (permeator). Inflammation of the eye is characterized by redness, watering and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.	<p>Inhalation - Remove to fresh air. If necessary, aid breathing. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of soap and water for 15 minutes. Remove contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - Induce vomiting immediately as directed by medical personnel. Get medical attention.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
carbon monoxide	Symptoms may include headache, dizziness, heart palpitations, weakness, confusion, nausea, eventual convulsions, and death. Because it is a colorless and odorless gas, there is no warning of its presence other than the above symptoms. Analytical monitors with alarms should be employed where the possibility of released toxic quantities exists.	Inhalation - Conscious persons should be assisted to an uncontaminated area and be treated with supplemental oxygen. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area and be given artificial respiration and oxygen at the same time.
carbon tetrachloride	Poison. Vapors may cause eye irritation; contact to skin causes irritation and may be absorbed thru skin in harmful amounts. Inhalation can cause respiratory irritation and harmful if ingested. Symptoms include dizziness, headaches and nausea.	Inhalation - Poison material. If inhaled, get medical attention. Remove victim to fresh air. If necessary, aid breathing. Eyes - Immediately flush eyes with plenty of water for 15 minutes. Get medical attention. Skin - Immediately flush skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Get medical attention. Ingestion - Potential for aspiration if swallowed. Get medical attention. Do not induce vomiting unless directed to do so by medical personnel.
chlorine	Corrosive. May cause burning sensation, coughing, headache, labored breathing, nausea, shortness of breath and sore throat. Symptoms may be delayed. Corrosive to the eyes. May cause pain, blurred vision and severe deep burns. Corrosive to the skin. May cause skin burns and pain.	Inhalation - Remove to fresh air. If necessary, aid breathing. Get medical attention. Eyes - Immediately flush with plenty of water for 15 minutes. Get medical attention. Skin - Immediately remove contaminated clothes. Flush skin with plenty of water for 15 minutes. Get medical attention.
chlorobenzene	Causes irritation to the respiratory tract where the symptoms may include coughing, shortness of breath. Toxic substance; causes irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea. An irritant to the skin; symptoms include redness, itching, and pain. Vapors cause eye irritation. Splashes cause severe irritation.	Inhalation - Remove to fresh air. If necessary, aid breathing. Get medical attention. Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention. Skin - Immediately flush skin with plenty of soap and water for 15 minutes while removing contaminated clothing and shoes. Get medical attention. Ingestion - Drink large amounts of water. Get medical attention.

Exposure Substance	Potential Health Effects	First Aid Measures
chloroform	Acts as a relatively potent anesthetic when inhaled. Will cause severe burning in mouth and throat, pain in the chest and vomiting if ingested. Skin contact will result in irritated red and painful skin. Vapors to the eye, will cause pain and irritation.	<p>Inhalation - Remove to fresh air. If necessary, aid breathing. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - If swallowed, do not induce vomiting. Give large quantities of water. Get medical attention.</p>
Chromium	Targets eyes, skin, and respiratory tract. Routes of exposure include inhalation and ingestion. Symptoms include: eye and skin irritation, and pulmonary fibrosis.	<p>Inhalation - Remove to fresh air-If necessary aid breathing and seek medical attention.</p> <p>Eyes - Immediately flush with water for 15 minutes, separating eyelids with fingers.</p> <p>Skin - Immediately flush with water for 15 minutes and wash with soap and water.</p> <p>Ingestion - Seek medical attention immediately</p>
chromium (hexavalent)	Cancer causing agent. Irritation to respiratory tract. May cause non-healing ulcerations of mucous membranes. May cause allergic sensitization. Irritation to gastro intestinal tract. May result in electrolyte disturbances. Causes skin irritation. Symptoms may include redness, itching, and pain. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to the material. Exposure to eyes may result in irritation, redness, and pain.	<p>Inhalation - Remove to fresh air. Support breathing if necessary. Give oxygen or artificial respiration. Seek Medical attention immediately.</p> <p>Eyes - Immediately flush with water for 15 minutes occasionally separating upper and lower eyelids. Seek medical attention immediately.</p> <p>Skin - Immediately flush with water for 15 minutes. Wash with soap and water. Seek medical attention if irritation persists.</p> <p>Ingestion - Seek medical attention immediately.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
cobalt	Irritation to respiratory tract. May cause asthmatic attacks due to allergic sensitization of the respiratory tract. May cause asthma and shortness of breath. Irritation to gastro intestinal tract. Symptoms include nausea, vomiting, and diarrhea. May cause allergic reaction. Irritation to skin. Symptoms include redness, itching, and pain. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to the material. Eye contact may result in irritation, redness, and pain. May cause conjunctivitis.	<p>Inhalation – Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eye – Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.</p> <p>Skin – Immediately flush skin with plenty of soap and water for 15 minutes. Remove contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion –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 attention.</p>
copper	Exposure symptoms can include: irritation of eyes, nose, and pharynx; nasal perforation; metallic taste; and, dermatitis. Target Organs: eyes, skin, respiratory system, liver, and kidneys.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical attention.</p> <p>Eyes - Immediately flush with water for 15 minutes, separating eyelids with fingers.</p> <p>Skin - Immediately flush with water for 15 minutes and wash with soap and water.</p> <p>Ingestion – Seek medical attention immediately.</p>
cumene	Inhalation of high concentrations may cause central nervous system effects symptoms include nausea, headache and dizziness. Vapors may cause dizziness or suffocation. Causes eye and skin irritation. Substance is an aspiration hazard. Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May be harmful if swallowed.	<p>Inhalation - Remove from exposure and move to fresh air immediately. If necessary aid breathing. 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. Get medical attention.</p> <p>Eyes - Immediately flush eyes with plenty of water for 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical attention immediately.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
cyclohexane	Inhalation of vapors may cause drowsiness and dizziness. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal. Vapors may cause mild eye irritation. Contact with the skin may cause irritation with burning pain, itching and redness.	<p>Eyes - Immediately flush eyes with plenty of water for 15 minutes. Get medical attention.</p> <p>Skin - Flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - Potential for aspiration if swallowed. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention.</p> <p>Inhalation - Remove to fresh air. If necessary, aid breathing. Get medical attention.</p>
cyclohexanol	Inhaling vapors can be irritating. Symptoms include nausea and tremors. Ingestion causes vomiting and gagging. Contact with eyes may cause severe irritation, and possible eye burns. Causes skin irritation and may cause dermatitis.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Remove any contaminated clothing. Wash skin with soap or mild detergent and water for 15 minutes. Get medical attention if irritation develops or persists.</p> <p>Ingestion - Give large amounts of water to drink. Get medical attention.</p>
cyclohexnone	Causes irritation to the respiratory tract. Symptoms may include coughing and shortness of breath. High concentrations have a narcotic effect. Irritation effects normally prevent exposures high enough to cause systemic effects. Ingestion may produce abdominal pain and nausea. Aspiration into lungs can produce severe lung damage and is a medical emergency. Other symptoms expected to parallel inhalation. Skin contact causes irritation. Symptoms include redness, itching, and pain. May be absorbed through skin causing possible systemic effects. Vapors may cause irritation to the eyes. Contact may cause corneal injury.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.</p> <p>Ingestion – Give large amounts of water to drink. Never give anything by mouth to an unconscious person. Get medical attention.</p> <p>Skin – Immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention.</p> <p>Eye – Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
diacetone alcohol	Causes irritation to the respiratory tract when inhaled. Symptoms may include coughing, shortness of breath. If ingested, irritation to the gastrointestinal tract may occur. Symptoms may include nausea, vomiting and diarrhea. Causes skin irritation. May be absorbed through skin. Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage	<p>Inhalation - Remove to fresh air. If necessary, aid breathing. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of soap and water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - Give large amounts of water to drink. Get medical attention.</p>
dichlorofluoroethane	Vapor is heavier than air and can cause suffocation by reducing the available oxygen for breathing. Liquid contact will irritate eyes and may cause conjunctivitis. Not a corrosive or irritant; however, repeated or prolonged exposure can cause defatting of skin. Single dose toxicity is low to moderate. If vomiting occurs the liquid can be aspirated into lungs, which can cause chemical pneumonia and systemic effects.	<p>Inhalation - Move to fresh air in case of accidental inhalation of vapors. If necessary, aid breathing. Get medical attention.</p> <p>Eye - Flush eyes with large amounts of water for 15 minutes or until irritation subsides. If irritation persists, get medical attention.</p> <p>Skin - Flush with large amounts of water. Use soap if available. Remove contaminated clothing (including shoes) and wash before reuse.</p> <p>Ingestion - Do not induce vomiting unless directed by a physician. If conscious and alert, give two glasses of water. Get medical attention.</p>
diesel fuel	Inhalation may cause irritation of the upper respiratory tract, depression, dizziness, headache, incoordination, anesthesia, coma, and respiratory arrest. Ingestion may cause irritation of the throat, esophagus, and stomach, and vomiting. May cause skin defatting and irritation. Causes eye irritation, severe burning sensation, and swelling of lids.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.</p> <p>Eye – Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.</p> <p>Skin – Immediately flush skin with plenty of soap and water. Remove contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion – Do not induce vomiting. If vomiting occurs keep airway clear. Get medical attention.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
diethylamine	Corrosive. Vapors irritate the respiratory tract causing coughing, chest pain, or immediate or delayed breathing difficulties. Harmful if swallowed. May cause burns of the mouth, throat and stomach with severe abdominal pain and collapse. Skin contact can cause irritation with redness, pain, and possible skin burns. Vapors irritate the eyes, causing tears, redness, pain, blurred vision.	<p>Inhalation - Remove to fresh air. If necessary, aid breathing. Get medical attention immediately.</p> <p>Eye - Immediately flush eyes with gentle but large stream of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - Do not induce vomiting. Give large quantities of water. Get medical attention.</p>
diethylaminoethanol	Inhalation will cause coughing, labored breathing, nausea, shortness of breath, sore throat and Vomiting. Skin contact may result in redness, skin burns and pain. Contact to the eye may cause redness, pain and blurred vision. Ingestion may cause abdominal pain and diarrhea.	<p>Inhalation - Remove to fresh air. If necessary, aid breathing. Get medical attention.</p> <p>Eyes - Immediately flush with plenty of water for 15 minutes. Get medical attention.</p> <p>Skin - Immediately flush with plenty of water. Remove contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - Do not induce vomiting. Give water to drink. Get medical attention immediately.</p>
diisobutyl ketone	Inhalation of vapors irritates the respiratory tract. May cause coughing, dizziness, dullness, nausea, vomiting and headache. Ingestion of this substance will cause irritation to the gastrointestinal tract with symptoms including nausea, vomiting and diarrhea. Contact with the skin and eyes will trigger irritation, redness and pain.	<p>Inhalation - Remove to fresh air. If necessary, aid breathing. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of water for 15 minutes. Remove contaminated clothing and shoes. Get medical attention if irritation develops.</p> <p>Ingestion - Induce vomiting immediately as directed by medical personnel. Get medical attention.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
D-limonene	Causes eye and skin irritation. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. By inhaling this substance, it may cause respiratory tract irritation. Ingestion may cause digestive tract disturbances.	<p>Inhalation - Remove to fresh air. If necessary, aid breathing. Get medical attention.</p> <p>Eyes - Immediately flush eyes with plenty of water for 15 minutes. Get medical aid.</p> <p>Skin - Immediately flush skin with soap and plenty of water. Remove contaminated clothing and shoes. Get medical aid if symptoms occur.</p> <p>Ingestion - Do not induce vomiting unless directed to do so by medical personnel. Get medical attention.</p>
dimethylformamide	Causes eye irritation. Lachrymator (substance which increases the flow of tears). Causes skin irritation. Harmful if absorbed through the skin. Substance is rapidly absorbed through the skin. This substance is harmful if inhaled and will cause gastrointestinal irritation with nausea, vomiting and diarrhea if ingested.	<p>Inhalation - Remove from exposure and move to fresh air immediately. If necessary, aid breathing. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Get medical aid immediately.</p> <p>Eyes - Immediately flush eyes with plenty of water for 15 minutes. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - Do not induce vomiting. Get medical attention. Call a poison control center.</p>
epichlorohydrin	Harmful if absorbed through the skin, swallowed and inhaled. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. May cause systemic toxicity with acidosis. Causes gastrointestinal tract irritation. May cause asthmatic attacks due to allergic sensitization of the respiratory tract. Contact with the eye causes severe eye irritation.	<p>Inhalation - Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eyes - Immediately flush eyes with plenty of water for 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Discard contaminated clothing in a manner which limits further exposure. Get medical attention.</p> <p>Ingestion - If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical attention.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
ethyl acrylate	Irritates the eye and skin. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. May cause gastrointestinal irritation with nausea, vomiting and diarrhea if ingested. May be harmful if inhaled. May cause irritation of the mucous membranes.	<p>Inhalation - Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eyes - Immediately flush eyes with plenty of water for 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention.</p> <p>Skin - Flush skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Get medical aid.</p> <p>Ingestion - Do not induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water. Get medical attention.</p>
ethyl benzene	Inhalation and ingestion may result in coughing dizziness, drowsiness and headache. Contact with the skin and eyes may cause redness, pain and blurred vision.	<p>Inhalation - Remove to fresh air. If necessary, aid breathing. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.</p> <p>Skin - Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.</p> <p>Ingestion - Do not induce vomiting unless directed to do so by medical personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
ethylene glycol	<p>Vapor inhalation is generally not a problem unless heated or misted. Exposure to vapors over an extended time period has caused throat irritation and headache. May cause nausea, vomiting, dizziness and drowsiness. Pulmonary edema and central nervous system depression may also develop. When heated or misted, has produced rapid, involuntary eye movement and coma. When ingested, initial symptoms in massive dosage parallel alcohol intoxication, progressing to CNS depression, vomiting, headache, rapid respiratory and heart rate, lowered blood pressure, stupor, collapse, and unconsciousness with convulsions. Death from respiratory arrest or cardiovascular collapse may follow. Lethal dose in humans: 100 ml (3-4 ounces). Minor skin irritation and penetration may occur. Exposure to eyes may cause irritation, pain and eye damage.</p>	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.</p> <p>Eyes - Immediately flush with water for 15 minutes, separating eyelids with fingers. Get medical attention.</p> <p>Skin – Remove contaminated clothing. Immediately flush with water for 15 minutes and wash with soap and water. Get medical attention if irritation continues.</p> <p>Ingestion – Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.</p>
ethylene oxide	<p>Inhalation may cause coughing, dizziness, drowsiness, headache, nausea, sore throat, vomiting and weakness. May be absorbed into the skin to cause dry skin, redness, burning sensation, pain, blisters; on contact with liquid: frostbite. Eye contact will result in redness, pain, blurred vision.</p>	<p>Inhalation – Remove to fresh air, rest. Half-upright position. Get medical attention.</p> <p>Eyes - Immediately flush with water for 15 minutes. Get medical attention.</p> <p>Skin - Remove contaminated clothes. On frostbite: rinse with plenty of water, do not remove clothes. Rinse skin with plenty of water or shower. Get medical attention.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
formaldehyde	Inhalation may cause sore throat, coughing, and shortness of breath. Ingesting this substance can cause severe abdominal pain, violent vomiting, headache, and diarrhea. Toxic to the skin. May cause irritation to skin with redness, pain, and possibly burns; severe skin irritant and sensitizer. Vapors to the eyes cause irritation, with redness, pain, and blurred vision.	<p>Inhalation - Remove to fresh air. If necessary, aid breathing. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - To absorb the ingested formaldehyde give milk, activated charcoal, or water. Any organic material will inactivate formaldehyde. Keep affected person warm and at rest. Get medical attention.</p>
gasoline	Inhalation can cause intense burning of the mucous membranes, throat and respiratory tract; overexposure to vapors can lead to bronchopneumonia. Inhalation of high concentrations can cause fatal pulmonary edema. Repeated or prolonged skin exposure can cause dermatitis. Can cause blistering of skin due to its defatting properties. Exposure to eyes can cause hyperemia of the conjunctiva. Ingestion or excessive vapors cause inebriation, drowsiness, blurred vision, vertigo, confusion, vomiting and cyanosis. Aspiration after ingestion can cause bronchitis, pneumonia, or edema, which can be fatal.	<p>Inhalation - Remove to fresh air-If necessary aid breathing and seek medical attention.</p> <p>Eyes - Immediately flush with water for 15 minutes, separating eyelids with fingers.</p> <p>Skin - Wash with soap and water.</p> <p>Ingestion - Do not induce vomiting.</p>
hexachloroethane	Causes eye and skin irritation. Ingestion may cause central nervous system depression, kidney damage, and liver damage. Inhalation of this substance causes irritation of mucous membrane.	<p>Inhalation - Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eyes - Immediately flush eyes with plenty of water for 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical attention.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
hexane	Dizziness, drowsiness, dullness, headache, labored breathing, nausea, Unconsciousness, weakness are symptoms when substance is inhaled. Contact with the skin and eyes will cause dry skin, redness and pain. Ingestion will result in abdominal pain.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Remove any contaminated clothing. Wipe off excess from skin. Wash skin with soap and water for 15 minutes. Get medical attention if irritation develops or persists.</p> <p>Ingestion - Aspiration hazard. If swallowed, do not induce vomiting. Give large quantities of water. Get medical attention.</p>
hydrazine	Harmful if inhaled or ingested. Absorption into the body may cause cyanosis. Causes irritation to skin. Symptoms include redness, itching, and pain. May cause allergic skin reactions. Eye contact causes irritation, redness, and pain.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of soap and water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - Induce vomiting immediately as directed by medical personnel. Get medical attention.</p>
hydrochloric acid	Corrosive. May cause coughing, choking, inflammation of the nose, throat, and upper respiratory tract, and in severe cases, pulmonary edema, circulatory failure and death. Corrosive to the eyes. May cause damage to the eyes, severe burns and permanent eye damage. Corrosive to the skin. May cause redness, pain and severe skin burns. Concentrated solutions cause deep ulcers and discolor skin. If ingested, may cause immediate pain and burns of the mouth, throat, esophagus and gastrointestinal tract. May cause nausea, vomiting, and diarrhea. Swallowing may be fatal.	<p>Inhalation - Remove to fresh air. If necessary, aid breathing. Get medical attention.</p> <p>Eyes - Immediately flush with plenty of water for 15 minutes. Get medical attention.</p> <p>Skin – Immediately remove contaminated clothes. Flush with water for 15 minutes. Get medical attention immediately.</p> <p>Ingestion – Do not induce vomiting. Give plenty of water to drink. Never give anything by mouth to an unconscious person. Get medical attention immediately.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
hydrofluoric acid	Severely corrosive to the respiratory tract. May cause sore throat, coughing, labored breathing and lung congestion/inflammation. Corrosive to the eyes. Symptoms of redness, pain, blurred vision, and permanent eye damage may occur. Corrosive to the skin. Skin contact causes serious skin burns which may not be immediately apparent or painful. Symptoms may be delayed 8 hours or longer. The fluoride ion readily penetrates the skin causing destruction of deep tissue layers and even bone. If ingested, may cause sore throat, abdominal pain, diarrhea, vomiting, severe burns of the digestive tract, kidney dysfunction and brain damage. Affects the heart and circulatory system.	<p>Inhalation - Remove to fresh air. If patient is unconscious, give artificial respiration or use inhalator. Keep patient warm and resting, and send to hospital after first aid is complete.</p> <p>Eyes – Irrigate eyes for at least 30 minutes with copious quantities of water, keeping the eyelids apart and away from eyeballs during irrigation. Get competent medical attention immediately, preferably an eye specialist. Do not use oily drops or ointment. Place ice pack on eyes until reaching emergency room.</p> <p>Skin – Remove the victim from the contaminated area and immediately place him under a safety shower. Remove all contaminated clothing and keep washing with large amounts of water for a minimum of 15 to 20 minutes. Get medical attention as soon as possible for all burns regardless of how minor they may appear initially.</p> <p>Ingestion – If swallowed, do not induce vomiting. Give large quantities of water. Get medical attention immediately.</p>
hydrogen sulfide	May act as a simple asphyxiant by displacing air. Symptoms include rapid respiration, muscular incoordination, fatigue, nausea, vomiting, and unconsciousness. Additional symptoms may include headache, mental dullness, dizziness and upset stomach. Extreme health hazard resulting in possible collapse and death. Exposure between 50 – 500 ppm hydrogen sulfide is characterized by respiratory irritation, cough, and labored breathing.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.</p> <p>Eye – Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.</p> <p>Skin – Immediately flush skin with plenty of soap and water. Remove contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion – Remove to fresh air. If vomiting occurs keep airway clear. If breathing is difficult, give oxygen. Get medical attention immediately.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
isopropyl alcohol	<p>Inhalation of vapors irritates the respiratory tract. Exposure to high concentrations has a narcotic effect, producing symptoms of dizziness, drowsiness, headache, staggering, unconsciousness and possibly death. Ingestion can cause drowsiness, unconsciousness, and death. Gastrointestinal pain, cramps, nausea, vomiting, and diarrhea may also result. The single lethal dose for a human adult = about 250 mls (8 ounces). Skin contact may cause irritation with redness and pain. May be absorbed through the skin with possible systemic effects. Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage.</p>	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.</p> <p>Ingestion – Give large amounts of water to drink. Never give anything by mouth to an unconscious person. Get medical attention.</p> <p>Skin – Immediately flush skin with plenty of water for at least 15 minutes. Call a physician if irritation develops.</p> <p>Eye – Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
lead	<p>Inhalation may cause irritation of bronchia and lungs and, in cases of acute exposure, symptoms such as metallic taste, chest and abdominal pain, and increased lead blood levels may follow. Ingestion may cause abdominal pain and spasms, nausea, vomiting, and headache. Acute poisoning can lead to muscle weakness, "lead line" on the gums, metallic taste, definite loss of appetite, insomnia, dizziness, high lead levels in blood and urine with shock, coma, and death in extreme cases. Lead may be absorbed through the skin on prolonged exposure; the symptoms of lead poisoning described for ingestion exposure may occur. Contact over short periods may cause local irritation, redness, and pain. May cause effects on the gastrointestinal tract, blood, central nervous system and kidneys, resulting in colics, shock, anemia, kidney damage, and encephalopathy. Long-term or repeated exposure may result in severe lead colics, paralysis of muscle groups of the upper extremities (forearm, wrist, and fingers), anemia, mood and personality changes, retarded mental development, and irreversible nephropathy.</p>	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical attention.</p> <p>Eyes - Immediately flush with water for 15 minutes, separating eyelids with fingers.</p> <p>Skin - Immediately flush with water for 15 minutes and wash with soap and water.</p> <p>Ingestion – Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Seek medical attention immediately</p>
m-cresol	<p>Corrosive. Causes severe burns to every area of contact. Cresol is toxic via ingestion and skin absorption. Breathing vapor, dust or mist results in vomiting, difficulty in swallowing, diarrhea, loss of appetite. Ingestion, poison. Symptoms may include burning pain in mouth and throat, abdominal pain, headache, dizziness and possibly death from circulatory or cardiac failure. Skin contact causes severe pain followed by numbness. Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.</p>	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.</p> <p>Skin - Immediately flush skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion – Do not induce vomiting. Give large quantities of water. Get medical attention.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
mercury	<p>Inhalation may cause abdominal pain, cough, diarrhea, shortness of breath, vomiting, and pneumonitis. Inhalation of high levels of mercury vapor can lead to severe respiratory irritation and death. May cause effects on the kidneys and the central nervous system, resulting in emotional and psychic instability, tremor mercurialis, cognitive disturbances, and speech disorders. May cause gum and mouth inflammation, gingivitis, excessive salivation, and loosening of teeth. Danger of cumulative effects. Animal tests show that this substance possibly causes toxic effects upon human reproduction.</p>	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical attention.</p> <p>Eyes - Immediately flush with water for 15 minutes, separating eyelids with fingers.</p> <p>Skin - Immediately flush with water for 15 minutes and wash with soap and water.</p> <p>Ingestion – Do not induce vomiting. Seek medical attention immediately</p>
methanol	<p>A slight irritant to the mucous membranes. Toxic effects exerted upon nervous system, particularly the optic nerve. Symptoms of overexposure may include headache, drowsiness, nausea, vomiting, blurred vision, blindness, coma, and death. Ingestion is Toxic. Symptoms parallel inhalation. Can intoxicate and cause blindness. Since methanol is a defatting agent it may cause skin to become dry and cracked. An irritant to the eye.</p>	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - Induce vomiting immediately as directed by medical personnel. Get medical attention.</p>
methyl isobutyl ketone	<p>Vapors cause eye irritation. Contact produces irritation, tearing, and burning pain to the eyes. Prolonged and/or repeated skin contact may cause irritation and/or dermatitis Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. Ingesting this substance may cause effects similar to those for inhalation exposure.</p>	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eyes - Immediately flush eyes with plenty of water for 15 minutes. Get medical attention.</p> <p>Skin - Flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if irritation develops and persists.</p> <p>Ingestion - Potential for aspiration if swallowed. Get medical attention. Do not induce vomiting unless directed to do so by medical personnel.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
methyl methacrylate	Inhalation will result in coughing, drowsiness, headache, shortness of breath, sore throat and unconsciousness. Ingestion will cause nausea and vomiting. Contact with the skin and eyes causes redness and pain.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of soap and water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - Induce vomiting immediately as directed by medical personnel. Get medical attention.</p>
methylene chloride	Causes irritation to respiratory tract. Has a strong narcotic effect with symptoms of mental confusion, light-headedness, fatigue, nausea, vomiting and headache. Ingestion may cause irritation of the gastrointestinal tract with vomiting. Skin contact may cause irritation, redness and pain. Vapors to the eye may result in redness, pain and severe deep burns.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of soap and water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion – Do not induce vomiting. Give large quantities of water. Get medical attention.</p>
methyl n-amyl ketone	Inhalation may cause coughing, dizziness, headache, unconsciousness and blurred vision. Skin and eye contact will cause dry skin and redness to the affected area.	<p>Inhalation – Remove to fresh air, rest. Get medical attention.</p> <p>Eye – Flush with plenty of water for 15 minutes (remove contact lenses if easily possible). Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of soap and water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - Give large quantities of water. Get medical attention.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
methyl tert-butyl ether	Inhalation of vapor can irritate respiratory tract. Ingestion may cause nausea, vomiting. Contact with the skin causes a mild skin irritation which causes loss of natural oils. May be a route of absorption into the body. Vapors can irritate eyes; splashes may cause damage to eye tissue.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Remove any contaminated clothing. Wash skin with soap and water for 15 minutes. Get medical attention if irritation develops or persists.</p> <p>Ingestion - Induce vomiting immediately as directed by medical personnel. Get medical attention.</p>
naphthalene	Inhalation of dust or vapors can cause headache, nausea, vomiting, extensive sweating, and disorientation. Toxic when ingested. Can cause headache, profuse perspiration, listlessness, dark urine, nausea, vomiting and disorientation. Can irritate the skin and, on prolonged contact, may cause rashes and allergy. "Sensitized" individuals may suffer a severe dermatitis. Vapors and solid cause irritation, redness and pain to the eyes.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Wash skin with soap or mild detergent and water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - Give large amounts of water to drink. Get medical attention.</p>
n-butyl acetate	Vapors cause eye irritation. Prolonged and/or repeated contact with the skin may cause defatting of the skin and dermatitis. Ingestion may cause gastrointestinal irritation with nausea, vomiting and diarrhea. Causes respiratory tract irritation. Inhalation of vapors may cause drowsiness and dizziness.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eyes - Immediately flush eyes with plenty of water for 15 minutes. Get medical attention.</p> <p>Skin - Flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if irritation develops and persists.</p> <p>Ingestion - Do not induce vomiting unless directed to do so by medical personnel. Get medical attention.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
n-butyl alcohol	Inhalation causes irritation to upper respiratory tract. Difficult breathing, coughing, headache, dizziness, and drowsiness may occur. May have narcotic effect if ingested. Can cause abdominal pain, nausea, headache, dizziness, and diarrhea. An irritant to the skin, causing a loss of natural oils and vapors to the eye can be irritating, causing tearing and pain.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of water for 15 minutes. Remove contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - Induce vomiting immediately as directed by medical personnel. Get medical attention.</p>
n-heptane	Inhalation of vapors irritates the respiratory tract. May produce light headedness, dizziness, muscle incoordination, loss of appetite and nausea. Ingestion may produce abdominal pain, nausea. Aspiration into lungs can produce severe lung damage and is a medical emergency. May cause mild irritation, redness, pain with skin contact and vapors may irritate the eyes. Splashes may produce redness, pain.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of water for 15 minutes. Remove contaminated clothing and shoes. Get medical attention if irritation develops.</p> <p>Ingestion - Aspiration hazard. Do not induce vomiting. Give large amounts of water. Get medical attention.</p>
n-hexane	Causes eye and skin irritation. May be absorbed through the skin in harmful amounts. May cause dermatitis. May be harmful if swallowed. Aspiration hazard. May cause irritation of the digestive tract. Harmful if inhaled. May cause respiratory tract irritation. Inhalation of vapors may cause drowsiness and dizziness.	<p>Inhalation - Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Possible aspiration hazard. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Get medical attention.</p> <p>Eyes - Immediately flush eyes with plenty of water for 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - Do not induce vomiting unless directed to do so by medical personnel. Get medical attention.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
nitrobenzene	<p>May be absorbed through inhalation of vapors. Ingestion of substance may cause headache, shallow respiration, dizziness, vomiting, weakness, and blood pressure fall. May be irritating and sensitizing to the skin and rapidly absorbed through the skin. Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage.</p>	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Do not give mouth to mouth resuscitation. Get medical attention immediately.</p> <p>Eye - Immediately flush eyes with gentle but large stream of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of soap and water for 15 minutes while removing contaminated clothing and shoes. Thorough cleansing of the entire contaminated area of the body including scalp and nails is of the utmost importance. Get medical attention.</p> <p>Ingestion - Induce vomiting immediately as directed by medical personnel. Get medical attention immediately.</p>
nickel	<p>Inhalation causes irritation to the respiratory tract. Symptoms may include metallic taste in mouth, coughing, sore throat, and shortness of breath. Lung damage may result from a single high exposure or lower repeated exposures. Lung allergy occasionally occurs, with asthma type symptoms. Toxic if ingested. Symptoms may include abdominal pain, diarrhea, nausea, and vomiting. Absorption is poor, but should it occur, symptoms may include giddiness, capillary damage, myocardial weakness, central nervous system depression, and kidney and liver damage. Contact with skin may result in irritation. May cause skin allergy with itching, redness or rash. Some individuals may become sensitized to the substance and suffer "nickel itch", a form of dermatitis. Contact with eyes causes irritation, redness, and pain.</p>	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.</p> <p>Skin - Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.</p> <p>Ingestion - Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
nitric acid	<p>Oxidizer. Inhalation of dust or vapors may cause severe irritation or burns to respiratory tract. Exposure may cause dryness in throat and nose, coughing, choking, chest pain and shortness of breath. May irritate eyes causing redness, tearing, blurred vision, corneal damage, and impaired vision. Exposure to skin can cause irritation, defatting, and dermatitis.</p>	<p>Inhalation - Remove to fresh air-If necessary aid breathing and seek medical attention. Eyes - Immediately flush with water for 15 minutes, separating eyelids with fingers. Skin - Immediately flush with water for 15 minutes and wash with soap and water. Ingestion - Dilute with two glasses of water or milk. Induce vomiting or gastric lavage.</p>
osmium tetroxide	<p>Causes eye burns. May result in corneal injury. May cause blindness. Causes skin burns. Aspiration hazard. Causes gastrointestinal tract burns. Causes cough, sore throat, chest pain, and lightheadedness. Causes chemical burns to the respiratory tract. May cause bronchopneumonia and possible death.</p>	<p>Eyes - Immediately flush eyes with plenty of water for 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention. Skin - Immediately flush skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Get medical attention. Ingestion - Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical attention. Inhalation - Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. Do not use mouth-to-mouth resuscitation. Get medical attention.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
phenol	Causes eye burns. May be fatal if absorbed through the skin. Causes skin burns. Direct skin contact results in white, wrinkled discoloration, followed by severe burns. May be fatal if swallowed which causes gastrointestinal tract burns. Inhalation may become fatal. Causes chemical burns to the respiratory tract.	<p>Inhalation - Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Speed is essential, obtain medical attention immediately. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.</p> <p>Eyes - Immediately flush eyes with plenty of water for 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Speedy action is essential, get medical attention immediately.</p> <p>Ingestion: Speed is essential. A doctor must be notified at once. Poison material. Only induce vomiting if directed to do so by medical personnel.</p>
phosphine	May cause eye irritation. Contact with the skin may cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. May be harmful if swallowed. May cause respiratory tract irritation. May cause neurotoxic effects including paresthesia	<p>Inhalation - Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eyes - Flush eyes with plenty of water for 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention.</p> <p>Skin - Flush skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion- If victim is conscious and alert give 2-4 cupfuls of milk or water. Get medical attention.</p>
phosphoric acid	Inhalation may cause coughing, burning sensation, wheezing, laryngitis, shortness of breath, headache and nausea. Contact with eyes may cause irritation and burns. Contact with skin may cause irritation and dermatitis. A concentrated solution will cause severe skin burns. If ingested, may cause irritation and burns of the gastro intestinal tract. May cause vomiting.	<p>Inhalation - Remove to fresh air. Get medical attention.</p> <p>Eyes - Immediately flush with plenty of water for 15 minutes. Get medical attention.</p> <p>Skin – Immediately flush skin with plenty of water for 15 minutes. Get medical attention.</p> <p>Ingestion – Do not induce vomiting. Give plenty of water to drink. Get medical attention.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
potassium hydroxide	Severe irritant. Effects from inhalation of dust or mist vary from mild irritation to serious damage of the upper respiratory tract, depending on the severity of exposure. Symptoms may include coughing, sneezing and damage to the nasal or respiratory tract. High concentrations can cause lung damage. Toxic! Swallowing may cause severe burns of mouth, throat and stomach. Other symptoms may include vomiting, diarrhea. Severe scarring of tissue and death may result. Estimated lethal dose: 5 grams. Contact with skin can cause irritation or severe burns and scarring with greater exposures. Highly Corrosive to the eyes. Causes irritation of eyes with tearing, redness and swelling. Greater exposures cause severe burns with possible blindness resulting.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.</p> <p>Eye - Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.</p> <p>Skin - In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.</p> <p>Ingestion - If swallowed, do not induce vomiting. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.</p>
propylene dichloride	Causes moderate eye irritation. Contact with the skin may result in irritation. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis. May be harmful if swallowed. Causes gastrointestinal tract irritation. Inhalation causes respiratory tract irritation. Symptoms of inhalation include: anorexia, abdominal pain, vomiting, blood abnormalities, and hematuria.	<p>Inhalation - Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eyes - Flush eyes with plenty of water for 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention.</p> <p>Skin - Flush skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical attention.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
propylene oxide	<p>Inhaling of the vapor is irritating to the mucous membranes and upper respiratory tract. Corrosive!</p> <p>Swallowing can cause severe burns of the mouth, throat, and stomach. Can cause sore throat, vomiting, diarrhea. Symptoms may include headache, nausea, vomiting, drunkenness, incoordination, dizziness, and general depression. Causes burns to any area of contact. Symptoms of redness, pain, and severe burn can occur with skin contact. Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.</p>	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eyes - Immediately flush eyes with gentle but large stream of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion – Do not induce vomiting. Give large quantities of water. Get medical attention immediately.</p>
pyridine	<p>Contact with eyes may cause severe irritation, and possible eye burns. Contact with the skin may cause skin irritation. Ingestion may cause gastrointestinal irritation with nausea, vomiting and diarrhea. Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. May also irritate the respiratory tract.</p>	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eyes - Immediately flush eyes with plenty of water for 15 minutes. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - Do not induce vomiting unless directed to do so by medical personnel. Get medical attention.</p>
sodium hydroxide	<p>Inhalation may cause coughing, burning sensation, wheezing, laryngitis, shortness of breath, headache and nausea. Can cause irritation and burns. Highly Corrosive to the eyes. Causes irritation of eyes with tearing, redness and swelling. Greater exposures cause severe burns with possible blindness resulting. Contact with skin can cause irritation or severe burns and scarring with greater exposures. Ingestion may cause irritation and burns of the gastro intestinal tract</p>	<p>Inhalation - Remove to fresh air. Get medical attention.</p> <p>Eyes - Immediately flush with plenty of water for 15 minutes. Get medical attention.</p> <p>Skin – Immediately remove contaminated clothes. Flush skin with plenty of water for 15 minutes. Get medical attention.</p> <p>Ingestion – Do not induce vomiting. Give plenty of water to drink. Get medical attention</p>

Exposure Substance	Potential Health Effects	First Aid Measures
styrene	Inhalation causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath. Ingestion may cause irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea. Contact with the skin causes irritation and may include redness, itching, pain and blisters. May be absorbed through the skin. May cause irritation, redness, pain, and corneal damage to the eyes.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of soap and water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - Do not induce vomiting. Give large amounts of water. Get medical attention.</p>
sulfuric acid	Corrosive. May cause coughing, burning sensation and labored breathing. Corrosive to the eyes. May cause redness, pain, and severe deep burns. Corrosive to the skin. May cause redness, serious skin burns and pain. Ingestion may result in abdominal pain, burning sensation and collapse.	<p>Inhalation - Remove to fresh air. If necessary, aid breathing. Get medical attention.</p> <p>Eyes - Immediately flush with plenty of water for 15 minutes. Get medical attention.</p> <p>Skin – Immediately remove contaminated clothes. Flush skin with plenty of water for 15 minutes. Get medical attention.</p> <p>Ingestion – Rinse mouth. Do not induce vomiting. Get medical attention</p>
tetrachloroethene	Irritating to the upper respiratory tract. Giddiness, headache, intoxication, nausea and vomiting may follow the inhalation of large amounts. Ingestion is not highly toxic by this route because of low water solubility. Symptoms include abdominal pain, nausea, diarrhea, headache, and dizziness. Causes irritation to skin. Symptoms include redness, itching, and pain. Causes irritation, redness, and pain to the eyes.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eye - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Wash skin with soap or mild detergent and water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - Aspiration hazard. Do not induce vomiting. Give large quantities of water. Get medical attention immediately.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
tetrahydrofuran	<p>Causes irritation to the respiratory tract. Symptoms may include coughing and shortness of breath. THF is an anesthetic agent in high concentrations. Overexposure may cause dizziness, headache, nausea and possible fluid in the lungs. May cause liver, kidney, or lung injury. Ingestion may result in irritation to the gastro intestinal tract. Symptoms may include nausea, vomiting and diarrhea. May cause sore throat and abdominal pain. May cause liver and kidney injury. Causes irritation to skin. Symptoms include redness, itching, and pain. Vapors exposure to the eyes may cause irritation, redness and pain. Eye contact may result in permanent eye damage.</p>	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.</p> <p>Eye – Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.</p> <p>Skin – Immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion – Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.</p>
toluene	<p>Inhalation may result in dizziness, drowsiness, headache, nausea, and unconsciousness. If ingested, may cause abdominal pain, burning sensation, and the same symptoms as inhalation. Contact with skin may cause dry skin and redness. Contact with eyes may cause redness and pain.</p>	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eye Contact - Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.</p> <p>Skin Contact - Remove contaminated clothes. Rinse and then wash skin with water and soap. Get medical attention.</p> <p>Ingestion – Rinse mouth. Give a slurry of activated charcoal in water to drink. Do not induce vomiting. Get medical attention.</p>
toluene diisocyanate	<p>Inhalation may cause abdominal pain, coughing, nausea, shortness of breath, sore throat and vomiting. Extremely hazardous in case of ingestion. Skin and eye contact may result in redness, burning sensation and pain with additional blurred vision in the eyes.</p>	<p>Inhalation - Remove to fresh air. Get medical attention.</p> <p>Eyes - Check for and remove any contact lenses. Do not use an eye ointment. Get medical attention.</p> <p>Skin - Flush immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. Get medical attention.</p> <p>Ingestion - Do not induce vomiting. If the victim is not breathing, perform mouth-to-mouth resuscitation. Get medical attention.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
trichloroethylene	<p>Vapors can irritate the respiratory tract. Causes depression of the central nervous system with symptoms of visual disturbances and mental confusion, incoordination, headache, nausea, euphoria, and dizziness. Inhalation of high concentrations could cause unconsciousness, heart effects, liver effects, kidney effects, and death. Ingestion may result in irritation to gastrointestinal tract. May also cause effects similar to inhalation. May cause coughing, abdominal pain, diarrhea, dizziness, pulmonary edema, unconsciousness. Kidney failure can result in severe cases. Estimated fatal dose is 3-5 ml/kg. Contact with skin causes irritation, redness and pain. Can cause blistering. Continued skin contact has a defatting action and can produce rough, dry, red skin resulting in secondary infection. Vapor exposure to the eyes may cause severe irritation with redness and pain. Splashes may cause eye damage. Chronic exposures may cause liver, kidney, central nervous system, and peripheral nervous system effects. Workers chronically exposed may exhibit central nervous system depression, intolerance to alcohol, and increased cardiac output. This material is linked to mutagenic effects in humans. This material is also a suspect carcinogen. Persons with pre-existing skin disorders, cardiovascular disorders, impaired liver or kidney or respiratory function, or central or peripheral nervous system disorders may be more susceptible to the effects of the substance.</p>	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.</p> <p>Eye Contact - Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.</p> <p>Skin Contact - Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.</p> <p>Ingestion - Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
triethylamine	Corrosive. Toxic by inhalation and ingestion. Vapors cause irritation to the respiratory tract; symptoms may include sneezing, coughing, nausea, difficulty in breathing, and pulmonary edema. May cause burns of the mouth, throat, and stomach with severe abdominal pain and collapse. Skin contact can cause redness, pain, and skin burns. Liquid contact will produce severe eye injury. Vapors are irritating, causing redness, pain and blurred vision.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eye - Immediately flush eyes with gentle but large stream of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion – Do not induce vomiting. Give large quantities of water. Get medical attention.</p>
urethane	Causes eye and skin irritation. Substance is readily absorbed through the skin. Ingestion may cause irritation of the digestive tract with nausea, vomiting and diarrhea. Causes respiratory tract irritation. Inhalation at high concentrations may cause CNS depression and asphyxiation.	<p>Inhalation - Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eyes - Immediately flush eyes with plenty of water for 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical attention.</p>
vinyl acetate	Contact with eyes may cause severe irritation, and possible eye burns. May cause mild skin irritation. Material evaporates quickly from open skin. However, it may cause burns if trapped under clothing. Ingestion may result in gastrointestinal irritation with nausea, vomiting and diarrhea. Inhalation may cause irritation of the respiratory tract with burning pain in the nose and throat, coughing, wheezing, shortness of breath and pulmonary edema. Vapors may cause dizziness or suffocation.	<p>Inhalation - Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eyes - Flush eyes with plenty of water for 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention.</p> <p>Skin - Flush skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical attention.</p>

Exposure Substance	Potential Health Effects	First Aid Measures
vinyl chloride	Inhalation may cause irritation, nausea, difficulty breathing, irregular heartbeat and headache. Skin and eye contact may result in irritation, redness, frostbite to the skin and pain. Ingestion may result in frostbite.	<p>Inhalation - Remove to fresh air. Give artificial respiration if not breathing. Get medical attention.</p> <p>Eye - Wash eyes immediately with large amounts of water, occasionally lifting upper and lower lids. Get medical attention.</p> <p>Skin - If frostbite or freezing occur, immediately flush with plenty of lukewarm water. Do not use hot water. If warm water is not available, gently wrap affected parts in blankets. Get medical attention.</p> <p>Ingestion - If a large amount is swallowed, get medical attention.</p>
xylene	Inhalation of vapors may be irritating to the nose and throat. Inhalation of high concentrations may result in nausea, vomiting, headache, ringing in the ears, and severe breathing difficulties which may be delayed in onset. Ingestion causes burning sensation in mouth and stomach, nausea, vomiting and salivation. Skin contact results in loss of natural oils and often results in a characteristic dermatitis. May be absorbed through the skin. Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage.	<p>Inhalation - Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.</p> <p>Eyes - Immediately flush eyes with plenty of water for 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.</p> <p>Skin - Immediately flush skin with plenty of soap and water for 15 minutes while removing contaminated clothing and shoes. Get medical attention.</p> <p>Ingestion - Aspiration hazard. If swallowed, vomiting may occur spontaneously, but do not induce. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Get medical attention.</p>

4.0 Personnel Training

Contractor personnel shall follow Cal/OSHA health and safety standards and have received health and safety training which meets the requirements of CCR Title 8 Regulations described in General Industry Safety Order 5192, and Hazardous Waste Site Operations (HAZWOPER) training which meets the requirements set forth under the Code of Federal Regulations (CFR), Title 29 Section 1910.120. Training shall be supplemented with at least eight hours of annual HAZWOPER refresher training for all field employees, and monthly in house training sessions for all employees.

All Contractor employees onsite will have received health and safety training meeting the requirements of CCR GISO 5192 and Federal 29 CFR 1910.120 regulations (HAZWOPER), including annual updates. Contractor project management and supervisory personnel will have received supervisor training in accordance Federal 29 CFR 1910.120 regulations (HAZWOPER).

Product knowledge is taught to all personnel as part of the Contractor's Hazard Communication Program included in *Section 26.0* of this HASP. All personnel are provided training in Material Safety Data Sheet (MSDS) comprehension, DOT placard definitions, understanding of NFPA

chemical hazard warning signs, as well as fundamental chemical hazards, principals of toxicology, and the selection and use of personal protective equipment.

Chemical hazard awareness training includes fundamental chemical hazard and incompatibility training as well as toxicology. Physical and environmental hazard awareness training is included in the curriculum of training regarding physical hazard awareness and site control procedures.

All training records for Contractor personnel shall be available for review at the project site. Appointments for training record reviews can be made through the SSO.

All Contractor employees receive pre-employment and annual medical examinations which include a general physical review, blood analysis, respirator fitness evaluation, and urinalysis for drug screening. Personnel medical evaluation policies and protocols are described in more detail in *Section 9.0* of this HASP.

Selected Contractor personnel are trained for various other health and safety functions, such as First Aid/CPR, Trench Excavation Safety, Confined Space Entry, Confined Space Entry Attendant, Confined Space Entry Supervisor and Atmospheric Testing/Site Monitoring, including equipment calibration and maintenance.

5.0 Personal Protective Equipment (PPE)

Whenever it is feasible to do so, the Contractor shall apply engineering and work practice controls as a means to protect personnel when performing site specific task in potentially hazardous environments. More detail on specific engineering and work practices controls is described in *Section 5.1* of this HASP. Only the SSO shall have the authority to authorize downgrades and upgrades in levels of personal protection assigned to individual work tasks at the project site.

The use of personal protective equipment shall comply with Subpart E, *Personal Protective and Life Saving Equipment*, 8 CCR Article 3, Section 1926. Guidelines in this section shall outline the general requirement for and use of personal protective equipment at the project site.

Use of some level of personal protective equipment shall be required for personnel and site visitors at the project site. At a minimum, all onsite personnel, including site visitors, shall utilize *Level D* personal protection at all times. Minimum *Level D* protection shall include the use of long pants, cotton sleeved shirts, gloves, steel toe work boots, safety glasses and hard hat. Hard toe safety boots shall be required at all times. Sneakers and sandals are not permitted.

Approved hearing protective devices shall be used when engineering and work practice controls fail to reduce sound levels within the limits specified by OSHA. Exposure to impulsive or impact noise shall not exceed 140 dB peak sounds pressure level.

Respiratory protection equipment shall be required in areas where health hazards exist due to the accumulation of dust, fumes, mists, or vapors. Respiratory protective devices shall be approved by the National Institute of Occupational Safety and Health (NIOSH) and shall be appropriate for the types of hazardous materials involved and the extent and nature of individual work requirements and conditions at the project site. Respiratory protective equipment will be inspected regularly and maintained in good condition. More detailed guidelines for the use of respiratory protection equipment are outlined in *Section 5.3* of this HASP.

Full body safety harnesses and lifelines shall be used as a means for personnel fall protection when other safeguards such as nets, planking, or scaffolding do not exist or cannot be used. Safety lines shall be independent of other rigging. More detailed fall protection standards are outlined in *Section 20.0* of this HASP.

Table 5-1: Definitions of Levels of Personal Protection

Level of PPE	Definitions, Environmental Qualifications and Limiting Criteria
Level D	<p><u>Equipment:</u> Hard-hat, safety glasses, steel toed safety boots and gloves.</p> <p><u>Protection Provided:</u> No respiratory protection. Minimal skin protection.</p> <p><u>Environmental Qualifications:</u> The atmosphere contains no known hazard. Work functions preclude splashes, immersions, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.</p> <p><u>Limiting Criteria:</u> This level should shall not be worn in the <i>exclusion zones</i> or an any work areas or an any potentially hazardous work areas where airborne concentration of contaminants are suspected to exceed the Permissible Exposure Limit (PEL).</p>
Level D Modified	<p>All requirements same as <i>Level D</i> listed above except for the use of some level of dermal protection (i.e. Tyvek suit and chemical resistant gloves).</p>
Level C	<p><u>Equipment:</u> Hard-hat, chemical resistant steel toed boots, gloves, poly coated Tyvek, and a full face air purifying respirator with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p><u>Protection Provided:</u> The same level of skin protection as level B, but a lower level of respiratory protection.</p> <p><u>Environmental Qualifications:</u> The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect any exposed skin. The types and concentrations of air contaminants have been identified and measured. The assigned protection factor (APF) for the air purifying respirator selected shall be appropriate so that employee exposure is limited to less than the PEL of the atmospheric contaminants.</p> <p><u>Limiting Criteria:</u> Atmospheric concentration of chemicals must not exceed IDLH levels. The atmospheric concentration of the chemicals must not exceed the rating of the respirator cartridge or the maximum use concentration (MUC) for the air purifying respirator being used.</p>

Level of PPE	Definitions, Environmental Qualifications and Limiting Criteria
Level B	<p><u>Equipment:</u> The equipment listed in Level C, but in place of a respirator, workers shall utilize supplied air. Air will be supplied from a cascade system, a compressed supplied air filtration unit, or a <i>self-contained breathing apparatus</i> (SCBA).</p> <p><u>Protection Provided:</u> The same level of respiratory protection but less skin protection than Level A. It is the minimum level recommended for initial site entries until the hazards have been further identified.</p> <p><u>Environmental Qualifications:</u> The type and atmospheric concentration of substances have been identified and require a high level of respiratory protection, but less skin protection. This involves atmospheres that do not meet the criteria for use of air-purifying respirators. Such atmosphere's may contains less than 19.5 percent oxygen or the atmospheric concentration of known chemical contaminants exceeds the rating of air purifying respirator cartridges or the MUC for air purifying respirators. Presence of incompletely identified vapors or gases is indicated by direct reading organic vapor detection instrument, but vapors and gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the intact skin.</p> <p><u>Limiting Criteria:</u> Use only when the vapor or gases present are not suspected of containing high concentrations of chemicals that are harmful to skin or capable of being absorbed through the intact skin. Use only when it is highly unlikely that the work being done will generate either high concentrations of vapors, gases, or particulates or splashes of material that will affect exposed skin.</p>
Level A	<p><u>Equipment:</u> The equipment listed in Level C, and in addition, workers will use pressure demand full face-piece SCBA or pressure demand supplied air respirator with escape SCBA. A totally encapsulating chemical protective suit, inner and outer chemical resistant gloves, chemical resistant boots with steel toe and shank, and two way radios worn inside encapsulating suit are also required as Level A protection. Note: SCBA is normally worn inside encapsulating suit to lessen the possibility of contamination and or damage to the unit.</p> <p><u>Protection Provided:</u> The maximum level of respiratory and skin protection. It is the minimum level recommended for initial site entries where hazards are unidentified and require further identification.</p> <p><u>Environmental Qualifications:</u> The type and atmospheric concentration of substances have been unidentified and require a high level of respiratory and skin protection.</p>

The anticipated level of personal protection for most work activities performed at the project site shall be *Level D Modified* including white Tyvek suits, hard hat with safety glasses, steel toe work boots, and leather gloves with chemical resistant nitrile glove liners. At a minimum, all onsite personnel, including site visitors, shall utilize *Level D* personal protection at all times. Minimum *Level D* protection shall include the use of long pants, cotton sleeved shirts, gloves, steel toe work boots, safety glasses and hard hat

High pressure water washing activities, confined space entry activities and any other work activity where a higher potential for chemical exposure exists shall, at a minimum, be performed in *Level C* including chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with appropriate cartridge configuration based on the anticipated chemical hazard.

Hearing Conservation

Protection against the effects of noise exposure shall be provided when sound levels for individual work tasks at the project site exceed those shown in table below. In the event that personnel onsite are subjected to sound levels exceeding those shown in the table below, feasible engineering and/or administrative controls shall be implemented to reduce noise levels. If such controls prove inadequate, hearing protection shall be required.

Table 5-2: Permissible Noise Exposure Levels

Duration Day (hour)	Sound Level (dBA Slow Response)
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
0.25 (or less)	115

If variations in maximum noise levels are at intervals of one second or less, the noise shall to be considered continuous. Exposure to impulsive or impact noise shall not exceed the 140dB peak sound pressure level.

As part of the Contractor's personnel medical surveillance program (refer to *Section 6.0* of this HASP), an audiometric testing program shall be maintained for all employees whose exposure equals or exceeds an 8-hr TWA of 85dBA. This testing shall be repeated annually. Testing will conform to California Code of Regulation Title 8, Article 105. Hearing protection shall be made available to all personnel exposed. Personnel exposed to 90dBA TWA or more shall be *required* to wear hearing protection.

Any unusual decrease in an employee's hearing shall immediately be brought to the attention of the SSO. The SSO shall assess noise exposures in individual work areas on a daily basis and implement control measures as required.

The SSO shall have the following responsibilities regarding hearing conservation at the project site:

1. Enforce the use of ear protection for personnel who are exposed to noise levels in excess of limits shown in the table above.
2. Supervise schedules for annual audiometric examinations.
3. Ensuring the availability of engineering controls for noise in specific work areas at the project site.
4. Providing annual training in conformity with that requested above and specified in CCR Title 8, Article 105.

5. Analyzing noise exposures and implement controls when exposures exceed noise levels listed above.
6. Approve hearing protection devices.

Vision Conservation

Eye protection shall be required at all times at the project site. All eye protection equipment shall meet the requirements of ANSI Z87.1-1989, "Practice for Occupational and Educational Eye and Face Protection".

SSO Responsibilities:

1. Assure that the necessary type and amount of eye and face protective devices are available for onsite personnel and visitors at the project site.
2. Conduct daily area hazard analysis (AHAs) and identify potential eye hazards for individual work areas and activities.
3. Identify the type of eye protection required in work areas where eye hazards cannot be eliminated.
4. Inspect individual work areas and identify potential eye hazards.
5. Initiate actions necessary to minimize and, where possible, eliminate eye hazards.
6. Post signs and placards and/or other identifications as applicable to appropriately identify areas where eye protection is required.

Employee Responsibilities

1. Use only eye protective devices which are serviceable (i.e., free from scratches and contaminants which could impair vision). Report unserviceable equipment to the SSO.
2. Store eye protective devices in a manner which will protect them from scratches and contaminants when not in use.
3. Utilize the most appropriate eye protective devices when working in an area or performing an operation which presents an eye hazard.
4. Report potential eye hazards to the SSO.

Visitors

All visitors shall be required to wear eye protection while observing operations at the project site.

5.1 Engineering and Work Practice Controls

Where feasible, the Contractor shall apply engineering and work practice controls described below as a means to protect personnel when performing site specific task in potentially hazardous environments. When safe to do so, engineering and work practice controls shall first be implemented to reduce the need for excessive use and/or elevated levels of personal protective equipment (PPE) that may restrict work performance and efficiency and increase the risk of heat related illnesses. Refer to *Section 18.0* of this HASP for policies and procedures associated with heat illness prevention.

Ventilation to Reduce VOC Emissions

The highest potential for the generation of VOC emissions is associated with closure activities of hazardous waste management units (HWMUs) that were formerly involved with solvent and fuel related chemicals. These units include tank farms A, B, C, D, G, H, I, J, L, M, N, O, Q, R, vacuum pots (HWMU #24), thin film evaporators (HWMU #26), liquid extraction unit (HWMU #27), pipe rack and chemical transfer piping, the former production area – fractionation (HWMU #23) including distillation columns, re-boilers, and condensers. Chemical vapor concentrations within these units (if any) may be largely dependent upon vapor pressures, amount of residue present, and temperature.

Prior to decontamination activities at a locations described above, the interiors of the waste management units shall be screened with a flame ionization detector (or equivalent) to establish interior vapor concentrations (if any). If interior vapors are present above 100 ppm, the interiors of the units shall be ventilated using the following procedures.

1. Place a flexible eight inch duct in the opening of the tank.
2. Connect the duct to a 2,000 pound vapor phase carbon adsorption vessel.
3. Ventilate the tank by pulling air out of the tank through a venturi blower at approximately 75 cubic feet per minute through the activated carbon for approximately 30 minutes.
4. Shut the blower off and re-test the atmosphere at the opening of the tank.
5. If the vapors are above 100 ppm, repeat the process.
6. Continue to ventilate the tank until the vapor concentration is below 100 ppm. Once vapor concentration is below 100 ppm periodic checks shall be performed to ensure vapor concentration remain below 100 ppm.

Dust Mitigation

Some dusts may be generated as a result of demolition and decontamination activities at the project site. The Contractor does not anticipate having to perform any soil excavation and trenching activities as part of the scope of work for this project. The primary dust source during project activities will be heavy equipment operation used for demolition and deconstruction of facility buildings and process equipment as well as concrete pad removal. Potential dust receptors may include onsite workers, adjacent properties, and vehicle drivers adjacent to the project area.

Avoidance and minimization of hazards can be accomplished by staying upwind of dust sources and avoiding areas where buildings, process equipment and concrete are mechanically disturbed. Dust mitigation measures shall be implemented at all times. Dust monitoring shall be performed to verify compliance. The preferred engineering method of dust control will be to spray water over dust sources to keep the exposed surfaces moist. If excessive winds result in large amounts of persistent airborne dust, site visits, work, monitoring, etc., may be terminated at the discretion of the SSO.

5.2 Respiratory Protection

Whenever it is feasible to do so, personnel respiratory protection shall be accomplished through engineering controls such as ventilation and through administrative controls limiting the duration of exposure. Should these methods be inadequate, respirators shall be provided to allow personnel to breathe safely in potentially hazardous environments.

It is recognized that respirators have limitations and their successful use shall depend upon policies and procedures identified in this section.

Responsibility

The SSO, in conjunction with onsite management personnel, shall provide leadership by example and demonstrate interest by ensuring that adequate resources are available for effective implementation policies and procedures outlined in this section.

The SSO shall have the authority and responsibility for overall management and administration of respiratory protection procedures. Responsibilities include:

- Preparing, evaluating and modifying written respiratory protection policies and procedures.
- Identifying, locating, and maintaining ongoing surveillance and evaluation of airborne exposures
- Respirator Selection
- Conducting medical screening for potential respirator users
- Conducting respirator fit testing and assignment
- Training and recordkeeping

The SSO, in conjunction with all other onsite project management and supervisory staff, shall be responsible for carrying out respiratory protection protocols for personnel under their supervision.

Workplace Exposure Assessment & Ongoing Surveillance

Prior to performing individual tasks at the project site, personnel exposure assessments shall be conducted to identify harmful airborne contaminants, their extent and magnitude, and how to control them.

Personnel exposure shall not exceed permissible concentrations specified in the *California Code of Regulations* Title 8, Section 5155. The SSO in conjunction with the CIH, shall evaluate individual work tasks and procedures and conduct exposure monitoring prior to and during work activities at the project site. Additional evaluations may be necessary if exposures change due to

new materials, process changes or other conditions increasing the degree of employee exposure or stress.

Respirator Selection

Contractor personnel shall be required to utilize respiratory protection where engineering and administrative means do not achieve desired exposure control and/or in the case of an emergency. Different types of respirators are available for a variety of applications. Proper NIOSH approved respirators shall be selected and used for the kind of work being performed and hazards involved.

Evaluating Respirator Wearer Health Status

Employee health status shall be considered before allowing personnel to utilize respiratory protection equipment. An employee's physical and medical condition, duration and difficulty of work tasks, individual contaminant toxicity, and type of respirator may affect an employee's ability to wear a respirator while working. All onsite personnel shall be evaluated under personnel medical evaluation protocols (refer to *Section 6.0* of this HASP) to determine if they are physically able to work while wearing a respirator.

Before personnel are assigned tasks requiring use of respiratory protection equipment, it shall be determined that employees are physically able to perform the work tasks that are required of them and are able to use the equipment. Personnel shall be required to go through medical examination (refer to *Section 6.0* of this HASP) to determine what health and physical conditions may limit their ability to perform work at the project site. Medical evaluations shall be completed and signed to certify an employee's ability to wear a respirator. The respirator user's medical status shall be reviewed annually. Employee medical evaluation records shall be maintained onsite and are available for review by contacting the SSO.

Respirator Fit Testing & Assignment

After the appropriate type of respirator is selected and each employee's ability to work while wearing a respirator is certified, a qualitative fit test shall be conducted to choose the best fitting face piece and determine the specific brand, model and size for each employee.

Qualitative Fit Testing Procedures

The following procedures pertain only to air purifying respirators, and to air supplying respirators that have a tight face piece fit.

Personnel shall be allowed to select the most comfortable face piece from a variety of sizes and manufacturers. Personnel shall be instructed on how to put on a respirator, how to position the face piece and head straps, and how to adjust the strap tension to make the respirator comfortable.

Evaluating respirator comfort shall include the following:

- Face piece positioning on the face at the chin and nose bridge
- Strap tension and tendency to slip
- Use of safety glasses and other personal protective equipment

After selecting a face piece, employees shall be required to put on the equipment and conduct a negative and positive air pressure fit check. Employees who pass the fit check shall then wear the respirator in normal atmosphere for at least five minutes to make sure the fit remains comfortable. Employees who do not pass the fit check shall be instructed to readjust the face piece and straps and perform the fit check again. For employees who again are unable to pass the fit check, a different face piece shall be selected and the test repeated.

Irritant Smoke Fit Test Procedure

Air purifying respirators used for fit testing shall be equipped with a high-efficiency particulate (P100) filters or canister.

The employee shall perform and pass both positive and negative fit checks, and wear the respirator at least five minutes prior to the fit testing to ensure a comfortable and tight fitting face piece.

During the test procedure, the employee shall be given a weak concentration of the irritant smoke to smell, and his/her ability to identify its presence shall be noted. Any employee unable to detect the irritant smoke shall be excluded from the test and an alternate test shall be conducted.

If a quarter or half face piece respirator is being used, the employee shall be instructed to close his or her eyes during the irritant smoke test, and to wash his or her face after the test is complete.

Personnel conducting the test shall break both ends of a smoke tube containing stannic oxychloride, attach a short length of tubing to one end of the tube and attach the other end to the positive pressure end of a two-way aspirator bulb. A material safety data sheet for stannic oxychloride shall be available for review prior to this fit testing procedure. The tester shall direct the smoke toward the face seal perimeter of the tightly fitted face piece, or toward the visor perimeter of a powered air purifying respirator equipped with a helmet or hood. The tester shall begin at least 12 inches away from the face piece, helmet or hood and gradually close to within one inch while moving around the entire perimeter of the face piece, helmet or hood.

The employee being tested shall perform the following exercises for at least 30 seconds each while the face piece, helmet or hood is challenged by the irritant smoke:

- Normal breathing
- Deep breathing at a regular rate
- Turn head from side to side and inhale when head is at either side
- Nod head down and back and inhale when head is in the down and back positions
- Bending forward to touch toes and inhale when head is in the down position
- Talk and recite the Rainbow Passage (shown below)
- Resume normal breathing

Rainbow Passage

“When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.”

Training

Once personnel have been properly fitted with the correct respirators for the work tasks with which they will be assigned, they shall receive training in the need, use, limitations, inspection, fit checks, maintenance and storage of the respiratory protection equipment. Detailed instructions for the care and use of respiratory protection equipment shall be provided and used for personnel training.

Evaluation of Respirator Cartridge Change Out Schedules

Due to nature of site activities, actual concentrations of airborne organic vapor contaminants during decommissioning activities are unknown. Therefore, the Contractor will initially rely on suggested manufacturer's cartridge change out schedules and conduct field testing in accordance with OSHA recommendations.

Due to anticipated low organic vapor concentrations, the change out schedule will assume a one-day change out schedule.

Procedure to Evaluate Cartridge Change Out Schedule

A procedure to determine, under actual workplace conditions, whether respirator cartridges are effectively protecting the worker is provided by the American Industrial Hygiene Association seminar "Respirator Cartridges: How to Set a Replacement Schedule" is outlined below.

Using a leak free cartridge holder, adaptors, inert tubing, a Teflon tee, sampling tube, and a sampling pump, air will be drawn through a cartridge being replaced (at the end of a work day). The air stream leaving the cartridge will be tested either with a PID, OVA, and/or detector tubes to determine if contaminant break through has occurred. If breakthrough has been determined, the cartridge is considered as no longer performing as designed and the change out schedule will be shortened by one hour. The testing will be repeated after the shortened change out schedule.

Testing will occur immediately before cartridge change out, and the detection method to be used will be selected to ensure sufficient sensitivity to detect the chemical of interest below the Occupational Exposure Limit (OEL). These procedures should be performed immediately after leaving the work area. In addition, the sampling train will be assembled on a cartridge from an onsite worker judged to have elevated exposures as compared to others. This will be determined qualitatively using the onsite chemical detection equipment (PID/OVA) to select the worker or workers to have their cartridges tested.

A figure of the proposed respirator sampling train is included as *Figure 4* in this HASP.

6.0 Personnel Medical Surveillance

This section is intended to address protocol associated with personnel baseline, ongoing and exit medical surveillance as well as protocol associated with pre-employment, post injury/accident and reasonable suspicion substance abuse screening. Protocols outlined in this section are in support of policies and protocols outlined in the following Contractor written programs:

- Contractor Injury and Illness Prevention Plan (IIPP)
- Contractor Respiratory Protection Plan
- Contractor Drug Free Work Place Policy
- Contractor Employee Safety Handbook
- Contractor New Hire Orientation Program

The above written programs are not included in this HASP and can be made available upon request by contacting the Contractor's Corporate EH&S Manager.

Employee Medical Surveillance

Medical surveillance shall be required for all contractor personnel exposed, or potentially exposed, to hazardous materials as part of their job descriptions. Contractor employment positions with potential exposure to hazardous materials may include, but are not limited to:

- Field Project Managers
- Field Supervisors
- Field Technicians
- DOT Registered Hazardous Materials/Waste Drivers
- Heavy Equipment Operators
- Operations Staff
- Environmental Health and Safety Staff
- Sales and Estimation Staff

The Contractor maintains accounts with pre-designated medical provider network clinics who are authorized to perform personnel medical evaluation in accordance with specific medical surveillance programs put together by the Contractor's Environmental Health and Safety (EH&S) Department as well as required by State and Federal OSHA regulations. It is the responsibility of the Contractor's Corporate EH&S Manager to ensure that the protocols associated with each medical surveillance program are consistent between individual medical provider network clinics.

Baseline Medical Surveillance Program (Employment Physical)

Personnel who may be exposed, or potentially exposed, to hazardous materials during their course of employment with the Contractor shall be required to undergo baseline medical evaluation before performing any job function that involves working in a hazardous environment and/or handling hazardous substances. For the purpose of this section, a hazardous environment shall be defined as any work environment with excessive noise or that requires heavy lifting and bending and/or the use of respiratory protection.

Baseline medical surveillance shall include the following medical evaluation protocols:

1. 5-Panel Drug Screen
2. Hazardous Material Handling Physical Examination
3. Pulmonary Function Test (PFT)
4. Audio Evaluation
5. 2-View Chest X-ray (may be performed at Doctor's discretion only)
6. Blood Metal Evaluation (Lead, Chromium, Arsenic, Mercury)

Annual Medical Surveillance Program (Annual Physical)

Personnel who are exposed, or potentially exposed, to hazardous materials during their course of employment with Contractor shall be required to undergo ongoing, annual medical surveillance. Annual medical evaluation results shall be compared to those from the previous year's as well as those from the employee's baseline medical evaluation to ensure that there have been no relevant changes in health monitored year to year since date of hire.

Annual medical surveillance shall include the following medical evaluation protocols:

1. 5-Panel Drug Screen
2. Hazardous Material Handling Physical Examination
3. Pulmonary Function Test (PFT)
4. Audio Evaluation
5. 2-View Chest X-ray (may be performed at Doctor's discretion only)
6. Blood Metal Evaluation (Lead, Chromium, Arsenic, Mercury)

Exit Medical Surveillance Program (Exit Physical)

Personnel who are exposed, or potentially exposed, to hazardous materials during their course of employment with the Contractor shall be required to undergo employee exit medical surveillance. Exit medical evaluation results shall be compared to those from all previous years as well as those from the employee's baseline medical evaluation to ensure that there have been no relevant changes in health during course of employment with the company.

Exit medical surveillance shall include the following medical evaluation protocols:

1. Hazardous Material Handling Physical Examination
2. Pulmonary Function Test (PFT)
3. Audio Evaluation
4. 2-View Chest X-ray (may be performed at Doctor's discretion only)
5. Blood Metal Evaluation (Lead, Chromium, Arsenic, Mercury)

Department of Transportation (DOT) Medical Surveillance Program

In addition to baseline, annual and exit medical evaluation protocols described above, all Contractor personnel with commercial drivers licenses hired to perform driving functions for the company shall be required to undergo a DOT medical surveillance physical examination before operating any company commercial vehicle registered under the Contractor's DMV Motor Carrier Permit. DOT physical examinations do not take the place of baseline, annual and exit physical examinations and must be performed in addition to these medical surveillance protocols.

Contractor personnel performing commercial driving functions shall undergo DOT medical evaluation every two years.

Employee Substance Abuse Screening

In accordance with the Contractor's *Drug Free Workplace Policy*, all Contractor personnel shall be required to undergo substance abuse screening as a result of the following:

- Pre-employment
- Annual Medical Evaluation
- Post Accident and/or Injury
- Documented Reasonable Suspicion

For the purposes of this section, discussion of substance abuse policy shall be limited to brief descriptions substance abuse screening protocols and affected personnel. More detailed information on substance abuse policies and procedures are outlined in the Contractor's written *Drug Free Workplace Policy*.

Employee substance abuse screening shall be performed by the same pre-designated medical provider network clinics who perform Contractor employee medical surveillance. Protocols for which employee substance abuse screening are performed shall be designated by the Contractor's EH&S Department. It is the responsibility of the Contractor's Corporate EH&S Manager to ensure that the protocols associated with substance abuse screening are consistent between medical provider network clinics.

Initial Pre-employment Drug Screening (In-house)

Before hire, all employment candidates shall be required to undergo pre-employment drug screening using an I-Cup™ 5-Panel, litmus strip disposable drug screen kit (or equivalent FDA approved kit). Initial pre-employment drug screening shall be administered in house by designated authorized personnel only. Designated authorized personnel shall consist of at least one male and one female employee. Authorized personnel administering pre-employment drug screening shall be trained as follows:

- Proper handling of the I-Cup™ 5-Panel disposable drug screen kit (or equivalent).
- Understanding and interpretation of results.
- Proper methods of communication with employment candidate when explaining results.
- Safety and proper hygiene associated with handling urinalysis specimens.

All employment candidates will submit to an initial pre-employment drug screen. Inconclusive (*Positive*) results on an initial screening will be referred for a confirming laboratory test at one of the Contractor's pre-designated medical provider network clinics.

Important: I-Cup™ 5-Panel pre-employment drug screen kits (or equivalent) are to be used for initial pre-employment drug screening only. Human resources policy as well as protocols outlined in the Contractor's *Drug Free Workplace Policy* prohibit company self administered drug screening for annual follow-up, post accident/injury and/or reasonable suspicion cases. I-Cup™ 5-Panel disposable drug screen kits (or equivalent) shall be inventoried and stored in a secure location accessible by designated authorized personnel only.

Pre-employment Drug Screening (Occupational Clinic Administered)

In addition to initial pre-employment drug screening performed in-house, new hire employees who may be exposed, or potentially exposed, to hazardous materials or who will perform work in potentially hazardous environments shall be required to undergo occupational clinic administered pre-employment drug screening as part of their baseline medical evaluation.

Annual Drug Screening

Contractor employees who are exposed, or potentially exposed, to hazardous materials or who perform work in hazardous environments shall be required to undergo annual, occupational clinic administered drug screening as part of their annual medical evaluation.

Department of Transportation (DOT) Drug Screening

In addition to pre-employment and annual drug screening protocols described above, all Contractor personnel with commercial drivers licenses hired to perform driving functions for the company shall be required to undergo an occupational clinic administered DOT drug screen

before operating any company commercial vehicle registered under the Contractor's DMV Motor Carrier Permit. DOT drug screens do not take the place of pre-employment or annual drug screens and must be performed in addition to these tests.

Important: Personnel subject to DOT Drug screening must bring a blank Federal Drug Testing Custody and Control Form to give to the clinic physician administering the drug test. This form is mandatory and can be obtained by contacting the Contractor's Corporate EH&S Manager.

All Contractor personnel who undergo DOT medical surveillance and drug screening and who operate company commercial vehicles registered under the Contractor's DMV Motor Carrier Permit are subject to Part 382 of the *Federal Motor Carrier Safety Regulations* and shall be entered into a random drug testing selection pool in accordance with §382.305.

Contractor personnel performing commercial driving functions shall undergo DOT drug screens every two years as part of their DOT medical surveillance evaluation or when requested for random drug screening from a selection pool.

Post Accident / Injury Drug Screening

After any workplace accident involving any injury or property damage, or a "near miss," the involved employee shall undergo post accident/injury drug screening. If the employee claims to be unable to provide a urine specimen adequate for testing, it will be treated as a refusal to cooperate.

Important: Personnel who operate company commercial vehicles registered under the Contractor's DMV Motor Carrier Permit must submit to DOT Drug screening protocols for post accident/injury incidents regardless if the incident was driving related. As with all DOT drug screens, these employees must bring a blank Federal Drug Testing Custody and Control Form to give to the clinic physician administering the drug test. This form is mandatory and can be obtained by contacting the Contractor's Corporate EH&S Manager.

Alcohol Abuse Screening

Personnel suspected to be under the influence of alcohol shall be immediately subject to alcohol collection and testing procedures at a pre-designated medical provider network clinic. Personnel subject to alcohol testing shall be escorted by authorized personnel to the medical provider network clinic where they shall be required to present photo identification and cooperate with the clinic's normal testing procedures.

The clinic shall use Evidential Breath Testing ("EBT") Devices to screen the test breath specimen for alcohol. Alcohol tests shall be documented using chain-of-custody forms. If the employee claims to be unable to provide a breath specimen adequate for testing, it will be treated as a refusal to cooperate.

Reasonable Suspicion Drug Screening

Contractor personnel are subject to drug and alcohol screening if a trained supervisor or manager reasonably suspects that they are using, possessing or impaired by drugs or alcohol in violation of the Contractor's *Drug Free Workplace Policy*. Such determination will be documented and based upon specific, contemporaneous observations of an employee's speech, appearance, actions, body odors and/or performance and reasonable inferences drawn there from.

Reasonable suspicion cases must first be documented using a Supervisor's Reasonable Cause Checklist and immediately reported to the Contractor's Corporate EH&S Manager.

Table 6-1: Medical Surveillance Program Reference Table

Program / Protocol	Affected Employees	Frequency
Baseline Medical Surveillance (Baseline Physical Examination)	<ul style="list-style-type: none"> • Field Project Managers • Field Supervisors • Field Technicians • DOT Registered Drivers • Equipment Operators • Operations Staff • EH&S Staff • Sales & Estimation Staff 	Pre-employment – prior to performing any job function that involves working in a hazardous environment and/or handling hazardous substances.
Annual Medical Surveillance (Annual Physical Examination)	<ul style="list-style-type: none"> • Field Project Managers • Field Supervisors • Field Technicians • DOT Registered Drivers • Equipment Operators • Operations Staff • EH&S Staff • Sales & Estimation Staff 	Annually on or near the month of employee hire date.
Exit Medical Surveillance (Exit Physical Examination)	<ul style="list-style-type: none"> • Field Project Managers • Field Supervisors • Field Technicians • DOT Registered Drivers • Equipment Operators • Operations Staff • EH&S Staff • Sales & Estimation Staff 	Upon employee termination of employment.
Department of Transportation (DOT) Medical Surveillance (DOT Physical Examination)	<ul style="list-style-type: none"> • DOT Registered Drivers • All Contractor personnel with commercial drivers licenses hired to perform driving functions for the company 	<p>Pre-employment - before operating any company commercial vehicle registered under the Contractor's DMV Motor Carrier Permit. Must be performed in addition to baseline medical surveillance.</p> <p>Repeat DOT medical surveillance every 2-years. Must be performed in addition to annual medical surveillance.</p>

Program / Protocol	Affected Employees	Frequency
<p>Initial Pre-employment Drug Screening (In-house)</p> <p>I-Cup™ 5-Panel, litmus strip disposable drug screen kit (or equivalent FDA approved kit).</p>	<p>*All Employment Candidates</p> <ul style="list-style-type: none"> • Field Project Managers • Field Supervisors • Field Technicians • DOT Registered Drivers • Equipment Operators • Operations Staff • EH&S Staff • Sales & Estimation Staff • Office Administrative Staff 	<p>Pre-employment - to be used for initial pre-employment drug screening only. Human resources policy as well as protocols outlined in the Contractor's <i>Drug Free Workplace Policy</i> prohibit company self-administered drug screening for annual follow-up, post accident/injury and/or reasonable suspicion cases.</p>
<p>Pre-employment Drug Screening (Occupational Clinic Administered)</p>	<ul style="list-style-type: none"> • Field Project Managers • Field Supervisors • Field Technicians • DOT Registered Drivers • Equipment Operators • Operations Staff • EH&S Staff • Sales & Estimation Staff 	<p>Pre-employment – prior to performing any job function that involves working in a hazardous environment and/or handling hazardous substances.</p> <p>Performed as part of employee baseline medical surveillance protocols.</p>
<p>Annual Drug Screening</p>	<ul style="list-style-type: none"> • Field Project Managers • Field Supervisors • Field Technicians • DOT Registered Drivers • Equipment Operators • Operations Staff • EH&S Staff • Sales & Estimation Staff 	<p>Annually on or near the month of employee hire date.</p> <p>Performed as part of employee annual medical surveillance protocols.</p>

Program / Protocol	Affected Employees	Frequency
<p>Department of Transportation (DOT) Drug Screening</p>	<ul style="list-style-type: none"> • DOT Registered Drivers • All Contractor personnel with commercial drivers licenses hired to perform driving functions for the company 	<p>Pre-employment - before operating any company commercial vehicle registered under the Contractor's DMV Motor Carrier Permit. Must be performed in addition to Pre-employment baseline drug screening.</p> <p>Repeat DOT drug screening every 2-years as part of DOT medical surveillance protocol or when requested for random drug screening from a selection pool in accordance with §382.305.</p> <p>Important: obtain blank Federal Drug Testing Custody and Control Form from Contractor EH&S Department.</p>
<p>Post Accident / Injury Drug Screening</p>	<ul style="list-style-type: none"> • Field Project Managers • Field Supervisors • Field Technicians • DOT Registered Drivers • Equipment Operators • Operations Staff • EH&S Staff • Sales & Estimation Staff 	<p>After any workplace accident involving injury or property damage or a "near miss".</p> <p>Important: Employees who operate company commercial vehicles registered under the Contractor's DMV Motor Carrier Permit must submit to DOT Drug screening protocols for post accident/injury incidents regardless if the incident was driving related. Obtain blank Federal Drug Testing Custody and Control Form from Contractor EH&S Department.</p>

Program / Protocol	Affected Employees	Frequency
Alcohol Abuse Screening	<ul style="list-style-type: none"> *All Contractor Employees • Field Project Managers • Field Supervisors • Field Technicians • DOT Registered Drivers • Equipment Operators • Operations Staff • EH&S Staff • Sales & Estimation Staff • Office Administrative Staff 	<p>When an employee is suspected to be under the influence of alcohol.</p> <p>Important: An employee subject to alcohol testing shall be escorted by authorized personnel to the medical provider network clinic.</p>
Reasonable Suspicion Substance Abuse Screening	<ul style="list-style-type: none"> *All Contractor Employees • Field Project Managers • Field Supervisors • Field Technicians • DOT Registered Drivers • Equipment Operators • Operations Staff • EH&S Staff • Sales & Estimation Staff • Office Administrative Staff 	<p>When a trained supervisor or manager reasonably suspects that an employee is using, possessing or impaired by drugs or alcohol in violation of the Contractor's <i>Drug Free Workplace Policy</i>.</p> <p>Important: Reasonable suspicion cases must first be documented using a Supervisor's Reasonable Cause Checklist and immediately reported to the Contractor's Corporate EH&S Manager.</p>

Scheduling Employee Medical Evaluations and Substance Abuse Screening

All personnel medical evaluations shall be scheduled through the Contractor's EH&S Department. Contractor management and human resources personnel shall contact the Contractor's Corporate EH&S Manager to schedule pre-employment, annual and exit medical evaluations as well as DOT medical surveillance evaluations. Accidents and injuries shall be immediately reported per the Contractor's Accident Prevention Program. Post accident/injury as well as reasonable suspicion substance abuse screening shall be scheduled through the Contractor's EH&S Department.

Record Keeping

All personnel medical evaluation and substance screening records shall be maintained in personnel medical and training files kept separate from employee personnel files. Only authorized Contractor EH&S and human resources personnel shall have access to personnel medical and training files. Individual personnel medical evaluation and substance abuse screening records shall be maintained on file for a minimum of 30 years.

6.1 Personnel Heat Stress Monitoring

For operations in which individuals are wearing clothing for which wet bulb globe temperature (WBGT) Clothing Adjustment Factors are available, the ACGIH Action Limits can be used as screening criteria to control heat stress. The ACGIH criteria are designed to ensure that an individual's core body temperature does not exceed 100.4°F.

Since the protective clothing ensemble for high pressure washing will include, polypropylene coverall, ACGIH has assigned an adjustment factor of 0.5 – 1 for this type of ensemble.

The screening criteria are based upon the measurement of environmental conditions. These conditions are expressed as a factor known as the wet bulb globe temperature index (WBGT). The WBGT can be determined using an electronic heat stress monitor (Quest Model TEMP 34).

Once the index number has been determined, and the type of workload established, a recommended work/test regimen can be implemented to ensure a safe working condition. See table below.

Table 6-2: Action Limits (WBGT)

Work-Rest Regimen	Work Load / Light Value in °C WBGT	Work Load / Moderate Value in °C WBGT	Work Load / Heavy Value in °C WBGT
Continuous Work	28	25	-
75% Work 25% Rest, Each Hour	28.5	26	24
50% Work 50% Rest, Each Hour	29.5	27	25.5
25% Work 75% Rest, Each Hour	30	29	28

Since the work will be performed in clothing other than a summer work uniform then the WBGT value must be adjusted using the appropriate ACGIH Clothing Adjustment Factors.

Other Precautionary Monitoring Procedures

If screening criteria (Action Limits) are exceeded and additional information is desired by the SSO, the following monitoring procedures and preventive measures shall be implemented.

Heart rate

- Determine personnel heart rate by monitoring the radial pulse at the beginning of rest periods.
- If heart rate is greater than 110 beats per minute, then shorten work period by 1/3.
- If heart rate is still above 110 beats per minute, then again shorten work period by 1/3.

Oral temperature

- Determine personnel oral temperature by using a disposable thermometer for 3 minutes under the tongue at the beginning of rest periods and before drinking liquids.
- If oral temperature is greater than 99.6°F, then shorten next work period by 1/3.
- If oral temperature is still above 99.6°F, then again shorten work period by 1/3.
- Do not allow personnel to continue working if oral temperature is greater than 100.6°F.

Additional Health Factors

There are certain predisposing factors that can increase one's risk to heat stress. Workers not acclimated to the environment, obese individuals, those currently experiencing vomiting or diarrhea conditions, recent alcohol intake on those individuals with chronic cardiovascular diseases are all at increased risk.

Water and Electrolyte Intake

Workers in a hot environment can lose as much as 3 gallons of fluids and electrolytes in sweat, and therefore must be able to readily compensate for this loss.

Fluids shall be replaced every 20 minutes and in amounts (approximately 150 ml) greater than are necessary to satisfy normal thirst (since the "thirst response" is an adequate stimulus for fluid replacement under stressful heat conditions).

Water shall be kept cool throughout the operation, a temperature of 50 to 60 degrees F. is recommended.

Electrolyte loss can be compensated by providing electrolyte replenishing fluids such Gatorade® or small, light snacks containing minor amounts of sodium.

Prevention

Certain precautions can be taken to reduce heat exposures and/or minimize their effects. More details on heat illness prevention are discussed in *Section 18.0* of this HASP.

1. Schedule the more strenuous physical activities during the beginning and the end of the day when external temperatures may be cooler.
2. Do not perform any work at midday. If possible, schedule work in split shifts (such as 6:00 a.m. - 10:00 a.m. and 2:00 p.m. - 6:00 p.m.).
3. An appropriate sunscreen lotion should be applied to a worker's exposed skin areas.
4. Potable water should be available in sprayer containers so that workers can cool down skin surfaces.
5. Provide workers with shaded and/or a cooled rest area. If possible, have an air-conditioned van available where workers can sit during breaks and lunch (be sure to monitor carbon monoxide levels if vehicle is stationary). If a vehicle is not possible then a canopy area with table and chairs should be provided. Chairs may also be advisable for "mini"-rest breaks in the work zone.

7.0 Air Surveillance

Several site closure activities have the potential to generate airborne contaminants and therefore may represent a potential concern to onsite workers and offsite receptors. However, engineering controls will be instituted for the activities having the most potential for generating airborne contaminants. Specifically, the decommissioning of site features that were previously involved with high vapor pressure volatile chemicals has the most potential to generate airborne contaminants of concern. The engineering controls to be applied will include screening the interior of these site features for vapor concentrations, and if present, the interior air will be purged by drawing the interior air through activated carbon sorbent media. After purging, these features will be re-screened and re-purged if necessary to ensure that low vapor concentrations are present prior to the commencement of decommissioning operations.

With respect to inorganic soluble chemical residues, and particulate bound low vapor pressure chemical residues, the primary engineering control is the application of water (pressure washing) to suppress the potential generation of chemical dusts.

The air monitoring procedures to be implemented to for offsite receptor and worker protection are described below.

7.1 Site Perimeter Airborne Contaminant Monitoring

A portable meteorological station (Met Station) will be set up on-site to record appropriate daily meteorological data (wind speed and direction) during site closure activities. This information will be useful for interpreting perimeter monitoring results, contaminant emission rates from activities monitored, and to ensure that perimeter monitoring devices are appropriately located.

Previously, hundreds of different chemical compounds were handled by the Romic facility. According to the Human Health Risk Assessment (Environ 1991) prepared for the facility, 95% of all waste materials processed at the site were primarily solvents, antifreeze, industrial waste water, and other oil based chemicals. The other approximately 5% consisted of dyes, photo processing wastes, detergents, soaps, adhesives and coatings, metals, and household hazardous wastes.

Currently, all receptacles at this facility that were previously used for chemical handling are empty. However, chemical residues may be present in tanks, pipes, pots, evaporators, boilers, distillation apparatus, and other receptacles. Vapor phase chemicals may be present in receptacles, and chemicals in vapor form have the ability to migrate in air once released. Therefore, the air monitoring program considers high vapor pressure -high toxicity compounds that have the potential to exist in a state that allows exposure and/or has the potential for offsite migration.

Other chemical compounds (acids, caustics, oils, antifreeze, etc) are less of a concern due to inherently lower vapor pressures, and the fact that pressure washing the interior of the receptacles will suppress the vapors of the more soluble compounds (acids, caustics, antifreeze).

The proposed perimeter monitoring program is further described below.

7.1.2 Volatile Organic Compounds (VOCs)

The highest potential for the generation of airborne contaminants is associated with closure activities of hazardous waste management units (HWMUs) that were formerly involved with solvent and fuel related chemicals. These units include Tank Farms A, B, C, D, G, H, I, J, L, M, N, O, Q, R, Vacuum Pots (HWMU #24), Thin Film Evaporators (HWMU #26), Liquid Extraction Unit (HWMU #27), Pipe Rack and Chemical Transfer Piping, the former Production Area – Fractionation (HWMU #23) including distillation columns, re-boilers, and condensers. Chemical vapor concentrations within these units (if any) will be largely dependent upon vapor pressures, amount of residue present, and temperature.

This health and safety plan proposes to institute a comprehensive one-time monitoring event to demonstrate the effectiveness of the proposed engineering controls, and thereafter provide real time screening of the site perimeter and work place.

Prior to site closure activities at a location(s) described above, the interiors of the waste management units will be screened with a flame ionization detector (or equivalent) to establish interior vapor concentrations (if any). If interior vapors are present above 100 ppm, the interiors of the units shall be ventilated as described in *Section 5.1* of this HASP. After ventilation, decommissioning will proceed. To establish the effectiveness of this engineering control, perimeter monitoring during this event shall consist of five monitoring locations that include 2 upwind locations for background concentrations and three downwind locations to quantify VOC concentrations related to site activities. At each of these locations, air monitoring will consist of the collection of whole air samples, over the entire work day for analysis using EPA Method TO-15 for volatile organic compounds. The samples will be collected in 6-liter stainless steel canisters equipped with flow controllers to allow for collection of entire work day samples. TO-15 is chosen as the method of choice due to the presence of unknown compounds; its ease of use, large number of target compounds (60) and that 10 – 20 tentatively identified compounds (TICs) can easily be added. TICs can be compared to a known library of 25,000 compounds.

Concurrently, an onsite portable flame ionization detector (FID) will be used to periodically screen perimeter locations for total organic compounds, and to screen immediate downwind concentrations of organic compounds during closure activities. In addition, the FID will be used to screen the interiors of various waste management units (receptacles) prior to the initiation of pressure washing. In addition, employee exposure monitoring will be implemented as described below during this event.

The data generated during this event will include wind speed and wind direction (met station), downwind chemical specific concentrations (above background), distances from the waste management units being decommissioned, onsite immediately downwind total vapor concentrations (FID), employee chemical specific exposure concentrations during the work activity, and perimeter total VOC concentrations at various times and locations. This information will allow the estimation of contaminant (source) generation rates, downwind dispersion, and offsite consequences for all vapor sources to be decommissioned.

Thereafter, the real time FID monitoring for total vapor during the rest of the project will allow appropriate engineering and other risk management activities to be initiated during decommissioning to ensure public and worker protection.

7.1.2.1 Perimeter Action Levels for VOCs

A site perimeter action level of 1 ppm (total VOCs) is proposed for site closure activities. This value is based on:

- The permissible exposure level for benzene, vinyl chloride, and 1,1-dichloroethylene which are high vapor pressure compounds that possess elevated acute and chronic toxicological properties. Since it is not expected that pure benzene, vinyl chloride, and 1,1-dichloroethylene will be present, a total vapor concentration of 1 ppm at the site perimeter should be protective for offsite receptors.

7.1.2.2 VOC Monitoring Frequency

During the initial decommissioning of solvent related waste management units, perimeter monitoring using U.S. EPA Method TO-15 and exposure monitoring will be conducted during the first day of operations. The perimeter data combined with real time periodic FID measurements and met data should provide the necessary information with which to determine the expectation for offsite consequences during site decommissioning. However, daily FID screening at the perimeter and work place during solvent related equipment decommissioning is required.

7.1.2.3 Instrument Calibration

The FID will be base calibrated using calibration gases from 0, 5 ppm, and 100 ppm methane concentrations. In addition, a chlorinated solvent calibration standard will be selected to test the instruments response to halogenated VOCs.

7.1.3 Total Dusts

Particulate bound and low vapor pressure compounds will be screened using PDR-1000 aerosol monitors at the five perimeter locations as described above. PDRs provide real time particle concentrations for particles sizes 10 micrometers (um) and less. The PDRs will be set at stationary locations and set to sample in data logging mode with 5-minute sampling time intervals. Data will be retrieved daily. The PDRs shall be calibrated daily using the factory provided calibration kits.

7.1.3.1 Perimeter Total Dust Action Level

Since there are no soil/dust matrix sample results for particulate and/or low vapor pressure compounds, the perimeter action level for total dusts will be set at 50 ug/m³ (above background) based on the BAAQMD 24 hour standard for total particulate matter that is 10 um and less in size.

7.2 Personnel Air Monitoring

During the initial comprehensive monitoring event described above, up to 4 workers (deemed representative for the work activities envisioned), will be monitored for the entire work day. Monitoring will consist of the collection of breathing zone air samples using low flow personal exposure monitoring pumps and sorbent media consisting of sintered carbon (carbo traps). The

pumps will be calibrated before and after the monitoring day, and periodically checked during the sampling event to ensure that they are operating properly. To be consistent with the perimeter monitoring program, and for the same reasons for selection, the analytical method will include EPA Method T0-17. TO-17 is identical to TO-15 except that the collection method is a sorbent tube.

Following the first comprehensive monitoring event, monitoring thereafter will consist of field screening using a FID and PDR 1000 for total dusts.

7.3 Data Retention

Site records to be retained will include monitoring records, field notes, and hazardous waste manifests.

Site records will be retained as follows:

7.3.1 Exposure Records

Exposure monitoring records will be maintained in accordance with Cal/OSHA regulations that require 30-year retention to include employee monitored, social security number, activity monitored, results, and date of monitoring. Exposure records will include any heat stress monitoring activities.

7.3.2 Perimeter Monitoring Records

Dust Monitoring

Real time dust monitoring data will be downloaded at the end of each monitoring day and printed out to provide a hard copy for the site file. The records will include real-time dust concentrations, monitoring location, time of each concentration recorded, and monitoring notes as appropriate.

Chemical Specific Monitoring

Chemical specific perimeter monitoring records to be retained with the site file will include monitoring location, monitoring date, monitoring notes, Certified Analytical Reports, and any summary reports of the monitoring results.

Meteorological Data

Information downloaded from the Met Station will accompany the daily monitoring data. This information will include temperature, pressure, humidity, wind speed and direction.

Organic Vapor Screening

Daily screening of volatile organic compounds will include results recording on field logs including time of day, location, activity monitored, vapor concentrations recorded, and perimeter concentrations recorded (time/location/concentrations).

8.0 Site Control

Access to the project site is limited to one gated entry point off of Bay Road on the South side of the property. An onsite security guard shall remain employed full time for the duration of the Romic Phase I Closure Project. The security guard shall be stationed in the Administration Building (*Building 1*) and shall have control of all vehicle access to the project site through the use of security cameras and remote gate opening and closing controls. The security guard shall also have visual access to multiple locations at the project site through the use of security cameras and television monitors.

All persons entering and exiting the project site, including Contractor personnel, shall be required to sign in and sign out at the security desk in *Building 1*. The daily sign in log shall include:

- Name of persons entering the site
- Affiliation
- Date
- Arrival time
- Departure time
- Purpose of visit
- In the case of an emergency requiring site evacuation in accordance with the procedures outlined in *Section 10.0* of this HASP, the daily sign-in log shall be utilized by the SSO, and/or alternate emergency coordination personnel, to conduct a head count at the personnel evacuation assembly areas. Primary and secondary evacuation assembly areas are shown on *Figure 2* included in this HASP.

8.1 Work Zones

Individual work tasks involving the decontamination and decommissioning of individual facility hazardous waste management units including but not limited to tank farms, vacuum pots, thin film evaporators, liquid extraction units, pipe racks and chemical transfer piping, distillation columns, re-boilers, condensers, etc; shall be performed in a manner as to reduce the possibility of contact with contaminants and to prevent the spread of contaminants by personnel and equipment to clean areas outside of immediate decontamination work zones.

The contractor shall delineate individual work zones in which specific decontamination operations are to take place. Individual work zones shall be further delineated into three established control zones with specific zone entry and decontamination procedures at designated control points. The three control zones are described in further detail below.

Support Zones

Support zones, or "clean zones", shall be defined as any areas at the project site located safe distances upwind from individual work areas where decontamination and decommissioning activities are performed. All other personnel not performing decontamination activities and/or site visitors shall remain in support zones at all times where they may safely observe operations utilizing minimal levels of PPE. Operation control centers as well as clean equipment and supplies shall be maintained only in those locations designated as support zone areas.

Procedures for personnel and equipment decontamination performed in contamination “reduction zones” as well as the controlled entry and exit of personnel and equipment in and out of contamination “reduction zones” shall be strictly enforced to prevent the spread of contamination into support or “clean zones”.

Contamination Reduction Zones

Contamination “reduction zones” shall be defined as designated areas immediately adjacent to exclusion zones where personnel and equipment must be decontaminated before entering support zone areas. Contamination “reduction zones” shall control personnel access to exclusion zones and shall serve as a single point of entry through which all personnel and equipment must pass through when entering an exclusion zone. Only authorized personnel shall be allowed to enter contamination “reduction zones” at the project site. It is within contamination “reduction zones” that personnel shall prepare for entry and doff PPE when egressing from “hot zone” areas where decontamination and decommissioning activities are immediately performed. Contamination reduction zones shall contain equipment and facilities for neutralizing, rinsing and scrubbing PPE as well as receptacles for depositing spent safety equipment. If necessary, a separate contamination “reduction zone” for equipment decontamination may be erected immediately adjacent to an exclusion zone. Under no circumstances are personnel and equipment permitted to exit an exclusion zone without first passing through the contamination “reduction zone”. In the event of an emergency, emergency decontamination procedures outlined in *Section 9.0* of this HASP shall be followed.

Exclusion Zones

Exclusion zones, or “hot zones”, shall be defined as the immediate work area where decontamination decommissioning activities are performed. It is within exclusion zones where actual work is performed and elevated potential for chemical and physical hazards are present. Only authorized personnel shall be allowed to enter exclusion zones at the project site. No personnel shall be allowed to enter an exclusion zone without the proper designated level of personnel protection for the work being performed and without first passing through the contamination “reduction zone” to prepare for entry.

9.0 Personnel and Equipment Decontamination

Equipment Decontamination

All equipment removed from designated work areas where decontamination and decommissioning activities are performed shall be decontaminated prior to entering support or “clean zone” areas. Equipment contamination “reduction zones”, separate from the “reduction zones” used for personnel decontamination, shall be erected immediately adjacent to the exclusion zones for individual work areas where decontamination and decommissioning activities are performed at the project site. Equipment contamination “reduction zones” shall contain equipment and facilities for neutralizing, rinsing and scrubbing the equipment as well as receptacles for depositing spent decontamination supplies and safety equipment. Decontamination rinse waters shall be collected and containerized for confirmation sampling and later disposal. Decontaminated equipment shall be visually inspected by the SSO and equipment decontamination procedures shall be monitored daily by the SSO to evaluate personnel safety and the effectiveness of decontamination procedures.

Personnel Decontamination

Personnel exiting designated work areas where decontamination and decommissioning activities are performed shall be required to pass through the decontamination or "reduction zone" adjacent to the immediate work area or exclusion zone. The Contractor shall erect a contamination "reduction zone" where personnel will prepare for entry and doff PPE when egressing from individual work areas where decontamination and decommissioning activities are performed at the project site. Contamination "reduction zones" shall contain equipment and facilities for neutralizing, rinsing and scrubbing PPE as well as receptacles for depositing spent safety equipment. Decontamination rinse water shall be collected and containerized for confirmation sampling and later disposal. New supplies shall be staged on the outside of contamination "reduction zones" and will be available to personnel preparing to enter individual work areas. Personnel in need of replacement equipment shall have to first meet the minimal decontamination requirements before donning new equipment. Contamination "reduction zones" shall be inspected daily by the SSO and decontamination procedures shall be strictly enforced to prevent contamination beyond designated exclusion zones and to mitigate the possibility of exposure to personnel at the project site.

Emergency Personnel Decontamination

In the event of an injury or severe exposure requiring immediate first aid or immediate transportation to a hospital for emergency services, the injured party shall be subject to "emergency decontamination" procedures. "Emergency decontamination" shall be performed in one of two ways depending on the exposure substance and/or the nature of the injury. If the injury or exposure is not immediately life threatening, the subject shall be assisted through the contamination reduction zone to remove contaminated PPE and then proceed to get medical services as needed. If the injury is life threatening and/or if the subject is unconscious, efforts shall be made to perform a wipe down, cutaway, or rinse off while moving the subject to an emergency service area. If time is critical, the subject may be encapsulated up to the neck in a bag or plastic sheeting. All personnel performing "emergency decontamination" procedures must, at a minimum, utilize the same level of PPE as the injured subject. Personnel exiting the exclusion zone to assist with "emergency decontamination" procedures must first decontaminate themselves before assisting the injured subject.

In the event of a severe injury, all personnel should make themselves available to respond and assist in the handling of the injured person until the situation has been stabilized. The SSO shall reestablish work when the situation has been resolved and work can continue safely.

10.0 Contingency Planning

When an emergency occurs, contingency planning outlined in this section shall be implemented to minimize hazards to people, environment, or property. An emergency is any site condition, which poses a greater than normal threat to people, the community, the environment, or property. Contractor personnel under the direction of the SSO and designated alternate emergency coordinators onsite shall implement these procedures.

Medical emergency procedures shall be assessed based on the severity of the incident. Serious medical emergencies shall be addressed by immediately calling the emergency telephone numbers listed below. For medical emergencies that do not require immediate dispatch of emergency medical responders, the name, address, and telephone number of the nearest emergency medical facility is provided below. A map and driving directions to the nearest emergency medical facility is provided as *Attachment C* in this HASP.

For non-emergency and/or standard first aid medical incidents, the name, address, and telephone number of the nearest first aid clinic under the Contractor's occupational medical provider network (MPN) is provided below. A map and driving directions to the nearest MPN first aid clinic is provided as *Attachment C* in this HASP.

Emergency Telephone Numbers:

Note – 911 calls made from mobile/cellular phones are automatically routed to the California Highway Patrol (CHP) potentially slowing response time. Because mobile/cellular phones will be the primary source of communication for contractor employees, personnel dialing 911 from these devices should be prepared to provide concise detailed information about the emergency so that CHP dispatch can route the emergency call to the nearest local authorities in a timely and efficient manner.

Fire: 911
Police: 911
Ambulance: 911
Poison Control Center: (800) 222-1222

Nearest Emergency Medical Facility:

Facility Name: Stanford University Hospital
300 Pasteur Drive
Palo Alto, California

Telephone #: (650) 723-4000 (General)

Nearest Non-Emergency Medical Provider Network (MPN) Clinic

Facility Name: U.S. Health Works – Union City
33560 Alvarado Niles Boulevard
Union City, CA

Telephone #: (510) 489-8700 (General)

SSO Responsibilities (22 CCR 66264.52(d), 66264.55, 66264.56)

The SSO shall be responsible for coordinating emergency response procedures in the event of a release, fire, explosion, or other emergency situation occurring at the facility.

In the event of an emergency, the SSO shall:

- Assure the safety of facility personnel
- Assess the nature and severity of the situation
- Initiate the contingency plan, if appropriate
- Coordinate facility evacuation, if necessary
- Direct containment and control operations

- Contact emergency agencies and authorities (if necessary)
- Initiate clean-up and emergency equipment replenishment operations (cleaning and restocking)

The SSO shall be thoroughly familiar with all aspects of the contingency plan, the facility layout and onsite operations, and the locations and properties of hazardous materials and wastes handled at the project site. The SSO shall have the authority to commit Contractor resources needed to carry out the contingency plan.

The Contractor Project Manager and Superintendent shall act as alternate emergency coordinators (EC) and shall be onsite or on call at all times during both operational and non-operational hours. The SSO shall act as the primary EC and will typically be onsite from the hours of 7:00 a.m. to 4:00 p.m. weekdays and can be reached by mobile telephone. The following table includes the names, title and contact information of Contractor EC personnel at the project in order in which they assume EC responsibilities.

Table 10-1: Contractor Emergency Coordination Personnel Onsite

Name	Title	Contact Information
Mr. Jason Costello	Project SSO	(510) 750-2099 mobile
Mr. Christopher Kwoka	Project Manager	(510) 773-9136 mobile
Mr. Sean Orman	Project Superintendent	(510) 385-5612 mobile

Site Security

Access to the project site is limited to one gated entry point off of Bay Road on the South side of the property. An onsite security guard shall remain employed full time for the duration of the Romic Phase I Closure Project. The security guard shall be stationed in the Administration Building (*Building 1*) and shall have control of all vehicle access to the project site through the use of security cameras and remote gate opening and closing controls. The security guard shall also have visual access to multiple locations at the project site through the use of security cameras and television monitors.

All persons entering and exiting the project site, including Contractor personnel, shall be required to sign in and sign out at the security desk in *Building 1*. The daily sign in log shall include:

- Name of persons entering the site
- Affiliation
- Date
- Arrival time
- Departure time
- Purpose of visit
- In the case of an emergency requiring site evacuation in accordance with the procedures outlined in this section, the daily sign-in log shall be utilized by the SSO, and/or alternate emergency coordination personnel, to conduct a head count at the personnel evacuation assembly areas. Primary and secondary evacuation assembly areas are shown on *Figure 2* included in this HASP.

Communications

Working telephones are located in administrative buildings on the project site. Contractor personnel shall utilize two-way radios for internal communications. Administrative office building #1 housing the onsite security station and 24-hour guard shall serve as the base station for internal communications. Project managers, supervisors, technical, and safety personnel shall carry portable radios at all times.

Depending on the magnitude of an incident, the SSO will immediately notify alternate EC personnel onsite using site radios and/or telephones. As appropriate, the SSO or alternate EC personnel will notify local emergency response agencies such as the fire department or the police. Each incident has specific reporting requirements described later in this section. During an emergency, radios on the site are used only for essential communications. Contractor personnel shall receive training and understand the following emergency radio protocol:

- **“Code Red”** – A life threatening incident has occurred. Unless specifically asked to provide help by the SSO and/or alternate EC personnel, stay off the radio and listen for notification to evacuate or to provide help. Do not go to the incident area unless requested.
- **“Code Yellow”** – An incident that is not life threatening has occurred. Stay off the radio and listen for notification to provide help. Do not go to the incident area unless requested.
- **“Evacuate”** – An emergency situation which requires immediate site evacuation and notification of emergency support agencies (“911”). Listen to radio for evacuation directions to a specific evacuation assembly area.
- **“911/Team Alert”** – Any emergency situation which requires notification of “911”, and a response from EC personnel. The SSO will direct EC personnel to a specific site location.
- **“Team Alert”** – An emergency which requires a response from the SSO and/or alternate EC personnel only. The SSO will direct the ERT to a specific site location.
- **“All Clear”** – The situation is under control. Resume normal radio protocol.

In the event of an emergency, on-site communication between emergency response agencies and the SSO and/or alternate EC personnel will not occur by radio or telephone since these agencies may not have the same radio frequencies and telephone communication between the agencies and the SSO may be difficult. Therefore, the SSO will coordinate communications with the emergency response agency (police or fire) who will assume overall direction for the emergency. The SSO will coordinate activities through the Administrative building #1 serving as the base station for onsite communications. The SSO may use radios or telephones to contact personnel as directed by the emergency response agency commander.

Emergency Equipment and Supplies

The site has fire fighting equipment, spill control equipment and supplies, emergency showers, eyewashes and first aid kits. Site construction equipment may be used in some types of emergencies as described later in this plan. There are supplies of PPE to include protective clothing, gloves, boots and respirators. The SSO shall ensure that all equipment and supplies are readily available, maintained, and inspected weekly.

Spill Control and Containment

Refer to *Section 12.0* of this HASP for mitigation and control procedures associated with accidental spills and releases of hazardous materials and/or wastes at the project site. Any spill or accidental release of hazardous substances requires immediate containment and cleanup. Salvage drums, various absorbents, admixtures for caustic spill neutralization, and assorted shovels and scoops shall be located in designated areas throughout the project site.

Personal Protective Equipment

Supplies of various items of PPE shall be maintained on site at all times. Coveralls made of multi-layer laminated material, Saranex®-laminated Tyvek®, or polyethylene-coated Tyvek® are available. For hand protection, there are various chemical protective gloves made of nitrile, latex, natural rubber, or neoprene. All workers are required to wear steel-toe boots. American National Standards Institute (ANSI)-approved safety glasses and goggles are available for eye protection. All personnel are required wear hard hats at all times unless inside break areas or administrative building areas.

Training

All permanent and temporary personnel shall receive emergency contingency plan (ECP) training at an initial orientation. ECP training will also be provided as appropriate during weekly safety meetings and daily tailgate meetings. This training will include:

- How to Respond to an Emergency
- Location of Emergency Equipment and Supplies
- Evacuation Procedures, Assembly Areas, and Routes

In addition, alternate EC personnel will receive training:

- On their duties and responsibilities
- On the command and control system (ICS)
- On coordination procedures with emergency response agencies, health departments, and medical facilities

The SSO will prepare instruction, evaluate training program, and maintain documentation of training. The SSO shall conduct training in a classroom setting and on-the-job (“in the field”).

The SSO shall arrange periodic meetings and/or training exercises conducted at least once before the start of any new work activity, or work activity performed in a new area or structure, to ensure employee familiarization with the ECP procedures outlined in this section. The drills shall also assist in ensuring that Contractor personnel can respond effectively to emergencies through the implementation of defined emergency procedures, and the proper use of available emergency equipment.

If an emergency occurs this may be substituted for the training exercise. The SSO shall invite public emergency response agencies to participate in training exercises which is appropriate for their potential involvement in on-site emergencies. A post-training critique will be held to discuss and assess the effectiveness of the exercise in implementing the ECP procedures outlined in this section.

Emergency Response Procedures (Incident Response, Assessment, and Identification)

Personnel Response

Contractor personnel, when faced with an actual or imminent emergency, shall first attend to their own safety. Then, if and when it is safe to do so, they shall attend to other personnel requiring immediate assistance. Personnel shall also notify other affected facility personnel by means of two-way radio communication, voice and/or hand signals (e.g., shouting of instructions, pointing).

In all emergency situations, personnel involved in or discovering the situation shall contact the SSO and provide information as to the location, nature, and extent of the incident (refer to *Table 10-1* in this section). *Figure 1, Emergency Response Notification Flow Chart*, included in this HASP outlines the proper emergency notification procedures to be followed by Contractor personnel at the project site.

Contingency planning outlined in this section shall address emergency response procedures for the containment and control of emergency situations including injured or endangered employees, fires and explosions. Refer to *Section 12.0* of this HASP for mitigation and control procedures associated with accidental spills and releases of hazardous materials and/or wastes at the project site.

SSO Response

The SSO shall assess the situation immediately after an incident occurs (or immediately upon arrival at the site if not present at the time of the incident) to determine the appropriate response actions, including implementation of the contingency plan where public health or the environment are threatened. Contractor personnel shall only respond to incipient fire or spills within the capability of onsite spill response personnel and resources. If the incident is beyond the incipient stages, then the emergency will be responded to by outside emergency service providers. The SSO shall ensure that the procedures for containment and control of emergency situations are initiated (refer to *Section 12.0* of this HASP).

If necessary, the SSO will contact outside emergency service providers, and will notify appropriate local, state, and federal agencies as required. The SSO will evaluate the severity and nature of the incident, and will attempt to identify the character, source, quantity, and real extent of any released materials.

The selection of appropriate response actions shall be influenced by the following factors:

- The severity and nature of the incident: fire, explosion or spill.
- The potential for severe consequences: location of the incident, to what extent might other areas become involved; are persons offsite in danger; will surrounding property be damaged or contaminated; is there a threat to surface and groundwater.
- The current weather conditions: will the temperature, wind direction, and velocity affect response activities.

Identification of the character, source, quantity, and areal extent of the released materials shall be made through the following methods and sources of information:

- Eyewitness accounts: employee discovering emergency
- Visual inspection: real extent, noted fumes, odors, reactions
- Source: origin of leak
- Tank involved: type of waste stored or treated
- Containers involved: labels or placards
- Location of incident: operational or segregated storage area
- In-plant records: waste tracking forms, tank volume logs, manifests, generators' waste profiles.

Notification [22 CCR 66264.56(d)]

Contractor personnel shall immediately notify the SSO in the event of any emergency regardless of size or extent. The SSO shall supply specific information as to the type, quantity, and location of released material. The SSO in conjunction with the alternate EC personnel, will evaluate this information. If it is determined that there has been a hazardous substance spill/release, fire, or explosion which could threaten public health or the environment outside the project site, or there has been an uncontained release of a reportable quantity of a hazardous substance, the proper local, state, and federal agencies shall be notified immediately. The name and phone numbers of these agencies are presented in *Figure 1, Emergency Response Notification Flow Chart* included in this HASP. Reports to outside authorities shall include:

- Name and phone number of person reporting the incident
- Name and address of the project site
- Time and type of incident (e.g., fire, release)
- Name and the quantity of material(s) involved to the extent known
- Extent of injuries (if any)
- Possible hazards to public health or the environment outside the project site.

Pursuant to 19 CCR 2703, notification to the State Office of Emergency Services and the CUPA shall further include, to the extent known:

- An indication of whether the substance is an extremely hazardous substance as defined by 19 CCR 2770.5, Tables 2 and 3
- Duration of the release
- Medium or media into which the release occurred

- Any known or anticipated acute or chronic health risks associated with the emergency and, where appropriate, advice regarding medical attention necessary for the exposed individuals
- Proper precautions to take as a result of the release, including evacuation
- Names and telephone numbers of person(s) to be contacted for further information.

An example Emergency Information Reporting Form is included as *Attachment B* in this HASP.

General Emergency Response Activities

There are procedures that are common to all emergency response activities:

Notification - The person discovering the incident immediately reports the incident to the SSO. The SSO notifies onsite EC personnel as required and notifies the site as necessary by alerting all personnel on the site. The SSO will ensure that responding agencies [Fire, Police or Medical (911)] or regulatory agencies are notified.

Establish Command System - The SSO will direct EC personnel to perform duties as required by the nature of the emergency. The SSO determines the level of personnel mobilization. The SSO considers the ability to notify personnel for incidents occurring after normal operating hours in determining possible level of response. The SSO will assure that communications systems are functioning. If needed, the SSO will establish an Operational Command Post (OCP) at a safe field location.

Assess the Nature and Extent of Incident - The SSO shall determine the nature and extent of the incident. Each incident has specific factors requiring actions that mitigate the incident. This ECP discusses several types of anticipated incidents.

Identify Immediate Response Activities - The SSO shall ensure that immediate response activities are initiated. The shall determine if partial or total evacuation is necessary. The SSO shall ensure that any activity, which impacts the nearby community, is coordinated with regulatory agencies. The SSO shall determine the need for a shutdown of any facility operations.

Coordinate Activities - The shall coordinate all site activities. The shall ensure the use of appropriate technical procedures such as air monitoring, control and containment, engineering to mitigate the incident and to minimize effects to people, the environment, or to property.

Maintain Site Security - The SSO shall ensure that the site security personnel maintain control of all personnel entering and leaving the site during an emergency. The SSO may direct other employees to augment site security.

Follow-up Activities - The SSO shall ensure that all required notifications, especially to regulatory agencies are made. The SSO shall ensure the preparation of documentation and other reports regarding the incident. The SSO shall conduct a post incident review to assure completion of all requirements, to evaluate the incident, to plan and prevent future reoccurrence, and to ensure appropriate startup procedures.

Shutdown (operations, facilities, systems)

The IC may direct shutdown of facility systems. Table 11-2 lists the systems and references to shutdown procedures found in the Site Operations Plan. If the facility or system is shut down, the IC will assess the need for monitoring the affected areas and equipment. The monitoring will check for imminent hazards such as release, gas generation, pressure buildup, presence of incompatible waste, proper equipment and utilities shut off.

Evacuation

In the event an incident poses an imminent threat to personnel, the SSO will direct an evacuation of the facility or portions of the facility affected by the incident. Evacuation routes and designated assembly areas are shown on *Figure 2* included in this HASP. The SSO and alternate EC personnel shall supervise all evacuation efforts until emergency response agencies assume control. The SSO and alternate EC personnel shall account for all onsite personnel and direct them to specified assembly areas and direct subcontractors, suppliers and visitors to specified assembly areas.

The pre-planned evacuation routes may change to respond to incident-specific factors such as location of incident, road closures, construction, wind direction, and so forth. All personnel except those participating in emergency response activities will remain in an assembly area until directed by the SSO or alternate EC personnel. To account for personnel at an assembly area, the site security guard will provide a copy of the site access log to the SSO and EC personnel. The SSO will verify the accounting of all personnel listed.

Injuries

The Contractor maintains an Injury and Illness Prevention Program (IIPP) in accordance with Cal OSHA regulations in Title 8 of the California Code of Regulations. The IIPP includes a discussion of safety measures that are implemented, including all those in this HASP, to prevent illness and injury to personnel onsite. Investigation and reporting procedures in case of an accident or injury are also included in the IIPP. The Contractor's IIPP will be maintained at the project site at all times.

Minor Injuries

First aid trained individuals may treat minor injuries. The SSO shall post a list of all personnel current in first aid/CPR qualification. All alternate EC personnel shall be current in first aid/CPR qualification. The SSO may direct personnel with minor injuries requiring further medical attention to designated medical provider network (MPN) clinics as per protocols and procedures outlined in the Contractor's Injury and Illness Prevention Plan (IIPP). In most cases, the Contractor will provide a driver to transport the injured employee, unless the SSO determines that it is not necessary. *Attachment C* included in this HASP indicates the location and routes to the nearest area hospital and contracted MPN clinics.

Major Injuries

All injuries to the back, all injuries to the head that cause dizziness or loss of consciousness, anything that causes an employee to lose consciousness, anything that affects the breathing, and any condition that cannot be treated or controlled by first aid is a major injury. A qualified first aid/CPR person may provide immediate support to the injured employee. Response to a major injury shall require the following:

1. Contact the SSO and/or alternate EC personnel by radio. They will call 911.
2. SSO will notify alternate EC personnel as needed.
3. CPR/first aid-qualified individual provides treatment or stabilizes the injured person, until emergency response agency arrives.

- If employee is in an unsafe area, move the employee to a safer area if it is possible to do so without exacerbating the injury.
 - Decontaminate the employee, if necessary and only if it will not injure the employee.
4. SSO or alternate EC personnel will escort outside medical or emergency agency personnel insuring that area is safe to enter.
 5. Nonessential personnel will leave the area.
 6. At the request of emergency agency personnel, assist with injured or contaminated personnel. If injured employee is contaminated:
 - Assure that personnel are wearing appropriate PPE and have necessary training.
 - Remove contaminated clothing from injured person, if possible.
 - Decontamination or removal of PPE is secondary to medical care. Medical personnel may choose to wrap the injured person in plastic or other clean protective material to protect emergency personnel and equipment while injured person is transported to emergency room.
 - Emergency response agency personnel will notify hospital/emergency room of the presence and nature of contaminated clothing and/or person. The SSO sends a MSDS or other type of chemical information sheet with the medical personnel.
 - If employee can walk or be moved without further injury, wash all affected skin areas thoroughly with soapy water.
 7. Emergency agency personnel choose the medical facility to which the injured person is transported.

Recovery

The SSO shall ensure that California Occupational Safety and Health Administration (Cal-OSHA) is immediately notified if there is a death or serious injury to employees. The SSO will initiate an incident investigation and ensure that the area is safe for work that all equipment is safe to use and review all work procedures regarding the incident. In the event of a death, the scene is left undisturbed, until police and/or Cal-OSHA investigate.

Fire / Explosion

Any person discovering a fire or witnessing an explosion will immediately notify security or SSO. The SSO or security guard will immediately call "911" based on the report. Site personnel will report all fires, no matter the size. The person making the initial report will describe the location and the type of fire.

Site Personnel Response to Fire / Explosion

Site personnel will immediately leave the area of an explosion. Site personnel will attempt to extinguish only incipient stage fires. Incipient stage fires are those type of fires which can easily be extinguished by fire extinguishers. Personnel will not attempt to extinguish fires beyond the incipient stage. Personnel will leave the area of the fire and report to an area specified by the SSO. The SSO will immediately investigate all incipient stage fires that have been extinguished by site personnel.

SSO Response to Fire / Explosion

For all fires beyond the incipient stage and for all explosions, the SSO shall:

- Obtain wind and weather information.
- Ask for head count of all personnel.
- Determine need for full or partial evacuation.
- Determine if there is a health threat due to release of toxic vapors, gases, or liquids.
- Inform public agencies to arrange evacuation of nearby neighborhoods, if necessary.
- Ensure that alternate EC personnel or a designated escort person meets the fire department at the main gate or other access point.

Recovery

After the completion of investigations, the SSO will ensure that notifications are made to the appropriate agencies. Before resuming operations the SSO will coordinate repairs to damaged property and take measures to prevent reoccurrence. The SSO will ensure that fire suppression equipment such as fire extinguishers are returned to working order prior to restart of work.

Earthquake

Personnel Response to Earthquake

If an earthquake occurs personnel will:

- Remain calm. Personnel will take cover under a desk or heavy table. Stay clear of glass and falling debris. Stay away from bookcases, cabinets and files.
- If outside, get into an open area away from buildings, structures, power lines, and so forth.
- If in vehicle, pull to side of road and stop, stay away from structure, power line, fences and other objects. Stay in vehicle and listen to either vehicle radio or portable radio for information.

SSO Response to Earthquake

If an earthquake occurs, the SSO shall:

- Initiate site evacuation, if necessary.
- Initiate field inspections for slope damage and damage to systems. Instruct alternate EC personnel operating under the "Buddy System" to inspect critical areas at the project site.
- Ensure that damaged systems are shut down to prevent further damage or to facilitate repairs.
- Notify appropriate agencies depending on types of incidents (fire, injury, and so forth).
- Ensure site security.

Inspection Team

The SSO and alternate EC personnel shall designate facility inspection teams. The inspection teams will:

- Shut down systems as needed during the inspection to assure safe operating conditions or to prevent further damage.
- Radio observations to the SSO and alternate EC personnel after checking areas of concern.

Recovery

Along with alternate EC personnel, the SSO will coordinate a complete inspection. The team will thoroughly inspect the facility prior to resumption of routine activities. The team will evaluate the site for:

- Damage to process equipment and electrical systems
- Extent of damage to access roads.
- Damage to buildings and onsite equipment.

Weather

The SSO will assess weather conditions as weather affects safe operations at the project site. Weather conditions may require the SSO to stop work or evacuate the site. Examples of extreme weather and potential resulting hazards are the following:

- Heavy rain - overburdening of storm water collection tanks and runoff into neighborhoods
- High winds - dust, unsafe equipment operations
- Fog - impaired visibility
- Lightning - electrical system failure, fires, personal injury

Site personnel will inform the SSO of any weather-related condition which may affect safe operations at the project site. After normal work hours, the security guard shall notify the SSO when weather is adverse and when the weather affects site equipment and facilities.

Recovery

Prior to resuming operations, the SSO will inspect the site. Onsite personnel will report all damages to the SSO.

Vehicle and Property Incidents

Most vehicle incidents and property damage are minor. Site personnel who damage vehicles, equipment or property shall immediately report the incident to the SSO. The SSO in conjunction with involved personnel will prepare an incident report and initiate an incident investigation.

The SSO shall assess the incident. The SSO may activate the ECP if the incident causes injury, causes a release, or if the incident causes damage outside of the site.

Recovery

Before resuming operations in the area where the incident took place, corrective actions shall be taken to prevent reoccurrence of the event.

Civil Disturbance and Security Incidents

Civil disturbances directed at the site by environmental activists or similar protest groups and riots or insurrections involving adjacent areas, which may affect the site due to their own momentum, are types of events that may be anticipated over the duration of this project. Security incidents such as trespass, vandalism, and bomb threats are also incidents that may affect the operations of the site.

Unauthorized Entry or Trespass

Site Security will immediately notify the SSO and 911 of any unauthorized entry or trespass. If there are riots or protests, the SSO will:

- Direct Security to Contact 911. (After hours, to avoid delays, site security will call 911 immediately).
- Activate the ECP.
- Establish liaison and coordination with responding public agencies.

The SSO may:

- Determine need for evacuation of nonessential personnel from the site.
- Direct workers to report to another location or not to report to work if protesters or riots have blocked access to the site.
- Initiate shutdown procedures for site equipment and systems to minimize possible release of materials by destructive acts.
- Direct site personnel to disable nonessential on-site vehicle by removing keys, batteries, rotors, and so forth, so that vehicle may not be commandeered by participants.

Recovery

The SSO will inspect all equipment and facilities to ensure that there is no damage that affects safe operation. The SSO shall inspect carefully for possible sabotage of equipment. Onsite personnel shall report all damages and findings to the SSO.

Vandalism

Any person discovering vandalism shall immediately report it to the SSO. The SSO will call police (not 911) to report the damage. The SSO will investigate the damages and ensure that area or equipment is safe to use. The SSO will complete an Incident Report Form.

Bomb Threat

A person receiving the bomb threat on the telephone will:

1. Remain calm, not divert the call to another party, and keep the caller on the line as long as possible.
2. Ask the caller to repeat the message.
3. Try to get as much information as possible, such as
 - Location of bomb.
 - Type of bomb.
 - If the caller placed the bomb and why.
 - Name and address of caller.
4. Immediately contact a supervisor or the IC after the caller hangs up.
5. Keep the phone line open should caller call back.
6. Write down everything that was said and note information such as:
 - Sex and estimated age of caller.
 - Voice quality (angry, calm, excited), accent, speech impediments
 - Background noises.

The SSO will:

1. Notify 911.
2. Direct employees to immediately evacuate area.

Recovery

The SSO will cooperate with investigators. Police and other responding agency personnel shall inspect all areas and equipment before site personnel resume operations.

Reports and Notifications

The Menlo Park Fire Department is expected to assume the role of primary responder in the event of an emergency incident at the project site. Medical response, hospital, and police shall be contacted as needed by calling 911 for injury or evacuation emergencies. In the event that area hospitals are unable to respond to a medical emergency (for example, during an area-wide crisis that results in unavailable ambulance services), onsite personnel shall be taken to the nearest hospital. *Attachment C* included in this HASP indicates the location and routes to the nearest area hospital and contracted clinic, respectively. In the event of an emergency requiring evacuation, such decisions shall be made and implemented by the fire department after consultation with the SSO.

Table 10-2: Public Agencies and Hospitals

<u>Menlo Park Fire Department</u> East Palo Alto Station 2 2290 University Avenue East Palo Alto, CA 94303	DIAL 911 – EMERGENCY 650- 323-2404
<u>East Palo Alto Police Department</u> 2415 University Avenue East Palo Alto, CA 94303	DIAL 911 - EMERGENCY 650-321-1112
<u>Office of Emergency Services</u> 2800 Meadowview Road Sacramento, CA 95832	800-852-7550
<u>Chemical Emergency Planning and Response Commission</u> 2800 Meadowview Road Sacramento, CA 95832	916-262-1621
<u>CUPA</u> San Mateo County Environmental Health Services 455 County Center, Fourth Floor Redwood City, CA 94063	650-363-4305
<u>San Mateo County Emergency Services</u> 401 Marshall Street Redwood City, CA 94063	650-363-4790

<u>Department of Toxic Substances Control</u> Northern California Region 700 Heinz Avenue Berkeley, CA 94710	510-540-2122
<u>Bay Area Air Quality Management District</u> 939 Ellis Street San Francisco, CA 94109	415-749-4787 after hours fax number: 415-928-0338
<u>East Palo Alto Sanitary District</u> 901 Weeks Street P.O. Box 51686 East Palo Alto, CA 94303	650-325-9021
<u>Regional Water Quality Control Plant</u> City of Palo Alto 2501 Embarcadero Way Palo Alto, CA 94303	650-329-2598
<u>Stanford Hospital Emergency Department</u> 300 Pasteur Drive Stanford, CA 94035	650-723-5111
<u>U.S. Health Works (Union City)</u> Contractor Medical Provider Network 33560 Alvarado Niles Boulevard Union City, CA 94587	510-489-8700

Reportable Quantities

Federal agencies require additional information if the material released is a Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) hazardous substance that is released in quantities over a certain level, or RQ. If an RQ release to the environment occurs, 40 CFR 302.6 requires notification to the National Response Center as soon as the SSO has knowledge that the release is an RQ. Title 40 CFR 355.40 requires immediate notification to the Governor's Office of Emergency Services Warning Center and 911 local emergency response services when an RQ release of a substance not federally permitted for release under CERCLA and which impacts persons outside the boundary of the site occurs. The reporting person will report the following:

- Name and telephone number of reporter
- Name and address of facility
- Name and quantities of material(s) involved to the extent known
- Medium or media impacted by the release
- Date, time and duration of the release

- Proper precautions to take
- Known and anticipated health risks

The reporting person will obtain an assigned number from the agency taking the report. This number is used to document reporting.

Incident Reports

After an emergency incident requiring the implementation and notification procedures outlined in this section, the SSO shall complete the following notification requirements.

- a) The SSO shall immediately notify the appropriate agencies of a reportable release. This includes required notification of a reportable quantity release to the State Office of Emergency Services and the CUPA as required by 19 CCR 2703.
- b) The SSO shall note the time, date, and details of any incident that requires implementation of the contingency plan. The SSO shall submit a written report detailing the following:
 - Name, address, and telephone number of the owner or operator
 - Name, address, and telephone number of the Contractor
 - Date, time, and type of incident (e.g., fire, explosion)
 - Name and quantity of material(s) involved
 - The extent of injuries (if any)
 - An assessment of actual or potential hazards to human health or the environment (if applicable)
 - The estimated quantity and disposition of recovered material that resulted from the incident.
- c) The SSO shall submit in writing as soon as possible, information as outlined in 19 CFR 2705(b) to the Chemical Emergency Response and Planning Commission (CERPC), if required. The information shall include an update regarding:
 - The chemical name of substance spilled/released
 - Whether the substance is an Extremely Hazardous Substance
 - An estimate of the quantity spilled/released into the environment
 - The time and duration of the spill/release
 - The medium or media into which the spill/release occurred
 - Any known or anticipated acute or chronic health risks associated with the emergency and, where appropriate, advice regarding necessary medical attention for exposed individuals

- Proper precautions to take as a result of the spill/release, including evacuation
 - Names and phone numbers of persons to contact
 - Summary of actions taken to respond to and contain the spill/release
 - Summary of any known acute or chronic health risks
- d) In the event of a spill/release of hazardous materials to the environment from a tank system [as defined under 22 CCR 66264.196(b)(5)(A)], the DTSC shall be notified of the spill/release within twenty-four hours and the spill/release shall be reported and logged. In the event of release of a reportable quantity, the SSO shall be responsible for notifying DTSC that cleanup is complete in accordance with 22 CCR Section 66264.56(i) and (j) and 66264.196(b)(7), if appropriate. Any incident requiring implementation of the contingency plan shall be placed in an operating record and shall note date, time, and details of incident.
- e) The SSO shall submit to the Department (as applicable) within 30 days of detection of a spill/release from a tank system to the environment (as described under above), a written report detailing the following:
- Characteristics of the surrounding soil (soil composition, geology, hydrology, climate)
 - Results of any monitoring or sampling conducted in connection with the spill/release (if available). If sampling or monitoring data relating to the spill/release are not available within 30 days, the data shall be submitted to the Department as soon as they become available
 - Proximity to down-gradient drinking water, surface water, and populated areas
 - Description of response action taken or planned.
- f) Before operations resume, the SSO shall notify the Department of Toxic Substances Control that no released material is incompatible with hazardous materials and wastes stored or processed in the affected area, or that the cleanup has been completed; and that all emergency equipment been cleaned and is fit for its intended use.
- g) The SSO shall maintain a log of all emergency incidents requiring implementation of the contingency plan and associated investigations. A reporting form equivalent to that included as *Attachment B* in this HASP shall be completed for each type of event specified above.

Emergency Repair Plan

When an incident causes damage to site facilities or infrastructure, the SSO will develop and submit an Emergency Repair Plan to the EPA for approval within 7 days of the incident. The plan will include a schedule of necessary repairs and the identification of any resulting improvement proposals, including the type of deliverables required and the implementation schedule.

Decontamination of Equipment

Personnel will decontaminate all equipment used in the emergency response and all areas affected by the emergency. Personnel will collect all fluids and debris for proper disposal. The

SSO will ensure that all areas of the site, all equipment and facilities have been inspected to assure readiness.

Post-Incident Critique and Assessment

Following any emergency response activity, the SSO will convene a meeting of all EC personnel within 7 working days. The SSO will invite local emergency response agencies to provide input and to participate. The critique will:

- Review overall strategy and tactics employed.
- Effectiveness of ECP elements.
- Successful operations and identification of problems.
- Review lessons learned.
- Suggest improvements of general and specific operations for the future and suggest amendment of the ECP to correct identified deficiencies.

The SSO will prepare and distribute a written summary of the critique and assessment within 30 days of the incident. The SSO may forward copies of the written summary to the local emergency response agencies.

11.0 Confined Space Entry Operations

All necessary precautions shall be taken to prevent employee exposure to chemical and physical hazards, explosive environment and oxygen deficiency when performing work in confined spaces. Potential confined spaces at the project site include, but are not limited to chemical storage and handling tanks, distillation columns, boiler units, storm water collection tanks, sewer tanks and other such confined areas not intended for continuous human occupancy. Because of the varied and unpredictable nature of confined spaces, entry into these locations shall be strictly controlled to prevent serious injury or death. The following anticipated hazards may be associated with confined spaces at the project site.

1. An atmosphere containing less than 19.5% oxygen (normal air contains 20.9% oxygen). This is usually the result of oxygen displacement by gases such as nitrogen, argon, helium, or sulfur hexafluoride, or oxidation.
2. Flammable gases and vapors (eg: methane, ethane, propane, gasoline, methyl ethyl ketone, alcohols).
3. Toxic gases and vapors (eg: hydrogen sulfide, nitrogen dioxide, 1,1,1-trichloroethane, perchloroethane, methylene chloride).
4. Physical hazards such as radiation, high voltage, or crushing or engulfment by liquids or particulate matter.

Confined spaces exhibiting any of the above hazards may be divided into two categories:

1. Low hazard non-permit confined spaces.
2. High hazard permit required confined spaces.

Low Hazard Non-Permit Required Confined Spaces

Any confined space that does not have the qualities of a high hazard confined space and that does not have any atmospheric hazards that have the potential to cause death or serious harm shall be considered a low hazard, non-permit required confined space.

High Hazard Permit Required Confined Spaces

1. Contains or has the potential to contain an oxygen deficient or explosive atmosphere.
2. Contains a material that has the potential of engulfing an entrant.
3. Has an external configuration that can trap and asphyxiate an entrant.
4. Contains any other recognized safety hazards and is not intended for human occupancy.

High Hazard Permit Required Confined Space Entry

This section describes the program which meets the requirements of the California Code of Regulations Title 8, Article 108.

Each confined space entry (CSE) team shall consist of an entrant, a CSE attendant, a CSE supervisor and at least one CSE rescue standby team member. Each member of the CSE team shall have confined space entry and rescue training in accordance with CCR Title 8, Section 5156 - 5159 regulations. Training records shall be maintained onsite at all times.

Prior to any CSE activity, air monitoring shall be employed to determine if the workspace is to be designated as a confined space requiring a self contained breathing apparatus (SCBA) or line air. For high hazard permit required confined space entries, the SSO must be present to ensure that the appropriate rescue equipment such as a hoist, lifeline and harness are being utilized. Prior to entry of such a space, a planning session and a simulated field exercise shall be coordinated. For confined space entry where air supplied respiratory protection is required, the personnel entering the space shall be properly trained in its use, fit tested, and under medical surveillance.

The minimum level of personal protective equipment for all CSE activities at the project site shall be *Level C PPE* including chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with appropriate cartridge configuration based on the anticipated chemical hazard.

Entrants:

Employees acting as confined space entrants shall:

1. Assist the CSE Supervisor and SSO with a pre-hazard analysis of the workspace prior to entry.
2. Be familiar with and follow written CSE procedures as well as the direction of the CSE Supervisor.
3. Notify the CSE Supervisor and the SSO immediately of any unusual hazards associated with confined spaces not addressed by CSE procedures.
4. Report all emergency conditions immediately to the CSE Supervisor and the SSO.

CSE Attendants:

CSE Attendants shall utilize the same level of personal protective equipment as the entrant(s). It may not be necessary for the attendant(s) to wear an air purifying respirator at all times; however, the attendant(s) shall have an air purifying on their person at all times for immediate assistance with confined space rescue operations. Employees acting as CSE Attendants shall:

1. Assist the CSE Supervisor and SSO with a pre-hazard analysis of the workspace prior to entry.
2. Be familiar with and follow written CSE procedures as well as the direction of the CSE Supervisor.
3. Notify the CSE Supervisor and the SSO immediately of any unusual hazards associated with confined spaces not addressed by CSE procedures.
4. Report all emergency conditions immediately to the CSE Supervisor and the SSO.
5. Remain posted within visual and or audible contact with the Entrant(s) at all times.
6. Continually monitor atmospheric conditions within the confined space and record monitoring equipment readings on the CSE permit.
7. Assist the CSE Supervisor and CSE rescue team member with non-entry rescue procedures if warranted.

CSE Supervisors:

Supervisors and managers responsible for personnel performing CSE activities shall:

1. Ensure that CSE team members have been trained and certified adequately for entry into confined spaces.
2. Ensure that equipment used for CSE activities is kept in good operational condition and is calibrated according to manufacturers' recommendations.
3. Administer and audit the performance of the Confined Space Entry Program.
4. Act as a floating assistant to the CSE attendant and the CSE rescue team member when needed.

CSE Rescue Standby:

At least one standby person must be present at all times while the confined space is occupied. If only one standby person is present at the site of confined space work, that person shall have a means of communication (ie: a radio) to summon help in the case of an emergency. The primary responsibility of the standby personnel is the safety of the occupants of the confined space. Standby personnel must be trained in basic first aid and CPR. Standby personnel must be in constant visual or audible contact with the Attendant(s) and/or Entrant(s) and shall be at the ready utilizing the same level of PPE as the Attendant(s) and Entrant(s). It is not necessary for CSE standby rescue personnel to wear an air purifying respirator at all times; however, rescue personnel shall have an air purifying on their person at all times for immediate assistance with confined space rescue operations.

In the event on an emergency, the CSE Attendant must NEVER enter a confined space prior to contacting and receiving assistance from the CSE Supervisor and the CSE rescue standby team member. In the event safety equipment failure occurs while the Entrant(s) are in a confined space, the CSE rescue standby member shall first attempt non-entry rescue procedures to remove the Entrant(s). A hand-operated or mechanical wench (lifeline) shall be utilized to retrieve any victims from the confined space. Only when non-entry rescue methods are unable to be performed shall the CSE rescue standby member enter the confined space and retrieve the victim.

General Provisions:

1. A Confined Space Entry Permit (CSEP) will be obtained before any work begins. The CSEP will be put on official record at the project site and submitted for review by the SSO. A copy of a confined space entry activity permit form is included as *Attachment F* in this HASP.
2. Confined spaces will be identified with a posted sign which reads: "Caution - Confined Space" and the completed CSEP shall be posted in the immediate work area where CSE activities are being performed.
3. The CSE Attendant shall remain posted within visual and/or audible contact with the Entrant(s) at all times while CSE activity is in progress.
4. Only personnel trained and knowledgeable of the requirements of these CSE entry procedures shall be authorized to enter a confined space or act as a CSE Attendant, CSE Supervisor or CSE rescue standby member. Each member of the CSE team shall have confined space entry and rescue training in accordance with 29 CFR 1910.146 regulations. Training records shall be maintained onsite at all times.
5. Natural ventilation shall be utilized prior to initial entry and for the duration of CSE activities. Based on initial and continual atmospheric monitoring, positive/forced mechanical ventilation may be required prior to and during CSE activities. Care will be taken to not spread any contamination outside the enclosed area when utilizing mechanical ventilation.
6. Explosion proof equipment shall be used if there is potential for flammable liquids, gases, or vapors to be contained within the confined space. All equipment shall be positively grounded. No personnel shall be allowed to enter a confined space in which atmospheric monitoring indicates a lower explosive limit (LEL) less than 10%.
7. Efforts shall be made to remove all contents from a confined space prior to entry. All sources of ignition shall be removed prior to any CSE activity.
8. CSE team members shall break and blank-out all feed lines (if any) to confined spaces prior to entry. Identified sources of electrical or mechanical energy which could activate any area of the confined space shall be locked out and tagged out prior to entry. Lock out tag out procedures shall be documented in the CSEP.
9. Lighting used in confined spaces (if required) will be equipped with guards preventing contact with the bulb and shall be explosion proof.
10. No gas cylinders other than self contained breathing apparatus (SCBA) shall be permitted inside confined spaces.
11. Lifelines, safety belts, and body harnesses shall be used in confined spaces which require respiratory equipment or where rescue may be difficult.
12. Entry into an untested or Immediately Dangerous to Life and Health (IDLH) confined space shall be strictly prohibited.

13. If air moving equipment is used to provide ventilation, all chemicals shall be removed from the vicinity where confined space entry activities are to take place.
14. Smoking is prohibited at all times.
15. Atmospheric monitoring equipment shall be used to monitor percent oxygen and lower explosive limit (LEL) prior to and during CSE activities. No personnel shall be allowed to enter a confined space indicating an LEL of less than 10% or oxygen readings less than 19.5% or greater than 23% until engineering controls that stabilize the atmosphere within the confined space have been established.
16. No CSE team member shall be allowed to deviate from CSE policies and procedures without authorization from the SSO.

Confined Space Evaluation

Pre-hazard evaluation of confined spaces shall be performed to ensure that all necessary steps and precautions have been taken to reduce the potential for chemical and physical hazards prior to entry.

Atmospheric Monitoring

Atmospheric monitoring shall be required for all CSE activities where there is potential for atmospheric hazards. Atmospheric hazards may include: lack of oxygen (limiting atmosphere), presence of toxic gases or chemicals (toxic atmospheres), the presence of flammable gases or particulates (explosive atmospheres), or oxygen enriched atmospheres (explosive atmospheres). Atmospheric monitoring is required before mechanical ventilation is put into operation. Results from initial atmospheric monitoring shall serve as a baseline reading to identify potential hazards as well as give an understanding of expected worst possible case if mechanical ventilation fails. Continual atmospheric monitoring shall be performed during all permit required CSE activities even when initial monitoring has indicated a stable work atmosphere. Atmospheric testing shall be performed by personnel who have been trained in the use of gas and vapor detection instruments.

Mechanical Ventilation:

Mechanical ventilation shall be required for confined spaces with potential atmospheric hazards and must be utilized until all work is completed and entrants have exited the space. If ventilation is required but cannot be utilized, the space shall automatically become a permit required confined space.

Communication:

Special communications such as bone microphones allowing an individual to communicate with the standby person due to the use of an air supplied respirator may be required. Hot work performed in any confined space must have the approval of the SSO, and the appropriate permit shall be completed and posted at the entrance to the space.

Exceptions to requirements for confined space entry shall be justified in writing.

Procedure for Entry:

The following procedures will be used for confined space entry:

1. Evaluate the job to be done and identify all potential hazards before scheduling work in a confined space as outlined above.

2. Ensure that all process piping, mechanical and electrical equipment, etc. have been disconnected, purged, blanked-off or locked and tagged as necessary.
3. Complete and submit a Confined Space Entry Permit.
4. Ventilation shall be provided for the duration of the task in the confined space.
5. CSE team members shall be familiar with and understand the policies and procedures outlined in this section of the HASP.
6. Atmospheric monitoring shall be performed prior to validation of a CSEP. Confined spaces shall be monitored for oxygen, combustible gases, toxins, corrosives, and other irritants. If remote testing is not possible, *Level B PPE* shall be utilized.
7. The CSEP shall be posted at all times during CSE activities. The SSO shall maintain records of all CSEPs onsite.

CSE activities that require entering a vault and then subsequently entering a tank will require two confined space entries, thus requiring two CSEPs and separate CSE teams for each entry.

12.0 Emergency Spill / Release Mitigation and Containment

The following section identifies response procedures designed to minimize possible impacts to public health or the environment from accidental emergency spills/releases. Procedures identified in this section may not necessarily entail implementation of the contingency plan described in *Section 10.0* of this HASP. Procedures are described for responding to accidental spills/releases that may occur during Phase I facility decontamination and closure activities.

Spill response supplies shall be maintained onsite at all times to mitigate small spills or releases that may occur as a result of chemical handling and decontamination activities at the project site. The Contractor shall maintain portable spill clean-up kits in multiple locations at the project site. Portable spill clean-up kits shall be maintained in the general vicinity of individual work locations in the plant process areas.

In the event of an accidental spill/release at the project site, the SSO shall commit all necessary Contractor resources and may also contact outside emergency service providers to assist in the control, containment, and cleanup of an accidental spill/release. The SSO shall coordinate the activities of emergency service providers should outside agency assistance be required. Spills

If a spill is off site or enters the municipal storm water system, public response agencies will determine response actions at the time of the event. They will consider factors such as volume and type of spill, volume and types of other liquids in the drainage system, and anticipated receptors of the mixed spill and storm water liquid. Public response agencies have various resources they may use to respond to a release. The lead response agency, which takes over as incident command, may identify, obtain and allocate these resources. For example, the fire department may have additional absorbent material or they may be able to use foam to control vapors or fumes.

In the event of an accidental spill/release at the project site, the following general procedures shall be implemented:

- Immediately notify onsite personnel via, two-way radio communication and/or voice and/or hand signals and establish communication with personnel who may be immediately in danger.

- Cut off spill/release source by closing valves, shutting down pumps, etc. Immediate measures shall be taken to eliminate ignition sources.
- Immediately notify the SSO.
- Utilize appropriate protective clothing and equipment.
- Attempt to contain the spill/release and runoff by utilizing absorbent material or by diking with soil/sand and/or absorbent booms.
- Contain and prevent further migration of any visible spill/release to the environment outside of containment and provide for removal and proper disposal of visibly contaminated soil or surface water
- Utilize pumps to evacuate sumps containing spilled material to an appropriate storage container. If spill/release material is unknown, the Contractor shall sample from sumps and analyze for compatibility and any constituents/parameters necessary to assign an appropriate treatment and disposal method prior to pumping the material to another containment vessel that may already contain waste from previous operations.

Leaking Containers

- Immediately notify onsite personnel via, two-way radio communication and/or voice and/or hand signals and establish communication with personnel who may be immediately in danger.
- Utilize appropriate protective clothing and equipment.
- Locate source of leak and attempt to control the leak so that the container can be moved and isolated. Immediate measures shall be taken to eliminate ignition sources.
- Immediately notify the SSO.
- Place container in overpack drum, if necessary.
- Utilize absorbent materials to contain spill and prevent exposure to incompatible materials.
- After spill containment, transfer the contents of the leaking container (and any spill residues and clean up materials) to an appropriate storage container.
- Contain and prevent further migration of any visible spill/release to the environment outside of containment and provide for the removal and proper disposal of visibly contaminated soil or surface water.

Spill/Releases From Tank Systems

- Immediately notify onsite personnel via, two-way radio communication and/or voice and/or hand signals and establish communication with personnel who may be immediately in danger.
- Cut off source to tank by closing valves, shutting down pumps, etc. Immediate measures shall be taken to eliminate ignition sources.

- Immediately notify the SSO.
- Utilize appropriate protective clothing and equipment.
- Provide for immediate containment of the spill/release if no secondary containment berms exist or if secondary containment berms surrounding the tank have been damaged.
- Contain and prevent further migration of any visible spill/release to the environment outside of containment and provide for removal and proper disposal of visibly contaminated soil or surface water.
- After the quantity and the character of the spill/release has been determined, the Contractor shall transfer remaining contents of the leaking tank (and any spill residues/clean up material) to an appropriate storage container. The contents shall be transferred within 24 hours after detection of the leak, or, if the Contractor determines that it is not possible within this time frame, at the earliest practical time to prevent further release of hazardous waste to the environment.
- Inspect and assess reason for leak or rupture.
- Assess damage to ancillary equipment and containment structures.

Spill/Release From Transfer Lines and Piping

- Immediately notify onsite personnel via, two-way radio communication and/or voice and/or hand signals and establish communication with personnel who may be immediately in danger.
- Cut off flow by closing valves, shutting down pumps, etc. Immediate measures shall be taken to eliminate ignition sources.
- Utilize appropriate protective clothing and equipment.
- Immediately notify the SSO.
- After quantity and character of the spill/release has been determined, the Contractor shall transfer spilled material to an appropriate storage container.

Releases to Air

- Immediately notify onsite personnel via, two-way radio communication and/or voice and/or hand signals and establish communication with personnel who may be immediately in danger.
- Move personnel away from downwind of the release or shelter-in-place in accordance with emergency contingency planning outlined in *Section 10.0* of this HASP.
- Immediately notify the SSO.
- Utilize appropriate protective clothing and equipment.
- Cut off source of spill/release by closing valves, shutting down pumps, etc. Immediate measures shall be taken to eliminate ignition sources.

Seismic Event

- Immediately notify onsite personnel via, two-way radio communication and/or voice and/or hand signals and establish communication with personnel who may be immediately in danger.
- Immediately notify the SSO.
- Utilize appropriate protective clothing and equipment.
- Cut off source of spill/release by closing valves, shutting down pumps, etc. Immediate measures shall be taken to eliminate ignition sources.
- Assess damage to equipment and containment structures.

Non-Permitted Discharge to Sewer

- Cut off source of spill/release by closing valves, shutting down pumps, etc.
- Immediately notify the SSP.
- Record event, noting quantity, source, and duration of release.
- Immediately notify appropriate agencies in accordance with *Response Notification Flow Chart*, included as *Figure 1* in this HASP

Flooding Conditions

- Immediately notify onsite personnel via, two-way radio communication and/or voice and/or hand signals and establish communication with personnel who may be immediately in danger.
- Utilize appropriate protective clothing and equipment.
- Shut down operations and take immediate measures to eliminate ignition sources.
- Immediately notify the SSO.
- Use diking where necessary to prevent flooding in and around buildings and structures.
- Utilize portable pumps and/or vacuum trucks to remove excess water from sumps and/or secondary containment areas. Flood waters shall be pump to an appropriate storage/ container and or removed from the project site using vacuum trucks.

Freezing Conditions

- Purge all piping that could be adversely affected by freezing with air to displace liquids and prevent freezing of pipes.
- Close valves as needed to isolate piping damaged due to freezing.
- Wrap insulation (e.g., fiberglass, cloth) around tank valves where necessary to protect against further damage.
- Provide onsite tank storage capacity as needed, or arrange for temporary portable tanks.

Prevention of Recurrence (22 CCR 66264.56(e)(f))

The SSO shall take all necessary steps to ensure that a secondary spill/release does not recur after the initial incident. The SSO shall ensure that no wastes incompatible with the released material will be treated or stored in the affected area. Following an emergency incident, the SSO shall monitor the situation until normal operations can resume.

The SSO, with assistance from alternate Contractor EC personnel shall evaluate the incident to understand why and how the incident occurred and determine if modifications are needed to prevent a recurrence. Equipment design, operational procedures, response tactics, and personnel safety shall be included as part of the evaluation.

Incident Reporting [22 CCR 66264.56(j), 66264.196(b)(5)(C)]

After an emergency incident requiring the implementation and notification procedures outlined in this section, the SSO shall complete the following notification requirements.

- a) The SSO shall immediately notify the appropriate agencies of a reportable release. This includes required notification of a reportable quantity release to the State Office of Emergency Services and the CUPA as required by 19 CCR 2703.
- b) The SSO shall note the time, date, and details of any incident that requires implementation of the contingency plan. The SSO shall submit a written report detailing the following:
 - Name, address, and telephone number of the owner or operator
 - Name, address, and telephone number of the Contractor
 - Date, time, and type of incident (e.g., fire, explosion)
 - Name and quantity of material(s) involved
 - The extent of injuries (if any)
 - An assessment of actual or potential hazards to human health or the environment (if applicable)
 - The estimated quantity and disposition of recovered material that resulted from the incident.
- c) The SSO shall submit in writing as soon as possible, information as outlined in 19 CFR 2705(b) to the Chemical Emergency Response and Planning Commission (CERPC), if required. The information shall include an update regarding:
 - The chemical name of substance spilled/released
 - Whether the substance is an Extremely Hazardous Substance
 - An estimate of the quantity spilled/released into the environment
 - The time and duration of the spill/release

- The medium or media into which the spill/release occurred
 - Any known or anticipated acute or chronic health risks associated with the emergency and, where appropriate, advice regarding necessary medical attention for exposed individuals
 - Proper precautions to take as a result of the spill/release, including evacuation
 - Names and phone numbers of persons to contact
 - Summary of actions taken to respond to and contain the spill/release
 - Summary of any known acute or chronic health risks
- d) In the event of a spill/release of hazardous materials to the environment from a tank system [as defined under 22 CCR 66264.196(b)(5)(A)], the DTSC shall be notified of the spill/release within twenty-four hours and the spill/release shall be reported and logged. In the event of release of a reportable quantity, the SSO shall be responsible for notifying DTSC that cleanup is complete in accordance with 22 CCR Section 66264.56(i) and (j) and 66264.196(b)(7), if appropriate. Any incident requiring implementation of the contingency plan shall be placed in an operating record and shall note date, time, and details of incident.
- e) The SSO shall submit to the Department (as applicable) within 30 days of detection of a spill/release from a tank system to the environment (as described under above), a written report detailing the following:
- Characteristics of the surrounding soil (soil composition, geology, hydrology, climate)
 - Results of any monitoring or sampling conducted in connection with the spill/release (if available). If sampling or monitoring data relating to the spill/release are not available within 30 days, the data shall be submitted to the Department as soon as they become available
 - Proximity to down-gradient drinking water, surface water, and populated areas
 - Description of response action taken or planned.
- f) Before operations resume, the SSO shall notify the Department of Toxic Substances Control that no released material is incompatible with hazardous materials and wastes stored or processed in the affected area, or that the cleanup has been completed; and that all emergency equipment been cleaned and is fit for its intended use.
- g) The SSO shall maintain a log of all emergency incidents requiring implementation of the contingency plan and associated investigations. A reporting form equivalent to that included as *Attachment B* in this HASP shall be completed for each type of event specified above.

13.0 Sanitation

Power shall remain connected to administrative buildings and office areas at the project site. The main administrative building located on the Southwest corner of the property has a locker room facility adjacent to the employee break room. The locker room is equipped with functioning showers and multiple functioning toilets for employee use. Upstairs and downstairs bathrooms located in the office areas shall also remain functional for the duration of the project. Locker room and bathroom facilities in the administrative building shall be inspected daily by the SSO and appropriate sanitation shall be maintained at all times.

The SSO shall inspect the break room on a daily basis to ensure that it remains clean and tidy. The break room shall be equipped with potable water sources, refrigerators, and microwave ovens for employee use. The Contractor intends to supply bottled water in addition to potable water sources located in the employee break room and office areas.

Potable Water

1. An adequate supply of potable water shall be available at the project site at all times.
2. Any portable containers used to dispense drinking water shall be capable of being tightly closed, and equipped with a tap. Personnel shall not be permitted to dip water from portable containers.
3. Any portable container used to distribute drinking water shall be clearly marked as to the nature of its contents and not used for any other purpose.
4. Sanitary, disposable drinking cups shall be provided. Sharing from a common cup shall be prohibited.
5. Where disposable drinking cups are supplied, both a sanitary container for the unused cups and a receptacle for disposing of the used cups shall be provided.

Non-Potable Water

1. Outlets for non-potable water, such as water for industrial or firefighting purposes only, shall be identified by signs to indicate clearly that the water is unsafe and is not to be used for drinking, washing, or cooking purposes.
2. There shall be no cross-connection, open or potential, between a system furnishing potable water and a system furnishing non-potable water.

Toilets

Based on initial site assessments, adequate functioning toilets for the number of working personnel onsite are available at the main administrative building located on the Southwest corner of the property. Separate restroom facilities are available for female employees. Minimum requirements for functioning toilets at the project site are based on the table below.

Table 13-1: Project Site Toilet Facilities

Number of Employees	Minimum Number of Facilities
20 or less	1
20 or more	1 toilet seat & urinal per 40 workers
200 or more	1 toilet seat & urinal per 50 workers

14.0 Illumination

Due to noise ordinance regulations set by the City of East Palo Alto, no decontamination and demolition activities shall be performed at the project site during night hours. Per contract specifications, work onsite shall be restricted to daylight hours between 7:00 a.m. and 6:00 p.m. The Contractor intends to disconnect power to facility process areas prior to performing decontamination and demolition activities. Power shall remain connected in the administrative buildings and office areas. Based on initial site assessments, it is anticipated that natural light during daylight areas shall be sufficient for work activities performed in facility process areas where power is to be disconnected. For work areas where natural lighting is deemed insufficient, the following illumination standards shall be implemented.

Construction site offices, stairways, passageways, construction roads, and working areas shall be lighted while work is in progress by at least the following minimum light intensities.

Table 14-1: Minimum Lighting Intensities for Project Site Work Areas

Facility Name / Function	Lighting Intensity (foot candles)
Accessways-General Indoor	5
Accessways-General Outdoor	3
Administrative Areas (Offices, Conference Rooms, etc.)	50
Construction Areas	
Indoor – General	5
Outdoor – General	3
Concrete Placement Operation	3
Excavation and Fill Areas	3
Docks and Loading Platforms	3
Exitways, Walkways, Ladders, Stairways	10
Locker and Dressing Rooms	10
Maintenance, Operating & Construction Shops	
Carpenter Shops	10
Field Maintenance Area Outside	5
Refueling - Outside	5
Shops - Fine Work	50
Shops - Medium Work	30
Mechanical and Electrical Equipment Rooms	10
Toilets and Wash Rooms	10
Tunnels and General Underground Work Areas	10
Warehouses and Storage Rooms and Areas	
Active or Bulk Storage - Inside	10
Inactive Storage - Inside	5
Rack Storage - Inside	25
Stockrooms	10
Outside Storage - Active	3
Welding	30
Work Areas - General	30

Any artificial lighting, if required, shall be maintained until all personnel have had an opportunity to leave the area. Temporary lighting used in damp and/or hazardous locations must be operated at a maximum of 12 volts.

15.0 Electrical Safety (29 CFR 1926.400 / 8 CCR 1670)

As part of work activity pre-hazard analysis and ongoing activity hazard analysis (AHAs) conducted by the SSO, each work area shall be checked for the presence of high voltage and other hazardous electricity sources prior to beginning work in that area. Sources shall be labeled and work areas provided with shielding or located at sufficient distance from the sources to prevent contact or arcing to personnel or equipment.

Contractor personnel shall locate and ensure there will be no adverse contact with overhead utilities, prior to positioning or moving any elevated work platforms or aerial lifting devices.

Should high voltage electrical service be required for site or project activities, service shall be connected by certified electricians in accordance with all applicable local and National Electric Codes.

Ground Fault Circuit Interrupters shall always be used in the absence of properly grounded circuitry or when portable tools must be used around wet areas. Electric lines, cables and extension cords must be appropriately guarded and maintained in good condition.

No Contractor employees shall be permitted to work in proximity to any part of an electric power circuit unless precautions have been taken to protect against electrical shock by de-energizing the circuit and grounding it or by guarding it effectively by insulation or other means.

All underground electric power lines shall be identified and marked before performing any ground breaking activities.

As part of work activity pre-hazard analysis and ongoing activity hazard analysis (AHAs), the SSO shall ascertain by inquiry or direct observation, or by instruments, whether any part of an energized electric power circuit, exposed or concealed, is so located that work activities may bring any person, tool or machine into physical or electrical contact with an electric power circuit. The SSO shall post and maintain proper warning signs where such circuits exist. The SSO shall advise personnel of the location of such power circuits, the hazards involved, and the protective measures to be taken.

Powered equipment not essential to work activities shall be disconnected or locked out and tagged out prior to start of work. These procedures shall apply to all electrical circuits, electric power equipment, steam systems, hydraulic systems, compressed air and gas systems, and any other systems which have the potential for causing injury or damage if they are improperly or accidentally energized. Refer to lock out / tag out procedures discussed in *Section 21.0* of this HASP.

Any temporary installations shall conform to the National Electric Code, unless otherwise provided by OSHA regulations. No damaged or defective tools shall be used.

Extension cords used with portable electric tools shall be the 3-wire type and shall be protected from damage at all times. Extension cords shall not be fastened with staples, hung from nails, or suspended from wires. All extension cords used on the project site shall be rated for hard usage and shall not be connected to other extension cords or buried or covered. Worn or frayed extension cords shall be removed from service.

Except where bulbs are deeply recessed in a reflector cage, bulbs on temporary lights shall be equipped with guards. Temporary lights shall not be suspended by their electric cords unless designed for suspension. Broken and burned-out lamps shall be replaced immediately.

Receptacles for attachment plugs shall be of the approved, concealed contact type. Where different voltages, frequencies, or types of current are supplied, receptacles will be of such design that attachment plugs are not interchangeable.

Disconnecting means for motors and appliances and individual service feeders or branch circuits at the point where they originate shall be legibly marked to indicate its purpose, unless located and arranged so the purpose is evident.

Cable passing through work areas will be covered or elevated to protect it from damage and to minimize slip, trip and fall hazards to personnel in the work area. Cables and cords shall be kept clear of walkways and other locations where they may be exposed to damage or create tripping hazards.

Boxes for disconnecting means will be securely and rigidly fastened to the surface upon which they are mounted and fitted with covers.

No Contractor employees shall be permitted to work in proximity to any part of an electric power circuit unless precautions have been taken to protect against electrical shock by de-energizing the circuit and grounding it or by guarding it effectively by insulation or other means. Precautions may include using insulated protective gloves, blankets, mats and other protective devices. In work areas where the exact location of underground electric power lines is unknown, workers using jackhammers, bars, or other hand tools shall be provided with insulated protective gloves.

Work areas where potential electrical hazards are present shall be barricaded and appropriate warning signs provided.

Energized wiring in junction boxes, circuit breaker panels, and similar places shall be covered at all times.

Grounding

All electrical tools and equipment shall be approved double-insulated, properly grounded or used with ground fault circuit interrupters.

For 15 and 20 ampere receptacle outlets on single-phase or 120-volt circuits for construction sites which are not a part of the permanent wiring of the building or structure, either ground-fault circuit interrupters shall be used or an assured equipment grounding conductor program shall be implemented.

16.0 Overhead Power Lines (8 CCR 2946)

Overhead power lines are present in multiple locations at the project site. Warning signs reading "Danger Overhead Power Lines" and indicating highest potential voltage at each location shall be posted at all times in areas where vehicle traffic, heavy equipment and personnel are permitted to pass under areas where overhead power lines are situated. Prior to the start of work, the SSO in conjunction with the equipment operator(s) shall designate and mark safe routes where cranes and other aerial lifting devices can travel beneath power lines. Personnel working on site shall be aware of the locations of all overhead power lines and shall adhere to the proper clearances and safe work distances outlined in the tables below. Based on initial assessment of the location of overhead power lines at the project site the Contractor shall implement engineering controls to prevent the need to operate heavy equipment and aerial lifting devices under or immediately adjacent to overhead power lines.

Table 16-1: General Clearances Required From Energized Overhead Power Lines

Nominal Voltage (Phase to Phase)	Minimum Required Clearance (Feet)
600 - 50,000	6
over 50,000 - 345,000	10
over 345,000 - 750,000	16
over 750,000 - 1,000,000	20

Operation of boom-type equipment shall conform to the minimum clearances set forth in *Table 16-2*, except in transit where the boom is lowered and there is no load attached, in which case the distances specified in *Table 16-1* shall apply.

Table 16-2: Boom-type Lifting and Hoisting Equipment Clearances Required From Energized Overhead Power Lines

Nominal Voltage (Phase to Phase)	Minimum Required Clearance (Feet)
600 - 50,000	10
over 50,000 - 75,000	11
over 75,000 - 125,000	13
over 125,000 - 175,000	15
over 175,000 - 250,000	17
over 250,000 - 370,000	21
over 370,000.... 550,000 27	over 370,000.... 550,000 27
over 550,000.... 1,000,000 42	over 550,000.... 1,000,000 42

The erection, operation or dismantling of any boom-type lifting or hoisting equipment, or any part thereof, closer than the minimum clearances from energized overhead power lines outlined in *Table 16-2* shall be prohibited.

The storage of tools, machinery, equipment, supplies, materials, or apparatus under, or immediately adjacent to energized overhead power lines is hereby expressly prohibited if at any time during such handling or other manipulation it is possible to bring such tools, machinery, equipment, supplies, materials, or apparatus, or any part thereof, closer than the minimum clearances outlined in *Table 16-1*.

Specified clearances outlined in *Table 16-1* and *Table 16-2* shall not be reduced by movement due to any strains impressed (by attachments or otherwise) upon the structures supporting energized overhead power lines or upon any equipment, fixtures, or attachments thereon.

In general, it is the Contractor's policy that no personnel shall be permitted to perform any work function in proximity to energized overhead power lines or to enter upon any land, building, or other premises and engage excavation, demolition, construction, repair, or store any tools, machinery, equipment, or materials beneath and/or immediately adjacent to energized overhead power lines unless danger from accidental contact has been effectively mitigated.

The operation of heavy equipment and/or the erection, or handling of tools, machinery, apparatus, supplies, or materials, or any part thereof, over energized overhead power lines is strictly prohibited. The operation, erection, handling, or transportation of tools, machinery, materials, structures, and scaffolds, or the moving any part of an employee's body within the minimum clearances from energized overhead power lines outlined in *Table 16-2* shall be prohibited.

Personnel operating heavy equipment and/or aerial lifting devices near overhead power lines shall be aware of the electrocution hazards associated with such operations. To protect workers

against electrocution when operating or working around cranes and other aerial lifting devices near overhead power lines the following safe work practices shall be implemented:

1. Operating personnel shall be aware of the location and voltage of all overhead power lines at the project site.
2. Operating personnel shall evaluate the job site before beginning work to decide the size and type of machinery to use and the safest areas for machinery operation and material storage.
3. If practical engineering controls such as de-energizing power lines and erecting insulated barriers to prevent physical contact with the energized lines shall be implemented. Operating personnel shall adhere to Cal/OSHA proper clearances and safe work distances at all times.
4. Warning signs shall be posted on cranes and other aerial lifting devices cautioning operators to maintain safe clearances between energized power lines and their equipment.
5. Before the start of work, the site safety officer in conjunction with the equipment operator(s) shall designated and mark safe routes where cranes and other aerial lifting devices can travel beneath power lines.
6. Operating personnel shall assume all power lines are energized and maintain Cal/OSHA proper clearances and safe work distances at all times.
7. Only personnel trained in safe operating procedures and Cal/OSHA regulations shall be allowed to operate a crane on the project site.
8. Operating personnel shall be instructed to operate cranes and other aerial lifting devices at a slower-than-normal rate in areas where overhead power lines are present.
9. Operating personnel shall use extreme caution when moving over uneven ground that could cause the crane and/or aerial lifting device to weave or bob into power lines.
10. Operating personnel shall use extreme caution near long spans of overhead power lines and shall be aware that wind conditions may cause power lines to sway back and forth and reduce clearances and safe working distances.
11. Crane operators shall understand that cage-type boom guards, insulated lines, ground rods, nonconductive links, and proximity warning devices shall not be used as a substitute for de-energizing and grounding lines and/or maintaining safe clearances.
12. Where it is difficult for the crane operator to see the power lines or see the clearance during crane movement, a signal person shall be assigned to watch and give immediate warning when the crane comes close to the limits of safe clearance.
13. Under no circumstances are nearby personnel permitted to touch a crane or its load until the signal person says it is safe to do so.
14. Nearby personnel shall maintain a safe distance from cranes and other aerial lifting devices working in close proximity to overhead power lines.

If contact is made between a crane and an energized line, the crane operator shall remain inside the cab and try to remove the crane from contact by moving it in the reverse direction from that which caused the contact. If the crane cannot be moved away from contact, the operator shall

remain inside the cab until the lines have been de-energized. Nearby personnel shall be instructed to keep away from the crane, ropes, and load, since the ground around the machine may become energized. Crane operators shall utilize cellular phones and/or two way radios as a means of communicating with nearby personnel and calling for help should an emergency occur.

17.0 Blood Borne Pathogen Exposure

This section is intended to address policies and procedures associated with preventing or minimizing employee exposure to blood borne pathogens and to provide policy and safe practices to prevent the spread of disease resulting from handling blood or other potentially infectious materials (OPIM) at the project site. The policies and procedures outlined in this section are in accordance with State and Federal “Occupational Blood Borne Pathogens” standards specifically addressed in:

- 29 CFR Part 1910.1030
- CCR Title 8, Section 5193

Key elements addressed in this section are:

- Scope and application of policies and procedures for identifying and understanding control measures for prevention of exposure to blood borne pathogens.
- Contractor requirements for provision of personal protective equipment.
- Procedures for handling and clean up of blood or OPIM spills.
- Mandatory medical evaluation and follow up to any exposure.
- Employee training and record keeping.

The scope and application of this section apply to Contractor work activities performed where environmental risk factors for contact with blood borne pathogens or other potentially infectious materials are present.

In addition, California OSHA requires a listing of job classifications in which some employees may have occupational exposure. Since not all the employees in these categories would be expected to incur exposure to blood or other potentially infectious materials, tasks or procedures that would cause these employees to have occupational exposure are also required to be listed in order to clearly understand which employees in these categories are considered to have occupational exposure.

The job classifications and associated tasks for these categories are as follows:

JOB CLASSIFICATIONS	TASKS/PROCEDURES
Project Managers and Site Safety Officers	- General first aid and/or CPR. - Post injury/accident equipment and/or area decontamination activities.
Field Supervisors and Superintendents	- General first aid and/or CPR. - Post injury/accident equipment and/or area decontamination activities.
Field Technicians	- General first aid and/or CPR. - Post injury/accident equipment and/or area decontamination activities.
Equipment Operators	- General first aid and/or CPR. - Post injury/accident equipment and/or area decontamination activities.

Universal Precautions

Although California OSHA has defined the amount of blood or body fluids required to constitute an infectious risk as “substantial,” “dripping” and “15 milliliters,” the Contractor requires that workers protect themselves from all potentially infective fluids, even of hardly visible quantity.

All blood or other potentially infectious material will be considered infectious regardless of the perceived status of the source individual.

Work Practice Controls

Work practice controls will be utilized to eliminate or minimize employee exposure to blood borne pathogens.

- Work area restrictions: In work area where there is a reasonable likelihood of exposure to blood or other potentially infectious materials (OPIM) employees are not to eat, drink, apply lip balm, or cosmetics, smoke, or handle contact lenses. Food and beverages are not to be kept in refrigerators, freezers, shelves, cabinets, or on counter tops or bench tops where blood or OPIM are present.
- Hand washing: Sanitation facilities are available at the project site to all employees who may incur exposure to blood or OPIM.

Supervisors shall ensure that after the removal of personal protective gloves, employees immediately wash hands and any other potentially contaminated skin area with soap and water.

Supervisors shall ensure that if employees incur exposure to their skin and mucous membranes then those areas shall be washed or flushed with water as soon as possible following contact.

- Sharps: Contaminated sharps will not be bent, recapped, removed, sheared, or purposely broken. All sharp items are to be placed in a puncture resistant container. All areas where such sharps are used will be equipped with suitable sharps containers.
- Contaminated Equipment: Supervisors are responsible for ensuring that equipment which has become contaminated with blood or OPIM is examined prior to servicing or shipping and is decontaminated as necessary.

Personal Protective Equipment

Personal protective equipment will be used to minimize exposure.

- PPE Provision: All personal protective equipment used shall be provided by the Contractor. Gloves, dust masks, safety glasses/goggles, and tyveks/lab coats will be provided as necessary.
- Employees must wear masks in combination with eye protective devices, such as goggles or glasses with solid side shield, or chin length face shields, whenever splashes splatter, or droplets of blood or other potentially infectious materials (OPIM) may be generated and reasonable anticipated to contaminate eye, nose, or mouth.

- PPE use: The SSO shall ensure that employees use appropriate PPE. (The protective equipment will be considered appropriate only if it does not permit blood or OPIM to pass through or reach the employees' clothing, skin, eyes, mouth, or other mucous membranes under normal conditions of use and for the duration of time the protective equipment will be used.). An exemption from the use of PPE occurs in rare and extraordinary circumstances when it is the employee's professional judgment that in the given situation the use of PPE would prevent the proper delivery of health care or pose an increased hazard to the personal safety of the worker or co-worker. When the employee makes this judgment, the circumstances will be investigated and documented in order to determine whether changes can be made to prevent such occurrences in the future.
- PPE Accessibility: The SSO shall ensure that appropriate PPE in appropriate sizes is readily available. If an employee feels more or different, protection should be provided for certain procedures, a request shall be made to the SSO.
- Type of PPE: Gloves shall be worn where it is reasonably anticipated that employees will have hand contact with blood, OPIM, skin, and/or mucous membranes. Disposable gloves used are not to be washed or decontaminated for re-use and are to be replaced as soon as practical when they become contaminated or as soon as feasibly possible if they are torn, punctured, or when their ability to function as a barrier is compromised. Eye and face protection shall be used whenever splashes, spray, spatter, or droplets of blood or other OPIM may be generated and eye, nose, or mouth contamination can reasonably be anticipated.
- Protective body clothing: Additional protective clothing (such as tyveks, lab coats, and aprons) shall be worn in instances when gross contamination occurs.
- All personal protective equipment will be cleaned, laundered, and / or disposed of by the Contractor at no cost to the employees.
- All garments which are penetrated by blood or OPIM shall be removed immediately or as soon as feasibly possible. All personal protective equipment will be removed prior to leaving the work area, and placed in a "red bag" marked with a standard bio hazard symbol.

Handling Of Blood or OPIM Spills (Clean up)

1. Secure area. If the spill situation appears to be a bigger problem than available equipment supplies or training can handle, contact the Office of Public Safety.
2. Put on appropriate PPE. Gloves, safety glasses/goggles, and Tyvek/aprons should be worn when mop clean up is active.
3. Disinfect spill: Use 1:10 bleach: water, ammonium disinfectant, or any other appropriate method of decontamination advised by your supervisor.
4. Areas with floor drains may be mopped and rinsed to sewer. Areas without floor drains may be wet mopped with detergent/water followed by wet mop rinsed with disinfectant water. Carpeted areas may be wet vacuumed with detergent/water followed by disinfectant/water rinse.
5. Any regulated medical waste associated with the spill (such as a blood-soaked towel) will be placed in a "red bag" marked with a standard biohazard symbol.

6. After clean up all surfaces will be treated with disinfectant such as 1:10 bleach: water or ammonium, and the area allowed air-drying.
7. If gloves worn during the clean up are contaminated they are to be placed in the "red bag" marked with the standard biohazard symbol.
8. Immediately after completing clean up, disinfection, and glove removal, the employee will thoroughly wash hands and any exposed skin surfaces. A disinfectant soap will be use.
9. The area will not be left unattended until cleaned up, disinfected, and cleared of any "red bag" waste.

Labels and Signs

Biohazard labels are affixed to containers of regulated waste, refrigerators and freezers containing blood or OPIM, and other containers used to store, transport or ship blood or OPIM. The universal biohazard symbol is used. The label is fluorescent orange or orange-red. Red bags containers may be substituted for labels.

Housekeeping

Housekeeping requirements to prevent the spread of blood borne pathogens include:

- Any broken glassware which may be contaminated will not be picked up directly with the hands.
- Broken glassware which may be contaminated must not be picked up directly with the hands. It shall be cleaned up using mechanical means, such as a brush and dust pan, tongs, or forceps.

Exposure Evaluation and Follow Up

All exposure incidents shall be reported, investigated, and documented.

When an employee incurs an exposure incident to their skin and/or mucous membranes, it shall be reported promptly to the SSO. An incident report shall be generated immediately.

Following a report of an exposure incident, the exposed employee shall immediately receive a confidential medical evaluation and follow up, including at least the following elements:

- Documentation of the route of exposure, and the circumstances under which the exposure-occurred.
- Identification and documentation of the source individual, unless it can be established that identification is infeasible or prohibited by state or local law.
- The source individual's blood shall be tested as soon as feasible and after consent is obtained in order to determine HBV and HIV infectivity. If consent is not obtained, Medical Officer establishes that legally required consent cannot be obtained. When the source individual's consent is not required by law, the source individual's blood, if available, will be tested and the results documented.
- When the source individual is already known to be infected with HBV or HIV, testing for the source individual's known HBV or HIV status need not be repeated.

- Results of the source individual's testing are made available to the exposed employee, and the employee is informed of applicable laws and regulations concerning disclosure of the identity and infectious status of the source individual.

Collection and testing of blood for HBV and HIV serological status will comply with the following:

- The exposed employee's blood is collected as soon as possible and tested after consent is obtained.
- The employee will be offered the option of having their blood collected for testing of the employee's HIV / HBV serological status.
- The blood sample will be preserved for up to 90 days to allow the employee to decide if the blood should be tested for HIV serological status.

All employees who incur an exposure incident will be offered post-exposure evaluation and follow-up according to the California OSHA standard.

The Contractor obtains and provides the employee with a copy of the evaluating healthcare professional's written opinion within 15 days of the completion of the evaluation.

The healthcare professional's written opinion for HBV vaccination must be limited to whether HBV vaccination is indicated for an employee, and if the employee has received such vaccination.

The healthcare professional's written opinion for post-exposure follow-up is limited to the following information:

- A statement that the employee has been informed of the results of the evaluation.
- A statement that the employee has been told about any medical conditions resulting from exposure to blood or OPIM which require further evaluation or treatment.

Note: All other findings or diagnosis shall remain confidential and will not be included in the written report.

Training

Blood borne Pathogen training shall be interactive and cover the following:

1. Policies and procedures outlined in this section.
2. The epidemiology and symptoms of blood borne diseases.
3. The modes of transmission of blood borne pathogens.
4. Contractor's written Blood borne Pathogens Program, and a method for obtaining a copy.
5. The recognition of tasks that may involve exposure.
6. The use and limitations of methods to reduce exposure, for example engineering controls, work practices and personal protective equipment (PPE).
7. The types, use, location, removal, handling, decontamination, and disposal of PPE.
8. The basis of selection of PPE.

9. The Hepatitis B vaccination, including efficacy, safety, method of administration, benefits and that it will be offered free of charge.
10. The appropriate actions to take and persons to contact in an emergency involving blood or other potentially infectious materials (OPIM).
11. The procedures to follow if an exposure incident occurs, including the method of reporting and medical follow-up.
12. The evaluation and follow-up required after an employee exposure incident.
13. The signs, label, and color coding systems.

Additional training may be provided to employees when there are any changes of tasks or procedures affecting the employee's occupational exposure.

Recordkeeping

Medical records shall be maintained in accordance with California OSHA Standards. These records shall be kept confidential, and must be maintained for at least the duration of employment plus 30 years. The records shall include the following:

- The name and social security number of the employee.
- A copy of the employee's HBV vaccinations status, including the dates of vaccination.
- A copy of all results of examinations, medical testing, and follow-up procedures.
- A copy of the information provided to the healthcare professional, including a description of the employee's duties as they relate to the exposure incident, and documentation of the routes of exposure and circumstances of the exposure.
- All employee records shall be made available to the employee in accordance with California OSHA Standards.

18.0 Heat Illness Prevention (8 CCR 3395)

The following section is intended to address policies and procedures associated with preventing both the frequency and severity of occupational heat related illness in all outdoor places of employment. Policies and procedures outlined in this section are in support of and in reference to the California Department of Occupational Safety and Health (DOSH) General Industry Safety Orders (GISO) specifically addressed in:

Code of California Regulations (CCR) Title 8, Section 3395

The following key elements shall be covered:

- Scope and application of policies and procedures for identifying and understanding symptoms of and control measures for heat related illnesses.
- Key terms and definitions used to support the scope and application of this SOP.
- Employer requirements for provision of water and access to shade.
- Mandatory heat illness prevention training topics for employees and supervisors.

Understanding Heat Stress

The scope and application of this section are in accordance with CCR Title 8, Section 3395(a) and apply to Contractor work activities performed outdoors where environmental risk factors for heat illness are present.

When the body is unable to cool itself by sweating, several heat induced illnesses such as heat stress or heat exhaustion or the more severe heat stroke can occur and result in serious injury or illness or even death. High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; certain medications; and inadequate tolerances for hot workplaces are all factors which can lead to heat stress and heat related illness.

Temperature	Relative Humidity	Hazard Level
Less than 80 degrees F.	Less than 30%	Low Hazard
80 – 85 degrees F.	30-40%	Low - Cautionary
85-95 degrees F.	40-60%	Cautionary
95-100 degrees F.	60-70%	Danger

There are two main ways in which the body produces heat:

- *Metabolic Heat* – heat generated through digestion of food, work, and exercise
- *Environmental Heat* – heat from the surrounding environment (sun, hot room, etc.)

The body typically produces sweat through perspiration to keep itself cool. When the body is unable to cool itself serious heat illness may occur. The most severe heat induced illnesses are heat exhaustion and heat stroke. If actions are not taken to treat heat exhaustion, the illness can progress to heat stroke and possible death.

The following table identifies common heat related illnesses, their symptoms, and procedures to prevent or minimize their conditions.

Table 18-1: Heat Related Illnesses, Symptoms and Emergency Response Procedures

<u>Illness</u>	<u>Symptoms</u>	<u>Emergency Response</u>
<u>Heat Rash</u> – also know as <i>Prickly Heat</i> , occurs in hot humid environments where sweat can't easily evaporate from the skin.	Presence of a red rash which in some cases causes severe pain.	Move person to cool shaded area to rest. Prevent reoccurrence by resting frequently in cool dry areas and bathing frequently to ensure clean, dry skin.

Illness	Symptoms	Emergency Response
<u>Fainting</u> – occurs when an employee is not acclimatized to the work environment.	Headache, Dizziness, Light Headedness, Weakness, Temporary Black Outs (loss of vision), Nausea, Vomiting	Move the person to a cool shaded area to rest. Do not leave the person alone. If the person is dizzy, lay on their back and raise legs 6-8 inches. If the person is sick to his/her stomach, lay on side. Loosen and remove any heavy clothing. Have the person drink cool water (a small cup every 15 minutes) if not feeling sick. Try to cool the person by fanning or cool the skin with a spray mist of water or wet cloth. If the person does not feel better within a few minutes, call for emergency help (911).
<u>Heat Cramps</u> – painful muscle spasms that result in the loss of salt and electrolytes due to excessive sweating.	Painful muscle spasms usually affecting the stomach, arms, and legs. Vomiting may occur.	Move the person to a cool shaded area to rest. Do not leave the person alone. If the person is dizzy or light headed, lay on back and raise legs 6-8 inches. Have the person drink fluids containing electrolytes such as calcium, sodium, and potassium (i.e. Gatorade).
<u>Heat Exhaustion</u> – state brought on by the loss of fluids lost during excessive sweating. Individuals may still sweat but experience extreme weakness and may even collapse.	Headache, Dizziness, Light Headedness, Weakness, Mood Changes (irritable, confused / can't think straight), Nausea, Vomiting, Decreased and Dark Colored Urine, Fainting, Pale and Clammy Skin	Move the person to a cool shaded area to rest. Do not leave the person alone. If the person is dizzy or light headed, lay on back and raise legs 6-8 inches. If the person is sick to his/her stomach, lay on side. Loosen and remove any heavy clothing. Have the person drink cool water (a small cup every 15 minutes) if he/she is not feeling sick. Try to cool the person by fanning or cool the skin with a spray mist of water or wet cloth. If the person does not feel better within a few minutes, call for emergency help (911). (If heat exhaustion is not treated, the illness may advance to heat stroke).

Illness	Symptoms	Emergency Response
<p><u>Heat Stroke</u> – a severe medical emergency which can result in death. The body's core temperature gets too high and the body is no longer able to cool itself.</p>	<p>Dry Pale Skin (no sweating), Hot Red Skin (looks like sunburn), Mood Changes (irritable, confused / not making sense), Seizures, and Collapse (not responding)</p>	<p>Call for emergency help (911). Move the person to a cool shaded area. Do not leave the person alone. Lay him/her on back and if the person is having seizures, remove any objects close to him/her so he/she won't strike against them. If the person is sick to his/her stomach, lay on side. Remove heavy outer clothing. Have the person drink cool water (a small cup every 15 minutes) if he/she is alert enough to drink anything and is not sick to his/her stomach. Try to cool the person by fanning or cool the skin with a spray mist of water or wet cloth. If ice is available, place ice packs under arm pits and in the groin area.</p>

Note: Employees are at increased risk of heat illness when taking certain medications, have had heat induced illness in the past, and/or are required to wear personal protective equipment (PPE) including suits, respirators, heavy gloves and boots. Employees taking medication should check with their doctor, nurse, or pharmacy to determine if their medication will affect them when working in hot environments.

Steps to protect employees from heat illness include:

- Learning and understanding the signs and symptoms of heat illnesses and what to do to help affected employees.
- Employee training on heat induced illnesses.
- When possible, try to perform heaviest work during coolest part of the day.
- *Acclimatization* – build up tolerance to heat and work activity (takes up to two weeks).
- Use the buddy system (work in pairs).
- Drink plenty of cool water (one small cup every 15-20 minutes).
- Wear light, loose fitting, breathable clothing.
- Take frequent short breaks in cool, shaded areas allowing the body to cool down.
- Avoid eating large, heavy meals before working in hot environments.
- Avoid caffeinated beverages as they make the body lose water and increase the risk of heat illnesses.

Key Terms and Definitions

The following terms and definitions are outlined in CCR Title 8, Section 3395(b) and are included to support the language used to describe the scope and application of this section.

Acclimatization – The biological process through which the body adapts to the environment. Usually peaks within 4 to 14 hours of work for at least 2 hours per day in the heat.

Heat Illness – A serious medical condition resulting from the body’s inability to cope with a particular heat load, including heat cramps, heat exhaustion, heat syncope, and heat stroke. (Heat Syncope = fainting, temporary loss of consciousness or posture or both).

Environmental Risk Factors – Working conditions that create the possibility that heat illness could occur, including; air temperature, relative humidity, radiant heat from the sun, conductive heat sources (ground, air movement), workload severity and duration, protective clothing and PPE worn by employees.

Personal Risk Factors – Personal conditions and factors that create the possibility that heat illness could occur, including; individuals age and state of health, degree of acclimatization, water, alcohol, and caffeine consumption, and use of prescription medication that affect the body’s water retention or other physiological response to heat.

Recovery Period – The period of time required to recover from the heat in order to prevent heat related illnesses.

Shade – Blockage of direct sunlight; canopies, umbrellas. Blockage is sufficient when objects do not cast a shadow in the area of blocked sunlight. Shade is not adequate when heat in the area of shade defeats the purpose of shade. (i.e. a car sitting in the sun does not provide acceptable shade to a person inside it, unless the car is running with air conditioning in use).

Provisions of Water

The Contractor shall adhere to the requirements for provision of drinking water as outlined in CCR Title 8, Section 3395(c). The provision of drinking water is a control measure to ensure exposed employees are provided with a suitable quantity of drinking water to prevent heat illnesses. The Contractor shall provide water in sufficient quantity to exposed employees at the beginning of their work shift so at least one quart per employee per hour is available for drinking over the entire shift.

A shift may be begin with smaller quantities of water only if effective procedures for water replenishment during the shift are available so that each employee has access to a quart or more per hour. Frequent drinking shall be encouraged.

Access to Shade

In accordance with CCR Title 8, Section 3395(d), The Contractor shall provide exposed employees with access to shaded areas when working outdoors in conditions of elevated heat, humidity, and / or work activity. Employees suffering from heat illness, or believing that a preventative recovery period is needed, shall be provided access to an area that is either open to the air or provided with ventilation or cooling for a period of no less than five (5) minutes. Such access shall be permitted at all times.

Employee and Supervisor Training

As outlined in CCR Title 8, Section 3395(e), the following are detailed topics on which employees and supervisors shall be trained with respect to prevention of, and response to, heat illness and risk factors for heat illness:

Employee Training

- Environmental and personal risk factors for heat illness.
- The Contractor’s procedure for identifying, evaluating, and controlling exposures to the environment and personal risk factors for heat illness.

- The importance of frequent consumption (up to 4 cups per hour) of water under extreme conditions.
- The importance of *acclimatization*.
- The different types of heat illnesses and common signs and symptoms.
- The importance of immediately reporting symptoms of heat illness in either themselves or co-workers.
- The Contractor's procedures for responding to heat illness, including emergency medical services.
- Procedures for contacting EMS and for transporting employees to a point where they can be reached by EMS personnel.
- How to provide clear and concise directions to the project site.

Supervisor Training

- All information contained in the *Employee Training* section.
- The procedures a supervisor is to follow to effectively implement policies and procedures outlined in this section.
- The procedures a supervisor is to follow when an employee exhibits symptoms consistent with possible heat illness, including emergency response procedures.

19.0 Emergency Eyewash and Shower Equipment

Functioning emergency eyewash and shower stations are located in multiple areas throughout the project site. Locations of all emergency eyewash and shower stations are shown on *Figure 3* of this HASP. The Contractor intends to disconnect power to facility process areas prior to performing decontamination and demolition activities; however, efforts shall be made to maintain water line plumbing to all emergency eyewash and shower equipment at individual facility process areas until final demolition activities are performed in each area.

The SSO shall inspect emergency eyewash and shower stations on a daily basis to ensure proper functionality and sanitation standards are maintained at all times. All personnel shall be trained on the locations of emergency eyewash and shower stations at the project site with reminders incorporated each day in the daily "Tail Gate" / "Tool Box" safety meetings and during periodic walk throughs and inspections performed by the SSO. The SSO shall ensure that each emergency eyewash station and safety shower is clearly marked with immediate access free from obstructions. All eyewash stations at the project site shall at a minimum meet ANSI Z358.1 compliance standards.

The Contractor shall provide portable eyewash stations for use in work areas where plumbed emergency eyewash stations are not immediately available or in work areas where the water source to plumbed emergency eyewash stations has been disconnected as part of facility process area demolition activities. Portable eyewash stations shall meet ANSI standards requiring a flow of 0.4 gallons of water per minute for a 15 minute period.

Portable emergency eyewash stations shall be inspected daily by the SSO and shall be kept clean and sanitary at all times. The following procedures shall be used to prepare portable eyewash stations for use prior to use at the project site.

Preparation For Use:

1. Clean interior and exterior of eyewash with mild detergent and a soft cloth.
2. Rinse with tap water.
3. Fill eyewash with a mild bleach solution (2 ounces per gallon of water).
4. Let eyewash sit for a minimum of one half hour.
5. Drain solution from eyewash by lowering the rinse station.
6. Inspect the water dispensing ports for proper function.
7. Triple rinse the interior of the eyewash station with tap water.
8. When filling the station for use, utilize eyewash buffer solution at concentrations recommended on the container.
9. Temperature of the water delivered by portable eyewash stations shall be tepid (lukewarm) per ANSI Z358.1 compliance standards.

Preparation For Storage After Use:

1. Empty any remaining eyewash fluids out of the container.
2. Rinse the interior and exterior of the unit with tap water.
3. Invert the eyewash station, leaving fill port open. Leave the unit inverted until dry on the inside and outside.
4. Close the fill hole and the eyewash port.
5. Place the clean and dry unit into storage.

20.0 Fall Protection

The following section describes the requirements for recognizing fall hazards and for establishing procedures to prevent falls through lower levels, but are not limited to holes; leading edge work; unprotected sides and edges; roofing work; wall openings; and other walking/working surfaces.

All personnel onsite shall be protected from fall hazards and falling objects when performing work in elevated areas 6 feet or more above a lower level.

Fall protection may be provided through the use of safety monitoring systems of controlled access zones, guardrail systems, and personal fall arrest systems. All fall protection systems shall comply with 29 CFR 1926.502.

The SSO shall be responsible for continual observation of work operations performed in elevated areas and shall enforce safety policy and procedures outlined in this section

Controlled Access Zones

Controlled access zones at the project site are defined as elevated areas where work may take place without the use of conventional fall protection systems. Controlled access zones at the project site include but are not limited to elevated tank tops platforms, walkways, catwalks and scaffolding systems.

1. Site personnel, other than those authorized to enter the immediate work area where guardrails have been removed, shall be prohibited from entering controlled access zones.
2. Controlled access zones shall be defined by a control line or by another means that restricts access.
3. Control lines shall consist of ropes, wires, tapes or equivalent material.
4. Each line shall be rigged and supported so that the line doesn't sag below 39 inches, and not over-exceed 45 inches in height.
5. Each line shall have a minimum breaking strength of 200 pounds.
6. The control line shall extend along the entire length of the unprotected or leading edge and shall be approximately parallel to the unprotected or leading edge.

Guardrail Systems

Top rails and mid rails of guardrail systems shall be at least one-quarter inch (0.6 cm) nominal diameter or thickness to prevent cuts and lacerations. If wire rope is used for top rails, it must be flagged at not more than 6-foot intervals with high visibility material. Manila, plastic or synthetic rope used for top rails or mid rails shall be frequently inspected by the SSO ensure strength and stability.

The top edge height of top rails or equivalent guardrails shall be 42 inches plus or minus three inches above the walking/working level.

Screens, mid rails, or equivalent structural members shall be installed between the top edge of the guardrail system and the walking/working surface when there are no walls or parapet walls at least 21 inches high.

Other structural members, such as additional mid rails and architectural panels, shall be installed, so that there are no openings in the guardrail system more than 19 inches.

Guardrail systems shall be capable of withstanding a force of at least 200 pounds applied within 2 inches of the top edge in any outward or downward direction. When the 200-pound test is applied downward, the top edge of the guardrail must not deflect to a height less than 39 inches above the walking/working level.

Mid rails, screens, mesh or other equivalent structural members shall be capable of withstanding a force of at least 150 pounds applied in any direction.

Guardrails shall be surfaced to protect workers from punctures or lacerations and to prevent clothing from snagging.

Where there are holes, guardrails shall be set up on all unprotected sides or edges. When holes are used for the passage of equipment and materials, the hole shall have not more than two sides with removable guardrails. The hole shall be covered or protected on all sides and edges when not in use.

Holes that are covered shall be able to support at least twice the weight of employees, equipment, and materials that may be imposed on the cover at any one time.

All covers shall be coded or marked, "Hole" or "Cover."

Personal Fall Arrest Systems

Personal fall arrest systems shall consist of an anchorage; connectors and a body harness and may include, but are not limited to, deceleration devices and lifelines. Personal fall arrest system used at the project site shall meet the following requirements.

1. Limit maximum arresting force on an employee to 1800 pounds when used with a body harness.
2. Be rigged so that an employee cannot free-fall more than 6 feet; nor contact any lower level.
3. Bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet.
4. Have the sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of 6 feet.

Personal fall arrest systems must be inspected daily by the SSO and determined to be in safe operating condition prior to use.

Dee-rings and locking spans shall have a minimum tensile strength of 5,000 pounds and must be proof-tested to a minimum of 3,600 pounds without cracking, breaking or deforming.

Locking spans shall not be engaged directly to webbing, rope or wire rope; to each other; to a Dee-ring to which another snap hook or other connector is attached; to a horizontal lifeline; or to any other object incompatible in shape or dimension relative to the snap hook, thereby causing the connected object to depress the snap hook keeper and release unintentionally.

On suspended scaffolds or similar work platforms with horizontal lifelines that may become vertical lifelines, the device used to connect to a horizontal lifeline shall be capable of locking in both directions on the lifeline.

Lifelines shall be protected against being cut or abraded.

Self-retracting lifelines and lanyards that automatically limit free fall distance to 2 feet or less shall be capable of sustaining a minimum tensile load of 3,000 pounds applied to the device without the lifeline or lanyard extended to its full position.

Self-retracting lifelines and lanyards that do not limit free fall distance to 2 feet or less, shall be capable of sustaining a minimum tensile load of 5,000 pounds applied to the device with the lifeline or lanyard in the fully extended position.

Lanyards and vertical lifelines shall have a minimum breaking strength of 5,000 pounds.

21.0 Lock Out Tag Out

The Contractor intends to disconnect power to facility process areas prior to performing decontamination and demolition activities. Power shall remain connected in the administrative buildings and office areas.

In the case that power is unable to be disconnected to certain facility process equipment, the following section shall address policies and procedures associated with the isolation of energy sources to prevent the accidental and unexpected activation of process equipment or other energized systems during facility decontamination and closure activities at the project site. The policies and procedures outlined in this section are in support of and in reference to both 29 Code of Federal Regulations (CFR) and the California Department of Occupational Safety and Health (DOSH) General Industry Safety Orders:

29 CFR, Section 1910.147
Code of California Regulations (CCR) Title 8, Section 3314

The following key elements shall be covered:

- Establishing lockout/tagout procedures
- Minimum requirements for isolating and de-energizing equipment or machines where the unexpected release of stored energy could cause injury.
- Minimum requirements for re-energizing equipment or machines after servicing, maintenance and/or set-up activities are completed.
- Lockout/tagout training.

Policies and procedures outlined in this section shall address the basic requirements for the lockout of energy-isolating devices to ensure that individual machines or equipment are stopped, isolated from all potentially hazardous energy sources, and locked out before personnel perform decommissioning activities.

Lockout / tagout (LOTO) procedures shall involve three (3) categories of employees with different levels of responsibility:

1. **Authorized Personnel** – Personnel who perform the servicing, maintenance, and set up of machinery and who apply the locks and tags to the equipment.
2. **Affected Personnel** – Personnel who perform and/or oversee the day-to-day operation of the equipment and machines being locked out and tagged out for servicing, maintenance, or set-up.
3. **Other Personnel** – Personnel who are neither affected nor authorized employees.

Only authorized personnel shall be permitted to remove process equipment from a LOTO state.

All personnel shall be required to comply with restrictions and limitations imposed upon them during LOTO activities. All authorized personnel are required to perform LOTO activities in accordance with the procedures outlined in this section.

If the Facility has pre-established, written LOTO procedures for individual process equipment, the SSO shall obtain, review, and train authorized and affected employees on the pre-established written LOTO procedures.

If pre-established, written LOTO procedures do not exist at the Facility, the SSO shall identify energy isolation points, and identify LOTO points as part individual task pre-hazard assessments. When all hazards are assessed and it is deemed safe to begin project activities, authorized and affected personnel shall receive training and perform LOTO activities in accordance with the

procedures outlined in this section. A Contractor Lockout Tagout Procedural Checklist is included as Attachment D of this HASP.

Establishing Energy Control (LOTO) Procedures

Individual energized processes shall have their own LOTO procedures. Procedures shall contain steps for shutting down, isolating, blocking, and securing the equipment or process to control hazardous energy. Procedures shall also include steps for placement, removal, and transfer of LOTO devices (ie. locks and tags). Finally, procedures shall contain the requirements for testing and verifying the effectiveness of the LOTO devices. An orderly shutdown shall be required to avoid additional or increased hazards when a energized process or equipment are stopped. Only the shut down procedures specifically established for an individual energized processes or equipment shall be used during LOTO activities.

LOTO devices shall meet the following minimum requirements as defined by 29 CFR, Section 1910.147 and CCR Title 8, Section 3314:

Locks

- Shall be durable and substantial.
- Shall be standardized for ease of recognition (same color and/or same make and model).
- Authorized personnel shall have their own lock and key. Duplicate keys are prohibited. Use of other authorized personnel's LOTO devices is prohibited.

Tags

- Shall be durable and substantial.
- Shall be standardized for ease of recognition including print and format. The tag's legend must include statements such as "Do Not Start", "Do Not Open", "Do Not Close", "Do Not Energize", and "Do Not Operate".
- The attachment means for a tag must be: non-reusable, attached by hand, self-locking, non-releasable with an unlocking strength of 50 pounds.
- The attachment means must be equivalent to a one-piece, all-environment-tolerant nylon cable tie.

Affected personnel shall be notified by the SSO and/or authorized personnel of the application and removal of LOTO devices. Affected personnel shall be notified before LOTO controls are applied to a piece of equipment or machine. After LOTO devices have been removed and before a piece of equipment or machine is started, affected personnel shall be notified that the LOTO devices have been removed.

Only authorized personnel may remove energized systems or equipment from LOTO.

Affected personnel shall not attempt to restart or reenergize energized systems or equipment that are locked/tagged out.

Sequence of Lockout

The following procedure establishes the minimum requirements for isolating and de-energizing energized systems or equipment where the unexpected release of stored energy could cause injury. Authorized personnel shall:

1. Notify all affected personnel that decommissioning activities are in progress and that the energized system or equipment must be shut down and locked out to perform

decommissioning activities. The SSO in addition to authorized personnel shall maintain a roster containing the names, job titles, and contact information of all affected personnel.

2. Refer to individual task pre-hazard assessments to identify the type and magnitude of energy that the energized system or equipment utilizes, and shall understand the hazards of the energy and the methods for controlling it.
3. Attempt to shut down the energized system or equipment utilizing normal stopping procedures (depress the stop button, open switch, close valve, etc.).
4. Deactivate energy isolating devices so that the energized system or equipment is isolated from all energy sources.
5. Lock out and tag out energy isolating devices with assigned, individual locks and tags.
6. Dissipate and/or restrain stored or residual energy sources (capacitors, springs, elevated machine members, rotating fly wheels, hydraulic systems, air, gas, steam, and/or water pressure) by methods such as grounding, repositioning, blocking, bleeding down, etc.
7. Ensure that the energized system or equipment is disconnected from energy sources by first checking that no personnel are exposed, then verify the isolation of the energized system or equipment by operating the push button or other normal operating controls or by testing to make certain the energized system or equipment will not operate. Return operating controls to neutral or "off" position after verifying the isolation of the energized system or equipment.
8. The energized system or equipment is now locked out.

Restoring Energized Systems or Equipment to Service (if required)

The following procedure establishes the minimum requirements for re-energizing energized systems or equipment after decommissioning activities are completed. Authorized personnel shall:

1. Check the energized system or equipment, and the immediate area surrounding it, to ensure that nonessential items have been removed and that energized systems or equipment components are operationally intact.
2. Check the work area to ensure that all personnel are safely positioned or removed from the area.
3. Verify that the energized system or equipment controls are in neutral or the "off" position.
4. Remove LOTO devices and re-energize the energized system or equipment. *The removal of some forms of blocking may require re-energization of the equipment before safe removal.*
5. Notify all affected personnel that re-energizing activities are complete and that the energized system or equipment is ready for use.

LOTO Training

Training and instruction of LOTO procedures shall be provided to:

- All new personnel.
- All personnel given new job assignments for which training has not previously been received.
- Project managers, superintendents, and area supervisors so that they can familiarize themselves with the health and safety hazards to which personnel under their immediate direction and control may be exposed.
- Contractors and/or subcontractors working on-site (shall have general understanding of LOTO procedures).

22.0 Fixed and Portable Ladders - Safe Work Practices

Fixed Ladder Systems

Fixed ladders shall be constructed and used in accordance with OSHA Standards, 29 CFR 1910.27 and ANSI Standard A-14.3 and 8 CCR 1629.

The following load requirements shall be met:

1. Minimum live load capacity of 200 lbs concentrated at the points of maximum stress. Capacity must be increased by 200 lb increments for each additional person based upon the rate of use and potential for more than one person using a ladder or ladder section at the same time.
2. Weight of ladder itself and appurtenances must be considered in designing the railings and fastenings.
3. Wooden ladders must meet design stress requirements of 29 CFR 1910.25 and 8 CCR 1629.

The following feature requirements shall be met:

1. Except where metal rungs of ladders are exposed to corrosive atmospheres and must be 1 inch in diameter or coated to prevent corrosion, metal rungs must be a minimum diameter of 3/4 inch. Wooden rungs must be a minimum of 1 inch in diameter.
2. The distance between rungs, cleats or steps must be no more than 12 inches. Rungs, cleats or steps must be uniformly spaced throughout the length of the ladder.
3. The minimum clear width of rungs, cleats or steps must be 16 inches.
4. Rungs, cleats or steps and side rails which may be used for handholds when climbing shall offer adequate gripping surface and be free of splinters, splinters or burrs and substances which could cause slipping.
5. Fixed ladders using different metals which could conduct electric shock shall incorporate shock protection. Ladders in atmospheres which could affect the integrity of the ladder must be treated to prevent corrosion or deterioration.
6. Fixed ladders (unless of sufficient height to use caging or a well construction as fall protection) shall have a minimum of 15 inches of clearance from the centerline of the rungs

to each side, 30 to 36 inches from the rungs to any obstruction on the climbing side of the ladder, 7 inches between the rungs and any obstruction on the non-climbing side of the ladder, have grab rails or extensions of side rails reaching a minimum of 40 inches above the landing and be oriented so that it is not necessary to step across more than 12 inches to a point of landing through or to the side of the ladder.

7. Fixed ladders of greater than 20 feet must have cages or other approved fall protection devices. Where cages or wells are used for fall protection, the cage must begin no lower than 7 feet from the "ground" landing, but no higher than 8 feet. If more than 30 feet, sections must be offset with side accessed landings (minimum dimensions 24-inch wide by 30-inch length) located at least four feet below the top of a 30 foot or fraction thereof section. The distance from the rungs to the cage back on the climbing side shall be between 27 and 28 inches and the width of the cage or well no less than 27 inches. There should be no projections through the cage. Projections in wells may reduce space from rung to projection to no less than 24 inches and projections must have deflectors for head protection.

Inspection

Fixed ladder systems shall be inspected prior to performing work at the project site for defects prior to use. Inspections shall be performed to determine:

1. Joints between steps or rungs are properly welded and there are no cracks or defects in structural integrity.
2. Hardware and fittings are secure, rivets are not sheared.
3. Rungs are not loose, cracked, bent, dented, are free of splinters or splinters and are treated to prevent slipping.
4. Side rails are not cracked, bent or dented and are free of splinters.

Fixed ladder systems found to be defective shall be clearly tagged to indicate OUT OF SERVICE / DO NOT USE, if repairable; or destroyed immediately if no repair is possible. Subsequently, all fixed ladder systems found to be in good condition will clearly tagged to indicate CLEAR FOR USE.

Portable Ladders

Portable ladders shall be used for their designed purpose only and if purchased, used, maintained and constructed according to ANSI Standards A-14.1 and A-14.2, OSHA 29 CFR 1910.25 and .26, 8 CCR 1675, and manufacturers' instructions.

Inspection

Portable ladders shall be inspected daily for defects prior to use. Inspections shall be performed to determine:

5. Joints between steps or rungs are tight.
6. Hardware and fittings are secure, rivets are not sheared.
7. Metal bearings of locks, wheels, pulley, etc. are lubricated.
8. Ropes on extension ladders are in good condition.
9. Rungs are not loose, cracked, bent, dented, are free of splinters or splinters and are treated to prevent slipping.

10. Side rails are not cracked, bent or dented and are free of splinters.

Portable ladders found to be defective shall be clearly tagged to indicate OUT OF SERVICE, if repairable; or destroyed immediately if no repair is possible.

Use Requirements

1. Personnel use both hands and face the ladder when ascending and descending.
2. Personnel shall keep their body centered between the side rails.
3. Portable ladders shall be utilized on flat, firm surfaces with both handrails in contact with an upper support which is sufficiently strong and rigid.
4. Straight portable ladders shall have secure footing provided by a combination of safety feet, top of ladder tie-offs and mud cells or another person holding the ladder to prevent slipping.
5. When middle or top sections of sectional portable ladders are used as bottom sections, they must have safety feet.
6. The ratio of the distance to the foot of a portable ladder from the base of the vertical plane to the height from the base to the top of the vertical plane when the portable ladder rests on the top of the vertical plane shall be no more than 1:4 and no less than 1:3 (e.g., one foot out from a wall for every 4 feet up the wall to the point where the portable ladder rests against the wall).
7. The handrails of a straight portable ladder must extend at least 36 inches above the landing.
8. Straight portable ladders may not be lashed together to make sectional ladders.
9. Metal portable ladders shall not be used near electrical conductors.
10. Personnel shall use both hands and face the portable ladder when ascending and descending.
11. No more than one person may use a straight portable ladder at a time.
12. Standing on the top rung/step or above the manufacturer's safe indication is prohibited.
13. Portable ladders shall be positioned so personnel do not have to lean so that more than half of their body is beyond (outside of) either handrail.
14. Portable ladders shall not be placed in front of doors which open toward the ladder unless the door is locked and personnel using the ladder have the key, the door is blocked open and other personnel are warned of the presence of the ladder.
15. Portable ladders placed in any location where they can be displaced by workplace activities or traffic, such as in passageways or doorways, shall be secured to prevent accidental displacement or barricades shall be used to keep activity or traffic way from the ladder.
16. Portable ladders shall be inspected after each use and if acceptable, stored in a manner not to damage or stress the ladder. Ideally ladders should be hung from a side rail in an area where sunlight or extremes in temperature or humidity will not affect them.
17. Portable ladders must never be used as scaffolding or as storage racks or shelves.

23.0 High Pressure Water Washing – Safe Operating Practices

High pressure water washing (or cleaning, jetting) shall be defined as the use of high pressure water, with or without the addition of other liquids or solid particles, to remove unwanted matter from various surfaces, where the pressure of the liquid jet exceeds 1000 PSIG at the orifice (or nozzle). The lower limit of 1000 PSIG does not mean that pressures below 1000 PSIG cannot cause personal injury or require that operating personnel shall pay any less attention to the guidelines in the following recommended safe operating practices. Adequate precautions shall be maintained at all times during any operating pressure.

Pressure Washing Equipment Requirements

All pressure washing equipment utilized at the project site shall be quipped with an automatic pressure relief device on the discharge side of the pump, adjusted so that the manufacturer's maximum allowable system pressure is not exceeded.

All pressure washing equipment shall be equipped with a functioning gauge to indicate pressure being developed in the system.

All electrical controls shall be either fail safe, low voltage, or protected with an approved ground fault circuit interrupter.

Personal Protection Equipment (PPE)

All personnel performing high pressure water washing activities shall be required to utilize *Level C* PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with appropriate cartridge configuration based on the anticipated chemical hazard.

Operator Training

Only trained and qualified Contractor personnel shall be permitted to operate high pressure washing equipment. The training of new operators shall be supervised by one or more previously trained and qualified Contractor employees and the SSO. Where equipment is rented or newly purchased and no personnel has had prior experience with the equipment, immediate safety training shall be conducted by the SSO and operating personnel shall become with the recommended safe operating practices outlined in the manufacturer's operation manual.

Safety Concerns and Special Hazards

Injuries caused by the impact of high pressure water may appear insignificant and give little indication of the extent of actual and immediate injury beneath the skin as well as damage to deeper tissues. It may be possible for large quantities of water to punctured the skin, flesh, and organs through a very small hole with little or no bleeding.

In the event of a high pressure water injury, immediate hospital attention shall be required and medical staff shall be informed of the cause of the injury. As a precaution, medical staff shall be advised that, in previous cases of water jet punctures, unusual infections with micro-aerophilic organisms occurring at lower temperatures have been reported and that bacterial swabs and blood cultures may therefore be helpful.

Safe Operating Practices

1. Only personnel who have undergone proper training and who have demonstrated the knowledge and skill, and gained the experience to perform all likely assigned tasks shall operate high pressure water equipment.
2. Personnel operating pressure washers shall utilize Level C PPE consisting of hard hat, safety glasses, half face APR with organic vapor HEPA filter stack cartridges, face shields, rubber steel toe chemical resistant work boots, chemical resistant gloves and a chemical resistant polypropylene suit with bright orange or green reflective safety vests.
3. Before operation, the operator shall clearly define the work area by establishing boundary limits using visible and physical barriers posted with danger or warning signs preventing unauthorized personnel and/or by-standers from entering the work area. Barriers shall be of the warning type or the protective type. Where it is not possible to provide barriers beyond the effective range of the jet, the operator shall erect protective physical barriers to prevent fluids and particles from going beyond the immediate work area.
4. The operator shall ensure that is possible to pressure wash all surfaces to be cleaned, and that a stable, secure working platform is available at all times from which to reach those surfaces. The operator shall maintain sound and secure footing at all times.
5. The operator shall insure that all electrical controls are either fail safe, low voltage, or protected with an approved ground fault circuit interrupter.
6. At no time shall the operator operate the equipment above the manufacturers rated pressure maximum. The need to operate pressure washing equipment at or below the manufacturer's recommended working pressure shall be stressed.
7. The operator shall always increase pressure slowly until required working pressure is reached.
8. High pressure water can puncture splash suits and other personal protective clothing. At no time shall the operator point the pressure washer nozzle in the direction of other personnel.
9. Prior to operation, the operator shall ensure that all operating controls are in working order. Under no circumstances shall the operator be permitted to tamper with or alter the function of operating control systems.
10. The operator shall be aware that the valves and seating surfaces in pressure regulating devices encounter high wear during pressure washing activities. These items shall be inspected frequently to ensure safe operation.
11. The operator shall be aware of the proper method of identifying and connecting hoses, including laying out without kinks, protecting hoses from excessive wear, identifying worn and unsafe hoses, and proper tools to use on couplings and fittings.
12. The operator shall arrange hoses in a manner to minimize slip, trip and fall hazards.
13. Hoses, pipes and fittings shall be supported to prevent excessive sway and/or wear created by vibration or stress on the end connections.
14. The operator shall ensure that all hoses are protected from being run over by other vehicles in the area.

15. The operator shall not attempt to tighten or tamper with couplings and fittings while the hose is pressurized. Safety connectors shall be used across all hose connections. All fittings shall be clean, leak free and pressure rated before installing.
16. The operator shall ensure that hose guards and/or hose shrouds are used at all times to prevent injury if the hose, pipe or fitting breaks open.
17. The operator shall inspect the nozzle for blockage and/or damage or imperfections before attaching to the system. The operator shall pressurize the system slowly to make sure that nozzle openings are open and clear.
18. The operator shall be familiar with the pressures and flow rates required to effectively perform individual tasks. Within the limits of any restrictions on flow volumes, pressure washing activities shall be performed at the lowest effective pressure.
19. The operator shall be familiar with the safe operation of dump valves that allow rapid shut down of the equipment and release of water to atmosphere rapidly reducing the pressure in the system to low level. The operator shall have control of the dump valve at all times. The valve shall be of the type that will automatically activate when the operator releases the control handle, whether the control handle is operated by hand or foot.

24.0 Torch Cutting Activities – Safe Operating Practices

Torch cutting activities may be required for the dismantling and disconnect of distillation column sections as well as for the size reduction of process equipment and machinery, railings, ladders, platforms and facility process piping. No hot work activities producing heat, sparks, or any other energy sufficient to serve as an ignition source shall be permitted in any location with potential ignitable atmospheres, until a hot work protection procedure has been instituted and a hot work permit has been issued and reviewed by the SSO.

Examples of hot work at the project site may include welding, cutting, burning, soldering, grinding, use of power tools and internal combustion engines.

Hot work permits will be issued by the SSO and shall be reissued at the beginning of each day, each work shift or if the area has not been monitored within one half hour. All copies of hot work permits shall be submitted to the SSO at the completion of each work task or at the completion of the days shift.

Hot Work Permit Procedures

1. The SSO shall be responsible for inspecting each work task where hot work may be required and will determine the need for a Hot Work Permit if necessary.
2. All Contractor personnel shall be formally notified and instructed of the requirements for, need for, and procedures for obtaining hot work permits.
3. A fire watch shall be required for every activity where the potential for a fire, due to ignition of combustibles, may result from hot work activities.
4. Fire extinguishing equipment commensurate with the ignitable matrix and training level of fire watch personnel shall be immediately available at locations where hot work is to be performed.

5. A combustible gas meter shall be used for continual atmospheric monitoring of air between any flammable materials and the immediate vicinity of where hot work being performed.

Welding, Cutting, Burning, and Heating

1. Improper welding, cutting, burning, and heating operations may result in personal injuries and fires. Precautions shall be taken to assure a safe work environment at all times.
2. Operating personnel shall be instructed in the safe use of welding equipment. Personnel who have not received training shall not be allowed to use equipment.
3. Proper precautions (isolating welding and cutting, removing fire hazards from the vicinity, providing a fire watch, etc.) for fire prevention shall be taken in areas where welding or other hot work is being done. No welding, cutting or heating will be done where the application of flammable paints, or the presence of any other flammable compounds, or heavy dust concentrations creates a fire hazard.
4. Arc welding and cutting operations shall be shielded by noncombustible or flameproof shields to protect personnel from direct arc rays.
5. When electrode holders are to be left unattended, the electrodes shall be removed and the holder shall be placed or protected in a manner so that electrical contact with personnel or conducting objects cannot occur.
6. Arc welding and cutting cables shall be completely insulated and shall be capable of handling the maximum current requirements for the task. No repairs or splices within 100 feet of the electrode holder, except where splices are insulated equal to the insulation of the cable shall be permitted. Defective cables shall be repaired or replaced. Corrective action shall be reported to the SSO.
7. Fuel gas and oxygen hose shall be easily distinguishable and shall not be interchangeable. Hoses shall be inspected at the beginning of each shift and shall be repaired or replaced if defective.
8. No welding or burning shall be allowed in a hazardous area.
9. Suitable fire-extinguishing equipment shall be available at all locations where hot work activities are performed.
10. Burning or welding equipment shall be maintained in safe operating condition at all times.
11. When burning or welding, Personnel shall utilize approved eye protection with suitable filter lenses. If eyes are exposed to flying objects from chipping slag or other weld-cleaning activity, personnel must wear approved eye protection. When performing arc welding near other workers, all personnel shall be protected from the arc rays by non-combustible screens or they shall be required to wear adequate eye protection.
12. Operating personnel shall keep all welding leads and burning hoses up off floors, walkways, and stairways or they shall employ engineering controls to appropriately protect such leads and hoses.
13. Operating personnel shall not be permitted weld or burn on barrels, tanks, piping, or any other system that may have contained either combustible or unknown products without first properly purging and venting the container and obtaining approval from the SSO. The frames of all welding machines shall be grounded at all times during operation.

14. Only spark igniters shall be used to light torches. The use of matches or cigarette lighters is strictly prohibited. Torches shall be used to light smoking materials. Operating personnel shall utilize appropriate protective gloves.
15. When utilizing a crescent wrench or other specialized wrench to operate an acetylene cylinder valve, the wrench shall be kept in position on the valve at all times during operation.
16. General mechanical or local exhaust ventilation or airline respirators shall be provided as required, when welding, cooling or heating.
17. Operating personnel shall utilize filter-type respirators when welding, cutting, heating, burning metals that have toxic significance, (such as zinc, lead, cadmium, or chromium-bearing metals).

25.0 Motor Vehicles and Heavy Equipment – Safe Operating Practices

The following shall address policies and procedures associated with safe operation of heavy, motorized equipment, machinery, and other mechanized equipment at the project site that when operated in an unsafe manner may cause serious injury or death to equipment operators and/or other personnel or bystanders in the immediate work area. Specific policies and procedures outlined in this SOP are in support and in reference to both 29 Code of Federal Regulations (CFR) and the California Department of Occupational Safety and Health (DOSH) General Industry Safety Orders:

- 29 CFR, Sections 1926.600, 1926.1000, 1926.1001, and 1926.1002
- Code of California Regulations (CCR) Title 8, Sections 1596 and 1597

General Safe Operating Practices (all heavy equipment, machinery, and other mechanized equipment)

1. Before any machinery or mechanized equipment is used, it will be inspected and tested by a competent mechanic and certified to be in safe operating condition.
2. The Contractor shall designate a competent person to be responsible for the inspection of all machinery and equipment daily and during use to make sure it is in safe operating condition. Equipment inspections shall be performed at the beginning of each shift during which the equipment is to be used to determine that all operating systems are in proper working condition. Equipment inspection checklists are included as *Attachment E* of this HASP.
3. Preventative maintenance procedures recommended by the manufacturer will be followed.
4. Any machinery or equipment found to be unsafe will be deadlined and its use prohibited until unsafe conditions have been reviewed and corrected by the SSO.
5. Inspections or determinations of site roadway conditions and structures will be made each day to assure that clearances and load capacities are safe for the passing or placing of machinery or equipment used at the project site.
6. Machinery and mechanized equipment will be operated only by designated personnel with proper training. Equipment deficiencies observed at any time that affect safe operation will be corrected before continuing operation. Inspections and corrective actions will be documented.

7. Seats and restraint systems (seat belts, harness, etc.) or equal protection will be provided for any person required to ride on equipment.
8. Getting off or on any equipment while it is in motion is prohibited.
9. Machinery or equipment requiring an operator will not be permitted to run unattended.
10. Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
11. All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done. Exemption: Equipment designated to be serviced while running.
12. All repairs on machinery or equipment will be made at a designated location which will provide protection from other site operations.
13. Heavy machinery, equipment, or parts thereof which are suspended or held apart by slings, hoists, or jacks also will be substantially blocked or cribbed before personnel are permitted to work underneath or between them.
14. Bulldozer and scraper blades, end-loader buckets, dump bodies, and similar equipment will be either fully lowered or blocked when being repaired or when not in use. All controls will be in a neutral position, with the engines stopped and brakes set, unless work being performed on the machine requires otherwise.
15. Stationary machinery and equipment will be placed on a stable foundation and secured before being operated.
16. All points requiring lubricating during operation will have fittings so located or guarded to be accessible without hazardous exposure.
17. When necessary, all mobile equipment and the operating area will be adequately illuminated while work is in progress.
18. Mechanized equipment will be shut down prior to and during fueling operations. Closed systems, with automatic shut-off which will prevent spillage if connections are broken, may be used to fuel diesel powered equipment left running.
19. All towing devices used on any combinations of equipment will be structurally adequate for the weight drawn and securely mounted.
20. Persons will not be permitted to get between a towed and towing piece of equipment until the towing equipment has been stopped.
21. All equipment with windshields will be equipped with powered wipers. Vehicles that operate under conditions that cause fogging or frosting of windshields will be equipped with operable defogging and defrosting devices.
22. All equipment left unattended at night, adjacent to a highway in normal use, or adjacent to construction areas where work is in progress, will have lights or reflectors, or barricades equipped with lights or reflectors, to identify the location of the equipment.
23. Whenever the equipment is parked, the parking brake will be set. Equipment parked on inclines will have wheels chocked or track mechanism blocked and the parking brake set.

24. Lift trucks, stackers, etc., will have the rated capacity posted on the vehicle so as to be clearly visible to the operator. When auxiliary removable counterweights are provided by the manufacturer, corresponding alternate rated capacities also will be clearly shown on the vehicle. The capacity rating will not be exceeded.
25. Steering or spinner knobs will not be attached to the steering wheel unless the steering mechanism prevents road reactions from causing the steering handwheel to spin. When permitted the steering knob will be mounted within the periphery of the wheel.
26. All industrial trucks in use will meet the requirements of design, construction, stability, inspection, testing, maintenance, and operation, defined in ANSI B56.1, Safety Standards for Powered Industrial Trucks.
27. The installation of live booms on material and personnel hoists is prohibited.
28. The controls of loaders, excavators, or similar equipment with folding booms or lift arms will not be operated from a ground position unless so designed.
29. Personnel will not work or pass under the buckets or booms of loaders in operation.

Motor Vehicles and Mechanized Equipment (29 CFR 1926.600 / 8 CCR 1597)

1. All vehicles in use at the project site shall be checked at the beginning of each shift to assure that all parts, equipment, and accessories that affect safe operation are in proper operating condition and free from defects. All defects shall be corrected before the vehicle is returned for service. Inspections and corrective actions will be documented.
2. No employee shall use any motor vehicle, earth-moving, or compacting equipment having an obstructed view to the rear unless:
 - (a) The vehicle has a reverse signal alarm distinguishable from the surrounding noise level or;
 - (b) The vehicle is backed up only when an observer signals that it is safe to do so.
3. Heavy machinery, equipment, or parts thereof which are suspended or held aloft should be substantially blocked to prevent falling or shifting before employees are permitted to work under or between them.
4. The parking brake shall be set when the vehicle is parked.
5. Seat belts shall be worn at all times when the vehicle is in operation.
6. Riding in the bed of a truck is prohibited unless the truck has been appropriately outfitted for the transportation of personnel.
7. Riding on loads, fenders, running boards, or tailgates is strictly prohibited. Legs or arms shall remain inside the vehicle at all times when the vehicle is in motion except to give appropriate hand signals.
8. Drivers shall not operate any motor vehicle at the project site until riders comply with all safety precautions.

Rollover Protective Structures (ROPS) (29 CFR 1926.1000 / 8 CCR 1596)

The following requirements for the installation of rollover protective structures (ROPS) apply to the following types of materials handling equipment:

To all rubber-tired, self-propelled scrapers, rubber-tired front-end loaders, rubber-tired dozers, wheel-type agricultural and industrial tractors, crawler tractors, crawler-type loaders, and motor graders, with or without attachments, those are used in construction work. This requirement does not apply to sideboom pipelaying tractors.

1. Rollover protective structures and supporting attachments shall meet the minimum performance criteria detailed in 29 CFR 1926.1001, 1926.1002, and 8 CCR 1596, as applicable or shall be designed, fabricated, and installed in a manner which will support, based on the ultimate strength of the metal, at least two times the weight of the prime mover applied at the point of impact.
2. The design objective shall be to minimize the likelihood of a complete overturn and thereby minimize the possibility of the operator being crushed as a result of a rollover or upset.
3. The design shall provide a vertical clearance of at least 52 inches from the work deck to the ROPS at the point of ingress or egress.
4. Remounting - ROPS removed for any reason, shall be remounted with equal quality, or better, bolts or welding as required for the original mounting.
5. Labeling - Each ROPS shall have the following information permanently affixed to the structure:
 - (a) Manufacturer or fabricator's name and address.
 - (b) ROPS model number, if any;
 - (c) Machine make, model, or series number that the structure is designed to fit.
6. Machines meeting certain existing governmental requirements - Any machine in use, equipped with rollover protective structures, shall be deemed in compliance with this section if it meets the rollover protective structure requirements of the State of California, the U.S. Army Corps of Engineers, or the Bureau of Reclamation of the U.S. Department of the Interior in effect on April 5, 1972. The requirements in effect are:
 - (a) State of California: Title 8 of California Code of Regulations, Construction Safety Orders, issued by the Department of Industrial relations pursuant to Division 5, Labor Code, Section 6312, State of California.
 - (b) U.S. Army Corps of Engineers: General Safety Requirements, EM-385-1-1 (March 1967).
 - (c) Bureau of Reclamation, U.S. Department of the Interior: Safety and Health Regulations for Construction. Part II (September 1971).
7. Minimum performance criteria for rollover protective structures for designated scrapers, loaders, dozers, graders, and crawler tractors can be found in 29 CFR 1926.1001 and 8 CCR 1596.

Safe Operating Practices – AIR COMPRESSOR

1. Only trained and experienced Contractor personnel shall operate air compressors.
2. When using electric air compressors, the operator shall avoid using the air compressor in wet or damp locations to avoid the potential for electric shock.
3. Diesel powered, tow behind air compressors shall not be towed at speeds exceeding 50 miles per hour. Safety chains shall be attached all times during towing.
4. The operator shall avoid wearing jewelry or loose clothing that can be caught in moving parts while operating the compressor.
5. DO NOT BREATHE COMPRESSED AIR. Compressor exhaust gases contain carbon monoxide. Compressors shall only be operated in well ventilated areas.
6. Air compressor noise may exceed 90 dB. The operator and all nearby personnel and/or bystanders shall utilize hearing protection at all times.
7. Tow behind air compressors shall be parked and operated on level surfaces to prevent potential roll over during operation.
8. Before operating diesel powered, tow behind compressors, the operator shall ensure all compartment doors, guards and panels are secured so as prevent coming loose and causing personnel injury and/or equipment damage.
9. Never refill diesel powered compressors while they are in operation. The operator shall allow engine to cool before refueling and/or removing radiator and oil filter caps. Operating personnel shall always be aware of hot surfaces including mufflers, exhaust manifolds, and other engine parts.

Safe Operating Practices – BACKHOE / LOADER

1. Only trained and qualified Contractor personnel shall be permitted operate a backhoe / loader. Training documentation shall be provided to the Client and/or kept onsite at all times.
2. The operator shall perform a pre-operational check of the equipment and be familiar with operator's manual. The operator shall check backup alarms, tire pressure, engine oil, hydraulic oil, fuel, dust collector and grease fittings daily as part of the pre-equipment operation inspection process.
3. When checking for leaks in the hydraulic system, the operator shall use a piece of paper or cardboard. At no time shall the operator use his/her hands since oil from a pin-hole leak under high pressure can penetrate the skin.
4. The operator shall be responsible for lockout and tagout of damaged and unsafe equipment and equipment controls. The operator shall promptly report all needed repairs to the site supervisor.
5. Seat belts and/or shoulder harnesses must always be worn to keep the operator secure within the equipment's roll over protection system (ROPS).

6. The operator shall keep windshield, windshield wipers, side windows and mirrors clean. Mirrors shall be adjusted to provide the largest possible view of the rear of the equipment.
7. When mounting or dismounting equipment, the operator shall only use the designated steps and handholds provided on the equipment. Operators are not permitted to jump from equipment at any time.
8. Whenever possible, the operator shall plan ahead to minimize or eliminate the need for backing. When available, the operator shall use an observer to assist with backing up of the equipment. The operator shall make sure back-up alarms are working properly as part of the pre-equipment operation inspection process.
9. When parking the equipment, the operator shall be mindful of safe parking locations and avoid parking in high traffic areas and in other equipment's blind spots.
10. The operator shall always wear appropriate personal protective equipment consistent with the immediate hazards on hand.
11. The operator shall keep hearing protection on hand at all times in case noise from equipment operation or noise from nearby construction activities exceeds 90 dBA.
12. The operator shall inspect fire extinguisher locations on the equipment as part of the pre-equipment operation inspection process.
13. The operator shall always be aware of employees and others on foot in the immediate work zone. The operator shall be mindful of the location of foot personnel before lowering stabilizers or moving the boom.
14. The operator shall always ensure the attachment locking devices are in place, even when switching attachments for only a few minutes. If not locked, attachments may break free and fall onto nearby personnel or damage nearby equipment.
15. The operator shall only utilize manufacturer-approved attachments and buckets.
16. The operator shall not leave attachments in the raised position when equipment is not in use.
17. The operator shall always use outriggers/stabilizers when performing digging activities.
18. No personnel shall be allowed to work in or under a raised bucket at any time. Other than the operator, no riders are allowed anywhere on the equipment.
19. The operator shall always be mindful of overhead power line clearances. Equipment shall not be operated within 10 feet of energized power lines.
20. Whenever possible, the equipment shall be transported from location to location using a truck and trailer. Swing and boom locking pins must be set and equipment must be properly secured prior to transporting.
21. Before digging, the operator shall review trenching and excavation standard operating procedures.
22. The operator shall remain a minimum of 2-feet away from open trenches.

23. When operating on slopes, the operator shall use caution when swinging the bucket in a downhill direction. The operator shall position equipment so that material is dumped on the uphill side of the equipment.
24. The operator shall always keep the loader bucket at the safest, lowest position when moving the equipment. The operator shall always keep the heaviest end of the loader pointing uphill when moving up and down inclines with a full bucket. The operator shall always use the break and never coast downhill. Equipment shall not be operated on slopes of more than 20 degrees.
25. The operator shall select loading areas that are as level as possible.
26. The operator shall never leave the equipment unattended with the engine running. The operator shall lower the bucket to the ground, shut off engine and set the parking brake when equipment is not in use.

Safe Operating Practices – BOOM LIFT

1. The operator shall survey the usage area for potential hazards such as untamped earth fills, unlevel surfaces, overhead obstructions, and electrically charged conductors or wires. The operator shall be aware of any potential hazards and always consider what could happen. Watch for moving vehicles and other personnel in the operating area at all times.
2. The operator shall read, understand, and follow the procedures in the safety and operations manual before attempting to operate the equipment.
3. The operator shall inspect the equipment for damaged or worn parts. Check for cracked welds, hydraulic leaks, damaged wiring, loose wire connectors, damaged out-riggers, low tire pressure, uneven tire wear, or tire damage. Also the operator shall check for any improper operation.
4. The operator shall NEVER operate equipment if damaged in any way. Improperly operating equipment must be repaired before using.
5. The operator shall wear proper clothing for the job. Wear protective equipment as required by federal, state, or local regulations. The operator MUST wear a safety harness and lanyard at all times and abide fall protection standards outlined in *Section 20.0* of this HASP.
6. The operator shall locate, read, and follow all directions and warnings displayed on the equipment.
7. The operator shall inspect the equipment for “DO NOT USE” tags. NEVER use equipment tagged in this way until all repairs are made and all “DO NOT USE” tags are removed by authorized maintenance personnel.
8. The operator shall make sure the basket and outrigger shoes are free of mud, grease, or other slippery material to reduce the possibility of slipping.
9. The operator shall NEVER allow improperly trained personnel to operate this equipment. Only trained and authorized personnel shall be allowed to operate this equipment.
10. The operator shall NEVER operate this equipment while under the influence of alcohol or drugs, or if feeling ill, dizzy, or unsteady in any way. Operators must be physically fit, thoroughly trained, and not easily excitable.

11. The operator shall NEVER modify, alter, or change the equipment in any way that would affect its original design or operation in any way.
12. The operator shall NEVER operate this equipment in ways for which it is not intended.
13. The operator shall position the lift far enough away from power sources to ensure that no part of the lift can accidentally reach into an unsafe area. This includes full extension of the boom through 360 degrees rotation.
14. The operator shall operate only on a firm and level surface. NEVER use on surfaces that do not support the equipment with its rated load capacity and the resulting force exerted on the outriggers during boom extension and rotation.
15. The operator shall keep clear and make sure all other personnel stay away from potential pinch or shear points.
16. The operator shall report any misuse of equipment to onsite management personnel. Horseplay is strictly prohibited.
17. The operator shall maintain good footing on the work platform. NEVER wear slippery soled shoes.
18. The operator shall make certain all personnel are clear and there are no obstructions before repositioning basket.
19. Operating personnel shall cordon off area around the outriggers to keep other personnel, bystanders and other equipment away from it while in use.
20. The operator shall stay clear of wires, cables, and other overhead obstructions.
21. Boom travel locking pins shall always be engaged before towing the trailer.
22. Operating personnel shall NEVER allow electrode contact with any part of the basket if welding is being performed from the platform.
23. The operator shall NEVER use the equipment without the outriggers fully extended and firmly based.
24. The operator shall NEVER override or by-pass manufacturer's safety devices.
25. The operator shall NEVER attach a safety harness to an adjacent structure, pole, or equipment while working from the boom platform.
26. The operator shall NEVER move unit with a person or materials on board.
27. The operator shall NEVER try to move the trailer with the boom extended.
28. The operator shall NEVER stand or sit on cage bars. The operator shall work only within the work cage and will not lean out over the cage to perform work.
29. The operator shall NEVER attempt to increase working height with boxes, ladders, or other means.

30. The operator shall NEVER operate this equipment when exposed to high winds, thunderstorms, ice, or any other weather conditions that would compromise operator safety.
31. The operator shall NEVER allow ropes, electric cords, hoses, etc. to become entangled in the equipment when the basket is being raised or lowered.
32. The operator shall NEVER exceed manufacturer's load limits or use the lift as a crane for lifting heavy materials. Make sure all tools and equipment are safely stowed.
33. The operator shall NEVER exceed load ratings by transferring loads to the basket at elevated heights.
34. The operator shall NEVER use the cage to carry materials and shall never allow overhang of materials when raising or lowering the basket.
35. The operator shall NEVER push or pull with the boom or basket and shall NEVER use the boom to lift any part of the trailer.
36. The operator shall NEVER use the boom or basket to place a "dead man" load against any structure, materials, or equipment.
37. Operating personnel shall NEVER climb up or down boom.
38. Operating personnel shall NEVER leave the keys in the boom lift while unattended or not in use.

Safe Operating Practices – EXCAVATOR

1. Only trained and qualified Contractor personnel are permitted operate an excavator. Training documentation shall be provided to the Client and/or kept onsite at all times.
2. The operator shall perform a pre-operational check of the equipment and be familiar with operator's manual. The operator shall check backup alarms, engine oil, hydraulic oil, fuel, dust collector and grease fittings daily as part of the pre-equipment operation inspection process.
3. When checking for leaks in the hydraulic system, the operator shall use a piece of paper or cardboard. At no time shall the operator use his/her hands since oil from a pin-hole leak under high pressure can penetrate the skin.
4. The operator shall be responsible for lockout and tagout of damaged and unsafe equipment and equipment controls. The operator shall promptly report all needed repairs to the site supervisor.
5. Seat belts and/or shoulder harnesses must always be worn to keep the operator secure within the equipment's cab or roll over protection system (ROPS).
6. The operator shall keep windshield, windshield wipers, side windows and mirrors clean. Mirrors shall be adjusted to provide the largest possible view of the rear of the equipment.
7. When mounting or dismounting equipment, the operator shall only use the designated steps and handholds provided on the equipment. Operators are not permitted to jump from equipment at any time.

8. Whenever possible, the operator shall plan ahead to minimize or eliminate the need for backing and/or excessive rotation. When available, the operator shall use an observer to assist with backing up and rotating the equipment. The operator shall make sure back-up alarms are working properly as part of the pre-equipment operation inspection process.
9. When parking the equipment, the operator shall be mindful of safe parking locations and avoid parking in high traffic areas and in other equipment's blind spots.
10. The operator shall always wear appropriate personal protective equipment consistent with the immediate hazards on hand.
11. The operator shall keep hearing protection on hand at all times in case noise from equipment operation or noise from nearby construction activities exceeds 90 dBA.
12. The operator shall inspect fire extinguisher locations on the equipment as part of the pre-equipment operation inspection process.
13. The operator shall always be aware of employees and others on foot in the immediate work zone. The operator shall be mindful of the location of foot personnel before rotating the cab and bucket.
14. The operator shall rotate the cab and bucket with extreme caution and continually check both sides and behind when rotating and backing up the equipment. Excavator maneuverability can be quick and abrupt. The operator shall always be aware of personnel on foot in the immediate area zone and whenever possible, keep all other personnel away from the immediate work area.
15. The operator shall always ensure the attachment locking devices are in place, even when switching attachments for only a few minutes. If not locked, attachments may break free and fall onto nearby personnel or damage nearby equipment.
16. The operator shall only utilize manufacturer-approved attachments and buckets.
17. The operator shall not leave attachments in the raised position when equipment is not in use.
18. No personnel shall be allowed to work in or under a raised bucket at any time. Other than the operator, no riders are allowed anywhere on the equipment.
19. The operator shall always be mindful of overhead power line clearances. Equipment shall not be operated within 10 feet of energized power lines.
20. Whenever possible, the equipment shall be transported from location to location using a truck and trailer. Swing and boom locking pins must be set and equipment must be properly secured prior to transporting.
21. Before digging, the operator shall review trenching and excavation standard operating procedures.
22. The operator shall remain a minimum of 2-feet away from open trenches.
23. When operating on slopes, the operator shall use caution when rotating the cab and bucket in a downhill direction. The operator shall position equipment so that material is dumped on the uphill side of the equipment.
24. The operator shall always keep buckets and/or other attachments at the safest, lowest position when moving the equipment. The operator shall always keep the heaviest end

of the bucket pointing uphill when moving up and down inclines with a full bucket. Equipment shall not be operated on slopes of more than 20 degrees.

25. The operator shall select loading areas that are as level as possible.
26. The operator shall never leave the equipment unattended with the engine running. Lower the bucket/attachment to the ground and shut off engine when equipment is not in use.

Safe Operating Practices – FORKLIFT

1. The operator shall be sure that a safe distance is maintained from the edge of ramps or platforms while on any elevated dock, platform or freight car.
2. When leaving the truck unattended, the forks will be fully lowered the controls placed in neutral, the power shut off, the brakes set to and the key or connector plug removed. The wheels will be blocked if the forklift is parked on an incline. Note: A powered forklift is considered unattended when the operator is 25 feet or more away from the vehicle which remains in his/her view or whenever the operator leaves the vehicle and the forklift is not in view.
3. When the operator of an industrial forklift is dismounted and within 25 ft. of the forklift still in his view, the load engaging means shall be fully lowered, controls neutralized, and the brakes set to prevent movement.
4. Forklifts will not be used to open or close freight doors.
5. The brakes of the forklift shall be set and wheel chocks or stops will be in place to prevent movement during loading or unloading operations. Fixed jacks may be necessary to support a semi-trailer during loading or unloading when the trailer is not coupled to a tractor. The flooring of trucks, trailers and railroad cars will be checked by the operator for breaks and weakness before driving these vehicles into these surfaces.
6. An overhead guard shall be used at all times as protection against falling objects. Note: The overhead guard may only be intended to offer protection from the impact of small packages, boxes or bagged materials only.
7. The operator shall utilize a load backrest extension whenever necessary to minimize the possibility of the load or part of the load from falling rearward.
8. Only approved industrial forklifts will be used in hazardous conditions.
9. The operator shall not drive a forklift up to anyone standing in front of a bench or other fixed object.
10. No person shall be allowed to stand or pass under the elevated portion of any forklift, whether loaded or empty.
11. Under no circumstances are passengers permitted to ride on a forklift unless authorized and the forklift is equipped with a safe place for the passenger to ride.
12. The operator shall never place his/her arms or legs between the uprights of the mast or outside the running lines of the forklift.
13. The operator shall NEVER push one load with another load.

14. Spinner knobs shall NEVER be attached to the steering handwheels of forklifts not originally equipped with such knobs.
15. The operator shall NEVER lift people on the forks of a forklift unless the forklift has a properly designed safety platform securely attached to the lifting carriage and/or forks. If the forklift is equipped with vertical controls only, or vertical and horizontal controls elevatable with the lifting carriage or forks, means will be provided whereby personnel on the platform can shut off power to the forklift. Protection from falling objects as indicated necessary by the operating conditions shall also be provided based on site conditions.
16. Safety platforms, firmly secured to the lifting carriage and/or forks, shall be used whenever possible.
17. Only stable and safely arranged loads shall be handled. The operator shall use extreme caution when handling off-centered loads that cannot be centered on the forks.
18. Only loads within the rated capacity of the forklift shall be handled.
19. The operator shall ensure that the forks are placed under the load as far as possible and the mast carefully tilted backward to stabilize the load.
20. Extreme care shall be used when tilting the load forward or backward especially when high tiering. Tilting forward with load engaging means elevation shall be prohibited except to pick up a load. An elevated load will not be tilted forward except when the load is in a deposit position over a rack or stack of material.
21. When stacking or tiering loads, the operator shall tilt the load backward only enough to stabilize the load.
22. The operator shall remove unsafe containers and pallets from service.
23. Forklifts equipped with attachments will be operated as a partially loaded truck when not handling a load.
24. The operator shall adjust long and high loads, including multiple-tiered loads that may affect the capacity of the forklift.
25. The operator shall insure there is always a safe distance between the mast and overhead lights, pipes, sprinkler systems, wires, cables, and power lines.
26. Forklifts shall be inspected before being placed in service. The operator shall perform equipment inspection and complete an inspection checklist at least once daily before operation. A forklift used on a round-the-clock basis will be inspected after each shift.
27. If at any time during an operator's shift a forklift is found to be in unsafe, the operator shall immediately notify onsite management personnel and remove the forklift from service until it has been restored to safe operating condition.
28. Fuel tanks shall not be filled while the engine is running. Spillage shall be avoided.
29. Spillage of excess oil or fuel shall be carefully cleaned up and disposed off in accordance with state and federal regulations. Fuel cap must be replaced before restarting the engine.
30. The operator shall always wear the proper personal protective equipment when fueling the truck or performing any other maintenance on the truck.

31. No forklift shall be operated with a leak in the fuel and/or hydraulic systems until the leak(s) have been corrected.
32. Open flames shall NEVER be used to check the electrolyte level in batteries or the gasoline level in the fuel tank.
33. Smoking is not allowed at anytime while operating the forklift or while changing LPG tanks, refueling gas powered forklifts or changing or charging batteries for electric powered forklifts.

Safe Operating Practices – GENERATORS

1. Only trained and experienced Contractor personnel shall operate generator(s).
2. Tow behind generators shall not be towed at speeds exceeding 50 miles per hour. Safety chains shall be attached all times during towing.
3. The operator shall avoid wearing jewelry or loose clothing that can be caught in moving parts while operating the generator(s).
4. Generator exhaust gases contain carbon monoxide. Generators shall only be operated in well ventilated areas.
5. Generator noise may exceed 90 dB. The operator and all nearby personnel and/or bystanders shall utilize hearing protection at all times.
6. Tow behind generators shall be parked and operated on level surfaces to prevent potential roll over during operation.
7. Before operating tow behind generators, the operator shall ensure all compartment doors, guards and panels are secured so as prevent coming loose and causing personnel injury and/or equipment damage.
8. Never refill diesel and/or gas powered generators while they are in operation. The operator shall allow engine to cool before refueling and/or performing maintenance and repairs. Operating personnel shall always be aware of hot surfaces including mufflers, exhaust manifolds, and other engine parts.

Safe Operating Practices – JACK HAMMER

1. Only trained and experienced Contractor personnel shall operate jack hammers.
2. When using an electric jack hammer, the operator shall insure that all electrical controls are either fail safe, low voltage, or protected with an approved ground fault circuit interrupter.
3. When using an engine or air driven jack hammer, the operator shall always fill the jack hammer or compressor gas tank out of doors with the unit's engine shut off and cool. At no time shall the operator handle fuel while smoking or while in the presence of sparks and/or open flame. The operator shall allow engine driven models to cool briefly before refueling during operation.

4. The operator shall wear proper jack hammer protective equipment at all times during operation. Proper jack hammer protective equipment shall consist of hard hat with face shield, hearing protection, steel toed work boots with steel metatarsal covers, respiratory protection (dust mask), sturdy long pants and long sleeve shirt.
5. Before operation the operator shall check all bits to ensure they are sharp and not damaged. Dull bits shall be sharpened in accordance with manufactures specifications. Damage bits shall be discarded immediately.
6. The operator shall always disconnect electric power or air supply before inserting tools or bits. The operator shall ensure tools and bits are properly locked into the unit before operating.
7. Only one operator at a time shall be allowed to operated the unit. The operator shall ensure that all other personnel and/or bystanders are out of the immediate work area before operating the unit.
8. The operator shall always work to prevent back injuries by using leg muscles to lift the unit into safe operating position. **Important – the operator shall allow the tool to do the work by using a grip light enough to maintain control of the unit.**
9. Continued use of the jack hammer over long periods of time can subject the operator to prolonged and extreme vibration. **Extreme vibration of the instrument may cause an impairment of the operator’s blood circulation to the hands commonly referred to as Raynaud’s disease.** The operator shall be allowed to take frequent rest breaks to ensure proper circulation of blood to the hands.
10. When stopping jack hammer operations for a short period of time during the day, the operator shall unplug the electricity or disconnect the unit from the air source and stop the compressor.

Safe Operating Practices – PUMPS

1. Once in operating position, pumps shall be secured to prevent tip over, roll, slide, and/or fall.
2. Operating personnel shall keep hands and feet clear of moving parts. Operating personnel shall not attempt to maintain or repair pumps while in operation.
3. Operating personnel shall not attempt to close down or restrict the discharge hose while the pump is in operation. An unsecured discharge hose may whip violently while under pressure.
4. Operating personnel shall always wear a face shield while priming a pump.
5. Operating personnel utilizing electrical pumps shall not handle energized power cords with wet hands. Unless operating submersible pumps, operating personnel shall position electric pumps so they cannot fall into water. Operating personnel shall inspect electric pumps for cord damage before use.
6. At no time shall electrical pumps be utilized in an explosive or a potentially explosive atmosphere.

7. Exhaust from gasoline/diesel powered pumps contains carbon monoxide. Operating personnel shall not utilize fuel powered pumps in enclosed, non-ventilated areas where exhaust fumes can accumulate.
8. Personnel operating fuel powered pumps shall always be aware of hot surfaces.
9. Never add fuel while pump motor is running. Operating personnel shall allow fuel powered pumps to cool before re-filling.
10. Operating personnel shall not run centrifugal pumps longer than 10 minutes without water flow. Overheating of centrifugal pumps can cause severe burns and injuries.
11. Personnel operating submersible pumps shall never lower and retrieve pumps using the power cord. Operating personnel shall always lower and retrieve pumps using a rope or cable attached to a lift bale.
12. At no time shall operating personnel attempt to thaw a frozen submersible pump using a torch or any other source of flame.

Safe Operating Practices – SCISSOR LIFT

1. The operator shall survey the usage area for potential hazards such as untamped earth fills, unlevel surfaces, overhead obstructions, and electrically charged conductors or wires. The operator shall be aware of any potential hazards and always consider what could happen. Watch for moving vehicles and other personnel the operating area at all times.
2. The operator shall read, understand, and follow the procedures in the safety and operations manual before attempting to operate the equipment.
3. The operator shall inspect the equipment for damaged or worn parts. Check for cracked welds, hydraulic leaks, damaged wiring, loose wire connectors, low tire pressure, uneven tire wear, or tire damage. Also the operator shall check for any improper operation of controls.
4. The operator shall NEVER operate equipment if damaged in any way. Improperly operating equipment must be repaired before using.
5. The operator shall wear proper clothing for the job. Wear protective equipment as required by federal, state, or local regulations. The operator MUST wear a safety harness and lanyard at all times and abide fall protection standards outlined in *Section 20.0* of this HASP.
6. The operator shall locate, read, and follow all directions and warnings displayed on the equipment.
7. The operator shall inspect the equipment for “DO NOT USE” tags. NEVER use equipment tagged in this way until all repairs are made and all “DO NOT USE” tags are removed by authorized maintenance personnel.
8. The operator shall make sure the basket and platform surfaces are free of mud, grease, or other slippery material to reduce the possibility of slipping.
9. The operator shall NEVER allow other improperly trained personnel to operate this equipment. Only trained and authorized personnel shall be allowed to operate this equipment.

10. The operator shall NEVER operate this equipment while under the influence of alcohol or drugs, or if feeling ill, dizzy, or unsteady in any way. Operators must be physically fit, thoroughly trained, and not easily excitable.
11. The operator shall NEVER modify, alter, or change the equipment in any way that would affect its original design or operation in any way.
12. The operator shall NEVER operate this equipment in ways for which it is not intended.
13. The operator shall position the lift far enough away from power sources to ensure that no part of the lift can accidentally reach into an unsafe area. This includes full extension of the scissor lift.
14. The operator shall operate only on a firm and level surface. NEVER use on surfaces that do not support the equipment with its rated load capacity.
15. The operator shall keep clear and make sure all other personnel stay away from potential pinch or shear points.
16. The operator shall report any misuse of equipment to onsite management personnel. Horseplay is strictly prohibited.
17. The operator shall maintain good footing on the work platform. NEVER wear slippery soled shoes.
18. The operator shall make certain all personnel are clear and there are no obstructions before raising, lowering and repositioning the lift.
19. When possible, operating personnel shall cordon off area around the scissor lift to keep other personnel, bystanders and other equipment away from it while in use.
20. The operator shall stay clear of wires, cables, and other overhead obstructions.
21. Operating personnel shall NEVER allow electrode contact with any part of the basket if welding is being performed from the platform.
22. The operator shall NEVER override or by-pass manufacturer's safety devices.
23. The operator shall NEVER attach a safety harness to an adjacent structure, pole, or equipment while working from the boom platform.
24. The operator shall NEVER try to move the scissor lift while the basket is extended.
25. The operator shall NEVER stand or sit on cage bars. The operator shall work only within the work cage and will not lean out over the cage to perform work.
26. The operator shall NEVER attempt to increase working height with boxes, ladders, or other means.
27. The operator shall NEVER operate this equipment when exposed to high winds, thunderstorms, ice, or any other weather conditions that would compromise operator safety.
28. The operator shall NEVER allow ropes, electric cords, hoses, etc. to become entangled in the equipment when the basket is being raised or lowered.

29. The operator shall NEVER exceed manufacturer's load limits or use the lift as a crane for lifting heavy materials. Make sure all tools and equipment are safely stowed.
30. The operator shall NEVER exceed load ratings by transferring loads to the basket at elevated heights.
31. The operator shall NEVER use the cage to carry materials and shall never allow overhang of materials when raising or lowering the basket.
32. The operator shall NEVER use the scissor lift to place a "dead man" load against any structure, materials, or equipment.
33. Operating personnel shall NEVER climb up or down the scissor lift.
34. Operating personnel shall NEVER leave the keys in the scissor lift while unattended or not in use.

Safe Operating Practices – SKIDSTEER (BOBCAT)

1. Only trained and qualified Contractor personnel are permitted operate a skidsteer. Training documentation shall be provided to the Client and/or kept onsite at all times.
2. The operator shall perform a pre-operational check of the equipment and be familiar with operator's manual. The operator shall check backup alarms, tire pressure, engine oil, hydraulic oil, fuel, dust collector and grease fittings daily as part of the pre-equipment operation inspection process.
3. When checking for leaks in the hydraulic system, the operator shall use a piece of paper or cardboard. At no time shall the operator use his/her hands since oil from a pin-hole leak under high pressure can penetrate the skin.
4. The operator shall ensure that all required safety shields are in place and in good condition.
5. Due to quick and abrupt maneuverability, skid steer operators shall wear head protection at all times.
6. The operator shall always wear appropriate personal protective equipment consistent with the immediate hazards on hand.
7. The operator shall keep hearing protection on hand at all times in case noise from equipment operation or noise from nearby construction activities exceeds 90 dBA.
8. The operator shall be responsible for lockout and tagout of damaged and unsafe equipment and equipment controls. The operator shall promptly report all needed repairs to the site supervisor.
9. Seat belts and/or shoulder harnesses must always be worn to keep the operator secure within the equipment's roll over protection system (ROPS).
10. When mounting or dismounting equipment, the operator shall only use the designated safety treads and grab handles provided on the equipment. Operators are not permitted to jump from equipment at any time.
11. The operator shall only utilize manufacturer-approved attachments and buckets.

12. The operator shall always ensure the attachment locking devices are in place, even when switching attachments for only a few minutes. If not locked, attachments may break free and roll down the loader arms or fall onto nearby personnel.
13. The operator shall always be mindful of overhead power line clearances. Equipment shall not be operated within 10 feet of energized power lines.
14. Due to quick and abrupt maneuverability, skid steer operators shall refrain from operating near open trenches and/or excavations. At a minimum the operator shall keep at least a 2-foot distance from open trenches and excavations.
15. The operator shall drive with caution and continually check both sides and behind when turning and backing up the equipment. Skid steer maneuverability can be quick and abrupt. The operator shall always be aware of personnel on foot in the immediate area zone and whenever possible, keep all other personnel away from the immediate work area.
16. The operator shall keep feet on the pedals at all times while operating the equipment.
17. The operator shall not make sharp, fast turns, move bucket controls abruptly, or travel or turn with lift arms up.
18. The operator shall always maneuver the equipment with the bucket (or other attachments) as close to the ground as possible to maintain equipment stability as well as to maintain an unobstructed view of the surrounding work area. In all possible cases the operator shall plan ahead to ensure that loading, unloading, and turning are performed on level ground.
19. To maintain safe stability and steering control, the operator shall load the bucket evenly (i.e. weight should not be lop-sided) and shall not load beyond the limits or rated capacity of the equipment to ensure safe stability and steering control.
20. The operator shall always keep the loader bucket at the safest, lowest position when moving the equipment. The operator shall always keep the heaviest end of the loader pointing uphill when moving up and down inclines with a full bucket.
21. The operator shall be mindful of holes, rocks or obstructions which may cause a roll-over or loss of control.
22. When parking the equipment, the operator shall be mindful of safe parking locations and avoid parking in high traffic areas and in other equipment's blind spots.
23. The operator shall not leave attachments in the raised position when equipment is not in use.
24. At no time shall the operator remove the roll over protection system (ROPS) or side screens.
25. At no time shall the operator attempt to repair, adjust or unplug equipment with the Power Takeoff (PTO) engaged.
26. At no time shall the operator attempt to operate steering levers or any other hydraulic controls while standing outside of the cab or ROPS.

27. No personnel shall be allowed to work in or under a raised bucket at any time. Other than the operator, no riders are allowed anywhere on the equipment.
28. At no time shall the operator use the loader as a lift for people or as a work platform.
29. The operator shall not leave loader unattended with engine running or with lift arms up.

Safe Operating Practices – VACTOR TRUCK

1. Only trained and qualified Contractor personnel are permitted operate the vactor truck.
2. The buddy system shall be implemented at all times during vactor truck operations. Due hazardous conditions associated with large hoses and powerful suction, two hose handlers shall work together and observe one another at all times.
3. The operators shall perform a pre-operational check of the equipment and be familiar with operator's manual. The operators shall check backup alarms, tire pressure, engine fluids, lights and turn indicators and vacuum equipment daily as part of the pre-equipment operation inspection process.
4. The operators shall inspect pressure relief systems and safety shut-off systems as part of the pre-equipment operation inspection process.
5. The operators shall be responsible for lockout and tagout of damaged and unsafe equipment and equipment controls. The operators shall promptly report all needed repairs to the site supervisor.
6. Seat belts must always be worn when driving the vactor truck.
7. The operators shall keep windshield, windshield wipers, side windows and mirrors clean. Mirrors shall be adjusted to provide the largest possible view of the rear of the equipment.
8. When mounting or dismounting the vehicle, the operator shall only use the designated steps and handholds provided on the equipment. Operators are not permitted to jump from equipment at any time.
9. Whenever possible, the operators shall plan ahead to minimize or eliminate the need for backing. When available, the operators shall use an observer to assist with backing up of the equipment. The operators shall make sure back-up alarms are working properly as part of the pre-equipment operation inspection process.
10. The operators shall always wear appropriate personal protective equipment consistent with the immediate hazards on hand.
11. The operators shall keep hearing protection on hand at all times in case noise from equipment operation or noise from nearby construction activities exceeds 90 dBA.
12. The operators shall inspect fire extinguisher locations on the equipment as part of the pre-equipment operation inspection process.
13. The operators shall always be aware of employees and others on foot in the immediate work zone.
14. Other than within the cab of the vehicle, no riders are allowed anywhere on the equipment.

15. The operators shall inspect hoses and cam fittings prior to use. The operator shall only utilize manufacturer-approved attachments.
16. The operators shall always use the same diameter hose along its entire length for maximum efficiency and to eliminate stop-ups.
17. Whenever possible, the operators shall utilize smooth bore hoses to ensure maximum efficiency and eliminate stop-ups.
18. At no time shall the operators be permitted to change hoses while the equipment is running.
19. The operators shall set the emergency brake and chalk the tires prior to vacuum operations.
20. The operators shall ground the truck prior to vacor operations.
21. The vacor truck shall be operated only in areas that are as level as possible.
22. Other than low levels of dissolved solids, soils, and sediments in the waste water. The operators shall not intentionally mix wet and dry materials or any materials with unidentified hazards in the same tank.
23. The operators shall maintain safe vehicle distance (minimum of 2-feet) from open trenches.
24. The vacor truck tank shall be treated as a confined space. At no time shall personnel be permitted to enter the tank until vehicle is decommissioned, locked-out and tagged-out, and permit required confined space entry procedures are reviewed and followed.
25. When parking the equipment, the operators shall be mindful of safe parking locations and avoid parking in high traffic areas and in other equipment's blind spots.

Safe Operating Practices – VACUUM TRUCK

1. Only trained and qualified Contractor personnel are permitted operate the vacuum truck.
2. The operator shall perform a pre-operational check of the equipment and be familiar with operator's manual. The operator shall check backup alarms, tire pressure, engine fluids, lights and turn indicators and vacuum equipment daily as part of the pre-equipment operation inspection process.
3. The operator shall inspect pressure relief systems and safety shut-off systems as part of the pre-equipment operation inspection process.
4. The operator shall be responsible for lockout and tagout of damaged and unsafe equipment and equipment controls. The operator shall promptly report all needed repairs to the site supervisor.
5. Seat belts must always be worn when driving the vacuum truck.
6. The operator shall keep windshield, windshield wipers, side windows and mirrors clean. Mirrors shall be adjusted to provide the largest possible view of the rear of the equipment.

7. When mounting or dismounting the vehicle, the operator shall only use the designated steps and handholds provided on the equipment. Operators are not permitted to jump from equipment at any time.
8. Whenever possible, the operator shall plan ahead to minimize or eliminate the need for backing. When available, the operator shall use an observer to assist with backing up of the equipment. The operator shall make sure back-up alarms are working properly as part of the pre-equipment operation inspection process.
9. The operator shall always wear appropriate personal protective equipment consistent with the immediate hazards on hand.
10. The operator shall keep hearing protection on hand at all times in case noise from equipment operation or noise from nearby construction activities exceeds 90 dBA.
11. The operator shall inspect fire extinguisher locations on the equipment as part of the pre-equipment operation inspection process.
12. The operator shall always be aware of employees and others on foot in the immediate work zone.
13. Other than within the cab of the vehicle, no riders are allowed anywhere on the equipment.
14. The operator shall inspect hoses and cam fittings prior to use. The operator shall only utilize manufacturer-approved attachments.
15. The operator shall always use the same diameter hose along its entire length for maximum efficiency and to eliminate stop-ups.
16. Whenever possible, the operator shall utilize smooth bore hoses to ensure maximum efficiency and eliminate stop-ups.
17. At no time shall the operator be permitted to change hoses while the equipment is running.
18. The operator shall set the emergency brake and chalk the tires prior to vacuum operations.
19. The operator shall ground the truck prior to vacuum operations.
20. The vacuum truck shall be operated only in areas that are as level as possible.
21. Other than low levels of dissolved solids, soils, and sediments in the waste water. The operator shall not intentionally mix wet and dry materials or any materials with unidentified hazards in the same tank.
22. The operator shall maintain safe vehicle distance (minimum of 2-feet) from open trenches.
23. The vacuum truck tank shall be treated as a confined space. At no time shall personnel be permitted to enter the tank until vehicle is decommissioned, locked-out and tagged-out, and permit required confined space entry procedures are reviewed and followed.
24. When parking the equipment, the operator shall be mindful of safe parking locations and avoid parking in high traffic areas and in other equipment's blind spots.

Preventative Maintenance and Equipment Inspection

Wear, tear and changes shall be anticipated by operating personnel and routine inspections and continuous corrective actions shall be taken to ensure personal safety, peak equipment operating efficiency and minimal equipment deterioration. Preventative maintenance shall involve planned, systematic inspection, adjustment, lubrication, and replacement of components as well as performance testing and analysis in some cases. The overall impact of routine equipment inspection and preventative maintenance shall serve to extend the life of the equipment, minimize unscheduled downtime, and protect the health and safety of personnel working with and around the equipment.

Upon discovery of an imminent hazard associated with equipment operation, operating personnel shall immediately notify the SSO and use appropriate means to immediately assess and correct the situation.

There may be occasions when a piece of equipment is involved in an incident that results in structural or mechanical damage. Operating personnel shall be aware that this can seriously compromise the ability of the equipment to perform safely and efficiently. When a piece of equipment is damaged structurally or mechanically or the equipment operator suspects the possibility of structural or mechanical damage (damage may be internal and not always visible), the following safe practices shall be followed:

1. Immediately remove the equipment from service and notify all affected personnel of the problem and potential unsafe conditions.
2. Remove keys and/or disconnect equipment from power sources and tag the equipment with a conspicuous notice or "out of service" tag.
3. Immediately notify onsite management and the SSO.
4. Conduct an Activity Hazard Analysis (AHA) and document damage/malfunction, safety concerns and corrective actions.

All corrective actions and/or immediate repairs shall be performed with the full knowledge of area employees, supervisors, managers and the SSO. The SSO will take actions to inform all employees of any imminent hazards discovered and will ensure that all necessary actions are taken to prevent further unsafe operation of the equipment until corrective measures have been taken.

General Inspection and Maintenance Guidelines

1. Operating and/or maintenance personnel shall perform maintenance procedures according to the equipment manufacturer's requirements. NEVER short change maintenance procedures.
2. When applicable, operating personnel shall always inspect hydraulic systems prior to equipment operations. All lines, connectors, and fittings should be tight and in good condition.
3. Operating and/or maintenance personnel shall always turn the key switch off or disconnect equipment from power sources before inspecting, connecting or disconnecting wiring to or from any electrical device.

4. Operating and/or maintenance personnel shall always disconnect power to hydraulic pump drive motors before making electrical checks of hydraulic valves and other system components.
5. Operating and/or maintenance personnel shall always keep all mechanisms properly adjusted and lubricated according to manufacturer's specifications.
6. Operating personnel shall always perform a function check of operating controls before each use and after repairs have been made to equipment.
7. Operating and/or maintenance personnel shall locate and protect against possible pinch points prior to performing maintenance and repairs.
8. Operating and/or maintenance personnel shall always use factory approved parts to repair or maintain equipment. If equipment is rebuilt, retesting shall be required in accordance with factory instructions.
9. Operating and/or maintenance personnel shall never test or operate the hydraulic components when another person is near the equipment.
10. Operating and/or maintenance personnel shall never add unauthorized fluids to the equipment. Check original manufacturer specifications.
11. Operating and/or maintenance personnel shall never exceed manufacturer's recommended relief valve settings.
12. Operating and/or maintenance personnel shall never touch or allow metal tools to contact static discharge sensitive electronic components. Always use static discharge prevention mats and grounding devices when handling electronic components.
13. Operating personnel shall ensure that power tools are equipped and used with guards. Under no circumstances shall safety mechanisms and guards be removed from power tools.
14. Operating personnel shall ensure all belts, gears, shafts pulleys, sprockets, spindles, drums, flywheels, chains, or other reciprocating, rotating or moving parts of equipment are guarded if the operator is exposed to contact.
15. Operating personnel shall always utilize appropriate personal protective equipment when operation and maintenance of hand and power tools can create falling, flying or splashing debris, or harmful dusts, fumes, mists, vapors and gasses.
16. Operating personnel shall inspect power tools equipped with constant pressure switches that shut off power when released to ensure that the switch is functioning properly. Under no circumstances shall operating personnel alter the function of constant pressure switches.
17. Operating and/or maintenance personnel shall ensure all portable, electrically powered tools are properly grounded or double insulated.
18. Operating and/or maintenance personnel shall ensure that impact tools (ie. drift pins, wedges, and chisels) are kept free of mushroomed heads.
19. Operating and/or maintenance personnel shall ensure pneumatic power tools are secured to the hose or whip by some positive means, so as to prevent the tool from accidentally being discharged.

20. Operating and/or maintenance personnel shall ensure safety clips or retainers are used on pneumatic power tools to prevent attachments from accidentally being expelled.
21. Operating and/or maintenance personnel shall ensure all compressed air hoses and connections are designed for the pressure and service to which they are subjected. All hoses (exceeding one half inch inner diameter) shall have safety devices at the source of the supply or branch line to reduce pressure in case of hose failure.
22. Operating and/or maintenance personnel shall never attempt repairs they do not understand. Consult manufacturer if there are any questions regarding proper maintenance, specifications, or repairs.

Operating and/or maintenance personnel shall ensure the following general safety precautions are followed when performing battery maintenance:

1. Check battery test indicators for proper state of charge on maintenance free batteries before using equipment equipped with this feature.
2. Always wear safety glasses and chemical resistant gloves when working on or near batteries.
3. Always avoid contact with battery acid. Battery acid causes serious burns. Avoid contact with skin and eyes. If accidental contact occurs, flush with water and consult a physician immediately.
4. Always disconnect ground cable first when removing batteries from equipment.
5. Always connect ground cable last when installing batteries.
6. Always charge batteries in open, well-ventilated areas.
7. Under no circumstances are personnel permitted to smoke when servicing batteries.
8. Never allow batteries to overcharge and boil.
9. Under no circumstances are personnel permitted to short across battery posts to check for current. Never break a live circuit at battery.
10. Never jump start other motor vehicles using stationary equipment batteries.

26.0 Hazard Communication

Contractor personnel at the project site may be required to work with chemicals that may present some degree of hazard. The following section describes effective hazard communication policies and procedures to communicate project site hazards and identify control measures that shall be implemented to protect personnel health and safety. Safe work practices shall depend upon personnel being aware and informed of the hazards associated with chemical products they use.

Hazard communication policy and procedure identified in this Section shall consist of three key elements.

1. Appropriate use of labels to identify hazardous materials used at the project site.
2. Understanding material safety data sheets (MSDS's) and their role in educating onsite personnel of the hazardous properties of chemical products used at the project site along with control measures recommended for safe use.
3. Training to inform onsite personnel where hazardous chemicals are present at the project site, the methods and observations that may be used to detect the presence of a hazardous materials, the health hazards of hazardous materials, and personnel measures personnel shall take to protect themselves from these hazards.

Labels

All containers containing hazardous materials shall be labeled, tagged, or marked with the following information:

- Identity of the hazardous material
- Appropriate hazard warning
- Name and address of the chemical manufacturer, importer, or other responsible party

Signs, placards, process sheets, batch tickets, operating procedures, or other written materials may be used in lieu of labels for individual stationary process containers, as long as the identification method identifies the hazard(s).

Material Safety Data Sheets (MSDS's)

MSDSs shall contain detailed information concerning the hazardous properties of hazardous materials and chemical products used at the project site, including their identity, the health effects from exposure, emergency and first aid procedures, and precautions for safe use.

MSDSs for hazardous materials and chemical products used at the project site shall be maintained onsite in a central location accessible by all personnel.

Material Safety Data Sheet Components

Section I - Identification

This section shall identify the chemical name or trade name and synonyms, the manufacturer's name and address, emergency telephone number, telephone number for additional information, and the date the Material Safety Data Sheet was prepared.

Section II - Hazardous Ingredients

A hazardous ingredient is a hazardous material in a mixture in sufficient concentration to produce enough flammable vapor or gas to ignite or to produce acute or chronic adverse effects in doses which could result from normal use or predictable misuse of the mixture. The hazardous ingredient must be listed with the associated Permissible Exposure Limit (PEL), or Threshold Limit Value (TLV), or other recommended limit and the percentage of each hazardous ingredient.

Hazardous ingredients shall be listed when they comprise 1 percent or greater of the composition of the chemical product or 0.1 percent as a carcinogen. Hazardous ingredients are carcinogens

or potential carcinogens when listed by 29 CFR Part 1910, Subpart Z, National Toxicology Program or International Agency for Research on Cancer.

Section III - Physical/Chemical Characteristics

Boiling Point - Refers to the temperature at which the liquid boils, in degrees Fahrenheit, at a pressure of 760 mm Hg. Materials with low boiling points tend to evaporate quickly and may dissipate toxic or flammable components.

Vapor Pressure - Refers to the pressure of saturated vapor above the liquid in mm of Hg at 20 degrees Centigrade. Materials with high vapor pressure evaporate rapidly and may dissipate toxic or flammable components.

Vapor Density - Refers to the relative density or weight of a vapor or gas compared with an equal volume of air. Materials with vapor densities greater than one will tend to accumulate on the floor, while those with vapor densities less than one will rise.

Solubility in Water – Refers to the amount of a chemical that can be dissolved in water.

Specific Gravity - Refers to the ratio of the weight of a volume of material to the weight of an equal volume of water. A material with a specific gravity less than one will float on water, while those with specific gravities greater than one are heavier than water and will sink.

Melting Point - The temperature at which a solid changes into a liquid.

Evaporation Rate - Refers to the time for a liquid to be converted into its vapor at a given temperature, relative to ether or butyl acetate.

Appearance and Odor - Refers to the physical description of the chemical product.

Section IV - Fire and Explosion Hazard Data

Flash Point - Refers to the temperature in degrees Fahrenheit, at which a liquid will give off enough flammable vapor to ignite.

Flammable or Explosive Limits - Refers to the range of gas or vapor concentrations, percent by volume in air, which will burn or explode if an ignition source is present.

Lower Explosive Limit (LEL) - Refers to the concentration of vapor in air below which ignition will not occur.

Upper Explosive Limit (UEL) - Refers to the concentration of vapor in air above which ignition will not occur.

Extinguishing Media - Identifies the firefighting media suitable for use on the burning material.

Special Fire Fighting Procedures - Identifies the firefighting media to be used if water is unsuitable and lists necessary personal protective equipment.

Unusual Fire and Explosion Hazards - Identifies any unusual fire and explosion hazards and any special conditions that govern them.

Section V - Reactivity Data

Stability - Refers to whether the material is stable or unstable under reasonably foreseeable conditions of storage, use, or misuse. Describes those conditions which may cause a dangerous reaction if unstable.

Incompatibility - Refers to materials and contaminants with which the product may reasonably come into contact to produce a reaction which would release energy.

Hazardous Decomposition Products - Identifies hazardous materials produced by burning, oxidation, or by heating the chemical product.

Hazardous Polymerization – Describes the reaction which takes place at a rate which releases energy. Describes foreseeable storage conditions which would start polymerization.

Section VI - Health Hazard Data

This section of the MSDS shall describe how the chemical product would be expected to enter the body, including inhalation, ingestion, or skin absorption. The section describes recognized health hazards and symptoms due to acute (short-term) and chronic (long-term) overexposure to the material. The section shall also identify known or suspected carcinogens used as an ingredient in concentrations greater than 0.1 percent of the material. The signs and symptoms of exposure are noted. Describes common medical conditions personnel may encounter that may be aggravated by exposure to the chemical product. Describes emergency and first aid procedures.

Section VII - Precautions for Safe Handling and Use

This section of the MSDS refers to the precautionary measures to be taken in the event of accidental spills, releases, or leaks. Appropriate cleanup and disposal are defined. Precautions include avoiding breathing vapor or gas from toxic materials and removing sources of ignition when a flammable liquid is spilled. Handling and storage precautionary information are also described.

Section VIII - Control Measures

This section describes the types of personal protective equipment, including clothing, respirators, eye protection, face shield, gloves and boots, and other controls including ventilation which are needed when working with the material. Since the conditions of use including contaminant, contaminant concentration, application method, and degree of confinement will vary from one work place to another, the control measures will also vary. Generally, the protective equipment and controls recommended by the manufacturer in the Material Safety Data Sheet usually apply to the most hazardous conditions of use. Contact your supervisor concerning the control measures for your job.

Training and Information

Contractor personnel shall be trained on the safe use of all chemical products utilized at the project site. Personnel training shall include:

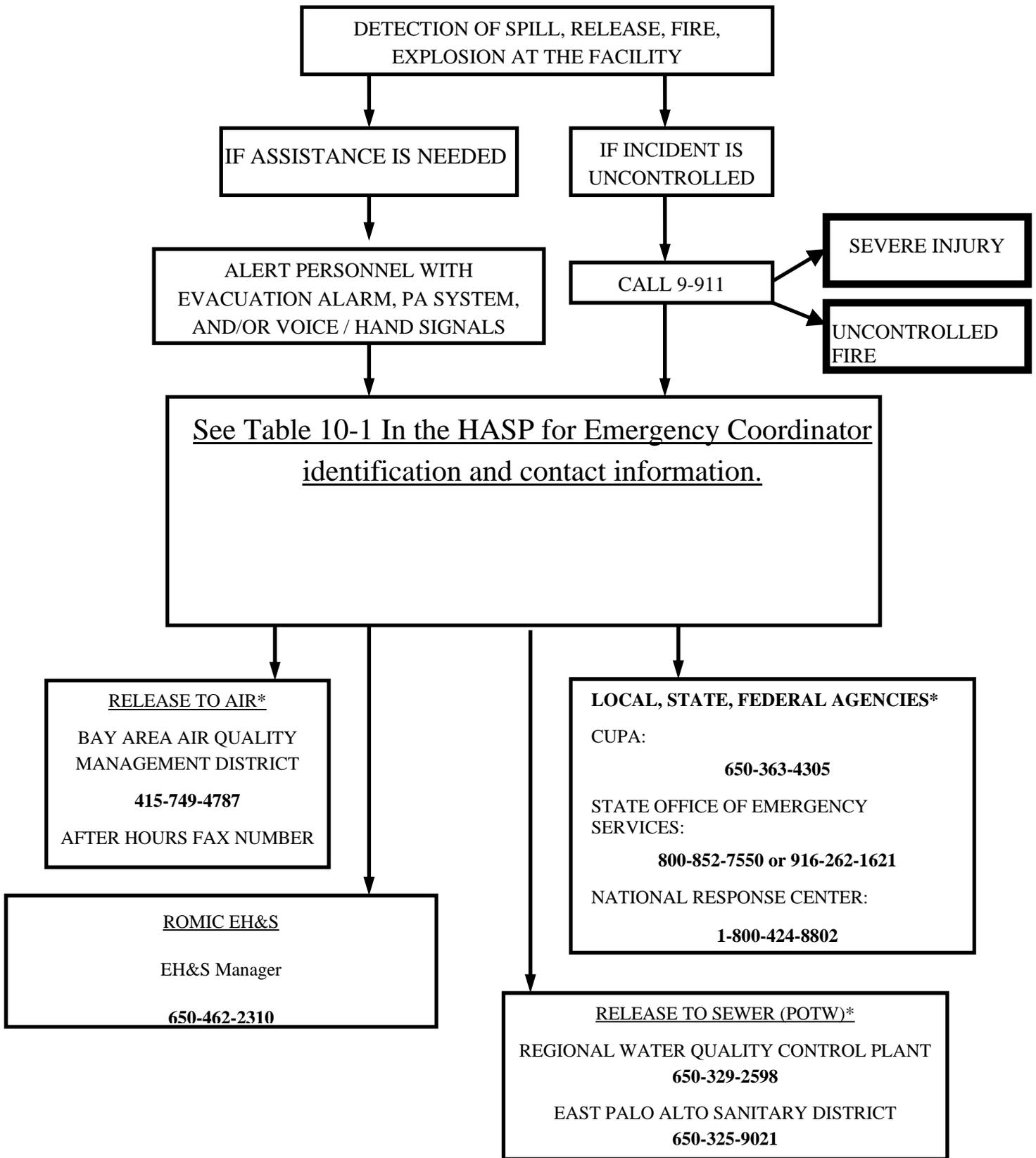
1. Methods and observations used to detect the presence or release of hazardous materials and/or chemical products in the work area. These methods and observations shall include monitoring conducted by onsite personnel in conjunction with the SSO, use of continuous monitoring devices, and visual appearance or odor of hazardous materials and/or chemical products when being released.

2. Discussion of the physical and health hazards associated with hazardous materials and/or chemical products used at the project site.
3. Measures onsite personnel shall take to protect themselves from chemical hazards, including specific procedures to protect themselves from exposure to hazardous materials and/or chemical products such as appropriate work practices, emergency procedures, and personal protective equipment.

Figure 1

Emergency Response Notification Flow Chart

EMERGENCY RESPONSE NOTIFICATION FLOW CHART



* The SSO will contact these agencies if it is readily apparent that the emergency threatens public health or the environment outside the facility

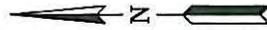
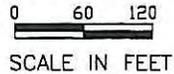
Figure 2

***Primary and Secondary Assembly Locations
For Emergency Evacuation***

Figure 3

Locations of Emergency Eye and Body Wash Stations

SITE PLAN

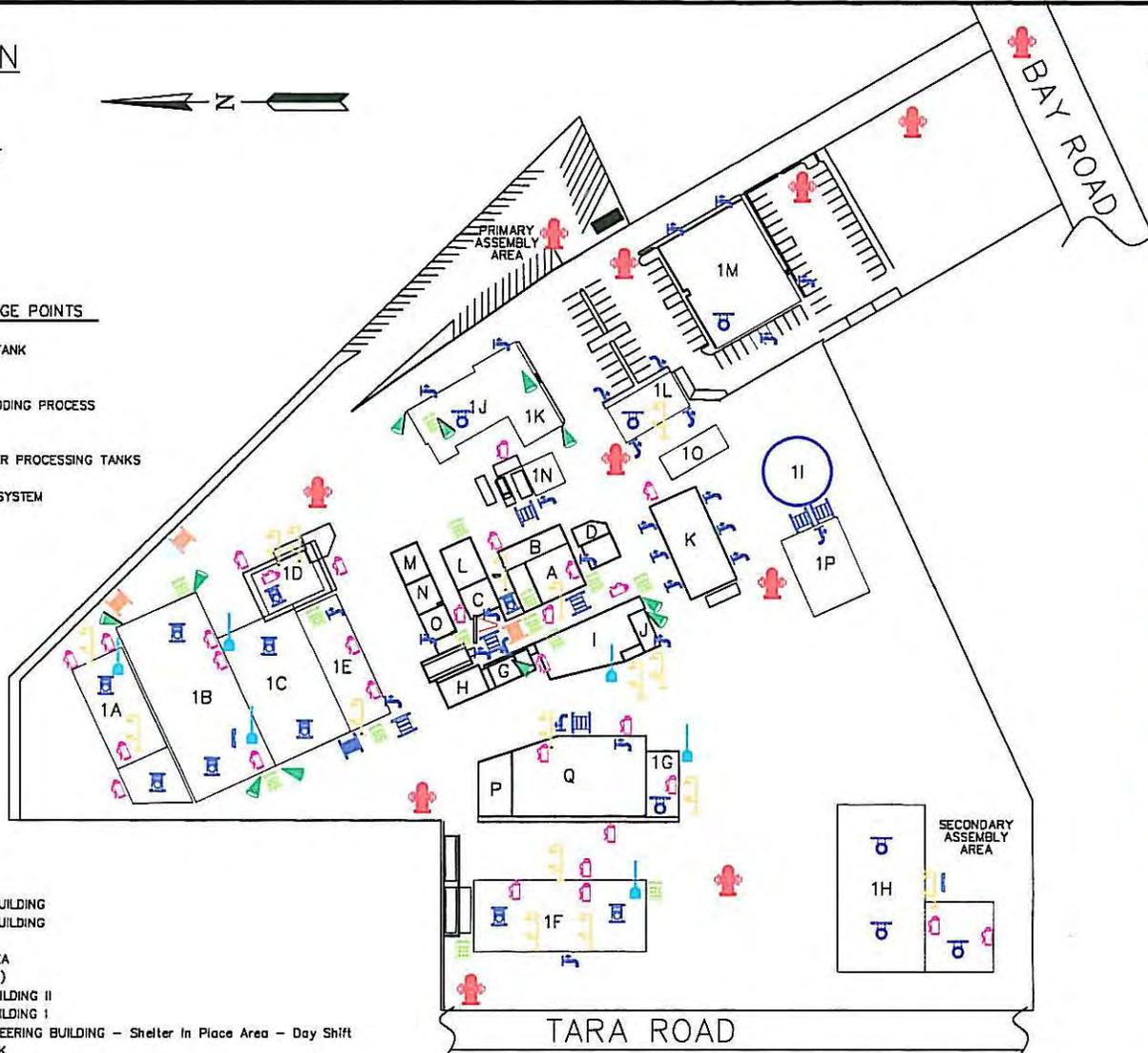


WATER SYSTEM DISCHARGE POINTS

- A. INTERMEDIATE PROCESS TANK
- B. BLEND TANKS
- C. WASTE TANKS
- D. BLEND TANKS FOR SHREDDING PROCESS
- G. PRODUCT TANKS
- H. PROCESS REBOILERS
- I. PROCESS REBOILER WATER PROCESSING TANKS
- J. NEUTRALIZATION TANKS
- K. BIOLOGICAL TREATMENT SYSTEM
- L. PRODUCT TANKS
- M. PRODUCT TANKS
- N. PRODUCT TANKS
- O. PRODUCT TANKS
- P. PRODUCT TANKS
- Q. PRODUCT TANKS

STRUCTURES

- 1A. NORTH DRUM STORAGE BUILDING
- 1B. SOUTH DRUM STORAGE BUILDING
- 1C. DRUM SAMPLING AREA
- 1D. SHREDDING PROCESS AREA
- 1E. MAINTENANCE SHOP (OLD)
- 1F. WEST DRUM STORAGE BUILDING II
- 1G. WEST DRUM STORAGE BUILDING I
- 1H. PLANT MAINTENANCE/ENGINEERING BUILDING - Shelter In Place Area - Day Shift
- 1I. RAINWATER HOLDING TANK
- 1J. PRODUCTION OFFICES
- 1K. ADMINISTRATIVE OFFICES
- 1L. LABORATORY - Shelter In Place Area - After Hours
- 1M. OFFICE BUILDING - Shelter In Place Area - Day Shift
- 1N. BOILER BUILDING
- 1O. TRAILER OFFICES
- 1P. TRUCK WASH



LEGEND

- FIRE HYDRANTS
- WATER HOSE REELS
1.5" Auxiliary Water Source with 75-100 ft. Hoses @ 75-100 PSI
- AFFF HOSE REELS
1.5" Positive Pressure (75PSI) System with 67 Gallons of 3' x 6' Ansulite Foam
- WATER HOSE BIBS
3/4" Faucets with 22-25 GPM Water Source (Hose may or may not be attached)
- AFFF FOAM SYSTEM (AUTOMATIC)
300 Gallon Foam Deluge System
- WATER SPRINKLER SYSTEM (AUTOMATIC)
- FIRE EXTINGUISHER
- EYE WASH, SHOWER STATION
- OUTSIDE PA SPEAKER
- WIND SOCK
- PHONE
- ALARM PANEL
- SPILL KIT
Contents Stored in A Overpack Drum May include Absorbent, Neutralizer, PPE etc..
- SEA CONTAINER
Orange Cones
Fire Jackets
SCBA'S
Oxygen Emergency Unit
Emergency Eyewash
Red ROMIC Hard Hat
"Emergency Personnel" Safety Vests
Megaphone
Walkie-Talkie
First Response Kit
Personnel Accountability Sheets & Shift Rosters
MSDS
Facility Site Plan
Hazardous Materials Management Plan
Safety Gloves
14-55 gallon drums AFFF
Decon. Equipment

3	8-00	Color Coding	JS	KM
2	6-00	Addition of Sea Container Spill Kit	LE	KM
1	6-00	Addition of last 6 legend details	LE	KM
0	3-00		JS	KM
REV	DATE	REVISION	BY	APP



FACILITY SITE PLAN
EAST PALO ALTO, CA
WATER SYSTEM DISCHARGE POINTS
EMERGENCY RESPONSE PLAN

DATE: 3-28-00

BY: Jessie M. Scianga

Figure 4

Figure of Proposed Respirator Sampling Train

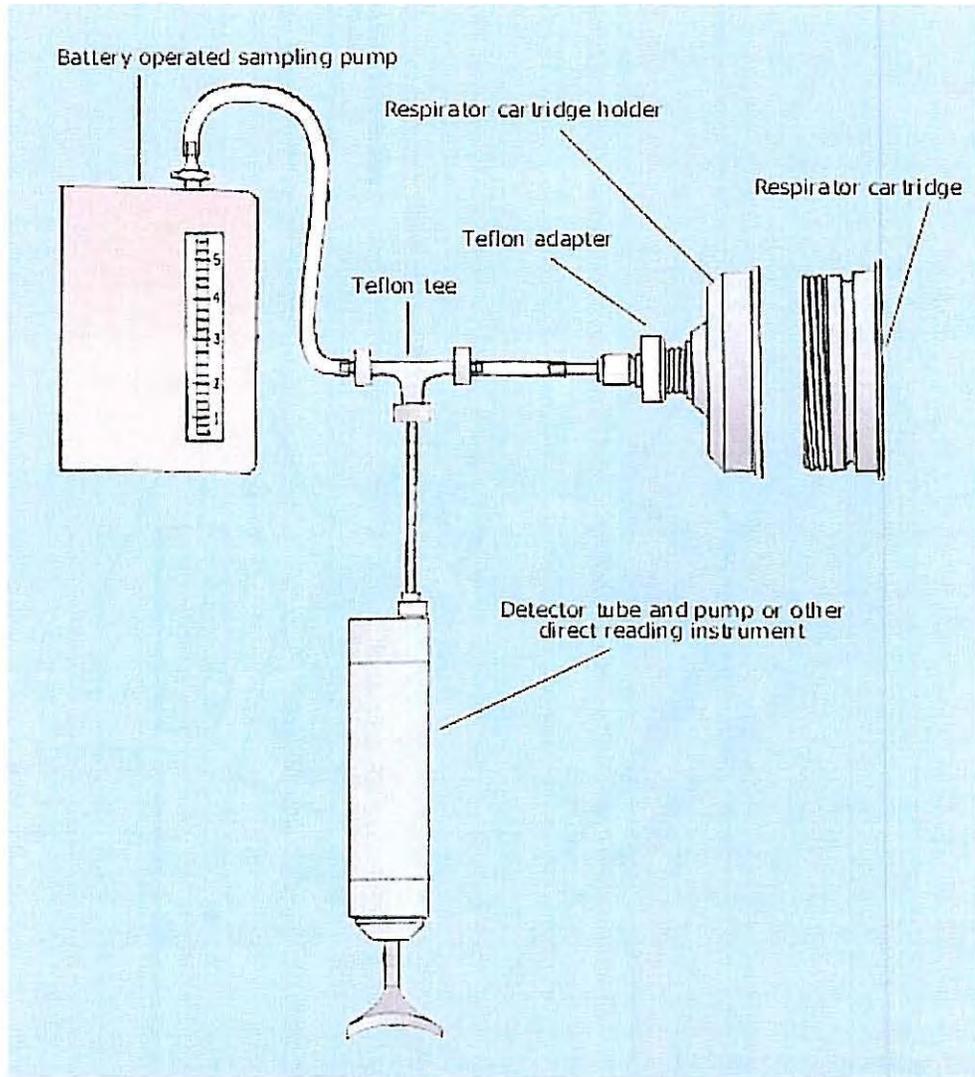
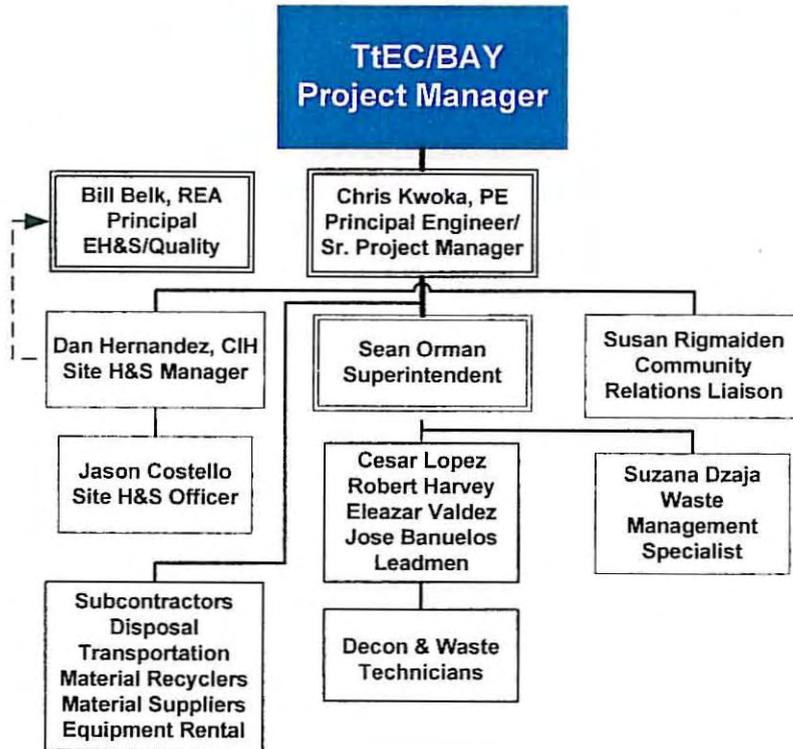


Figure 5

Contractor Project Team Organizational Chart

DECON Team

ROMIC Phase I Facility Closure Project



Attachment A

Task Specific Area Hazard Analysis (AHA) Documentation

Activity Hazard Analysis

Date:	August 15, 2008
Project:	Romic Phase I Facility Closure Project
Site Safety Officer:	Mr. Jason M. Costello
Activity Description:	Decontamination and Demolition of the Truck Wash Station

Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>The truck wash station shall be decontaminated via high pressure water washing activities starting at the overhead rack and working down to the concrete surface.</p>	<p>Bruising, cutting, tearing and major bodily harm are hazards associated with improper operation and lack of experience and training regarding use of concentrated high pressure water.</p> <p>Ground surfaces and footing areas may become wet and present potential slip, trip and fall hazards.</p> <p>Environmental and personnel chemical exposure (dermal and inhalation) due to overspray are hazards associated with high pressure water washing.</p>	<p>PPE: All personnel performing high pressure water washing activities shall utilize <i>Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>Safe Operating Practices – Pressure Washing Equipment: The SSO shall ensure all power tools are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Power tool inspection checklists will be turned into the SSO and maintained in an inspection checklist binder. Contractor personnel operating high pressure water washing equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Sections 23.0</i> and <i>25.0</i> of the HASP. In general, Contractor personnel performing pressure washing activities shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained (experienced) personnel shall operate high pressure washing equipment 2) The operator shall insure that all electrical controls are either fail safe, low voltage, or protected with an approved ground fault circuit interrupter. 3) At no time shall the operator operate the equipment above the manufacturers rated pressure maximum. 4) The operator shall always increase pressure slowly until required working pressure is reached. 5) High pressure water can puncture splash suits and other personal protective clothing. At no time shall the operator point the pressure washer nozzle in the direction of other personnel. 6) Water spray will be directed downward to minimize misting and overspray.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Qualified and experienced Contractor personnel may operate scissor lifts to access elevated areas near and around the truck wash station</p>	<p>Slip, trip, fall, crushing, pinching and struck-by hazards are potential health and safety hazards associated with improper operation and lack of experience and training regarding use of aerial lift devices.</p>	<p>PPE: Personnel operating scissor lifts who are <u>not</u> exposed to chemical hazards (ie. performing pressure washing activities) must, at a minimum, utilize <i>Level D</i> PPE including steel toe work boots, leather gloves, hard hat, safety glasses and bright colored protective safety vests. Hearing protection shall be immediately available in case noise from nearby equipment operation or noise from other nearby</p>

Activity Hazard Analysis

	<p>Struck-by hazards associated with dropped or falling objects are hazards associated with elevated, overhead work.</p>	<p>construction activities exceeds 90 dBA.</p> <p>Personnel operating scissor lifts who are also involved in high pressure water washing activities shall utilize <i>Leve C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>The SSO shall ensure all heavy equipment are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Heavy equipment checklists shall posted with the equipment for the operator(s) to review for the remainder of the day.</p> <p>Safe Operating Practices – Scissor Lift: All personnel operating heavy equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Section 25.0</i> of the HASP. In general, Contractor personnel operating scissor lifts shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) The operator shall survey the usage area for potential hazards such as untamped earth fills, unlevel surfaces, overhead obstructions, and electrically charged conductors or wires. The operator shall be aware of any potential hazards and always consider what could happen. Watch for moving vehicles and other personnel the operating area at all times. 2) The operator shall read, understand, and follow the procedures in the safety and operations manual before attempting to operate the equipment. 3) The operator shall inspect the equipment for damaged or worn parts. Check for cracked welds, hydraulic leaks, damaged wiring, loose wire connectors, low tire pressure, uneven tire wear, or tire damage. Also the operator shall check for any improper operation of controls. 4) The operator shall NEVER operate equipment if damaged in any way. Improperly operating equipment must be repaired before using. 5) The operator shall wear proper clothing for the job. Wear protective equipment as required by federal, state, or local regulations. The operator MUST wear a safety harness and lanyard at all times and abide fall protection standards outlined in <i>Section 20.0</i> of the HASP. 6) The operator shall locate, read, and follow all directions and warnings displayed on the equipment. 7) The operator shall inspect the equipment for “DO NOT USE” tags. NEVER use equipment tagged in this way until all repairs are made and all “DO NOT USE” tags are removed by authorized maintenance personnel. 8) The operator shall make sure the basket and platform surfaces are free of mud, grease, or other slippery material to reduce the possibility of slipping. 9) The operator shall NEVER allow other improperly trained personnel to operate this equipment. Only trained and authorized personnel shall be allowed to operate this
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Activity Hazard Analysis

		<p>equipment.</p> <ol style="list-style-type: none"> 10) The operator shall NEVER operate this equipment while under the influence of alcohol or drugs, or if feeling ill, dizzy, or unsteady in any way. Operators must be physically fit, thoroughly trained, and not easily excitable. 11) The operator shall NEVER modify, alter, or change the equipment in any way that would affect its original design or operation in any way. 12) The operator shall NEVER operate this equipment in ways for which it is not intended. 13) The operator shall position the lift far enough away from power sources to ensure that no part of the lift can accidentally reach into an unsafe area. This includes full extension of the scissor lift. 14) The operator shall operate only on a firm and level surface. NEVER use on surfaces that do not support the equipment with its rated load capacity. 15) The operator shall keep clear and make sure all other personnel stay away from potential pinch or shear points. 16) The operator shall report any misuse of equipment to onsite management personnel. Horseplay is strictly prohibited. 17) The operator shall maintain good footing on the work platform. NEVER wear slippery soled shoes. 18) The operator shall make certain all personnel are clear and there are no obstructions before raising, lowering and repositioning the lift. 19) When possible, operating personnel shall cordon off area around the scissor lift to keep other personnel, bystanders and other equipment away from it while in use. 20) The operator shall stay clear of wires, cables, and other overhead obstructions. 21) Operating personnel shall NEVER allow electrode contact with any part of the basket if welding is being performed from the platform. 22) The operator shall NEVER override or by-pass manufacturer's safety devices. 23) The operator shall NEVER attach a safety harness to an adjacent structure, pole, or equipment while working from the boom platform. 24) The operator shall NEVER try to move the scissor lift while the basket is extended. 25) The operator shall NEVER stand or sit on cage bars. The operator shall work only within the work cage and will not lean out over the cage to perform work. 26) The operator shall NEVER attempt to increase working height with boxes, ladders, or other means.
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Activity Hazard Analysis

		<p>27) The operator shall NEVER operate this equipment when exposed to high winds, thunderstorms, ice, or any other weather conditions that would compromise operator safety.</p> <p>28) The operator shall NEVER allow ropes, electric cords, hoses, etc. to become entangled in the equipment when the basket is being raised or lowered.</p> <p>29) The operator shall NEVER exceed manufacturer's load limits or use the lift as a crane for lifting heavy materials. Make sure all tools and equipment are safely stowed.</p> <p>30) The operator shall NEVER exceed load ratings by transferring loads to the basket at elevated heights.</p> <p>31) The operator shall NEVER use the cage to carry materials and shall never allow overhang of materials when raising or lowering the basket.</p> <p>32) The operator shall NEVER use the scissor lift to place a "dead man" load against any structure, materials, or equipment.</p> <p>33) Operating personnel shall NEVER climb up or down the scissor lift.</p> <p>34) Operating personnel shall NEVER leave the keys in the scissor lift while unattended or not in use.</p> <p>Fall Protection: Boom lift baskets shall serve as passive fall arrest systems. Active fall arrest systems will be utilized by all workers performing work activities at elevations greater than six (6) feet where no passive fall arrest systems (railings, platforms, etc.) exist. Contractor personnel performing work in elevated areas shall be familiar with and adhere to fall protection policies and protocols outlined in <i>Section 20.0</i> of the HASP.</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Once truck wash station racks, tanks, and process equipment have met the clean up criteria, they will be demolished utilizing an excavator mounted shear.</p>	<p>Slip, trip, and fall as well as crushing, pinching, amputation and struck-by hazards are associated with heavy equipment use.</p> <p>Excavator stability while demolishing the truck wash station may be adversely affected by one of the following conditions:</p> <ul style="list-style-type: none"> - The equipment is not on a level surface when cutting, lifting and loading. - Rear wheels and/or tracks settle unevenly during lifting and unloading. - Wind may exert lateral forces and cause swaying and abnormal stress. 	<p>PPE: Personnel operating the excavator who are <u>not</u> exposed to chemical hazards (ie. excavator operation only) must, at a minimum, utilize <i>Level D</i> PPE including steel toe work boots, leather gloves, hard hat, safety glasses and bright colored protective safety vests. Hearing protection shall be immediately available in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA.</p> <p>Nearby foot personnel assisting with moving and transfer of truck wash station components shall utilized <i>Modified Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, hard hats, safety glasses, and bright colored protective safety vests.</p> <p>Safe Operating Practices – Excavator</p> <ol style="list-style-type: none"> 1. Only trained and qualified Contractor personnel are permitted operate the equipment. Training documentation shall be provided to the Client and/or kept onsite at all times. 2. The operator shall perform a pre-operational check of the equipment and be familiar with operator's manual.

Activity Hazard Analysis

	<ul style="list-style-type: none"> - Poor rear suspension systems on one or the other side of the vehicle (non-tracked excavators). - Uneven tire pressures in front or rear wheels (non-tracked excavators). - Worn or inadequate components of the lifting systems such as pins. - Worn or inadequate lifting cylinders. 	<ol style="list-style-type: none"> 3. The operator shall check backup alarms, engine oil, hydraulic oil, fuel, dust collector and grease fittings daily as part of the pre-equipment operation inspection process. 4. When checking for leaks in the hydraulic system, the operator shall use a piece of paper or cardboard. At no time shall the operator use his/her hands since oil from a pin-hole leak under high pressure can penetrate the skin. 5. The operator shall be responsible for lockout and tagout of damaged and unsafe equipment and equipment controls. The operator shall promptly report all needed repairs to the site supervisor. 6. Seat belts and/or shoulder harnesses must always be worn to keep the operator secure within the equipment's cab or roll over protection system (ROPS). 7. The operator shall keep windshield, windshield wipers, side windows and mirrors clean. Mirrors shall be adjusted to provide the largest possible view of the rear of the equipment. 8. When mounting or dismounting equipment, the operator shall only use the designated steps and handholds provided on the equipment. Operators are not permitted to jump from equipment at any time. 9. Whenever possible, the operator shall plan ahead to minimize or eliminate the need for backing and/or excessive rotation. When available, the operator shall use an observer to assist with backing up and rotating the equipment. The operator shall make sure back-up alarms are working properly as part of the pre-equipment operation inspection process. 10. When parking the equipment, the operator shall be mindful of safe parking locations and avoid parking in high traffic areas and in other equipment's blind spots. 11. The operator shall always wear appropriate personal protective equipment consistent with the immediate hazards on hand. 12. The operator shall keep hearing protection on hand at all times in case noise from equipment operation or noise from nearby construction activities exceeds 90 dBA. 13. The operator shall inspect fire extinguisher locations on the equipment as part of the pre-equipment operation inspection process. 14. The operator shall always be aware of employees and others on foot in the immediate work zone. 15. The operator shall be mindful of the location of foot personnel before rotating the cab and bucket. 16. The operator shall rotate the cab and bucket with extreme caution and continually check both sides and behind when rotating and backing up the equipment. Excavator maneuverability can be quick and abrupt. The operator shall always be aware of personnel on foot in the immediate area zone and whenever possible, keep all other personnel away from the immediate work area.
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Activity Hazard Analysis

		<ol style="list-style-type: none"> 17. The operator shall always ensure the attachment locking devices are in place, even when switching attachments for only a few minutes. If not locked, attachments may break free and fall onto nearby personnel or damage nearby equipment. 18. The operator shall only utilize manufacturer-approved attachments and buckets. 19. The operator shall not leave attachments in the raised position when equipment is not in use. 20. No personnel shall be allowed to work in or under a raised bucket at any time. Other than the operator, no riders are allowed anywhere on the equipment. 21. The operator shall always be mindful of overhead power line clearances. Equipment shall not be operated within 10 feet of energized power lines. 22. Whenever possible, the equipment shall be transported from location to location using a truck and trailer. Swing and boom locking pins must be set and equipment must be properly secured prior to transporting. 23. Before digging, the operator shall review trenching and excavation standard operating procedures. 24. The operator shall remain a minimum of 2-feet away from open trenches. 25. When operating on slopes, the operator shall use caution when rotating the cab and bucket in a downhill direction. The operator shall position equipment so that material is dumped on the uphill side of the equipment. 26. The operator shall always keep buckets and/or other attachments at the safest, lowest position when moving the equipment. The operator shall always keep the heaviest end of the bucket pointing uphill when moving up and down inclines with a full bucket. Equipment shall not be operated on slopes of more than 20 degrees. 27. The operator shall select loading areas that are as level as possible. 28. The operator shall never leave the equipment unattended with the engine running. Lower the bucket/attachment to the ground and shut off engine when equipment is not in use.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Qualified and experienced Contractor personnel may utilize a vacuum truck to recover rinsewater from high pressure water washing activities.</p>	<p>Environmental contamination and employee chemical exposure to potentially contaminated rinsewaters.</p> <p>Slip, trip, and fall as well as crushing, pinching, and struck-by hazards are associated with heavy equipment use.</p> <p>Other hazards associated with vacuum truck operation may include:</p> <ul style="list-style-type: none"> - Improper selection and use of hoses for 	<p>PPE:</p> <ul style="list-style-type: none"> - The vacuum truck operator and any foot personnel assisting with collection of rinse water shall utilize <i>Level D Modified PPE</i> consisting of hard hats, safety glasses, rubber steel toe chemical resistant boots, chemical resistant gloves and yellow poly propylene chemical resistant suit with bright orange or green reflective safety vests. - The vacuum truck operator and any foot personnel assisting with collection of rinse water shall have immediately available a full face APR with appropriate cartridge configuration based on the anticipated chemical hazard. - Hearing protection shall be kept on hand at all times in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA.

Activity Hazard Analysis

	<p>material being collected.</p> <ul style="list-style-type: none"> - Improper inspection, monitoring and maintenance of pressure relief systems. - Improper inspection and use of safety shut down systems. - Failure to ground vehicle before operating vacuum systems. 	<p>Safe Operating Practices – Vacuum Truck</p> <p>Personnel operating heavy equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Section 25.0</i> of the HASP. In general, Contractor personnel operating the vacuum truck shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained and qualified Contractor personnel are permitted operate the vacuum truck. 2) The operator shall perform a pre-operational check of the equipment and be familiar with operator's manual. The operator shall check backup alarms, tire pressure, engine fluids, lights, turn indicators, and vacuum equipment daily as part of the pre-equipment operation inspection process. 3) The operator shall inspect pressure relief systems and safety shut-off systems as part of the pre-equipment operation inspection process. 4) The operator shall be responsible for lock out and tag out of damaged and unsafe equipment and equipment controls. The operator shall promptly report all needed repairs to the site supervisor. 5) Seat belts must always be worn when driving the vacuum truck. 6) The operator shall keep windshield, windshield wipers, side windows and mirrors clean. Mirrors shall be adjusted to provide the largest possible view of the rear of the equipment. 7) When mounting or dismounting the vehicle, the operator shall only use the designated steps and handholds provided on the equipment. Operators are not permitted to jump from equipment at any time. 8) Whenever possible, the operator shall plan ahead to minimize or eliminate the need for backing. When available, the operator shall use an observer to assist with backing up of the equipment. The operator shall make sure back-up alarms are working properly as part of the pre-equipment operation inspection process. 9) The operator shall always wear appropriate personal protective equipment consistent with the immediate hazards on hand. 10) The operator shall keep hearing protection on hand at all times in case noise from equipment operation or noise from nearby construction activities exceeds 90 dBA. 11) The operator shall inspect fire extinguisher locations on the equipment as part of the pre-equipment operation inspection process. 12) The operator shall always be aware of employees and others on foot in the immediate work zone. 13) Other than within the cab of the vehicle, no riders are allowed anywhere on the equipment. 14) The operator shall inspect hoses and cam fittings prior to use. The operator shall only
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		<p>utilize manufacturer-approved attachments.</p> <p>15) The operator shall always use the same diameter hose along its entire length for maximum efficiency and to eliminate stop-ups.</p> <p>16) Whenever possible, the operator shall utilize smooth bore hoses to ensure maximum efficiency and eliminate stop-ups.</p> <p>17) At no time shall the operator be permitted to change hoses while the equipment is running.</p> <p>18) The operator shall set the emergency brake and chalk the tires prior to vacuum operations.</p> <p>19) The operator shall ground the truck prior to vacuum operations.</p> <p>20) The vacuum truck shall be operated only in areas that are as level as possible.</p> <p>21) Other than low levels of dissolved solids, soils, and sediments in the waste water. The operator shall not intentionally mix wet and dry materials or any materials with unidentified hazards in the same tank.</p> <p>22) The operator shall maintain safe vehicle distance (minimum of 2-feet) from open trenches.</p> <p>23) The vacuum truck tank shall be treated as a confined space. At no time shall personnel be permitted to enter the tank until vehicle is decommissioned, locked-out and tagged-out, and permit required confined space entry procedures are reviewed and followed.</p> <p>24) When parking the equipment, the operator shall be mindful of safe parking locations and avoid parking in high traffic areas and in other equipment's blind spots.</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel may utilize fixed, enclosed ladder systems to access elevated areas near and around the truck wash station. Contractor personnel may also utilize portable ladders to access lesser elevated areas at the work site.	Slip, trip and fall are hazards associated with improper use of fixed and portable ladder systems.	<p>Portable Ladders: Active fall arrest systems will be utilized by all workers performing work activities on ladders at elevations greater than six (6) feet. Contractor personnel utilizing portable ladders shall be familiar with and adhere to policies and procedures outlined in <i>Section 22.0</i> of the HASP.</p> <p>Fall Protection: Active fall arrest systems will be utilized by all workers performing work activities at elevations greater than six (6) feet where no passive fall arrest systems (railings, platforms, etc.) exist. All Contractor personnel performing work in elevated areas shall be familiar with and adhere to fall protection policies and protocols outlined in <i>Section 20.0</i> of the HASP</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Qualified and experienced Contractor personnel may utilize pneumatic tools and torch cutting equipment when when further size reducing the overhead rack and associated piping.	<p>Cutting, pinching, skin burns, and eye damage from glare are hazards associated with improper operation of torch cutting equipment</p> <p>Air tool systems may present significant health hazards if not properly inspected before each use. Cutting, pinching and</p>	<p>PPE: Personnel performing torch cutting operations shall utilize <i>Modified Level D</i> PPE including hard toe work boots, leather gloves, long sleeve shirts, hard hat with protective face shield. Hearing protection shall be immediately available in case noise from tool operation and/or noise from other nearby construction activities exceed 90 dBA.</p> <p>Safe Operating Practices – Torch Cutting All personnel performing torch cutting activities shall be familiar with and shall adhere to all the safe</p>

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	<p>major bodily harm may result improper use of pneumatic tools or an accidental release of pressurized air due to ruptured hoses and fittings.</p>	<p>operating policies and procedures outlined in <i>Section 24.0</i> of the HASP.</p> <p>Air Tools: Air tool system shall be inspected before each use to check for worn fittings and compromised hoses. Pneumatic power tools should be secured to the hose or whip in a positive manner to prevent accidental disconnection. Safety clips or retainers should be securely installed and maintained on pneumatic impact tools to prevent attachments from being accidentally expelled. The manufacturer's safety operating pressure for all fittings should not be exceeded. All hoses exceeding 1/2-inch inside diameter should have a safety device at the source of supply or branch line to reduce pressure in case of hose failure.</p> <p>Safe Operating Practices – Air Compressors</p> <ol style="list-style-type: none"> 1. Only trained (experienced) personnel shall operate air compressors. Compressor operators shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Section 25.0</i> of the HASP. 2. When using electric air compressors, the operator shall avoid using the air compressor in wet or damp locations to avoid the potential for electric shock. 3. Diesel powered, tow behind air compressors shall not be towed at speeds exceeding 50 miles per hour. Safety chains shall be attached all times during towing. 4. The operator shall avoid wearing jewelry or loose clothing that can be caught in moving parts while operating the compressor. 5. DO NOT BREATHE COMPRESSED AIR. Compressor exhaust gases contain carbon monoxide. Compressors shall only be operated in well ventilated areas. 6. Air compressor noise may exceed 90 dB. The operator and all nearby personnel and/or bystanders shall utilize hearing protection at all times. 7. Tow behind air compressors shall be parked and operated on level surfaces to prevent potential roll over during operation. 8. Before operating diesel powered, tow behind compressors, the operator shall ensure all compartment doors, guards and panels are secured so as prevent coming loose and causing personnel injury and/or equipment damage. 9. Never refill diesel powered compressors while they are in operation. The operator shall allow engine to cool before refueling and/or removing radiator and oil filter caps. Operating personnel shall always be aware of hot surfaces including mufflers, exhaust manifolds, and other engine parts.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel may be performing work in chemical resistant, non-breathable PPE and/or working in areas where elevated temperatures are likely.	The potential for heat related illnesses are a factor when performing work activities in chemical resistant, non-breathable PPE especially in summer months where elevated temperatures are likely. When the body is unable to cool itself by	<p>Heat Illness Prevention: All Contractor employees shall adhere to heat illness prevention protocols outlined in <i>Section 18.0</i> of the HASP for work activities performed in non-breathable chemical resistant PPE both indoor and outdoor where environmental risk factors for heat illness are present. In general, personnel shall take into consideration the following preventative measures to reduce the risk of heat related illness:</p>

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	<p>sweating, several heat induced illnesses such as heat stress or heat exhaustion or the more severe heat stroke can occur and result in serious injury or illness or even death. High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; certain medications; and inadequate tolerances for hot workplaces are all factors which can lead to heat stress and heat related illness.</p>	<ol style="list-style-type: none">1) Learning and understanding the signs and symptoms of heat illnesses and what to do to help affected employees.2) Employee training on heat induced illnesses.3) When possible, try to perform heaviest work during coolest part of the day.4) <i>Acclimatization</i> – build up tolerance to heat and work activity (takes up to two weeks).5) Use the buddy system (work in pairs)6) Drink plenty of cool water (one small cup every 15-20 minutes).7) Wear light, loose fitting, breathable clothing.8) Take frequent short breaks in cool, shaded areas allowing the body to cool down9) Avoid eating large, heavy meals before working in hot environments10) Avoid caffeinated beverages as they make the body lose water and increase the risk of heat illnesses.
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Activity Hazard Analysis

Date:	August 15, 2008
Project:	Romic Phase I Facility Closure Project
Site Safety Officer:	Mr. Jason M. Costello
Activity Description:	High Pressure Water Washing Concrete Surfaces of the Truck Loading and Unloading Areas

Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>The concrete surfaces of the truck loading and unloading areas shall be cleaned via high pressure water washing activities.</p>	<p>Bruising, cutting, tearing and major bodily harm are hazards associated with improper operation and lack of experience and training regarding use of concentrated high pressure water.</p> <p>Ground surfaces and footing areas may become wet and present potential slip, trip and fall hazards.</p> <p>Environmental and personnel chemical exposure (dermal and inhalation) due to overspray are hazards associated with high pressure water washing.</p>	<p>PPE: All personnel performing high pressure water washing activities shall utilize <i>Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>Contractor personnel shall tape plastic over the ends of the fume hood and HVAC ducting sections to prevent potential release of contaminants when transferring these materials to designated decontamination stations.</p> <p>Safe Operating Practices – Pressure Washing Equipment: The SSO shall ensure all power tools are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Power tool inspection checklists will be turned into the SSO and maintained in an inspection checklist binder. Contractor personnel operating high pressure water washing equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Sections 23.0</i> and <i>25.0</i> of the HASP. In general, Contractor personnel performing pressure washing activities shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained (experienced) personnel shall operate high pressure washing equipment 2) The operator shall insure that all electrical controls are either fail safe, low voltage, or protected with an approved ground fault circuit interrupter. 3) At no time shall the operator operate the equipment above the manufacturers rated pressure maximum. 4) The operator shall always increase pressure slowly until required working pressure is reached. 5) High pressure water can puncture splash suits and other personal protective clothing. At no time shall the operator point the pressure washer nozzle in the direction of other personnel. 6) Water spray will be directed downward to minimize misting and overspray.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Contractor personnel may be performing work in chemical resistant, non-breathable PPE and/or working in areas where</p>	<p>The potential for heat related illnesses are a factor when performing work activities in chemical resistant, non-breathable PPE</p>	<p>Heat Illness Prevention: All Contractor employees shall adhere to heat illness prevention protocols outlined in <i>Section 18.0</i> of the HASP for work activities performed in non-breathable chemical resistant PPE both indoor and</p>

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<p>elevated temperatures are likely.</p>	<p>especially in summer months where elevated temperatures are likely. When the body is unable to cool itself by sweating, several heat induced illnesses such as heat stress or heat exhaustion or the more severe heat stroke can occur and result in serious injury or illness or even death. High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; certain medications; and inadequate tolerances for hot workplaces are all factors which can lead to heat stress and heat related illness.</p>	<p>outdoor where environmental risk factors for heat illness are present. In general, personnel shall take into consideration the following preventative measures to reduce the risk of heat related illness:</p> <ol style="list-style-type: none"> 1) Learning and understanding the signs and symptoms of heat illnesses and what to do to help affected employees. 2) Employee training on heat induced illnesses. 3) When possible, try to perform heaviest work during coolest part of the day. 4) <i>Acclimatization</i> – build up tolerance to heat and work activity (takes up to two weeks). 5) Use the buddy system (work in pairs) 6) Drink plenty of cool water (one small cup every 15-20 minutes). 7) Wear light, loose fitting, breathable clothing. 8) Take frequent short breaks in cool, shaded areas allowing the body to cool down 9) Avoid eating large, heavy meals before working in hot environments 10) Avoid caffeinated beverages as they make the body lose water and increase the risk of heat illnesses.
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Activity Hazard Analysis

Date:	August 15, 2008
Project:	Romic Phase I Facility Closure Project
Site Safety Officer:	Mr. Jason M. Costello
Activity Description:	Decontamination of Tank Farms, Vacuum Pots, Thin Film Evaporators, and the Liquid Extraction Unit

Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel will utilize high pressure water washing equipment to effectively wash and decontaminate exterior and interior surfaces of the tanks, vacuum pots, thin film evaporators, liquid extraction unit and associated piping and pumps.	<p>Bruising, cutting, tearing and major bodily harm are hazards associated with improper operation and lack of experience and training regarding use of concentrated high pressure water.</p> <p>Ground surfaces and footing areas may become wet and present potential slip, trip and fall hazards.</p> <p>Environmental and personnel chemical exposure (dermal and inhalation) due to overspray are hazards associated with high pressure water washing.</p>	<p>PPE: All personnel performing high pressure water washing activities shall utilize <i>Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>Safe Operating Practices – Pressure Washing Equipment: The SSO shall ensure all power tools are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Power tool inspection checklists will be turned into the SSO and maintained in an inspection checklist binder. Contractor personnel operating high pressure water washing equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Sections 23.0</i> and <i>25.0</i> of the HASP. In general, Contractor personnel performing pressure washing activities shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained (experienced) personnel shall operate high pressure washing equipment 2) The operator shall insure that all electrical controls are either fail safe, low voltage, or protected with an approved ground fault circuit interrupter. 3) At no time shall the operator operate the equipment above the manufacturers rated pressure maximum. 4) The operator shall always increase pressure slowly until required working pressure is reached. 5) High pressure water can puncture splash suits and other personal protective clothing. At no time shall the operator point the pressure washer nozzle in the direction of other personnel. 6) Water spray will be directed downward to minimize misting and overspray.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Qualified and experienced Contractor personnel may operate boom lifts to access elevated areas at the tank farms.	<p>Slip, trip, fall, crushing, pinching and struck-by hazards are potential health and safety hazards associated with improper operation and lack of experience and training regarding use of aerial lift devices.</p> <p>Struck-by hazards associated with</p>	<p>PPE: Personnel operating boom lifts who are <u>not</u> exposed to chemical hazards (ie. performing pressure washing activities) must, at a minimum, utilize <i>Level D</i> PPE including steel toe work boots, leather gloves, hard hat, safety glasses and bright colored protective safety vests. Hearing protection shall be immediately available in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA.</p>

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	<p>dropped or falling objects are hazards associated with elevated, overhead work.</p>	<p>Personnel operating boom lifts who are also involved in high pressure water washing activities shall utilize <i>Leve C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>The SSO shall ensure all heavy equipment are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Heavy equipment checklists shall posted with the equipment for the operator(s) to review for the remainder of the day.</p> <p>Safe Operating Practices – Boom Lift: All personnel operating heavy equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Section 25.0</i> of the HASP. In general, Contractor personnel operating boom lifts shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) The operator shall survey the usage area for potential hazards such as untamped earth fills, unlevel surfaces, overhead obstructions, and electrically charged conductors or wires. The operator shall be aware of any potential hazards and always consider what could happen. Watch for moving vehicles and other personnel in the operating area at all times. 2) The operator shall read, understand, and follow the procedures in the safety and operations manual before attempting to operate the equipment. 3) The operator shall inspect the equipment for damaged or worn parts. Check for cracked welds, hydraulic leaks, damaged wiring, loose wire connectors, damaged out-riggers, low tire pressure, uneven tire wear, or tire damage. Also the operator shall check for any improper operation. 4) The operator shall NEVER operate equipment if damaged in any way. Improperly operating equipment must be repaired before using. 5) The operator shall wear proper clothing for the job. Wear protective equipment as required by federal, state, or local regulations. The operator MUST wear a safety harness and lanyard at all times and abide fall protection standards outlined in <i>Section 20.0</i> of the HASP. 6) The operator shall locate, read, and follow all directions and warnings displayed on the equipment. 7) The operator shall inspect the equipment for “DO NOT USE” tags. NEVER use equipment tagged in this way until all repairs are made and all “DO NOT USE” tags are removed by authorized maintenance personnel. 8) The operator shall make sure the basket and outrigger shoes are free of mud, grease, or other slippery material to reduce the possibility of slipping. 9) The operator shall NEVER allow improperly trained personnel to operate this equipment. Only trained and authorized personnel shall be allowed to operate this equipment. 10) The operator shall NEVER operate this equipment while under the influence of alcohol or
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		<p>drugs, or if feeling ill, dizzy, or unsteady in any way. Operators must be physically fit, thoroughly trained, and not easily excitable.</p> <ol style="list-style-type: none"> 11) The operator shall NEVER modify, alter, or change the equipment in any way that would affect its original design or operation in any way. 12) The operator shall NEVER operate this equipment in ways for which it is not intended. 13) The operator shall position the lift far enough away from power sources to ensure that no part of the lift can accidentally reach into an unsafe area. This includes full extension of the boom through 360 degrees rotation. 14) The operator shall operate only on a firm and level surface. NEVER use on surfaces that do not support the equipment with its rated load capacity and the resulting force exerted on the outriggers during boom extension and rotation. 15) The operator shall keep clear and make sure all other personnel stay away from potential pinch or shear points. 16) The operator shall report any misuse of equipment to onsite management personnel. Horseplay is strictly prohibited. 17) The operator shall maintain good footing on the work platform. NEVER wear slippery soled shoes. 18) The operator shall make certain all personnel are clear and there are no obstructions before repositioning basket. 19) Operating personnel shall cordon off area around the outriggers to keep other personnel, bystanders and other equipment away from it while in use. 20) The operator shall stay clear of wires, cables, and other overhead obstructions. 21) Boom travel locking pins shall always be engaged before towing the trailer. 22) Operating personnel shall NEVER allow electrode contact with any part of the basket if welding is being performed from the platform. 23) The operator shall NEVER use the equipment without the outriggers fully extended and firmly based. 24) The operator shall NEVER override or by-pass manufacturer's safety devices. 25) The operator shall NEVER attach a safety harness to an adjacent structure, pole, or equipment while working from the boom platform. 26) The operator shall NEVER move unit with a person or materials on board. 27) The operator shall NEVER try to move the trailer with the boom extended. 28) The operator shall NEVER stand or sit on cage bars. The operator shall work only within
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		<p>the work cage and will not lean out over the cage to perform work.</p> <p>29) The operator shall NEVER attempt to increase working height with boxes, ladders, or other means.</p> <p>30) The operator shall NEVER operate this equipment when exposed to high winds, thunderstorms, ice, or any other weather conditions that would compromise operator safety.</p> <p>31) The operator shall NEVER allow ropes, electric cords, hoses, etc. to become entangled in the equipment when the basket is being raised or lowered.</p> <p>32) The operator shall NEVER exceed manufacturer's load limits or use the lift as a crane for lifting heavy materials. Make sure all tools and equipment are safely stowed.</p> <p>33) The operator shall NEVER exceed load ratings by transferring loads to the basket at elevated heights.</p> <p>34) The operator shall NEVER use the cage to carry materials and shall never allow overhang of materials when raising or lowering the basket.</p> <p>35) The operator shall NEVER push or pull with the boom or basket and shall NEVER use the boom to lift any part of the trailer.</p> <p>36) The operator shall NEVER use the boom or basket to place a "dead man" load against any structure, materials, or equipment.</p> <p>37) Operating personnel shall NEVER climb up or down boom.</p> <p>38) Operating personnel shall NEVER leave the keys in the boom lift while unattended or not in use.</p> <p>Fall Protection: Boom lift baskets shall serve as passive fall arrest systems. Active fall arrest systems will be utilized by all workers performing work activities at elevations greater than six (6) feet where no passive fall arrest systems (railings, platforms, etc.) exist. Contractor personnel performing work in elevated areas shall be familiar with and adhere to fall protection policies and protocols outlined in <i>Section 20.0</i> of the HASP.</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Overhead power lines are located with 100 feet to the West of the tank farm locations.	Electrocution resulting in serious bodily injury and death may occur if proper engineering controls and overhead power line clearances are not recognized.	<p>Removal of the tanks utilizing aerial lifting devices shall be performed moving from to East to West in an effort to make it significantly safer to approach tanks from the East side away from the power lines.</p> <p>Warning signs reading "Danger Overhead Power Lines" or equivalent, shall be posted at all times in locations where vehicle traffic, heavy equipment and personnel are permitted to pass under areas where overhead power lines are situated. Prior to the start of work, the SSO in conjunction with the equipment operator(s) shall designate and mark safe routes where cranes and other aerial lifting devices can travel beneath power lines. Personnel working on site shall be aware of the locations of all overhead power lines and shall adhere to the proper clearances and safe work distances outlined in <i>Section 16.0</i> of the HASP.</p>

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		<p>Personnel operating heavy equipment and/or aerial lifting devices near overhead power lines shall be aware of the electrocution hazards associated with such operations. To protect workers against electrocution when operating or working around cranes and other aerial lifting devices near overhead power lines the following safe work practices shall be implemented:</p> <ol style="list-style-type: none"> 1. Operating personnel shall be aware of the location and voltage of all overhead power lines at the project site. 2. Operating personnel shall evaluate the job site before beginning work to decide the size and type of machinery to use and the safest areas for machinery operation and material storage. 3. If practical engineering controls such as de-energizing power lines and erecting insulated barriers to prevent physical contact with the energized lines shall be implemented. Operating personnel shall adhere to Cal/OSHA proper clearances and safe work distances at all times. 4. Warning signs shall be posted on cranes and other aerial lifting devices cautioning operators to maintain safe clearances between energized power lines and their equipment. 5. Before the start of work, the site safety officer in conjunction with the equipment operator(s) shall designated and mark safe routes where cranes and other aerial lifting devices can travel beneath power lines. 6. Operating personnel shall assume all power lines are energized and maintain Cal/OSHA proper clearances and safe work distances at all times. 7. Only personnel trained in safe operating procedures and Cal/OSHA regulations shall be allowed to operated a crane on the project site. 8. Operating personnel shall be instructed to operate cranes and other aerial lifting devices at a slower-than-normal rate in areas where overhead power lines are present. 9. Operating personnel shall use extreme caution when moving over uneven ground that could cause the crane and/or aerial lifting device to weave or bob into power lines. 10. Operating personnel shall use extreme caution near long spans of overhead power lines and shall be aware that wind conditions may cause power lines to sway back and forth and reduce clearances and safe working distances. 11. Crane operators shall understand that cage-type boom guards, insulated lines, ground rods, nonconductive links, and proximity warning devices shall not be used as a substitute for de-energizing and grounding lines and/or maintaining safe clearances. 12. Where it is difficult for the crane operator to see the power lines or see the clearance during crane movement, a signal person shall be assigned to watch and give immediate warning when the crane comes close to the limits of safe clearance. 13. Under no circumstances are nearby personnel permitted to touch a crane or its load until
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		<p style="text-align: center;">the signal person says it is safe to do so.</p> <p>14. Nearby personnel shall maintain a safe distance from cranes and other aerial lifting devices working in close proximity to overhead power lines.</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Contractor personnel may have to enter all or part of their bodies into confined spaces as part of the effective strategy for tank farm decontamination activities. Trained and qualified personnel shall perform these tasks under permit required confined space entry protocols.</p>	<p>Chemical exposure, lack of oxygen, fire and explosion hazards are associated with confined space entry activities.</p> <p>Major bodily injury and death resulting from improper de-energizing and/or improper lock out tag out procedures are hazards associated with confined space entry activities.</p>	<p>PPE: All permit required confined space entry activities in which full entry is required shall be performed in <i>Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirators with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>Permit required confined space entry activities which <u>only</u> involve hands and arms in the confined space, and there is no chemical fume exposure, may be performed utilizing <i>modified Level D</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, safety glasses and hard hat with face shield.</p> <p>Energized Equipment: In and effort to eliminate detailed lock out tag out procedures for individual equipment and process, Contractor anticipates disconnecting all power to the plant portion of the facility prior to commencing work. Should lock out tag be required, Contractor shall adhere to detailed lock out tag out protocols and procedures outlined in <i>Section 21.0</i> of the HASP.</p> <p>Permit Required Confined Space Entry: Contractor personnel shall perform all permit required confined space entry activities in accordance with regulations outlined in 29 CFR 1910.146 and in accordance with protocols and procedures outlined in <i>Section 11.0</i> of the HASP. In general, Contractor personnel shall perform permit required confined space entry activities in accordance with the following safe operating practices:</p> <ul style="list-style-type: none"> - The confined space entry team shall review detailed confined space entry protocols outlined in <i>Section 11.0</i> of the HASP. -The confined space entry team shall consist of an entrant, an attendant, floating supervisor and one stand-by rescue. All team members shall have documented confined space entry training. In addition to confined space entry training, the floating supervisor and stand by rescue shall have documented confined space rescue training. Only personnel trained and knowledgeable of the requirements of confined space entry procedures shall be authorized to serve as an entrant, attendant, or supervisor. -The entrant and stand by rescue shall utilize <i>Level C PPE</i> consisting of hard hat, full face APR with organic vapor HEPA filter stack cartridges, rubber steel toe chemical resistant work boots, chemical resistant gloves, yellow chemical resistant poly propylene suit with safety harness and life line. - The attendant shall utilize <i>Modified Level D PPE</i> consisting of hard hats, safety glasses, steel toe work boots, leather gloves and a yellow chemical resistant polypropylene suit. The attendant shall have chemical resistant gloves and full face APR with HEPA filter stack cartridges immediately on hand to assist with confined space rescue activities if needed. - The floating supervisor shall utilize <i>Level D Modified PPE</i> consisting of hard hat, safety glasses, steel toe work boots, and a white tyvek suit. The floating supervisor shall have <i>Level C PPE</i> including full face APR with HEPA filter stack cartridges immediately on hand to assist with confined space rescue activities if needed.

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		<ul style="list-style-type: none"> - A Confined Space Entry Permit (CSEP) will be obtained before any confined space entry activities begin. The CSEP shall be posted in the immediate work areas during confined space entry activities. - Permit required confined spaces shall be identified with a posted sign which reads: "Caution – Permit Required Confined Space." - A combination percent oxygen meter and explosive gas meter (LEL) shall be utilized for air monitoring prior to and during permit required confined space entry activities. -Engineering controls for proper ventilation shall be used unless it is determined that natural ventilation is sufficient. - The confined space entry team shall ensure all chemicals are removed from the vicinity if positive/forced mechanical air-moving equipment is used to provide ventilation. - The attendant shall remain posted in direct line of sight and/or verbal contact with the entrant at all times. - The stand-by rescue shall remain posted in direct line of sight and/or verbal contact with the attendant at all times. - Explosion proof equipment will be used if flammable liquids, gases, or vapors are contained within the confined space. All equipment shall be positively grounded. - No cell phones shall be permitted at any time within the confined space. - The confined space entry team shall ensure all sources of ignition and tank contents are adequately removed. - The confined space entry team shall ensure break and blank-out of all feed lines to the tank(s). Lock-out/tag-out of identified sources of electrical or mechanical energy shall be performed prior to entering the tank(s). Lock-out/tag-out procedures shall be documented in the CSEP. -If required, lights used in the confined spaces will be equipped with guards preventing contact with the bulb and will be explosion proof. - At no time shall personnel enter into an untested or Immediately Dangerous to Life and Health (IDLH) confined space. - At no time shall personnel smoke in or nearby confined spaces or during confined space entry activities.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Qualified and experienced Contractor personnel will utilize a vacuum truck to recover rinsewater accumulated within tanks.	<p>Environmental contamination and employee chemical exposure to potentially contaminated rinsewaters.</p> <p>Slip, trip, and fall as well as crushing, pinching, and struck-by hazards are</p>	<p>PPE:</p> <ul style="list-style-type: none"> - The vacuum truck operator and any foot personnel assisting with collection of rinse water shall utilize <i>Level D Modified PPE</i> consisting of hard hats, safety glasses, rubber steel toe chemical resistant boots, chemical resistant gloves and yellow poly propylene chemical resistant suit with bright orange or green reflective safety vests.

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	<p>associated with heavy equipment use.</p> <p>Other hazards associated with vacuum truck operation may include:</p> <ul style="list-style-type: none"> - Improper selection and use of hoses for material being collected. - Improper inspection, monitoring and maintenance of pressure relief systems. - Improper inspection and use of safety shut down systems. - Failure to ground vehicle before operating vacuum systems. 	<ul style="list-style-type: none"> - The vacuum truck operator and any foot personnel assisting with collection of rinse water shall have immediately available a full face APR with appropriate cartridge configuration based on the anticipated chemical hazard. - Hearing protection shall be kept on hand at all times in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA. <p>Safe Operating Practices – Vacuum Truck</p> <p>Personnel operating heavy equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Section 25.0</i> of the HASP. In general, Contractor personnel operating the vacuum truck shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained and qualified Contractor personnel are permitted operate the vacuum truck. 2) The operator shall perform a pre-operational check of the equipment and be familiar with operator's manual. The operator shall check backup alarms, tire pressure, engine fluids, lights, turn indicators, and vacuum equipment daily as part of the pre-equipment operation inspection process. 3) The operator shall inspect pressure relief systems and safety shut-off systems as part of the pre-equipment operation inspection process. 4) The operator shall be responsible for lock out and tag out of damaged and unsafe equipment and equipment controls. The operator shall promptly report all needed repairs to the site supervisor. 5) Seat belts must always be worn when driving the vacuum truck. 6) The operator shall keep windshield, windshield wipers, side windows and mirrors clean. Mirrors shall be adjusted to provide the largest possible view of the rear of the equipment. 7) When mounting or dismounting the vehicle, the operator shall only use the designated steps and handholds provided on the equipment. Operators are not permitted to jump from equipment at any time. 8) Whenever possible, the operator shall plan ahead to minimize or eliminate the need for backing. When available, the operator shall use an observer to assist with backing up of the equipment. The operator shall make sure back-up alarms are working properly as part of the pre-equipment operation inspection process. 9) The operator shall always wear appropriate personal protective equipment consistent with the immediate hazards on hand. 10) The operator shall keep hearing protection on hand at all times in case noise from equipment operation or noise from nearby construction activities exceeds 90 dBA. 11) The operator shall inspect fire extinguisher locations on the equipment as part of the pre-equipment operation inspection process. 12) The operator shall always be aware of employees and others on foot in the immediate
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		<p>work zone.</p> <ol style="list-style-type: none"> 13) Other than within the cab of the vehicle, no riders are allowed anywhere on the equipment. 14) The operator shall inspect hoses and cam fittings prior to use. The operator shall only utilize manufacturer-approved attachments. 15) The operator shall always use the same diameter hose along its entire length for maximum efficiency and to eliminate stop-ups. 16) Whenever possible, the operator shall utilize smooth bore hoses to ensure maximum efficiency and eliminate stop-ups. 17) At no time shall the operator be permitted to change hoses while the equipment is running. 18) The operator shall set the emergency brake and chalk the tires prior to vacuum operations. 19) The operator shall ground the truck prior to vacuum operations. 20) The vacuum truck shall be operated only in areas that are as level as possible. 21) Other than low levels of dissolved solids, soils, and sediments in the waste water. The operator shall not intentionally mix wet and dry materials or any materials with unidentified hazards in the same tank. 22) The operator shall maintain safe vehicle distance (minimum of 2-feet) from open trenches. 23) The vacuum truck tank shall be treated as a confined space. At no time shall personnel be permitted to enter the tank until vehicle is decommissioned, locked-out and tagged-out, and permit required confined space entry procedures are reviewed and followed. 24) When parking the equipment, the operator shall be mindful of safe parking locations and avoid parking in high traffic areas and in other equipment's blind spots.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Qualified and experienced Contractor personnel may utilize pneumatic tools and torch cutting equipment when dismantling and disconnecting process piping and dismantling railings, ladders and platforms around the tanks.</p>	<p>Cutting, pinching, skin burns, and eye damage from glare are hazards associated with improper operation of torch cutting equipment</p> <p>Air tool systems may present significant health hazards if not properly inspected before each use. Cutting, pinching and major bodily harm may result from improper use of pneumatic tools or an accidental release of pressurized air due to ruptured hoses and fittings.</p>	<p>PPE: Personnel performing torch cutting operations shall utilize <i>Modified Level D</i> PPE including hard toe work boots, leather gloves, long sleeve shirts, hard hat with protective face shield. Hearing protection shall be immediately available in case noise from tool operation and/or noise from other nearby construction activities exceed 90 dBA.</p> <p>Safe Operating Practices – Torch Cutting All personnel performing torch cutting activities shall be familiar with and shall adhere to all the safe operating policies and procedures outlined in <i>Section 24.0</i> of the HASP.</p> <p>Air Tools: Air tool system shall be inspected before each use to check for worn fittings and compromised hoses. Pneumatic power tools should be secured to the hose or whip in a positive manner to prevent accidental disconnection. Safety clips or retainers should be securely installed and maintained on pneumatic</p>

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		<p>impact tools to prevent attachments from being accidentally expelled. The manufacturer's safety operating pressure for all fittings should not be exceeded. All hoses exceeding 1/2-inch inside diameter should have a safety device at the source of supply or branch line to reduce pressure in case of hose failure.</p> <p>Safe Operating Practices – Air Compressors</p> <ol style="list-style-type: none"> 1. Only trained (experienced) personnel shall operate air compressors. Compressor operators shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Section 25.0</i> of the HASP. 2. When using electric air compressors, the operator shall avoid using the air compressor in wet or damp locations to avoid the potential for electric shock. 3. Diesel powered, tow behind air compressors shall not be towed at speeds exceeding 50 miles per hour. Safety chains shall be attached all times during towing. 4. The operator shall avoid wearing jewelry or loose clothing that can be caught in moving parts while operating the compressor. 5. DO NOT BREATHE COMPRESSED AIR. Compressor exhaust gases contain carbon monoxide. Compressors shall only be operated in well ventilated areas. 6. Air compressor noise may exceed 90 dB. The operator and all nearby personnel and/or bystanders shall utilize hearing protection at all times. 7. Tow behind air compressors shall be parked and operated on level surfaces to prevent potential roll over during operation. 8. Before operating diesel powered, tow behind compressors, the operator shall ensure all compartment doors, guards and panels are secured so as prevent coming loose and causing personnel injury and/or equipment damage. 9. Never refill diesel powered compressors while they are in operation. The operator shall allow engine to cool before refueling and/or removing radiator and oil filter caps. Operating personnel shall always be aware of hot surfaces including mufflers, exhaust manifolds, and other engine parts.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel may utilize fixed, enclosed ladder systems to access elevated areas in the tank farms. Contractor personnel may also utilize portable ladders to access lesser elevated areas at the work site.	Slip, trip and fall are hazards associated with improper use of fixed and portable ladder systems.	<p>Portable Ladders: Active fall arrest systems will be utilized by all workers performing work activities on ladders at elevations greater than six (6) feet. Contractor personnel utilizing portable ladders shall be familiar with and adhere to policies and procedures outlined in <i>Section 22.0</i> of the HASP.</p> <p>Fall Protection: Active fall arrest systems will be utilized by all workers performing work activities at elevations greater than six (6) feet where no passive fall arrest systems (railings, platforms, etc.) exist. Contractor personnel performing work in elevated areas shall be familiar with and adhere to fall protection policies and protocols outlined in <i>Section 20.0</i> of the HASP</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures

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<p>Contractor personnel may be performing work in chemical resistant, non-breathable PPE and/or working in areas where elevated temperatures are likely.</p>	<p>The potential for heat related illnesses are a factor when performing work activities in chemical resistant, non-breathable PPE especially in summer months where elevated temperatures are likely. When the body is unable to cool itself by sweating, several heat induced illnesses such as heat stress or heat exhaustion or the more severe heat stroke can occur and result in serious injury or illness or even death. High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; certain medications; and inadequate tolerances for hot workplaces are all factors which can lead to heat stress and heat related illness.</p>	<p>Heat Illness Prevention: All Contractor employees shall adhere to heat illness prevention protocols outlined in <i>Section 18.0</i> of the HASP for work activities performed in non-breathable chemical resistant PPE both indoor and outdoor where environmental risk factors for heat illness are present. In general, personnel shall take into consideration the following preventative measures to reduce the risk of heat related illness:</p> <ol style="list-style-type: none"> 1) Learning and understanding the signs and symptoms of heat illnesses and what to do to help affected employees. 2) Employee training on heat induced illnesses. 3) When possible, try to perform heaviest work during coolest part of the day. 4) <i>Acclimatization</i> – build up tolerance to heat and work activity (takes up to two weeks). 5) Use the buddy system (work in pairs) 6) Drink plenty of cool water (one small cup every 15-20 minutes). 7) Wear light, loose fitting, breathable clothing. 8) Take frequent short breaks in cool, shaded areas allowing the body to cool down 9) Avoid eating large, heavy meals before working in hot environments 10) Avoid caffeinated beverages as they make the body lose water and increase the risk of heat illnesses.
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Activity Hazard Analysis

Date:	August 15, 2008
Project:	Romic Phase I Facility Closure Project
Site Safety Officer:	Mr. Jason M. Costello
Activity Description:	Demolition and Decontamination of Storm Water Tanks

Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>The interior and exterior surfaces of the storm water tanks shall be decontaminated via high pressure water washing activities.</p>	<p>Bruising, cutting, tearing and major bodily harm are hazards associated with improper operation and lack of experience and training regarding use of concentrated high pressure water.</p> <p>Ground surfaces and footing areas may become wet and present potential slip, trip and fall hazards.</p> <p>Environmental and personnel chemical exposure (dermal and inhalation) due to overspray are hazards associated with high pressure water washing.</p>	<p>PPE: All personnel performing high pressure water washing activities shall utilize <i>Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>Contractor personnel shall tape plastic over the ends of the fume hood and HVAC ducting sections to prevent potential release of contaminants when transferring these materials to designated decontamination stations.</p> <p>Safe Operating Practices – Pressure Washing Equipment: The SSO shall ensure all power tools are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Power tool inspection checklists will be turned into the SSO and maintained in an inspection checklist binder. Contractor personnel operating high pressure water washing equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Sections 23.0</i> and <i>25.0</i> of the HASP. In general, Contractor personnel performing pressure washing activities shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained (experienced) personnel shall operate high pressure washing equipment 2) The operator shall insure that all electrical controls are either fail safe, low voltage, or protected with an approved ground fault circuit interrupter. 3) At no time shall the operator operate the equipment above the manufacturers rated pressure maximum. 4) The operator shall always increase pressure slowly until required working pressure is reached. 5) High pressure water can puncture splash suits and other personal protective clothing. At no time shall the operator point the pressure washer nozzle in the direction of other personnel. 6) Water spray will be directed downward to minimize misting and overspray.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Contractor personnel shall decontaminate interior surfaces of the storm water collection tanks by entering the tanks under</p>	<p>Chemical exposure, lack of oxygen, fire and explosion hazards are associated with confined space entry activities.</p>	<p>PPE: All permit required confined space entry activities in which full entry is required shall be performed in <i>Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work</p>

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<p>confined space entry standard operating procedures.</p>	<p>Major bodily injury and death resulting from improper de-energizing and/or improper lock out tag out procedures are hazards associated with confined space entry activities.</p>	<p>boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirators with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>Permit required confined space entry activities which <u>only</u> involve hands and arms in the confined space, and there is no chemical fume exposure, may be performed utilizing <i>modified Level D PPE</i> including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, safety glasses and hard hat with face shield.</p> <p>Energized Equipment: In and effort to eliminate detailed lock out tag out procedures for individual equipment and process, Contractor anticipates disconnecting all power to the plant portion of the facility prior to commencing work. Should lock out tag be required, Contractor shall adhere to detailed lock out tag out protocols and procedures outlined in <i>Section 21.0</i> of the HASP.</p> <p>Permit Required Confined Space Entry: Contractor personnel shall perform all permit required confined space entry activities in accordance with regulations outlined in 29 CFR 1910.146 and in accordance with protocols and procedures outlined in <i>Section 11.0</i> of the HASP. In general, Contractor personnel shall perform permit required confined space entry activities in accordance with the following safe operating practices:</p> <ul style="list-style-type: none"> - The confined space entry team shall review detailed confined space entry protocols outlined in <i>Section 11.0</i> of the HASP. -The confined space entry team shall consist of an entrant, an attendant, floating supervisor and one stand-by rescue. All team members shall have documented confined space entry training. In addition to confined space entry training, the floating supervisor and stand by rescue shall have documented confined space rescue training. Only personnel trained and knowledgeable of the requirements of confined space entry procedures shall be authorized to serve as an entrant, attendant, or supervisor. -The entrant and stand by rescue shall utilize <i>Level C PPE</i> consisting of hard hat, full face APR with organic vapor HEPA filter stack cartridges, rubber steel toe chemical resistant work boots, chemical resistant gloves, yellow chemical resistant poly propylene suit with safety harness and life line. - The attendant shall utilize <i>Modified Level D PPE</i> consisting of hard hats, safety glasses, steel toe work boots, leather gloves and a yellow chemical resistant polypropylene suit. The attendant shall have chemical resistant gloves and full face APR with HEPA filter stack cartridges immediately on hand to assist with confined space rescue activities if needed. - The floating supervisor shall utilize <i>Level D Modified PPE</i> consisting of hard hat, safety glasses, steel toe work boots, and a white tyvek suit. The floating supervisor shall have <i>Level C PPE</i> including full face APR with HEPA filter stack cartridges immediately on hand to assist with confined space rescue activities if needed. - A Confined Space Entry Permit (CSEP) will be obtained before any confined space entry activities begin. The CSEP shall be posted in the immediate work areas during confined space entry activities. - Permit required confined spaces shall be identified with a posted sign which reads: "Caution – Permit Required Confined Space." - A combination percent oxygen meter and explosive gas meter (LEL) shall be utilized for air monitoring prior to and during permit required confined space entry activities.
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		<ul style="list-style-type: none"> -Engineering controls for proper ventilation shall be used unless it is determined that natural ventilation is sufficient. - The confined space entry team shall ensure all chemicals are removed from the vicinity if positive/forced mechanical air-moving equipment is used to provide ventilation. - The attendant shall remain posted in direct line of sight and/or verbal contact with the entrant at all times. - The stand-by rescue shall remain posted in direct line of sight and/or verbal contact with the attendant at all times. - Explosion proof equipment will be used if flammable liquids, gases, or vapors are contained within the confined space. All equipment shall be positively grounded. - No cell phones shall be permitted at any time within the confined space. - The confined space entry team shall ensure all sources of ignition and tank contents are adequately removed. - The confined space entry team shall ensure break and blank-out of all feed lines to the tank(s). Lock-out/tag-out of identified sources of electrical or mechanical energy shall be performed prior to entering the tank(s). Lock-out/tag-out procedures shall be documented in the CSEP. -If required, lights used in the confined spaces will be equipped with guards preventing contact with the bulb and will be explosion proof. - At no time shall personnel enter into an untested or Immediately Dangerous to Life and Health (IDLH) confined space. - At no time shall personnel smoke in or nearby confined spaces or during confined space entry activities.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Following decontamination, the storm water collection tanks shall be demolished using and excavator mounted shear.</p>	<p>Slip, trip, and fall as well as crushing, pinching, amputation and struck-by hazards are associated with heavy equipment use.</p> <p>Excavator stability while demolishing storm water collection tanks may be adversely affected by one of the following conditions:</p> <ul style="list-style-type: none"> - The equipment is not on a level surface when cutting, lifting and loading. - Rear wheels and/or tracks settle 	<p>PPE: Personnel operating the excavator who are <u>not</u> exposed to chemical hazards (ie. excavator operation only) must, at a minimum, utilize <i>Level D</i> PPE including steel toe work boots, leather gloves, hard hat, safety glasses and bright colored protective safety vests. Hearing protection shall be immediately available in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA.</p> <p>Nearby foot personnel assisting with loading and transfer of scrap metal shall utilize <i>Modified Level D</i> PPE including yellow chemical resistant polypropylene suits, steel toe work boots, leather gloves with nitrile glove inner liners, hard hats, safety glasses, and bright colored protective safety vests.</p> <p>Safe Operating Practices – Excavator</p> <ol style="list-style-type: none"> 1. Only trained and qualified Contractor personnel are permitted operate the equipment. Training documentation shall be provided to the Client and/or kept onsite at all times.

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<p>unevenly during lifting and unloading.</p> <ul style="list-style-type: none"> - Wind may exert lateral forces and cause swaying and abnormal stress. - Poor rear suspension systems on one or the other side of the vehicle (non-tracked excavators). - Uneven tire pressures in front or rear wheels (non-tracked excavators). - Worn or inadequate components of the lifting systems such as pins. - Worn or inadequate lifting cylinders. 	<ol style="list-style-type: none"> 2. The operator shall perform a pre-operational check of the equipment and be familiar with operator's manual. 3. The operator shall check backup alarms, engine oil, hydraulic oil, fuel, dust collector and grease fittings daily as part of the pre-equipment operation inspection process. 4. When checking for leaks in the hydraulic system, the operator shall use a piece of paper or cardboard. At no time shall the operator use his/her hands since oil from a pin-hole leak under high pressure can penetrate the skin. 5. The operator shall be responsible for lockout and tagout of damaged and unsafe equipment and equipment controls. The operator shall promptly report all needed repairs to the site supervisor. 6. Seat belts and/or shoulder harnesses must always be worn to keep the operator secure within the equipment's cab or roll over protection system (ROPS). 7. The operator shall keep windshield, windshield wipers, side windows and mirrors clean. Mirrors shall be adjusted to provide the largest possible view of the rear of the equipment. 8. When mounting or dismounting equipment, the operator shall only use the designated steps and handholds provided on the equipment. Operators are not permitted to jump from equipment at any time. 9. Whenever possible, the operator shall plan ahead to minimize or eliminate the need for backing and/or excessive rotation. When available, the operator shall use an observer to assist with backing up and rotating the equipment. The operator shall make sure back-up alarms are working properly as part of the pre-equipment operation inspection process. 10. When parking the equipment, the operator shall be mindful of safe parking locations and avoid parking in high traffic areas and in other equipment's blind spots. 11. The operator shall always wear appropriate personal protective equipment consistent with the immediate hazards on hand. 12. The operator shall keep hearing protection on hand at all times in case noise from equipment operation or noise from nearby construction activities exceeds 90 dBA. 13. The operator shall inspect fire extinguisher locations on the equipment as part of the pre-equipment operation inspection process. 14. The operator shall always be aware of employees and others on foot in the immediate work zone. 15. The operator shall be mindful of the location of foot personnel before rotating the cab and bucket. 16. The operator shall rotate the cab and bucket with extreme caution and continually check both sides and behind when rotating and backing up the equipment. Excavator maneuverability can be quick and abrupt. The operator shall always be aware of
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		<p>personnel on foot in the immediate area zone and whenever possible, keep all other personnel away from the immediate work area.</p> <ol style="list-style-type: none"> 17. The operator shall always ensure the attachment locking devices are in place, even when switching attachments for only a few minutes. If not locked, attachments may break free and fall onto nearby personnel or damage nearby equipment. 18. The operator shall only utilize manufacturer-approved attachments and buckets. 19. The operator shall not leave attachments in the raised position when equipment is not in use. 20. No personnel shall be allowed to work in or under a raised bucket at any time. Other than the operator, no riders are allowed anywhere on the equipment. 21. The operator shall always be mindful of overhead power line clearances. Equipment shall not be operated within 10 feet of energized power lines. 22. Whenever possible, the equipment shall be transported from location to location using a truck and trailer. Swing and boom locking pins must be set and equipment must be properly secured prior to transporting. 23. Before digging, the operator shall review trenching and excavation standard operating procedures. 24. The operator shall remain a minimum of 2-feet away from open trenches. 25. When operating on slopes, the operator shall use caution when rotating the cab and bucket in a downhill direction. The operator shall position equipment so that material is dumped on the uphill side of the equipment. 26. The operator shall always keep buckets and/or other attachments at the safest, lowest position when moving the equipment. The operator shall always keep the heaviest end of the bucket pointing uphill when moving up and down inclines with a full bucket. Equipment shall not be operated on slopes of more than 20 degrees. 27. The operator shall select loading areas that are as level as possible. 28. The operator shall never leave the equipment unattended with the engine running. Lower the bucket/attachment to the ground and shut off engine when equipment is not in use.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel will utilize a forklift to relocate scrap metal to designated staging areas.	<p>Slip, trip, fall, crushing, pinching and struck-by hazards are potential health and safety hazards associated with improper operation and lack of experience and training regarding use forklifts.</p> <p>Struck-by hazards associated with dropped or falling objects are hazards</p>	<p>PPE: Personnel operating forklifts who are <u>not</u> exposed to chemical hazards (ie. forklift operation only) must, at a minimum, utilize <i>Level D</i> PPE including steel toe work boots, leather gloves, hard hat, safety glasses and bright colored protective safety vests. Hearing protection shall be immediately available in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA.</p> <p>Foot personnel assisting with loading and transfer of chemical piping sections to the</p>

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	<p>associated with improper securing of loads.</p>	<p>decontamination stations shall utilize <i>Modified Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, hard hats, safety glasses, and bright colored protective safety vests.</p> <p>Safe Operating Practices – Forklift</p> <ol style="list-style-type: none"> 1) The operator shall be sure that a safe distance is maintained from the edge of ramps or platforms while on any elevated dock, platform or freight car. 2) When leaving the truck unattended, the forks will be fully lowered the controls placed in neutral, the power shut off, the brakes set to and the key or connector plug removed. The wheels will be blocked if the forklift is parked on an incline. Note: A powered forklift is considered unattended when the operator is 25 feet or more away from the vehicle which remains in his/her view or whenever the operator leaves the vehicle and the forklift is not in view. 3) When the operator of an industrial forklift is dismounted and within 25 ft. of the forklift still in his view, the load engaging means shall be fully lowered, controls neutralized, and the brakes set to prevent movement. 4) Forklifts will not be used to open or close freight doors. 5) The brakes of the forklift shall be set and wheel chocks or stops will be in place to prevent movement during loading or unloading operations. Fixed jacks may be necessary to support a semi-trailer during loading or unloading when the trailer is not coupled to a tractor. The flooring of trucks, trailers and railroad cars will be checked by the operator for breaks and weakness before driving these vehicles into these surfaces. 6) An overhead guard shall be used at all times as protection against falling objects. Note: The overhead guard may only be intended to offer protection from the impact of small packages, boxes or bagged materials only. 7) The operator shall utilize a load backrest extension whenever necessary to minimize the possibility of the load or part of the load from falling rearward. 8) Only approved industrial forklifts will be used in hazardous conditions. 9) The operator shall not drive a forklift up to anyone standing in front of a bench or other fixed object. 10) No person shall be allowed to stand or pass under the elevated portion of any forklift, whether loaded or empty. 11) Under no circumstances are passengers permitted to ride on a forklift unless authorized and the forklift is equipped with a safe place for the passenger to ride. 12) The operator shall never place his/her arms or legs between the uprights of the mast or outside the running lines of the forklift. 13) The operator shall NEVER push one load with another load.
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		<ul style="list-style-type: none"> 14) Spinner knobs shall NEVER be attached to the steering handwheels of forklifts not originally equipped with such knobs. 15) The operator shall NEVER lift people on the forks of a forklift unless the forklift has a properly designed safety platform securely attached to the lifting carriage and/or forks. If the forklift is equipped with vertical controls only, or vertical and horizontal controls elevatable with the lifting carriage or forks, means will be provided whereby personnel on the platform can shut off power to the forklift. Protection from falling objects as indicated necessary by the operating conditions shall also be provided based on site conditions. 16) Safety platforms, firmly secured to the lifting carriage and/or forks, shall be used whenever possible. 17) Only stable and safely arranged loads shall be handled. The operator shall use extreme caution when handling off-centered loads that cannot be centered on the forks. 18) Only loads within the rated capacity of the forklift shall be handled. 19) The operator shall ensure that the forks are placed under the load as far as possible and the mast carefully tilted backward to stabilize the load. 20) Extreme care shall be used when tilting the load forward or backward especially when high tiering. Tilting forward with load engaging means elevation shall be prohibited except to pick up a load. An elevated load will not be tilted forward except when the load is in a deposit position over a rack or stack of material. 21) When stacking or tiering loads, the operator shall tilt the load backward only enough to stabilize the load. 22) The operator shall remove unsafe containers and pallets from service. 23) Forklifts equipped with attachments will be operated as a partially loaded truck when not handling a load. 24) The operator shall adjust long and high loads, including multiple-tiered loads that may affect the capacity of the forklift. 25) The operator shall insure there is always a safe distance between the mast and overhead lights, pipes, sprinkler systems, wires, cables, and power lines. 26) Forklifts shall be inspected before being placed in service. The operator shall perform equipment inspection and complete an inspection checklist at least once daily before operation. A forklift used on a round-the-clock basis will be inspected after each shift. 27) If at any time during an operator's shift a forklift is found to be in unsafe, the operator shall immediately notify onsite management personnel and remove the forklift from service until it has been restored to safe operating condition. 28) Fuel tanks shall not be filled while the engine is running. Spillage shall be avoided. 29) Spillage of excess oil or fuel shall be carefully cleaned up and disposed off in accordance
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		<p>with state and federal regulations. Fuel cap must be replaced before restarting the engine.</p> <p>30) The operator shall always wear the proper personal protective equipment when fueling the truck or performing any other maintenance on the truck.</p> <p>31) No forklift shall be operated with a leak in the fuel and/or hydraulic systems until the leak(s) have been corrected.</p> <p>32) Open flames shall NEVER be used to check the electrolyte level in batteries or the gasoline level in the fuel tank.</p> <p>33) Smoking is not allowed at anytime while operating the forklift or while changing LPG tanks, refueling gas powered forklifts or changing or charging batteries for electric powered forklifts.</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel may utilize fixed and portable ladder systems to access the tops of the storm water collection tanks when performing confined space entry activities.	Slip, trip and fall are hazards associated with improper use of fixed and portable ladder systems.	<p>Portable Ladders: Active fall arrest systems will be utilized by all workers performing work activities on ladders at elevations greater than six (6) feet. Contractor personnel utilizing portable ladders shall be familiar with and adhere to policies and procedures outlined in <i>Section 22.0</i> of the HASP.</p> <p>Fall Protection: Active fall arrest systems will be utilized by all workers performing work activities at elevations greater than six (6) feet where no passive fall arrest systems (railings, platforms, etc.) exist. Contractor personnel performing work in elevated areas shall be familiar with and adhere to fall protection policies and protocols outlined in <i>Section 20.0</i> of the HASP</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel may be performing work in chemical resistant, non-breathable PPE and/or working in areas where elevated temperatures are likely.	The potential for heat related illnesses are a factor when performing work activities in chemical resistant, non-breathable PPE especially in summer months where elevated temperatures are likely. When the body is unable to cool itself by sweating, several heat induced illnesses such as heat stress or heat exhaustion or the more severe heat stroke can occur and result in serious injury or illness or even death. High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; certain medications; and inadequate tolerances for hot workplaces are all factors which can lead to heat stress and heat related illness.	<p>Heat Illness Prevention: All Contractor employees shall adhere to heat illness prevention protocols outlined in <i>Section 18.0</i> of the HASP for work activities performed in non-breathable chemical resistant PPE both indoor and outdoor where environmental risk factors for heat illness are present. In general, personnel shall take into consideration the following preventative measures to reduce the risk of heat related illness:</p> <ol style="list-style-type: none"> 1) Learning and understanding the signs and symptoms of heat illnesses and what to do to help affected employees. 2) Employee training on heat induced illnesses. 3) When possible, try to perform heaviest work during coolest part of the day. 4) <i>Acclimatization</i> – build up tolerance to heat and work activity (takes up to two weeks). 5) Use the buddy system (work in pairs) 6) Drink plenty of cool water (one small cup every 15-20 minutes). 7) Wear light, loose fitting, breathable clothing.

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		<ul style="list-style-type: none">8) Take frequent short breaks in cool, shaded areas allowing the body to cool down9) Avoid eating large, heavy meals before working in hot environments10) Avoid caffeinated beverages as they make the body lose water and increase the risk of heat illnesses.
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Activity Hazard Analysis

Date:	August 15, 2008
Project:	Romic Phase I Facility Closure Project
Site Safety Officer:	Mr. Jason M. Costello
Activity Description:	Demolition and Decontamination of Sewer Tanks

Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>The interior and exterior surfaces of the sewer tanks shall be decontaminated via high pressure water washing activities.</p>	<p>Bruising, cutting, tearing and major bodily harm are hazards associated with improper operation and lack of experience and training regarding use of concentrated high pressure water.</p> <p>Ground surfaces and footing areas may become wet and present potential slip, trip and fall hazards.</p> <p>Environmental and personnel chemical exposure (dermal and inhalation) due to overspray are hazards associated with high pressure water washing.</p>	<p>PPE: All personnel performing high pressure water washing activities shall utilize <i>Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>Contractor personnel shall tape plastic over the ends of the fume hood and HVAC ducting sections to prevent potential release of contaminants when transferring these materials to designated decontamination stations.</p> <p>Safe Operating Practices – Pressure Washing Equipment: The SSO shall ensure all power tools are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Power tool inspection checklists will be turned into the SSO and maintained in an inspection checklist binder. Contractor personnel operating high pressure water washing equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Sections 23.0</i> and <i>25.0</i> of the HASP. In general, Contractor personnel performing pressure washing activities shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained (experienced) personnel shall operate high pressure washing equipment 2) The operator shall insure that all electrical controls are either fail safe, low voltage, or protected with an approved ground fault circuit interrupter. 3) At no time shall the operator operate the equipment above the manufacturers rated pressure maximum. 4) The operator shall always increase pressure slowly until required working pressure is reached. 5) High pressure water can puncture splash suits and other personal protective clothing. At no time shall the operator point the pressure washer nozzle in the direction of other personnel. 6) Water spray will be directed downward to minimize misting and overspray.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Contractor personnel shall decontaminate interior surfaces of the sewer tanks by entering the tanks under confined space</p>	<p>Chemical exposure, lack of oxygen, fire and explosion hazards are associated with confined space entry activities.</p>	<p>PPE: All permit required confined space entry activities in which full entry is required shall be performed in <i>Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work</p>

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<p>entry standard operating procedures.</p>	<p>Major bodily injury and death resulting from improper de-energizing and/or improper lock out tag out procedures are hazards associated with confined space entry activities.</p>	<p>boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirators with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>Permit required confined space entry activities which <u>only</u> involve hands and arms in the confined space, and there is no chemical fume exposure, may be performed utilizing <i>modified Level D PPE</i> including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, safety glasses and hard hat with face shield.</p> <p>Energized Equipment: In and effort to eliminate detailed lock out tag out procedures for individual equipment and process, Contractor anticipates disconnecting all power to the plant portion of the facility prior to commencing work. Should lock out tag be required, Contractor shall adhere to detailed lock out tag out protocols and procedures outlined in <i>Section 21.0</i> of the HASP.</p> <p>Permit Required Confined Space Entry: Contractor personnel shall perform all permit required confined space entry activities in accordance with regulations outlined in 29 CFR 1910.146 and in accordance with protocols and procedures outlined in <i>Section 11.0</i> of the HASP. In general, Contractor personnel shall perform permit required confined space entry activities in accordance with the following safe operating practices:</p> <ul style="list-style-type: none"> - The confined space entry team shall review detailed confined space entry protocols outlined in <i>Section 11.0</i> of the HASP. -The confined space entry team shall consist of an entrant, an attendant, floating supervisor and one stand-by rescue. All team members shall have documented confined space entry training. In addition to confined space entry training, the floating supervisor and stand by rescue shall have documented confined space rescue training. Only personnel trained and knowledgeable of the requirements of confined space entry procedures shall be authorized to serve as an entrant, attendant, or supervisor. -The entrant and stand by rescue shall utilize <i>Level C PPE</i> consisting of hard hat, full face APR with organic vapor HEPA filter stack cartridges, rubber steel toe chemical resistant work boots, chemical resistant gloves, yellow chemical resistant poly propylene suit with safety harness and life line. - The attendant shall utilize <i>Modified Level D PPE</i> consisting of hard hats, safety glasses, steel toe work boots, leather gloves and a yellow chemical resistant polypropylene suit. The attendant shall have chemical resistant gloves and full face APR with HEPA filter stack cartridges immediately on hand to assist with confined space rescue activities if needed. - The floating supervisor shall utilize <i>Level D Modified PPE</i> consisting of hard hat, safety glasses, steel toe work boots, and a white tyvek suit. The floating supervisor shall have <i>Level C PPE</i> including full face APR with HEPA filter stack cartridges immediately on hand to assist with confined space rescue activities if needed. - A Confined Space Entry Permit (CSEP) will be obtained before any confined space entry activities begin. The CSEP shall be posted in the immediate work areas during confined space entry activities. - Permit required confined spaces shall be identified with a posted sign which reads: "Caution – Permit Required Confined Space." - A combination percent oxygen meter and explosive gas meter (LEL) shall be utilized for air monitoring prior to and during permit required confined space entry activities.
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		<ul style="list-style-type: none"> -Engineering controls for proper ventilation shall be used unless it is determined that natural ventilation is sufficient. - The confined space entry team shall ensure all chemicals are removed from the vicinity if positive/forced mechanical air-moving equipment is used to provide ventilation. - The attendant shall remain posted in direct line of sight and/or verbal contact with the entrant at all times. - The stand-by rescue shall remain posted in direct line of sight and/or verbal contact with the attendant at all times. - Explosion proof equipment will be used if flammable liquids, gases, or vapors are contained within the confined space. All equipment shall be positively grounded. - No cell phones shall be permitted at any time within the confined space. - The confined space entry team shall ensure all sources of ignition and tank contents are adequately removed. - The confined space entry team shall ensure break and blank-out of all feed lines to the tank(s). Lock-out/tag-out of identified sources of electrical or mechanical energy shall be performed prior to entering the tank(s). Lock-out/tag-out procedures shall be documented in the CSEP. -If required, lights used in the confined spaces will be equipped with guards preventing contact with the bulb and will be explosion proof. - At no time shall personnel enter into an untested or Immediately Dangerous to Life and Health (IDLH) confined space. - At no time shall personnel smoke in or nearby confined spaces or during confined space entry activities.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Following decontamination, the sewer tanks shall be demolished using and excavator mounted shear.</p>	<p>Slip, trip, and fall as well as crushing, pinching, amputation and struck-by hazards are associated with heavy equipment use.</p> <p>Excavator stability while demolishing the sewer tanks may be adversely affected by one of the following conditions:</p> <ul style="list-style-type: none"> - The equipment is not on a level surface when cutting, lifting and loading. - Rear wheels and/or tracks settle unevenly during lifting and unloading. 	<p>PPE: Personnel operating the excavator who are <u>not</u> exposed to chemical hazards (ie. excavator operation only) must, at a minimum, utilize <i>Level D</i> PPE including steel toe work boots, leather gloves, hard hat, safety glasses and bright colored protective safety vests. Hearing protection shall be immediately available in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA.</p> <p>Nearby foot personnel assisting with loading and transfer of scrap metal shall utilized <i>Modified Level D</i> PPE including yellow chemical resistant polypropylene suits, steel toe work boots, leather gloves with nitrile glove inner liners, hard hats, safety glasses, and bright colored protective safety vests.</p> <p>Safe Operating Practices – Excavator</p> <ol style="list-style-type: none"> 1. Only trained and qualified Contractor personnel are permitted operate the equipment. Training documentation shall be provided to the Client and/or kept onsite at all times.

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	<ul style="list-style-type: none"> - Wind may exert lateral forces and cause swaying and abnormal stress. - Poor rear suspension systems on one or the other side of the vehicle (non-tracked excavators). - Uneven tire pressures in front or rear wheels (non-tracked excavators). - Worn or inadequate components of the lifting systems such as pins. - Worn or inadequate lifting cylinders. 	<ol style="list-style-type: none"> 2. The operator shall perform a pre-operational check of the equipment and be familiar with operator's manual. 3. The operator shall check backup alarms, engine oil, hydraulic oil, fuel, dust collector and grease fittings daily as part of the pre-equipment operation inspection process. 4. When checking for leaks in the hydraulic system, the operator shall use a piece of paper or cardboard. At no time shall the operator use his/her hands since oil from a pin-hole leak under high pressure can penetrate the skin. 5. The operator shall be responsible for lockout and tagout of damaged and unsafe equipment and equipment controls. The operator shall promptly report all needed repairs to the site supervisor. 6. Seat belts and/or shoulder harnesses must always be worn to keep the operator secure within the equipment's cab or roll over protection system (ROPS). 7. The operator shall keep windshield, windshield wipers, side windows and mirrors clean. Mirrors shall be adjusted to provide the largest possible view of the rear of the equipment. 8. When mounting or dismounting equipment, the operator shall only use the designated steps and handholds provided on the equipment. Operators are not permitted to jump from equipment at any time. 9. Whenever possible, the operator shall plan ahead to minimize or eliminate the need for backing and/or excessive rotation. When available, the operator shall use an observer to assist with backing up and rotating the equipment. The operator shall make sure back-up alarms are working properly as part of the pre-equipment operation inspection process. 10. When parking the equipment, the operator shall be mindful of safe parking locations and avoid parking in high traffic areas and in other equipment's blind spots. 11. The operator shall always wear appropriate personal protective equipment consistent with the immediate hazards on hand. 12. The operator shall keep hearing protection on hand at all times in case noise from equipment operation or noise from nearby construction activities exceeds 90 dBA. 13. The operator shall inspect fire extinguisher locations on the equipment as part of the pre-equipment operation inspection process. 14. The operator shall always be aware of employees and others on foot in the immediate work zone. 15. The operator shall be mindful of the location of foot personnel before rotating the cab and bucket. 16. The operator shall rotate the cab and bucket with extreme caution and continually check both sides and behind when rotating and backing up the equipment. Excavator maneuverability can be quick and abrupt. The operator shall always be aware of
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		<p>personnel on foot in the immediate area zone and whenever possible, keep all other personnel away from the immediate work area.</p> <ol style="list-style-type: none"> 17. The operator shall always ensure the attachment locking devices are in place, even when switching attachments for only a few minutes. If not locked, attachments may break free and fall onto nearby personnel or damage nearby equipment. 18. The operator shall only utilize manufacturer-approved attachments and buckets. 19. The operator shall not leave attachments in the raised position when equipment is not in use. 20. No personnel shall be allowed to work in or under a raised bucket at any time. Other than the operator, no riders are allowed anywhere on the equipment. 21. The operator shall always be mindful of overhead power line clearances. Equipment shall not be operated within 10 feet of energized power lines. 22. Whenever possible, the equipment shall be transported from location to location using a truck and trailer. Swing and boom locking pins must be set and equipment must be properly secured prior to transporting. 23. Before digging, the operator shall review trenching and excavation standard operating procedures. 24. The operator shall remain a minimum of 2-feet away from open trenches. 25. When operating on slopes, the operator shall use caution when rotating the cab and bucket in a downhill direction. The operator shall position equipment so that material is dumped on the uphill side of the equipment. 26. The operator shall always keep buckets and/or other attachments at the safest, lowest position when moving the equipment. The operator shall always keep the heaviest end of the bucket pointing uphill when moving up and down inclines with a full bucket. Equipment shall not be operated on slopes of more than 20 degrees. 27. The operator shall select loading areas that are as level as possible. 28. The operator shall never leave the equipment unattended with the engine running. Lower the bucket/attachment to the ground and shut off engine when equipment is not in use.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel will utilize a forklift to relocate scrap metal to designated staging areas.	<p>Slip, trip, fall, crushing, pinching and struck-by hazards are potential health and safety hazards associated with improper operation and lack of experience and training regarding use forklifts.</p> <p>Struck-by hazards associated with dropped or falling objects are hazards</p>	<p>PPE: Personnel operating forklifts who are <u>not</u> exposed to chemical hazards (ie. forklift operation only) must, at a minimum, utilize <i>Level D</i> PPE including steel toe work boots, leather gloves, hard hat, safety glasses and bright colored protective safety vests. Hearing protection shall be immediately available in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA.</p> <p>Foot personnel assisting with loading and transfer of chemical piping sections to the</p>

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	<p>associated with improper securing of loads.</p>	<p>decontamination stations shall utilize <i>Modified Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, hard hats, safety glasses, and bright colored protective safety vests.</p> <p>Safe Operating Practices – Forklift</p> <ol style="list-style-type: none"> 1) The operator shall be sure that a safe distance is maintained from the edge of ramps or platforms while on any elevated dock, platform or freight car. 2) When leaving the truck unattended, the forks will be fully lowered the controls placed in neutral, the power shut off, the brakes set to and the key or connector plug removed. The wheels will be blocked if the forklift is parked on an incline. Note: A powered forklift is considered unattended when the operator is 25 feet or more away from the vehicle which remains in his/her view or whenever the operator leaves the vehicle and the forklift is not in view. 3) When the operator of an industrial forklift is dismounted and within 25 ft. of the forklift still in his view, the load engaging means shall be fully lowered, controls neutralized, and the brakes set to prevent movement. 4) Forklifts will not be used to open or close freight doors. 5) The brakes of the forklift shall be set and wheel chocks or stops will be in place to prevent movement during loading or unloading operations. Fixed jacks may be necessary to support a semi-trailer during loading or unloading when the trailer is not coupled to a tractor. The flooring of trucks, trailers and railroad cars will be checked by the operator for breaks and weakness before driving these vehicles into these surfaces. 6) An overhead guard shall be used at all times as protection against falling objects. Note: The overhead guard may only be intended to offer protection from the impact of small packages, boxes or bagged materials only. 7) The operator shall utilize a load backrest extension whenever necessary to minimize the possibility of the load or part of the load from falling rearward. 8) Only approved industrial forklifts will be used in hazardous conditions. 9) The operator shall not drive a forklift up to anyone standing in front of a bench or other fixed object. 10) No person shall be allowed to stand or pass under the elevated portion of any forklift, whether loaded or empty. 11) Under no circumstances are passengers permitted to ride on a forklift unless authorized and the forklift is equipped with a safe place for the passenger to ride. 12) The operator shall never place his/her arms or legs between the uprights of the mast or outside the running lines of the forklift. 13) The operator shall NEVER push one load with another load.
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		<ul style="list-style-type: none"> 14) Spinner knobs shall NEVER be attached to the steering handwheels of forklifts not originally equipped with such knobs. 15) The operator shall NEVER lift people on the forks of a forklift unless the forklift has a properly designed safety platform securely attached to the lifting carriage and/or forks. If the forklift is equipped with vertical controls only, or vertical and horizontal controls elevatable with the lifting carriage or forks, means will be provided whereby personnel on the platform can shut off power to the forklift. Protection from falling objects as indicated necessary by the operating conditions shall also be provided based on site conditions. 16) Safety platforms, firmly secured to the lifting carriage and/or forks, shall be used whenever possible. 17) Only stable and safely arranged loads shall be handled. The operator shall use extreme caution when handling off-centered loads that cannot be centered on the forks. 18) Only loads within the rated capacity of the forklift shall be handled. 19) The operator shall ensure that the forks are placed under the load as far as possible and the mast carefully tilted backward to stabilize the load. 20) Extreme care shall be used when tilting the load forward or backward especially when high tiering. Tilting forward with load engaging means elevation shall be prohibited except to pick up a load. An elevated load will not be tilted forward except when the load is in a deposit position over a rack or stack of material. 21) When stacking or tiering loads, the operator shall tilt the load backward only enough to stabilize the load. 22) The operator shall remove unsafe containers and pallets from service. 23) Forklifts equipped with attachments will be operated as a partially loaded truck when not handling a load. 24) The operator shall adjust long and high loads, including multiple-tiered loads that may affect the capacity of the forklift. 25) The operator shall insure there is always a safe distance between the mast and overhead lights, pipes, sprinkler systems, wires, cables, and power lines. 26) Forklifts shall be inspected before being placed in service. The operator shall perform equipment inspection and complete an inspection checklist at least once daily before operation. A forklift used on a round-the-clock basis will be inspected after each shift. 27) If at any time during an operator's shift a forklift is found to be in unsafe, the operator shall immediately notify onsite management personnel and remove the forklift from service until it has been restored to safe operating condition. 28) Fuel tanks shall not be filled while the engine is running. Spillage shall be avoided. 29) Spillage of excess oil or fuel shall be carefully cleaned up and disposed off in accordance
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		<p>with state and federal regulations. Fuel cap must be replaced before restarting the engine.</p> <p>30) The operator shall always wear the proper personal protective equipment when fueling the truck or performing any other maintenance on the truck.</p> <p>31) No forklift shall be operated with a leak in the fuel and/or hydraulic systems until the leak(s) have been corrected.</p> <p>32) Open flames shall NEVER be used to check the electrolyte level in batteries or the gasoline level in the fuel tank.</p> <p>33) Smoking is not allowed at anytime while operating the forklift or while changing LPG tanks, refueling gas powered forklifts or changing or charging batteries for electric powered forklifts.</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel may utilize fixed and portable ladder systems to access the tops of the storm water collection tanks when performing confined space entry activities.	Slip, trip and fall are hazards associated with improper use of fixed and portable ladder systems.	<p>Portable Ladders: Active fall arrest systems will be utilized by all workers performing work activities on ladders at elevations greater than six (6) feet. Contractor personnel utilizing portable ladders shall be familiar with and adhere to policies and procedures outlined in <i>Section 22.0</i> of the HASP.</p> <p>Fall Protection: Active fall arrest systems will be utilized by all workers performing work activities at elevations greater than six (6) feet where no passive fall arrest systems (railings, platforms, etc.) exist. Contractor personnel performing work in elevated areas shall be familiar with and adhere to fall protection policies and protocols outlined in <i>Section 20.0</i> of the HASP</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel may be performing work in chemical resistant, non-breathable PPE and/or working in areas where elevated temperatures are likely.	The potential for heat related illnesses are a factor when performing work activities in chemical resistant, non-breathable PPE especially in summer months where elevated temperatures are likely. When the body is unable to cool itself by sweating, several heat induced illnesses such as heat stress or heat exhaustion or the more severe heat stroke can occur and result in serious injury or illness or even death. High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; certain medications; and inadequate tolerances for hot workplaces are all factors which can lead to heat stress and heat related illness.	<p>Heat Illness Prevention: All Contractor employees shall adhere to heat illness prevention protocols outlined in <i>Section 18.0</i> of the HASP for work activities performed in non-breathable chemical resistant PPE both indoor and outdoor where environmental risk factors for heat illness are present. In general, personnel shall take into consideration the following preventative measures to reduce the risk of heat related illness:</p> <ol style="list-style-type: none"> 1) Learning and understanding the signs and symptoms of heat illnesses and what to do to help affected employees. 2) Employee training on heat induced illnesses. 3) When possible, try to perform heaviest work during coolest part of the day. 4) <i>Acclimatization</i> – build up tolerance to heat and work activity (takes up to two weeks). 5) Use the buddy system (work in pairs) 6) Drink plenty of cool water (one small cup every 15-20 minutes). 7) Wear light, loose fitting, breathable clothing.

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		<ul style="list-style-type: none">8) Take frequent short breaks in cool, shaded areas allowing the body to cool down9) Avoid eating large, heavy meals before working in hot environments10) Avoid caffeinated beverages as they make the body lose water and increase the risk of heat illnesses.
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Activity Hazard Analysis

Date:	August 15, 2008
Project:	Romic Phase I Facility Closure Project
Site Safety Officer:	Mr. Jason M. Costello
Activity Description:	Demolition and Decontamination of Pipe Racks and Chemical Transfer Piping

Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Cut sections of chemical transfer piping shall be relocated to a designated decontamination station where Contractor personnel shall utilize high pressure water (line mole) to decontaminate interior and exterior surfaces of the piping. Water generated high pressure water washing operations will be collected in a tote or small tank and transferred to a rinsate holding tank for sampling and analysis.</p>	<p>Bruising, cutting, tearing and major bodily harm are hazards associated with improper operation and lack of experience and training regarding use of concentrated high pressure water.</p> <p>Ground surfaces and footing areas may become wet and present potential slip, trip and fall hazards.</p> <p>Environmental and personnel chemical exposure (dermal and inhalation) due to overspray are hazards associated with high pressure water washing.</p>	<p>PPE: All personnel performing high pressure water washing activities shall utilize <i>Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>Safe Operating Practices – Pressure Washing Equipment: The SSO shall ensure all power tools are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Power tool inspection checklists will be turned into the SSO and maintained in an inspection checklist binder. Contractor personnel operating high pressure water washing equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Sections 23.0</i> and <i>25.0</i> of the HASP. In general, Contractor personnel performing pressure washing activities shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained (experienced) personnel shall operate high pressure washing equipment 2) The operator shall insure that all electrical controls are either fail safe, low voltage, or protected with an approved ground fault circuit interrupter. 3) At no time shall the operator operate the equipment above the manufacturers rated pressure maximum. 4) The operator shall always increase pressure slowly until required working pressure is reached. 5) High pressure water can puncture splash suits and other personal protective clothing. At no time shall the operator point the pressure washer nozzle in the direction of other personnel. 6) Water spray will be directed downward to minimize misting and overspray.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Qualified and experienced Contractor personnel may operate boom lifts to access chemical transfer piping at elevated areas on the pipe rack.</p>	<p>Slip, trip, fall, crushing, pinching and struck-by hazards are potential health and safety hazards associated with improper operation and lack of experience and training regarding use of aerial lift devices.</p> <p>Struck-by hazards associated with</p>	<p>PPE: Personnel operating boom lifts who are <u>not</u> exposed to chemical hazards (ie. performing pressure washing activities) must, at a minimum, utilize <i>Level D</i> PPE including steel toe work boots, leather gloves, hard hat, safety glasses and bright colored protective safety vests. Hearing protection shall be immediately available in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA.</p>

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	<p>dropped or falling objects are hazards associated with elevated, overhead work.</p>	<p>Personnel operating boom lifts who are also involved in high pressure water washing activities shall utilize <i>Leve C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>The SSO shall ensure all heavy equipment are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Heavy equipment checklists shall posted with the equipment for the operator(s) to review for the remainder of the day.</p> <p>Safe Operating Practices – Boom Lift: All personnel operating heavy equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Section 25.0</i> of the HASP. In general, Contractor personnel operating boom lifts shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) The operator shall survey the usage area for potential hazards such as untamped earth fills, unlevel surfaces, overhead obstructions, and electrically charged conductors or wires. The operator shall be aware of any potential hazards and always consider what could happen. Watch for moving vehicles and other personnel in the operating area at all times. 2) The operator shall read, understand, and follow the procedures in the safety and operations manual before attempting to operate the equipment. 3) The operator shall inspect the equipment for damaged or worn parts. Check for cracked welds, hydraulic leaks, damaged wiring, loose wire connectors, damaged out-riggers, low tire pressure, uneven tire wear, or tire damage. Also the operator shall check for any improper operation. 4) The operator shall NEVER operate equipment if damaged in any way. Improperly operating equipment must be repaired before using. 5) The operator shall wear proper clothing for the job. Wear protective equipment as required by federal, state, or local regulations. The operator MUST wear a safety harness and lanyard at all times and abide fall protection standards outlined in <i>Section 20.0</i> of the HASP. 6) The operator shall locate, read, and follow all directions and warnings displayed on the equipment. 7) The operator shall inspect the equipment for “DO NOT USE” tags. NEVER use equipment tagged in this way until all repairs are made and all “DO NOT USE” tags are removed by authorized maintenance personnel. 8) The operator shall make sure the basket and outrigger shoes are free of mud, grease, or other slippery material to reduce the possibility of slipping. 9) The operator shall NEVER allow improperly trained personnel to operate this equipment. Only trained and authorized personnel shall be allowed to operate this equipment. 10) The operator shall NEVER operate this equipment while under the influence of alcohol or
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		<p>drugs, or if feeling ill, dizzy, or unsteady in any way. Operators must be physically fit, thoroughly trained, and not easily excitable.</p> <ol style="list-style-type: none"> 11) The operator shall NEVER modify, alter, or change the equipment in any way that would affect its original design or operation in any way. 12) The operator shall NEVER operate this equipment in ways for which it is not intended. 13) The operator shall position the lift far enough away from power sources to ensure that no part of the lift can accidentally reach into an unsafe area. This includes full extension of the boom through 360 degrees rotation. 14) The operator shall operate only on a firm and level surface. NEVER use on surfaces that do not support the equipment with its rated load capacity and the resulting force exerted on the outriggers during boom extension and rotation. 15) The operator shall keep clear and make sure all other personnel stay away from potential pinch or shear points. 16) The operator shall report any misuse of equipment to onsite management personnel. Horseplay is strictly prohibited. 17) The operator shall maintain good footing on the work platform. NEVER wear slippery soled shoes. 18) The operator shall make certain all personnel are clear and there are no obstructions before repositioning basket. 19) Operating personnel shall cordon off area around the outriggers to keep other personnel, bystanders and other equipment away from it while in use. 20) The operator shall stay clear of wires, cables, and other overhead obstructions. 21) Boom travel locking pins shall always be engaged before towing the trailer. 22) Operating personnel shall NEVER allow electrode contact with any part of the basket if welding is being performed from the platform. 23) The operator shall NEVER use the equipment without the outriggers fully extended and firmly based. 24) The operator shall NEVER override or by-pass manufacturer's safety devices. 25) The operator shall NEVER attach a safety harness to an adjacent structure, pole, or equipment while working from the boom platform. 26) The operator shall NEVER move unit with a person or materials on board. 27) The operator shall NEVER try to move the trailer with the boom extended. 28) The operator shall NEVER stand or sit on cage bars. The operator shall work only within
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		<p>the work cage and will not lean out over the cage to perform work.</p> <p>29) The operator shall NEVER attempt to increase working height with boxes, ladders, or other means.</p> <p>30) The operator shall NEVER operate this equipment when exposed to high winds, thunderstorms, ice, or any other weather conditions that would compromise operator safety.</p> <p>31) The operator shall NEVER allow ropes, electric cords, hoses, etc. to become entangled in the equipment when the basket is being raised or lowered.</p> <p>32) The operator shall NEVER exceed manufacturer's load limits or use the lift as a crane for lifting heavy materials. Make sure all tools and equipment are safely stowed.</p> <p>33) The operator shall NEVER exceed load ratings by transferring loads to the basket at elevated heights.</p> <p>34) The operator shall NEVER use the cage to carry materials and shall never allow overhang of materials when raising or lowering the basket.</p> <p>35) The operator shall NEVER push or pull with the boom or basket and shall NEVER use the boom to lift any part of the trailer.</p> <p>36) The operator shall NEVER use the boom or basket to place a "dead man" load against any structure, materials, or equipment.</p> <p>37) Operating personnel shall NEVER climb up or down boom.</p> <p>38) Operating personnel shall NEVER leave the keys in the boom lift while unattended or not in use.</p> <p>Fall Protection: Boom lift baskets shall serve as passive fall arrest systems. Active fall arrest systems will be utilized by all workers performing work activities at elevations greater than six (6) feet where no passive fall arrest systems (railings, platforms, etc.) exist. Contractor personnel performing work in elevated areas shall be familiar with and adhere to fall protection policies and protocols outlined in <i>Section 20.0</i> of the HASP.</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>The majority of the inter-plant chemical transfer piping runs from the tank farms to the distillation columns via an overhead pipe rack. Qualified and experienced Contractor personnel shall utilize an excavator mounted sheer to remove overhead piping and pipe rack and to cut the pipe runs into manageable sections.</p>	<p>Slip, trip, and fall as well as crushing, pinching, amputation and struck-by hazards are associated with heavy equipment use.</p> <p>Excavator stability while cutting and removing overhead pip rack and piping sections may be adversely affected by one of the following conditions:</p>	<p>PPE: Personnel operating the excavator who are <u>not</u> exposed to chemical hazards (ie. excavator operation only) must, at a minimum, utilize <i>Level D</i> PPE including steel toe work boots, leather gloves, hard hat, safety glasses and bright colored protective safety vests. Hearing protection shall be immediately available in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA.</p> <p>Nearby foot personnel assisting with loading and transfer of chemical piping sections to the decontamination station shall utilized <i>Modified Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, hard hats, safety glasses, and bright colored protective safety vests.</p>

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	<ul style="list-style-type: none"> - The equipment is not on a level surface when cutting, lifting and loading. - Rear wheels and/or tracks settle unevenly during lifting and unloading. - Wind may exert lateral forces and cause swaying and abnormal stress. - Poor rear suspension systems on one or the other side of the vehicle (non-tracked excavators). - Uneven tire pressures in front or rear wheels (non-tracked excavators). - Worn or inadequate components of the lifting systems such as pins. - Worn or inadequate lifting cylinders. 	<p>Safe Operating Practices – Excavator</p> <ol style="list-style-type: none"> 1. Only trained and qualified Contractor personnel are permitted operate the equipment. Training documentation shall be provided to the Client and/or kept onsite at all times. 2. The operator shall perform a pre-operational check of the equipment and be familiar with operator's manual. 3. The operator shall check backup alarms, engine oil, hydraulic oil, fuel, dust collector and grease fittings daily as part of the pre-equipment operation inspection process. 4. When checking for leaks in the hydraulic system, the operator shall use a piece of paper or cardboard. At no time shall the operator use his/her hands since oil from a pin-hole leak under high pressure can penetrate the skin. 5. The operator shall be responsible for lockout and tagout of damaged and unsafe equipment and equipment controls. The operator shall promptly report all needed repairs to the site supervisor. 6. Seat belts and/or shoulder harnesses must always be worn to keep the operator secure within the equipment's cab or roll over protection system (ROPS). 7. The operator shall keep windshield, windshield wipers, side windows and mirrors clean. Mirrors shall be adjusted to provide the largest possible view of the rear of the equipment. 8. When mounting or dismounting equipment, the operator shall only use the designated steps and handholds provided on the equipment. Operators are not permitted to jump from equipment at any time. 9. Whenever possible, the operator shall plan ahead to minimize or eliminate the need for backing and/or excessive rotation. When available, the operator shall use an observer to assist with backing up and rotating the equipment. The operator shall make sure back-up alarms are working properly as part of the pre-equipment operation inspection process. 10. When parking the equipment, the operator shall be mindful of safe parking locations and avoid parking in high traffic areas and in other equipment's blind spots. 11. The operator shall always wear appropriate personal protective equipment consistent with the immediate hazards on hand. 12. The operator shall keep hearing protection on hand at all times in case noise from equipment operation or noise from nearby construction activities exceeds 90 dBA. 13. The operator shall inspect fire extinguisher locations on the equipment as part of the pre-equipment operation inspection process. 14. The operator shall always be aware of employees and others on foot in the immediate work zone. 15. The operator shall be mindful of the location of foot personnel before rotating the cab and
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		<p>bucket.</p> <ol style="list-style-type: none"> 16. The operator shall rotate the cab and bucket with extreme caution and continually check both sides and behind when rotating and backing up the equipment. Excavator maneuverability can be quick and abrupt. The operator shall always be aware of personnel on foot in the immediate area zone and whenever possible, keep all other personnel away from the immediate work area. 17. The operator shall always ensure the attachment locking devices are in place, even when switching attachments for only a few minutes. If not locked, attachments may break free and fall onto nearby personnel or damage nearby equipment. 18. The operator shall only utilize manufacturer-approved attachments and buckets. 19. The operator shall not leave attachments in the raised position when equipment is not in use. 20. No personnel shall be allowed to work in or under a raised bucket at any time. Other than the operator, no riders are allowed anywhere on the equipment. 21. The operator shall always be mindful of overhead power line clearances. Equipment shall not be operated within 10 feet of energized power lines. 22. Whenever possible, the equipment shall be transported from location to location using a truck and trailer. Swing and boom locking pins must be set and equipment must be properly secured prior to transporting. 23. Before digging, the operator shall review trenching and excavation standard operating procedures. 24. The operator shall remain a minimum of 2-feet away from open trenches. 25. When operating on slopes, the operator shall use caution when rotating the cab and bucket in a downhill direction. The operator shall position equipment so that material is dumped on the uphill side of the equipment. 26. The operator shall always keep buckets and/or other attachments at the safest, lowest position when moving the equipment. The operator shall always keep the heaviest end of the bucket pointing uphill when moving up and down inclines with a full bucket. Equipment shall not be operated on slopes of more than 20 degrees. 27. The operator shall select loading areas that are as level as possible. 28. The operator shall never leave the equipment unattended with the engine running. Lower the bucket/attachment to the ground and shut off engine when equipment is not in use.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Overhead power lines may be located within 100 feet to the West of certain sections of the pipe rack.	Electrocution resulting in serious bodily injury and death may occur if proper engineering controls and overhead power	Removal of the pipe rack and associated overhead piping utilizing aerial lifting devices and excavator mounted shear shall be performed moving from to East to West in an effort to make it significantly safer to approach the pipe racks and piping from the East side away from the power

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	<p>line clearances are not recognized.</p>	<p>lines.</p> <p>Warning signs reading “Danger Overhead Power Lines” or equivalent, shall be posted at all times in locations where vehicle traffic, heavy equipment and personnel are permitted to pass under areas where overhead power lines are situated. Prior to the start of work, the SSO in conjunction with the equipment operator(s) shall designate and mark safe routes where cranes and other aerial lifting devices can travel beneath power lines. Personnel working on site shall be aware of the locations of all overhead power lines and shall adhere to the proper clearances and safe work distances outlined in <i>Section 16.0</i> of the HASP.</p> <p>Personnel operating heavy equipment and/or aerial lifting devices near overhead power lines shall be aware of the electrocution hazards associated with such operations. To protect workers against electrocution when operating or working around cranes and other aerial lifting devices near overhead power lines the following safe work practices shall be implemented:</p> <ol style="list-style-type: none"> 1. Operating personnel shall be aware of the location and voltage of all overhead power lines at the project site. 2. Operating personnel shall evaluate the job site before beginning work to decide the size and type of machinery to use and the safest areas for machinery operation and material storage. 3. If practical engineering controls such as de-energizing power lines and erecting insulated barriers to prevent physical contact with the energized lines shall be implemented. Operating personnel shall adhere to Cal/OSHA proper clearances and safe work distances at all times. 4. Warning signs shall be posted on cranes and other aerial lifting devices cautioning operators to maintain safe clearances between energized power lines and their equipment. 5. Before the start of work, the site safety officer in conjunction with the equipment operator(s) shall designated and mark safe routes where cranes and other aerial lifting devices can travel beneath power lines. 6. Operating personnel shall assume all power lines are energized and maintain Cal/OSHA proper clearances and safe work distances at all times. 7. Only personnel trained in safe operating procedures and Cal/OSHA regulations shall be allowed to operated a crane on the project site. 8. Operating personnel shall be instructed to operate cranes and other aerial lifting devices at a slower-than-normal rate in areas where overhead power lines are present. 9. Operating personnel shall use extreme caution when moving over uneven ground that could cause the crane and/or aerial lifting device to weave or bob into power lines. 10. Operating personnel shall use extreme caution near long spans of overhead power lines and shall be aware that wind conditions may cause power lines to sway back and forth and reduce clearances and safe working distances.
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		<ol style="list-style-type: none"> 11. Crane operators shall understand that cage-type boom guards, insulated lines, ground rods, nonconductive links, and proximity warning devices shall not be used as a substitute for de-energizing and grounding lines and/or maintaining safe clearances. 12. Where it is difficult for the crane operator to see the power lines or see the clearance during crane movement, a signal person shall be assigned to watch and give immediate warning when the crane comes close to the limits of safe clearance. 13. Under no circumstances are nearby personnel permitted to touch a crane or its load until the signal person says it is safe to do so. 14. Nearby personnel shall maintain a safe distance from cranes and other aerial lifting devices working in close proximity to overhead power lines.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Qualified and experienced contractor personnel may utilize forklifts to transfer cut sections of the chemical transfer piping to a designated decontamination work station.</p>	<p>Slip, trip, fall, crushing, pinching and struck-by hazards are potential health and safety hazards associated with improper operation and lack of experience and training regarding use forklifts.</p> <p>Struck-by hazards associated with dropped or falling objects are hazards associated with improper securing of loads.</p>	<p>PPE: Personnel operating forklifts who are <u>not</u> exposed to chemical hazards (ie. forklift operation only) must, at a minimum, utilize <i>Level D</i> PPE including steel toe work boots, leather gloves, hard hat, safety glasses and bright colored protective safety vests. Hearing protection shall be immediately available in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA.</p> <p>Foot personnel assisting with loading and transfer of chemical piping sections to the decontamination stations shall utilized <i>Modified Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, hard hats, safety glasses, and bright colored protective safety vests.</p> <p>Safe Operating Practices – Forklift</p> <ol style="list-style-type: none"> 1) The operator shall be sure that a safe distance is maintained from the edge of ramps or platforms while on any elevated dock, platform or freight car. 2) When leaving the truck unattended, the forks will be fully lowered the controls placed in neutral, the power shut off, the brakes set to and the key or connector plug removed. The wheels will be blocked if the forklift is parked on an incline. Note: A powered forklift is considered unattended when the operator is 25 feet or more away from the vehicle which remains in his/her view or whenever the operator leaves the vehicle and the forklift is not in view. 3) When the operator of an industrial forklift is dismounted and within 25 ft. of the forklift still in his view, the load engaging means shall be fully lowered, controls neutralized, and the brakes set to prevent movement. 4) Forklifts will not be used to open or close freight doors. 5) The brakes of the forklift shall be set and wheel chocks or stops will be in place to prevent movement during loading or unloading operations. Fixed jacks may be necessary to support a semi-trailer during loading or unloading when the trailer is not coupled to a tractor. The flooring of trucks, trailers and railroad cars will be checked by the operator for breaks and weakness before driving these vehicles into these surfaces.

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		<ol style="list-style-type: none"> 6) An overhead guard shall be used at all times as protection against falling objects. Note: The overhead guard may only be intended to offer protection from the impact of small packages, boxes or bagged materials only. 7) The operator shall utilize a load backrest extension whenever necessary to minimize the possibility of the load or part of the load from falling rearward. 8) Only approved industrial forklifts will be used in hazardous conditions. 9) The operator shall not drive a forklift up to anyone standing in front of a bench or other fixed object. 10) No person shall be allowed to stand or pass under the elevated portion of any forklift, whether loaded or empty. 11) Under no circumstances are passengers permitted to ride on a forklift unless authorized and the forklift is equipped with a safe place for the passenger to ride. 12) The operator shall never place his/her arms or legs between the uprights of the mast or outside the running lines of the forklift. 13) The operator shall NEVER push one load with another load. 14) Spinner knobs shall NEVER be attached to the steering handwheels of forklifts not originally equipped with such knobs. 15) The operator shall NEVER lift people on the forks of a forklift unless the forklift has a properly designed safety platform securely attached to the lifting carriage and/or forks. If the forklift is equipped with vertical controls only, or vertical and horizontal controls elevatable with the lifting carriage or forks, means will be provided whereby personnel on the platform can shut off power to the forklift. Protection from falling objects as indicated necessary by the operating conditions shall also be provided based on site conditions. 16) Safety platforms, firmly secured to the lifting carriage and/or forks, shall be used whenever possible. 17) Only stable and safely arranged loads shall be handled. The operator shall use extreme caution when handling off-centered loads that cannot be centered on the forks. 18) Only loads within the rated capacity of the forklift shall be handled. 19) The operator shall ensure that the forks are placed under the load as far as possible and the mast carefully tilted backward to stabilize the load. 20) Extreme care shall be used when tilting the load forward or backward especially when high tiering. Tilting forward with load engaging means elevation shall be prohibited except to pick up a load. An elevated load will not be tilted forward except when the load is in a deposit position over a rack or stack of material. 21) When stacking or tiering loads, the operator shall tilt the load backward only enough to stabilize the load.
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		<ul style="list-style-type: none"> 22) The operator shall remove unsafe containers and pallets from service. 23) Forklifts equipped with attachments will be operated as a partially loaded truck when not handling a load. 24) The operator shall adjust long and high loads, including multiple-tiered loads that may affect the capacity of the forklift. 25) The operator shall insure there is always a safe distance between the mast and overhead lights, pipes, sprinkler systems, wires, cables, and power lines. 26) Forklifts shall be inspected before being placed in service. The operator shall perform equipment inspection and complete an inspection checklist at least once daily before operation. A forklift used on a round-the-clock basis will be inspected after each shift. 27) If at any time during an operator's shift a forklift is found to be in unsafe, the operator shall immediately notify onsite management personnel and remove the forklift from service until it has been restored to safe operating condition. 28) Fuel tanks shall not be filled while the engine is running. Spillage shall be avoided. 29) Spillage of excess oil or fuel shall be carefully cleaned up and disposed off in accordance with state and federal regulations. Fuel cap must be replaced before restarting the engine. 30) The operator shall always wear the proper personal protective equipment when fueling the truck or performing any other maintenance on the truck. 31) No forklift shall be operated with a leak in the fuel and/or hydraulic systems until the leak(s) have been corrected. 32) Open flames shall NEVER be used to check the electrolyte level in batteries or the gasoline level in the fuel tank. 33) Smoking is not allowed at anytime while operating the forklift or while changing LPG tanks, refueling gas powered forklifts or changing or charging batteries for electric powered forklifts.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Qualified and experienced Contractor personnel will utilize a vacuum truck to ensure chemical transfer piping is drained and empty prior to cutting and removal activities utilizing the excavator mounted shear.</p>	<p>Environmental contamination and employee chemical exposure hazards.</p> <p>Slip, trip, and fall as well as crushing, pinching, and struck-by hazards are associated with heavy equipment use.</p> <p>Other hazards associated with vacuum truck operation may include:</p>	<p>PPE:</p> <ul style="list-style-type: none"> - The vacuum truck operator and any foot personnel assisting with collection of rinse water and pipeline residuals shall utilize <i>Level D Modified PPE</i> consisting of hard hats, safety glasses, rubber steel toe chemical resistant boots, chemical resistant gloves and yellow poly propylene chemical resistant suit with bright orange or green reflective safety vests. - The vacuum truck operator and any foot personnel assisting with collection of rinse water and pipeline residuals shall have immediately available a full face APR with appropriate cartridge configuration based on the anticipated chemical hazard.

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	<ul style="list-style-type: none"> - Improper selection and use of hoses for material being collected. - Improper inspection, monitoring and maintenance of pressure relief systems. - Improper inspection and use of safety shut down systems. - Failure to ground vehicle before operating vacuum systems. 	<ul style="list-style-type: none"> - Hearing protection shall be kept on hand at all times in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA. <p>The Contractor shall connect a vacuum truck line to each of the lines where they have been cut at the tank farms and pull a vacuum on the lines. The open end of the lines where it has been disconnected at the distillation column will be checked to verify that air is being pulled through the pipe. If no air is being drawn into the pipe, the line will be re-traced to find out why (closed valve, check valve, etc.). The Contractor shall trace each piping run and identify low points in the pipe with either spray paint or marking tape. The pipe at these locations will be either drilled or cut to verify that there are no free liquids in these low points. If free liquids are encountered, they will be vacuumed out of the pipe at the low point.</p> <p>Safe Operating Practices – Vacuum Truck</p> <p>Personnel operating heavy equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Section 25.0</i> of the HASP. In general, Contractor personnel operating the vacuum truck shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained and qualified Contractor personnel are permitted operate the vacuum truck. 2) The operator shall perform a pre-operational check of the equipment and be familiar with operator's manual. The operator shall check backup alarms, tire pressure, engine fluids, lights, turn indicators, and vacuum equipment daily as part of the pre-equipment operation inspection process. 3) The operator shall inspect pressure relief systems and safety shut-off systems as part of the pre-equipment operation inspection process. 4) The operator shall be responsible for lock out and tag out of damaged and unsafe equipment and equipment controls. The operator shall promptly report all needed repairs to the site supervisor. 5) Seat belts must always be worn when driving the vacuum truck. 6) The operator shall keep windshield, windshield wipers, side windows and mirrors clean. Mirrors shall be adjusted to provide the largest possible view of the rear of the equipment. 7) When mounting or dismounting the vehicle, the operator shall only use the designated steps and handholds provided on the equipment. Operators are not permitted to jump from equipment at any time. 8) Whenever possible, the operator shall plan ahead to minimize or eliminate the need for backing. When available, the operator shall use an observer to assist with backing up of the equipment. The operator shall make sure back-up alarms are working properly as part of the pre-equipment operation inspection process. 9) The operator shall always wear appropriate personal protective equipment consistent with the immediate hazards on hand. 10) The operator shall keep hearing protection on hand at all times in case noise from equipment operation or noise from nearby construction activities exceeds 90 dBA.
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		<ol style="list-style-type: none"> 11) The operator shall inspect fire extinguisher locations on the equipment as part of the pre-equipment operation inspection process. 12) The operator shall always be aware of employees and others on foot in the immediate work zone. 13) Other than within the cab of the vehicle, no riders are allowed anywhere on the equipment. 14) The operator shall inspect hoses and cam fittings prior to use. The operator shall only utilize manufacturer-approved attachments. 15) The operator shall always use the same diameter hose along its entire length for maximum efficiency and to eliminate stop-ups. 16) Whenever possible, the operator shall utilize smooth bore hoses to ensure maximum efficiency and eliminate stop-ups. 17) At no time shall the operator be permitted to change hoses while the equipment is running. 18) The operator shall set the emergency brake and chalk the tires prior to vacuum operations. 19) The operator shall ground the truck prior to vacuum operations. 20) The vacuum truck shall be operated only in areas that are as level as possible. 21) Other than low levels of dissolved solids, soils, and sediments in the waste water. The operator shall not intentionally mix wet and dry materials or any materials with unidentified hazards in the same tank. 22) The operator shall maintain safe vehicle distance (minimum of 2-feet) from open trenches. 23) The vacuum truck tank shall be treated as a confined space. At no time shall personnel be permitted to enter the tank until vehicle is decommissioned, locked-out and tagged-out, and permit required confined space entry procedures are reviewed and followed. 24) When parking the equipment, the operator shall be mindful of safe parking locations and avoid parking in high traffic areas and in other equipment's blind spots.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Qualified and experienced Contractor personnel may utilize pneumatic tools and torch cutting equipment when further size reducing sections of the pipe rack and associated piping after it has been decontaminated.</p>	<p>Cutting, pinching, skin burns, and eye damage from glare are hazards associated with improper operation of torch cutting equipment</p> <p>Air tool systems may present significant health hazards if not properly inspected before each use. Cutting, pinching and major bodily harm may result improper</p>	<p>PPE: Personnel performing torch cutting operations shall utilize <i>Modified Level D</i> PPE including hard toe work boots, leather gloves, long sleeve shirts, hard hat with protective face shield. Hearing protection shall be immediately available in case noise from tool operation and/or noise from other nearby construction activities exceed 90 dBA.</p> <p>Safe Operating Practices – Torch Cutting All personnel performing torch cutting activities shall be familiar with and shall adhere to all the safe operating policies and procedures outlined in <i>Section 24.0</i> of the HASP.</p>

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	<p>use of pneumatic tools or an accidental release of pressurized air due to ruptured hoses and fittings.</p>	<p>Air Tools: Air tool system shall be inspected before each use to check for worn fittings and compromised hoses. Pneumatic power tools should be secured to the hose or whip in a positive manner to prevent accidental disconnection. Safety clips or retainers should be securely installed and maintained on pneumatic impact tools to prevent attachments from being accidentally expelled. The manufacturer's safety operating pressure for all fittings should not be exceeded. All hoses exceeding 1/2-inch inside diameter should have a safety device at the source of supply or branch line to reduce pressure in case of hose failure.</p> <p>Safe Operating Practices – Air Compressors</p> <ol style="list-style-type: none"> 1. Only trained (experienced) personnel shall operate air compressors. Compressor operators shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Section 25.0</i> of the HASP. 2. When using electric air compressors, the operator shall avoid using the air compressor in wet or damp locations to avoid the potential for electric shock. 3. Diesel powered, tow behind air compressors shall not be towed at speeds exceeding 50 miles per hour. Safety chains shall be attached all times during towing. 4. The operator shall avoid wearing jewelry or loose clothing that can be caught in moving parts while operating the compressor. 5. DO NOT BREATHE COMPRESSED AIR. Compressor exhaust gases contain carbon monoxide. Compressors shall only be operated in well ventilated areas. 6. Air compressor noise may exceed 90 dB. The operator and all nearby personnel and/or bystanders shall utilize hearing protection at all times. 7. Tow behind air compressors shall be parked and operated on level surfaces to prevent potential roll over during operation. 8. Before operating diesel powered, tow behind compressors, the operator shall ensure all compartment doors, guards and panels are secured so as prevent coming loose and causing personnel injury and/or equipment damage. 9. Never refill diesel powered compressors while they are in operation. The operator shall allow engine to cool before refueling and/or removing radiator and oil filter caps. Operating personnel shall always be aware of hot surfaces including mufflers, exhaust manifolds, and other engine parts.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel may utilize fixed, enclosed ladder systems to access elevated areas of the overhead pipe rack. Contractor personnel may also utilize portable ladders to access lesser elevated areas at the work site.	Slip, trip and fall are hazards associated with improper use of fixed and portable ladder systems.	<p>Portable Ladders: Active fall arrest systems will be utilized by all workers performing work activities on ladders at elevations greater than six (6) feet. Contractor personnel utilizing portable ladders shall be familiar with and adhere to policies and procedures outlined in <i>Section 22.0</i> of the HASP.</p> <p>Fall Protection: Active fall arrest systems will be utilized by all workers performing work activities at elevations</p>

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		greater than six (6) feet where no passive fall arrest systems (railings, platforms, etc.) exist. Contractor personnel performing work in elevated areas shall be familiar with and adhere to fall protection policies and protocols outlined in <i>Section 20.0</i> of the HASP
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel may be performing work in chemical resistant, non-breathable PPE and/or working in areas where elevated temperatures are likely.	The potential for heat related illnesses are a factor when performing work activities in chemical resistant, non-breathable PPE especially in summer months where elevated temperatures are likely. When the body is unable to cool itself by sweating, several heat induced illnesses such as heat stress or heat exhaustion or the more severe heat stroke can occur and result in serious injury or illness or even death. High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; certain medications; and inadequate tolerances for hot workplaces are all factors which can lead to heat stress and heat related illness.	<p>Heat Illness Prevention: All Contractor employees shall adhere to heat illness prevention protocols outlined in <i>Section 18.0</i> of the HASP for work activities performed in non-breathable chemical resistant PPE both indoor and outdoor where environmental risk factors for heat illness are present. In general, personnel shall take into consideration the following preventative measures to reduce the risk of heat related illness:</p> <ol style="list-style-type: none"> 1) Learning and understanding the signs and symptoms of heat illnesses and what to do to help affected employees. 2) Employee training on heat induced illnesses. 3) When possible, try to perform heaviest work during coolest part of the day. 4) <i>Acclimatization</i> – build up tolerance to heat and work activity (takes up to two weeks). 5) Use the buddy system (work in pairs) 6) Drink plenty of cool water (one small cup every 15-20 minutes). 7) Wear light, loose fitting, breathable clothing. 8) Take frequent short breaks in cool, shaded areas allowing the body to cool down 9) Avoid eating large, heavy meals before working in hot environments 10) Avoid caffeinated beverages as they make the body lose water and increase the risk of heat illnesses.

Activity Hazard Analysis

Date:	August 15, 2008
Project:	Romic Phase I Facility Closure Project
Site Safety Officer:	Mr. Jason M. Costello
Activity Description:	Maintenance Shop Floor Washing Activities

Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>The Contractor has noted staining on the locker room floor and concrete entrance ways in the maintenance shop. These surfaces shall be cleaned via high pressure water washing activities.</p>	<p>Bruising, cutting, tearing and major bodily harm are hazards associated with improper operation and lack of experience and training regarding use of concentrated high pressure water.</p> <p>Ground surfaces and footing areas may become wet and present potential slip, trip and fall hazards.</p> <p>Environmental and personnel chemical exposure (dermal and inhalation) due to overspray are hazards associated with high pressure water washing.</p>	<p>PPE: All personnel performing high pressure water washing activities shall utilize <i>Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>Contractor personnel shall tape plastic over the ends of the fume hood and HVAC ducting sections to prevent potential release of contaminants when transferring these materials to designated decontamination stations.</p> <p>Safe Operating Practices – Pressure Washing Equipment: The SSO shall ensure all power tools are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Power tool inspection checklists will be turned into the SSO and maintained in an inspection checklist binder. Contractor personnel operating high pressure water washing equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Sections 23.0</i> and <i>25.0</i> of the HASP. In general, Contractor personnel performing pressure washing activities shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained (experienced) personnel shall operate high pressure washing equipment 2) The operator shall insure that all electrical controls are either fail safe, low voltage, or protected with an approved ground fault circuit interrupter. 3) At no time shall the operator operate the equipment above the manufacturers rated pressure maximum. 4) The operator shall always increase pressure slowly until required working pressure is reached. 5) High pressure water can puncture splash suits and other personal protective clothing. At no time shall the operator point the pressure washer nozzle in the direction of other personnel. 6) Water spray will be directed downward to minimize misting and overspray.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Contractor personnel may be performing work in chemical resistant, non-breathable PPE and/or working in areas where</p>	<p>The potential for heat related illnesses are a factor when performing work activities in chemical resistant, non-breathable PPE</p>	<p>Heat Illness Prevention: All Contractor employees shall adhere to heat illness prevention protocols outlined in <i>Section 18.0</i> of the HASP for work activities performed in non-breathable chemical resistant PPE both indoor and</p>

Activity Hazard Analysis

<p>elevated temperatures are likely.</p>	<p>especially in summer months where elevated temperatures are likely. When the body is unable to cool itself by sweating, several heat induced illnesses such as heat stress or heat exhaustion or the more severe heat stroke can occur and result in serious injury or illness or even death. High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; certain medications; and inadequate tolerances for hot workplaces are all factors which can lead to heat stress and heat related illness.</p>	<p>outdoor where environmental risk factors for heat illness are present. In general, personnel shall take into consideration the following preventative measures to reduce the risk of heat related illness:</p> <ol style="list-style-type: none"> 1) Learning and understanding the signs and symptoms of heat illnesses and what to do to help affected employees. 2) Employee training on heat induced illnesses. 3) When possible, try to perform heaviest work during coolest part of the day. 4) <i>Acclimatization</i> – build up tolerance to heat and work activity (takes up to two weeks). 5) Use the buddy system (work in pairs) 6) Drink plenty of cool water (one small cup every 15-20 minutes). 7) Wear light, loose fitting, breathable clothing. 8) Take frequent short breaks in cool, shaded areas allowing the body to cool down 9) Avoid eating large, heavy meals before working in hot environments 10) Avoid caffeinated beverages as they make the body lose water and increase the risk of heat illnesses.
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Activity Hazard Analysis

Date:	August 15, 2008
Project:	Romic Phase I Facility Closure Project
Site Safety Officer:	Mr. Jason M. Costello
Activity Description:	Demolition and Decontamination of the Laboratory Building

Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Exhaust and HVAC ducting as well as fume hoods, non-metallic wet benches, and other grossly contaminated surface sections shall be transferred to a designated decontamination station and decontaminated via high pressure water washing activities.</p> <p>The Contractor has noted excessive staining on the roof and North wall of the laboratory building and shall decontaminate these areas via high pressure water washing activities.</p>	<p>Bruising, cutting, tearing and major bodily harm are hazards associated with improper operation and lack of experience and training regarding use of concentrated high pressure water.</p> <p>Ground surfaces and footing areas may become wet and present potential slip, trip and fall hazards.</p> <p>Environmental and personnel chemical exposure (dermal and inhalation) due to overspray are hazards associated with high pressure water washing.</p>	<p>PPE: All personnel performing high pressure water washing activities shall utilize <i>Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>Contractor personnel shall tape plastic over the ends of the fume hood and HVAC ducting sections to prevent potential release of contaminants when transferring these materials to designated decontamination stations.</p> <p>Safe Operating Practices – Pressure Washing Equipment: The SSO shall ensure all power tools are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Power tool inspection checklists will be turned into the SSO and maintained in an inspection checklist binder. Contractor personnel operating high pressure water washing equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Sections 23.0</i> and <i>25.0</i> of the HASP. In general, Contractor personnel performing pressure washing activities shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained (experienced) personnel shall operate high pressure washing equipment 2) The operator shall insure that all electrical controls are either fail safe, low voltage, or protected with an approved ground fault circuit interrupter. 3) At no time shall the operator operate the equipment above the manufacturers rated pressure maximum. 4) The operator shall always increase pressure slowly until required working pressure is reached. 5) High pressure water can puncture splash suits and other personal protective clothing. At no time shall the operator point the pressure washer nozzle in the direction of other personnel. 6) Water spray will be directed downward to minimize misting and overspray.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Once the laboratory building has met cleanup standards, it will be demolished using an excavator with a thumb</p>	<p>Slip, trip, and fall as well as crushing, pinching, amputation and struck-by hazards are associated with heavy</p>	<p>PPE: Personnel operating the excavator who are <u>not</u> exposed to chemical hazards (ie. excavator operation only) must, at a minimum, utilize <i>Level D</i> PPE including steel toe work boots, leather gloves, hard hat,</p>

Activity Hazard Analysis

<p>attachment.</p>	<p>equipment use.</p> <p>Excavator stability while demolishing the laboratory building may be adversely affected by one of the following conditions:</p> <ul style="list-style-type: none"> - The equipment is not on a level surface when cutting, lifting and loading. - Rear wheels and/or tracks settle unevenly during lifting and unloading. - Wind may exert lateral forces and cause swaying and abnormal stress. - Poor rear suspension systems on one or the other side of the vehicle (non-tracked excavators). - Uneven tire pressures in front or rear wheels (non-tracked excavators). - Worn or inadequate components of the lifting systems such as pins. - Worn or inadequate lifting cylinders. 	<p>safety glasses and bright colored protective safety vests. Hearing protection shall be immediately available in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA.</p> <p>Nearby foot personnel assisting with demolition activities shall utilized <i>Modified Level D</i> PPE including yellow chemical resistant polypropylene suits, steel toe work boots, Leather gloves with nitrile glove inner liners, hard hats, safety glasses, and bright colored protective safety vests.</p> <p>Safe Operating Practices – Excavator</p> <ol style="list-style-type: none"> 1. Only trained and qualified Contractor personnel are permitted operate the equipment. Training documentation shall be provided to the Client and/or kept onsite at all times. 2. The operator shall perform a pre-operational check of the equipment and be familiar with operator's manual. 3. The operator shall check backup alarms, engine oil, hydraulic oil, fuel, dust collector and grease fittings daily as part of the pre-equipment operation inspection process. 4. When checking for leaks in the hydraulic system, the operator shall use a piece of paper or cardboard. At no time shall the operator use his/her hands since oil from a pin-hole leak under high pressure can penetrate the skin. 5. The operator shall be responsible for lockout and tagout of damaged and unsafe equipment and equipment controls. The operator shall promptly report all needed repairs to the site supervisor. 6. Seat belts and/or shoulder harnesses must always be worn to keep the operator secure within the equipment's cab or roll over protection system (ROPS). 7. The operator shall keep windshield, windshield wipers, side windows and mirrors clean. Mirrors shall be adjusted to provide the largest possible view of the rear of the equipment. 8. When mounting or dismounting equipment, the operator shall only use the designated steps and handholds provided on the equipment. Operators are not permitted to jump from equipment at any time. 9. Whenever possible, the operator shall plan ahead to minimize or eliminate the need for backing and/or excessive rotation. When available, the operator shall use an observer to assist with backing up and rotating the equipment. The operator shall make sure back-up alarms are working properly as part of the pre-equipment operation inspection process. 10. When parking the equipment, the operator shall be mindful of safe parking locations and avoid parking in high traffic areas and in other equipment's blind spots. 11. The operator shall always wear appropriate personal protective equipment consistent with the immediate hazards on hand. 12. The operator shall keep hearing protection on hand at all times in case noise from equipment operation or noise from nearby construction activities exceeds 90 dBA.
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		<ol style="list-style-type: none"> 13. The operator shall inspect fire extinguisher locations on the equipment as part of the pre-equipment operation inspection process. 14. The operator shall always be aware of employees and others on foot in the immediate work zone. 15. The operator shall be mindful of the location of foot personnel before rotating the cab and bucket. 16. The operator shall rotate the cab and bucket with extreme caution and continually check both sides and behind when rotating and backing up the equipment. Excavator maneuverability can be quick and abrupt. The operator shall always be aware of personnel on foot in the immediate area zone and whenever possible, keep all other personnel away from the immediate work area. 17. The operator shall always ensure the attachment locking devices are in place, even when switching attachments for only a few minutes. If not locked, attachments may break free and fall onto nearby personnel or damage nearby equipment. 18. The operator shall only utilize manufacturer-approved attachments and buckets. 19. The operator shall not leave attachments in the raised position when equipment is not in use. 20. No personnel shall be allowed to work in or under a raised bucket at any time. Other than the operator, no riders are allowed anywhere on the equipment. 21. The operator shall always be mindful of overhead power line clearances. Equipment shall not be operated within 10 feet of energized power lines. 22. Whenever possible, the equipment shall be transported from location to location using a truck and trailer. Swing and boom locking pins must be set and equipment must be properly secured prior to transporting. 23. Before digging, the operator shall review trenching and excavation standard operating procedures. 24. The operator shall remain a minimum of 2-feet away from open trenches. 25. When operating on slopes, the operator shall use caution when rotating the cab and bucket in a downhill direction. The operator shall position equipment so that material is dumped on the uphill side of the equipment. 26. The operator shall always keep buckets and/or other attachments at the safest, lowest position when moving the equipment. The operator shall always keep the heaviest end of the bucket pointing uphill when moving up and down inclines with a full bucket. Equipment shall not be operated on slopes of more than 20 degrees. 27. The operator shall select loading areas that are as level as possible. 28. The operator shall never leave the equipment unattended with the engine running. Lower
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		the bucket/attachment to the ground and shut off engine when equipment is not in use.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Contractor personnel will utilize a forklift to relocate fume hoods, ducting, and other laboratory equipment to designated decontamination stations.</p>	<p>Slip, trip, fall, crushing, pinching and struck-by hazards are potential health and safety hazards associated with improper operation and lack of experience and training regarding use forklifts.</p> <p>Struck-by hazards associated with dropped or falling objects are hazards associated with improper securing of loads.</p>	<p>PPE: Personnel operating forklifts who are <u>not</u> exposed to chemical hazards (ie. forklift operation only) must, at a minimum, utilize <i>Level D</i> PPE including steel toe work boots, leather gloves, hard hat, safety glasses and bright colored protective safety vests. Hearing protection shall be immediately available in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA.</p> <p>Foot personnel assisting with loading and transfer of chemical piping sections to the decontamination stations shall utilized <i>Modified Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, hard hats, safety glasses, and bright colored protective safety vests.</p> <p>Safe Operating Practices – Forklift</p> <ol style="list-style-type: none"> 1) The operator shall be sure that a safe distance is maintained from the edge of ramps or platforms while on any elevated dock, platform or freight car. 2) When leaving the truck unattended, the forks will be fully lowered the controls placed in neutral, the power shut off, the brakes set to and the key or connector plug removed. The wheels will be blocked if the forklift is parked on an incline. Note: A powered forklift is considered unattended when the operator is 25 feet or more away from the vehicle which remains in his/her view or whenever the operator leaves the vehicle and the forklift is not in view. 3) When the operator of an industrial forklift is dismounted and within 25 ft. of the forklift still in his view, the load engaging means shall be fully lowered, controls neutralized, and the brakes set to prevent movement. 4) Forklifts will not be used to open or close freight doors. 5) The brakes of the forklift shall be set and wheel chocks or stops will be in place to prevent movement during loading or unloading operations. Fixed jacks may be necessary to support a semi-trailer during loading or unloading when the trailer is not coupled to a tractor. The flooring of trucks, trailers and railroad cars will be checked by the operator for breaks and weakness before driving these vehicles into these surfaces. 6) An overhead guard shall be used at all times as protection against falling objects. Note: The overhead guard may only be intended to offer protection from the impact of small packages, boxes or bagged materials only. 7) The operator shall utilize a load backrest extension whenever necessary to minimize the possibility of the load or part of the load from falling rearward. 8) Only approved industrial forklifts will be used in hazardous conditions. 9) The operator shall not drive a forklift up to anyone standing in front of a bench or other fixed object.

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		<ol style="list-style-type: none"> 10) No person shall be allowed to stand or pass under the elevated portion of any forklift, whether loaded or empty. 11) Under no circumstances are passengers permitted to ride on a forklift unless authorized and the forklift is equipped with a safe place for the passenger to ride. 12) The operator shall never place his/her arms or legs between the uprights of the mast or outside the running lines of the forklift. 13) The operator shall NEVER push one load with another load. 14) Spinner knobs shall NEVER be attached to the steering handwheels of forklifts not originally equipped with such knobs. 15) The operator shall NEVER lift people on the forks of a forklift unless the forklift has a properly designed safety platform securely attached to the lifting carriage and/or forks. If the forklift is equipped with vertical controls only, or vertical and horizontal controls elevatable with the lifting carriage or forks, means will be provided whereby personnel on the platform can shut off power to the forklift. Protection from falling objects as indicated necessary by the operating conditions shall also be provided based on site conditions. 16) Safety platforms, firmly secured to the lifting carriage and/or forks, shall be used whenever possible. 17) Only stable and safely arranged loads shall be handled. The operator shall use extreme caution when handling off-centered loads that cannot be centered on the forks. 18) Only loads within the rated capacity of the forklift shall be handled. 19) The operator shall ensure that the forks are placed under the load as far as possible and the mast carefully tilted backward to stabilize the load. 20) Extreme care shall be used when tilting the load forward or backward especially when high tiering. Tilting forward with load engaging means elevation shall be prohibited except to pick up a load. An elevated load will not be tilted forward except when the load is in a deposit position over a rack or stack of material. 21) When stacking or tiering loads, the operator shall tilt the load backward only enough to stabilize the load. 22) The operator shall remove unsafe containers and pallets from service. 23) Forklifts equipped with attachments will be operated as a partially loaded truck when not handling a load. 24) The operator shall adjust long and high loads, including multiple-tiered loads that may affect the capacity of the forklift. 25) The operator shall insure there is always a safe distance between the mast and overhead lights, pipes, sprinkler systems, wires, cables, and power lines.
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		<p>26) Forklifts shall be inspected before being placed in service. The operator shall perform equipment inspection and complete an inspection checklist at least once daily before operation. A forklift used on a round-the-clock basis will be inspected after each shift.</p> <p>27) If at any time during an operator's shift a forklift is found to be in unsafe, the operator shall immediately notify onsite management personnel and remove the forklift from service until it has been restored to safe operating condition.</p> <p>28) Fuel tanks shall not be filled while the engine is running. Spillage shall be avoided.</p> <p>29) Spillage of excess oil or fuel shall be carefully cleaned up and disposed off in accordance with state and federal regulations. Fuel cap must be replaced before restarting the engine.</p> <p>30) The operator shall always wear the proper personal protective equipment when fueling the truck or performing any other maintenance on the truck.</p> <p>31) No forklift shall be operated with a leak in the fuel and/or hydraulic systems until the leak(s) have been corrected.</p> <p>32) Open flames shall NEVER be used to check the electrolyte level in batteries or the gasoline level in the fuel tank.</p> <p>33) Smoking is not allowed at anytime while operating the forklift or while changing LPG tanks, refueling gas powered forklifts or changing or charging batteries for electric powered forklifts.</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel may utilize portable ladders to access elevated areas in the laboratory building	Slip, trip and fall are hazards associated with improper use of portable ladders.	<p>Portable Ladders: Active fall arrest systems will be utilized by all workers performing work activities on ladders at elevations greater than six (6) feet. Contractor personnel utilizing portable ladders shall be familiar with and adhere to policies and procedures outlined in <i>Section 22.0</i> of the HASP.</p> <p>Fall Protection: Active fall arrest systems will be utilized by all workers performing work activities at elevations greater than six (6) feet where no passive fall arrest systems (railings, platforms, etc.) exist. Contractor personnel performing work in elevated areas shall be familiar with and adhere to fall protection policies and protocols outlined in <i>Section 20.0</i> of the HASP</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel may be performing work in chemical resistant, non-breathable PPE and/or working in areas where elevated temperatures are likely.	The potential for heat related illnesses are a factor when performing work activities in chemical resistant, non-breathable PPE especially in summer months where elevated temperatures are likely. When the body is unable to cool itself by sweating, several heat induced illnesses such as heat stress or heat exhaustion or the more severe heat stroke can occur	<p>Heat Illness Prevention: All Contractor employees shall adhere to heat illness prevention protocols outlined in <i>Section 18.0</i> of the HASP for work activities performed in non-breathable chemical resistant PPE both indoor and outdoor where environmental risk factors for heat illness are present. In general, personnel shall take into consideration the following preventative measures to reduce the risk of heat related illness:</p> <p>1) Learning and understanding the signs and symptoms of heat illnesses and what to do to help affected employees.</p>

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	<p>and result in serious injury or illness or even death. High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; certain medications; and inadequate tolerances for hot workplaces are all factors which can lead to heat stress and heat related illness.</p>	<ol style="list-style-type: none">2) Employee training on heat induced illnesses.3) When possible, try to perform heaviest work during coolest part of the day.4) <i>Acclimatization</i> – build up tolerance to heat and work activity (takes up to two weeks).5) Use the buddy system (work in pairs)6) Drink plenty of cool water (one small cup every 15-20 minutes).7) Wear light, loose fitting, breathable clothing.8) Take frequent short breaks in cool, shaded areas allowing the body to cool down9) Avoid eating large, heavy meals before working in hot environments10) Avoid caffeinated beverages as they make the body lose water and increase the risk of heat illnesses.
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Activity Hazard Analysis

Date:	August 15, 2008
Project:	Romic Phase I Facility Closure Project
Site Safety Officer:	Mr. Jason M. Costello
Activity Description:	Demolition and Decontamination High Temperature Unit and Boilers

Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Exterior surfaces of the high temperature unit and boilers as well as secondary containment surfaces shall be washed and decontaminated via high pressure water washing activities.</p>	<p>Bruising, cutting, tearing and major bodily harm are hazards associated with improper operation and lack of experience and training regarding use of concentrated high pressure water.</p> <p>Ground surfaces and footing areas may become wet and present potential slip, trip and fall hazards.</p> <p>Environmental and personnel chemical exposure (dermal and inhalation) due to overspray are hazards associated with high pressure water washing.</p>	<p>PPE: All personnel performing high pressure water washing activities shall utilize <i>Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>Safe Operating Practices – Pressure Washing Equipment: The SSO shall ensure all power tools are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Power tool inspection checklists will be turned into the SSO and maintained in an inspection checklist binder. Contractor personnel operating high pressure water washing equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Sections 23.0</i> and <i>25.0</i> of the HASP. In general, Contractor personnel performing pressure washing activities shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained (experienced) personnel shall operate high pressure washing equipment 2) The operator shall insure that all electrical controls are either fail safe, low voltage, or protected with an approved ground fault circuit interrupter. 3) At no time shall the operator operate the equipment above the manufacturers rated pressure maximum. 4) The operator shall always increase pressure slowly until required working pressure is reached. 5) High pressure water can puncture splash suits and other personal protective clothing. At no time shall the operator point the pressure washer nozzle in the direction of other personnel. 6) Water spray will be directed downward to minimize misting and overspray.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>If the high temperature unit is not sold, an excavator mounted shear shall be utilized to size-reduce the high temperature unit and boilers.</p>	<p>Slip, trip, and fall as well as crushing, pinching, amputation and struck-by hazards are associated with heavy equipment use.</p> <p>Excavator stability while size reducing the high temperature unit and boilers may be</p>	<p>PPE: Personnel operating the excavator who are <u>not</u> exposed to chemical hazards (ie. excavator operation only) must, at a minimum, utilize <i>Level D</i> PPE including steel toe work boots, leather gloves, hard hat, safety glasses and bright colored protective safety vests. Hearing protection shall be immediately available in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA.</p>

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<p>adversely affected by one of the following conditions:</p> <ul style="list-style-type: none"> - The equipment is not on a level surface when cutting, lifting and loading. - Rear wheels and/or tracks settle unevenly during lifting and unloading. - Wind may exert lateral forces and cause swaying and abnormal stress. - Poor rear suspension systems on one or the other side of the vehicle (non-tracked excavators). - Uneven tire pressures in front or rear wheels (non-tracked excavators). - Worn or inadequate components of the lifting systems such as pins. - Worn or inadequate lifting cylinders. 	<p>Nearby foot personnel assisting with loading and transfer of tanks, associated piping and process equipment shall utilized <i>Modified Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, hard hats, safety glasses, and bright colored protective safety vests.</p> <p>Safe Operating Practices – Excavator</p> <ol style="list-style-type: none"> 1. Only trained and qualified Contractor personnel are permitted operate the equipment. Training documentation shall be provided to the Client and/or kept onsite at all times. 2. The operator shall perform a pre-operational check of the equipment and be familiar with operator's manual. 3. The operator shall check backup alarms, engine oil, hydraulic oil, fuel, dust collector and grease fittings daily as part of the pre-equipment operation inspection process. 4. When checking for leaks in the hydraulic system, the operator shall use a piece of paper or cardboard. At no time shall the operator use his/her hands since oil from a pin-hole leak under high pressure can penetrate the skin. 5. The operator shall be responsible for lockout and tagout of damaged and unsafe equipment and equipment controls. The operator shall promptly report all needed repairs to the site supervisor. 6. Seat belts and/or shoulder harnesses must always be worn to keep the operator secure within the equipment's cab or roll over protection system (ROPS). 7. The operator shall keep windshield, windshield wipers, side windows and mirrors clean. Mirrors shall be adjusted to provide the largest possible view of the rear of the equipment. 8. When mounting or dismounting equipment, the operator shall only use the designated steps and handholds provided on the equipment. Operators are not permitted to jump from equipment at any time. 9. Whenever possible, the operator shall plan ahead to minimize or eliminate the need for backing and/or excessive rotation. When available, the operator shall use an observer to assist with backing up and rotating the equipment. The operator shall make sure back-up alarms are working properly as part of the pre-equipment operation inspection process. 10. When parking the equipment, the operator shall be mindful of safe parking locations and avoid parking in high traffic areas and in other equipment's blind spots. 11. The operator shall always wear appropriate personal protective equipment consistent with the immediate hazards on hand. 12. The operator shall keep hearing protection on hand at all times in case noise from equipment operation or noise from nearby construction activities exceeds 90 dBA. 13. The operator shall inspect fire extinguisher locations on the equipment as part of the pre-equipment operation inspection process.
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		<ol style="list-style-type: none"> 14. The operator shall always be aware of employees and others on foot in the immediate work zone. 15. The operator shall be mindful of the location of foot personnel before rotating the cab and bucket. 16. The operator shall rotate the cab and bucket with extreme caution and continually check both sides and behind when rotating and backing up the equipment. Excavator maneuverability can be quick and abrupt. The operator shall always be aware of personnel on foot in the immediate area zone and whenever possible, keep all other personnel away from the immediate work area. 17. The operator shall always ensure the attachment locking devices are in place, even when switching attachments for only a few minutes. If not locked, attachments may break free and fall onto nearby personnel or damage nearby equipment. 18. The operator shall only utilize manufacturer-approved attachments and buckets. 19. The operator shall not leave attachments in the raised position when equipment is not in use. 20. No personnel shall be allowed to work in or under a raised bucket at any time. Other than the operator, no riders are allowed anywhere on the equipment. 21. The operator shall always be mindful of overhead power line clearances. Equipment shall not be operated within 10 feet of energized power lines. 22. Whenever possible, the equipment shall be transported from location to location using a truck and trailer. Swing and boom locking pins must be set and equipment must be properly secured prior to transporting. 23. Before digging, the operator shall review trenching and excavation standard operating procedures. 24. The operator shall remain a minimum of 2-feet away from open trenches. 25. When operating on slopes, the operator shall use caution when rotating the cab and bucket in a downhill direction. The operator shall position equipment so that material is dumped on the uphill side of the equipment. 26. The operator shall always keep buckets and/or other attachments at the safest, lowest position when moving the equipment. The operator shall always keep the heaviest end of the bucket pointing uphill when moving up and down inclines with a full bucket. Equipment shall not be operated on slopes of more than 20 degrees. 27. The operator shall select loading areas that are as level as possible. 28. The operator shall never leave the equipment unattended with the engine running. Lower the bucket/attachment to the ground and shut off engine when equipment is not in use.
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Activity Hazard Analysis

Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Contractor personnel will utilize a forklift to move and place piping and miscellaneous controls directly on a flatbed for transport to a scrap metal recycler or buyer.</p>	<p>Slip, trip, fall, crushing, pinching and struck-by hazards are potential health and safety hazards associated with improper operation and lack of experience and training regarding use forklifts.</p> <p>Struck-by hazards associated with dropped or falling objects are hazards associated with improper securing of loads.</p>	<p>PPE: Personnel operating forklifts who are <u>not</u> exposed to chemical hazards (ie. forklift operation only) must, at a minimum, utilize <i>Level D</i> PPE including steel toe work boots, leather gloves, hard hat, safety glasses and bright colored protective safety vests. Hearing protection shall be immediately available in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA.</p> <p>Foot personnel assisting with loading and transfer of chemical piping sections to the decontamination stations shall utilize <i>Modified Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, hard hats, safety glasses, and bright colored protective safety vests.</p> <p>Safe Operating Practices – Forklift</p> <ol style="list-style-type: none"> 1) The operator shall be sure that a safe distance is maintained from the edge of ramps or platforms while on any elevated dock, platform or freight car. 2) When leaving the truck unattended, the forks will be fully lowered the controls placed in neutral, the power shut off, the brakes set to and the key or connector plug removed. The wheels will be blocked if the forklift is parked on an incline. Note: A powered forklift is considered unattended when the operator is 25 feet or more away from the vehicle which remains in his/her view or whenever the operator leaves the vehicle and the forklift is not in view. 3) When the operator of an industrial forklift is dismounted and within 25 ft. of the forklift still in his view, the load engaging means shall be fully lowered, controls neutralized, and the brakes set to prevent movement. 4) Forklifts will not be used to open or close freight doors. 5) The brakes of the forklift shall be set and wheel chocks or stops will be in place to prevent movement during loading or unloading operations. Fixed jacks may be necessary to support a semi-trailer during loading or unloading when the trailer is not coupled to a tractor. The flooring of trucks, trailers and railroad cars will be checked by the operator for breaks and weakness before driving these vehicles into these surfaces. 6) An overhead guard shall be used at all times as protection against falling objects. Note: The overhead guard may only be intended to offer protection from the impact of small packages, boxes or bagged materials only. 7) The operator shall utilize a load backrest extension whenever necessary to minimize the possibility of the load or part of the load from falling rearward. 8) Only approved industrial forklifts will be used in hazardous conditions. 9) The operator shall not drive a forklift up to anyone standing in front of a bench or other fixed object. 10) No person shall be allowed to stand or pass under the elevated portion of any forklift, whether loaded or empty.

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		<ol style="list-style-type: none"> 11) Under no circumstances are passengers permitted to ride on a forklift unless authorized and the forklift is equipped with a safe place for the passenger to ride. 12) The operator shall never place his/her arms or legs between the uprights of the mast or outside the running lines of the forklift. 13) The operator shall NEVER push one load with another load. 14) Spinner knobs shall NEVER be attached to the steering handwheels of forklifts not originally equipped with such knobs. 15) The operator shall NEVER lift people on the forks of a forklift unless the forklift has a properly designed safety platform securely attached to the lifting carriage and/or forks. If the forklift is equipped with vertical controls only, or vertical and horizontal controls elevatable with the lifting carriage or forks, means will be provided whereby personnel on the platform can shut off power to the forklift. Protection from falling objects as indicated necessary by the operating conditions shall also be provided based on site conditions. 16) Safety platforms, firmly secured to the lifting carriage and/or forks, shall be used whenever possible. 17) Only stable and safely arranged loads shall be handled. The operator shall use extreme caution when handling off-centered loads that cannot be centered on the forks. 18) Only loads within the rated capacity of the forklift shall be handled. 19) The operator shall ensure that the forks are placed under the load as far as possible and the mast carefully titled backward to stabilize the load. 20) Extreme care shall be used when tilting the load forward or backward especially when high tiering. Tilting forward with load engaging means elevation shall be prohibited except to pick up a load. An elevated load will not be tilted forward except when the load is in a deposit position over a rack or stack of material. 21) When stacking or tiering loads, the operator shall tilt the load backward only enough to stabilize the load. 22) The operator shall remove unsafe containers and pallets from service. 23) Forklifts equipped with attachments will be operated as a partially loaded truck when not handling a load. 24) The operator shall adjust long and high loads, including multiple-tiered loads that may affect the capacity of the forklift. 25) The operator shall insure there is always a safe distance between the mast and overhead lights, pipes, sprinkler systems, wires, cables, and power lines. 26) Forklifts shall be inspected before being placed in service. The operator shall perform equipment inspection and complete an inspection checklist at least once daily before
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		<p>operation. A forklift used on a round-the-clock basis will be inspected after each shift.</p> <p>27) If at any time during an operator's shift a forklift is found to be in unsafe, the operator shall immediately notify onsite management personnel and remove the forklift from service until it has been restored to safe operating condition.</p> <p>28) Fuel tanks shall not be filled while the engine is running. Spillage shall be avoided.</p> <p>29) Spillage of excess oil or fuel shall be carefully cleaned up and disposed off in accordance with state and federal regulations. Fuel cap must be replaced before restarting the engine.</p> <p>30) The operator shall always wear the proper personal protective equipment when fueling the truck or performing any other maintenance on the truck.</p> <p>31) No forklift shall be operated with a leak in the fuel and/or hydraulic systems until the leak(s) have been corrected.</p> <p>32) Open flames shall NEVER be used to check the electrolyte level in batteries or the gasoline level in the fuel tank.</p> <p>33) Smoking is not allowed at anytime while operating the forklift or while changing LPG tanks, refueling gas powered forklifts or changing or charging batteries for electric powered forklifts.</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Qualified and experienced Contractor personnel may utilize a vacuum truck to collect rinsewaters generated from high pressure water washing activities.</p>	<p>Environmental contamination and employee chemical exposure hazards.</p> <p>Slip, trip, and fall as well as crushing, pinching, and struck-by hazards are associated with heavy equipment use.</p> <p>Other hazards associated with vacuum truck operation may include:</p> <ul style="list-style-type: none"> - Improper selection and use of hoses for material being collected. - Improper inspection, monitoring and maintenance of pressure relief systems. - Improper inspection and use of safety shut down systems. - Failure to ground vehicle before operating vacuum systems. 	<p>PPE:</p> <ul style="list-style-type: none"> - The vacuum truck operator and any foot personnel assisting with collection of rinse water and pipeline residuals shall utilize <i>Level D Modified PPE</i> consisting of hard hats, safety glasses, rubber steel toe chemical resistant boots, chemical resistant gloves and yellow poly propylene chemical resistant suit with bright orange or green reflective safety vests. - The vacuum truck operator and any foot personnel assisting with collection of rinse water and pipeline residuals shall have immediately available a full face APR with appropriate cartridge configuration based on the anticipated chemical hazard. - Hearing protection shall be kept on hand at all times in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA. <p>The Contractor shall connect a vacuum truck line to each of the lines where they have been cut at the tank farms and pull a vacuum on the lines. The open end of the lines where it has been disconnected at the distillation column will be checked to verify that air is being pulled through the pipe. If no air is being drawn into the pipe, the line will be re-traced to find out why (closed valve, check valve, etc.). The Contractor shall trace each piping run and identify low points in the pipe with either spray paint or marking tape. The pipe at these locations will be either drilled or cut to verify that there are no free liquids in these low points. If free liquids are encountered, they will be vacuumed out of the pipe at the low point.</p> <p>Safe Operating Practices – Vacuum Truck Personnel operating heavy equipment shall adhere to the heavy equipment safe operating protocols and</p>

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		<p>procedures outlined in <i>Section 25.0</i> of the HASP. In general, Contractor personnel operating the vacuum truck shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained and qualified Contractor personnel are permitted operate the vacuum truck. 2) The operator shall perform a pre-operational check of the equipment and be familiar with operator's manual. The operator shall check backup alarms, tire pressure, engine fluids, lights, turn indicators, and vacuum equipment daily as part of the pre-equipment operation inspection process. 3) The operator shall inspect pressure relief systems and safety shut-off systems as part of the pre-equipment operation inspection process. 4) The operator shall be responsible for lock out and tag out of damaged and unsafe equipment and equipment controls. The operator shall promptly report all needed repairs to the site supervisor. 5) Seat belts must always be worn when driving the vacuum truck. 6) The operator shall keep windshield, windshield wipers, side windows and mirrors clean. Mirrors shall be adjusted to provide the largest possible view of the rear of the equipment. 7) When mounting or dismounting the vehicle, the operator shall only use the designated steps and handholds provided on the equipment. Operators are not permitted to jump from equipment at any time. 8) Whenever possible, the operator shall plan ahead to minimize or eliminate the need for backing. When available, the operator shall use an observer to assist with backing up of the equipment. The operator shall make sure back-up alarms are working properly as part of the pre-equipment operation inspection process. 9) The operator shall always wear appropriate personal protective equipment consistent with the immediate hazards on hand. 10) The operator shall keep hearing protection on hand at all times in case noise from equipment operation or noise from nearby construction activities exceeds 90 dBA. 11) The operator shall inspect fire extinguisher locations on the equipment as part of the pre-equipment operation inspection process. 12) The operator shall always be aware of employees and others on foot in the immediate work zone. 13) Other than within the cab of the vehicle, no riders are allowed anywhere on the equipment. 14) The operator shall inspect hoses and cam fittings prior to use. The operator shall only utilize manufacturer-approved attachments. 15) The operator shall always use the same diameter hose along its entire length for
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		<p>maximum efficiency and to eliminate stop-ups.</p> <p>16) Whenever possible, the operator shall utilize smooth bore hoses to ensure maximum efficiency and eliminate stop-ups.</p> <p>17) At no time shall the operator be permitted to change hoses while the equipment is running.</p> <p>18) The operator shall set the emergency brake and chalk the tires prior to vacuum operations.</p> <p>19) The operator shall ground the truck prior to vacuum operations.</p> <p>20) The vacuum truck shall be operated only in areas that are as level as possible.</p> <p>21) Other than low levels of dissolved solids, soils, and sediments in the waste water. The operator shall not intentionally mix wet and dry materials or any materials with unidentified hazards in the same tank.</p> <p>22) The operator shall maintain safe vehicle distance (minimum of 2-feet) from open trenches.</p> <p>23) The vacuum truck tank shall be treated as a confined space. At no time shall personnel be permitted to enter the tank until vehicle is decommissioned, locked-out and tagged-out, and permit required confined space entry procedures are reviewed and followed.</p> <p>24) When parking the equipment, the operator shall be mindful of safe parking locations and avoid parking in high traffic areas and in other equipment's blind spots.</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Qualified and experienced Contractor personnel may utilize pneumatic tools and torch cutting equipment when further size the high temperature unit and associated process equipment.</p>	<p>Cutting, pinching, skin burns, and eye damage from glare are hazards associated with improper operation of torch cutting equipment</p> <p>Air tool systems may present significant health hazards if not properly inspected before each use. Cutting, pinching and major bodily harm may result from improper use of pneumatic tools or an accidental release of pressurized air due to ruptured hoses and fittings.</p>	<p>PPE: Personnel performing torch cutting operations shall utilize <i>Modified Level D</i> PPE including hard toe work boots, leather gloves, long sleeve shirts, hard hat with protective face shield. Hearing protection shall be immediately available in case noise from tool operation and/or noise from other nearby construction activities exceed 90 dBA.</p> <p>Safe Operating Practices – Torch Cutting All personnel performing torch cutting activities shall be familiar with and shall adhere to all the safe operating policies and procedures outlined in <i>Section 24.0</i> of the HASP.</p> <p>Air Tools: Air tool system shall be inspected before each use to check for worn fittings and compromised hoses. Pneumatic power tools should be secured to the hose or whip in a positive manner to prevent accidental disconnection. Safety clips or retainers should be securely installed and maintained on pneumatic impact tools to prevent attachments from being accidentally expelled. The manufacturer's safety operating pressure for all fittings should not be exceeded. All hoses exceeding 1/2-inch inside diameter should have a safety device at the source of supply or branch line to reduce pressure in case of hose failure.</p> <p>Safe Operating Practices – Air Compressors</p> <ol style="list-style-type: none"> 1. Only trained (experienced) personnel shall operate air compressors. Compressor operators shall adhere to the heavy equipment safe operating protocols and procedures outlined in

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		<p><i>Section 25.0 of the HASP.</i></p> <ol style="list-style-type: none"> 2. When using electric air compressors, the operator shall avoid using the air compressor in wet or damp locations to avoid the potential for electric shock. 3. Diesel powered, tow behind air compressors shall not be towed at speeds exceeding 50 miles per hour. Safety chains shall be attached all times during towing. 4. The operator shall avoid wearing jewelry or loose clothing that can be caught in moving parts while operating the compressor. 5. DO NOT BREATHE COMPRESSED AIR. Compressor exhaust gases contain carbon monoxide. Compressors shall only be operated in well ventilated areas. 6. Air compressor noise may exceed 90 dB. The operator and all nearby personnel and/or bystanders shall utilize hearing protection at all times. 7. Tow behind air compressors shall be parked and operated on level surfaces to prevent potential roll over during operation. 8. Before operating diesel powered, tow behind compressors, the operator shall ensure all compartment doors, guards and panels are secured so as prevent coming loose and causing personnel injury and/or equipment damage. 9. Never refill diesel powered compressors while they are in operation. The operator shall allow engine to cool before refueling and/or removing radiator and oil filter caps. Operating personnel shall always be aware of hot surfaces including mufflers, exhaust manifolds, and other engine parts.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel may utilize fixed, enclosed ladder systems to access elevated areas around the high temperature unit and boilers. Contractor personnel may also utilize portable ladders to access lesser elevated areas at the work site.	Slip, trip and fall are hazards associated with improper use of fixed and portable ladder systems.	<p>Portable Ladders: Active fall arrest systems will be utilized by all workers performing work activities on ladders at elevations greater than six (6) feet. Contractor personnel utilizing portable ladders shall be familiar with and adhere to policies and procedures outlined in <i>Section 22.0</i> of the HASP.</p> <p>Fall Protection: Active fall arrest systems will be utilized by all workers performing work activities at elevations greater than six (6) feet where no passive fall arrest systems (railings, platforms, etc.) exist. Contractor personnel performing work in elevated areas shall be familiar with and adhere to fall protection policies and protocols outlined in <i>Section 20.0</i> of the HASP</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel may be performing work in chemical resistant, non-breathable PPE and/or working in areas where elevated temperatures are likely.	The potential for heat related illnesses are a factor when performing work activities in chemical resistant, non-breathable PPE especially in summer months where elevated temperatures are likely. When the body is unable to cool itself by sweating, several heat induced illnesses such as heat stress or heat exhaustion or the more severe heat stroke can occur	<p>Heat Illness Prevention: All Contractor employees shall adhere to heat illness prevention protocols outlined in <i>Section 18.0</i> of the HASP for work activities performed in non-breathable chemical resistant PPE both indoor and outdoor where environmental risk factors for heat illness are present. In general, personnel shall take into consideration the following preventative measures to reduce the risk of heat related illness:</p> <ol style="list-style-type: none"> 1) Learning and understanding the signs and symptoms of heat illnesses and what to do to help affected employees.

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	<p>and result in serious injury or illness or even death. High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; certain medications; and inadequate tolerances for hot workplaces are all factors which can lead to heat stress and heat related illness.</p>	<ol style="list-style-type: none">2) Employee training on heat induced illnesses.3) When possible, try to perform heaviest work during coolest part of the day.4) <i>Acclimatization</i> – build up tolerance to heat and work activity (takes up to two weeks).5) Use the buddy system (work in pairs)6) Drink plenty of cool water (one small cup every 15-20 minutes).7) Wear light, loose fitting, breathable clothing.8) Take frequent short breaks in cool, shaded areas allowing the body to cool down9) Avoid eating large, heavy meals before working in hot environments10) Avoid caffeinated beverages as they make the body lose water and increase the risk of heat illnesses.
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Activity Hazard Analysis

Date:	August 15, 2008
Project:	Romic Phase I Facility Closure Project
Site Safety Officer:	Mr. Jason M. Costello
Activity Description:	Decontamination of Hazardous Waste Management Units (HWMUs)

Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Decontamination of the hazardous waste management units (HWMUs) shall involve pressure washing or hydroblasting building structures, concrete floors, and/or flat concrete surfaces. Pressure washing activities shall start at the highest elevation and work towards the floor.	<p>Bruising, cutting, tearing and major bodily harm are hazards associated with improper operation and lack of experience and training regarding use of concentrated high pressure water.</p> <p>Ground surfaces and footing areas may become wet and present potential slip, trip and fall hazards.</p> <p>Environmental and personnel chemical exposure (dermal and inhalation) due to overspray are hazards associated with high pressure water washing.</p>	<p>PPE: All personnel performing high pressure water washing activities shall utilize <i>Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>Safe Operating Practices – Pressure Washing Equipment: The SSO shall ensure all power tools are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Power tool inspection checklists will be turned into the SSO and maintained in an inspection checklist binder. Contractor personnel operating high pressure water washing equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Sections 23.0 and 25.0</i> of the HASP. In general, Contractor personnel performing pressure washing activities shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained (experienced) personnel shall operate high pressure washing equipment 2) The operator shall insure that all electrical controls are either fail safe, low voltage, or protected with an approved ground fault circuit interrupter. 3) At no time shall the operator operate the equipment above the manufacturers rated pressure maximum. 4) The operator shall always increase pressure slowly until required working pressure is reached. 5) High pressure water can puncture splash suits and other personal protective clothing. At no time shall the operator point the pressure washer nozzle in the direction of other personnel. 6) Water spray will be directed downward to minimize misting and overspray.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Qualified and experienced Contractor personnel may operate scissor lifts to access elevated areas within the HWMUs	Slip, trip, fall, crushing, pinching and struck-by hazards are potential health and safety hazards associated with improper operation and lack of experience and training regarding use of aerial lift devices.	<p>PPE: Personnel operating scissor lifts who are <u>not</u> exposed to chemical hazards (ie. performing pressure washing activities) must, at a minimum, utilize <i>Level D</i> PPE including steel toe work boots, leather gloves, hard hat, safety glasses and bright colored protective safety vests. Hearing protection shall be immediately available in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA.</p>

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	<p>Struck-by hazards associated with dropped or falling objects are hazards associated with elevated, overhead work.</p>	<p>Personnel operating scissor lifts who are also involved in high pressure water washing activities shall utilize <i>Leve C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>The SSO shall ensure all heavy equipment are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Heavy equipment checklists shall posted with the equipment for the operator(s) to review for the remainder of the day.</p> <p>Safe Operating Practices – Scissor Lift: All personnel operating heavy equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Section 25.0</i> of the HASP. In general, Contractor personnel operating scissor lifts shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) The operator shall survey the usage area for potential hazards such as untamped earth fills, unlevel surfaces, overhead obstructions, and electrically charged conductors or wires. The operator shall be aware of any potential hazards and always consider what could happen. Watch for moving vehicles and other personnel the operating area at all times. 2) The operator shall read, understand, and follow the procedures in the safety and operations manual before attempting to operate the equipment. 3) The operator shall inspect the equipment for damaged or worn parts. Check for cracked welds, hydraulic leaks, damaged wiring, loose wire connectors, low tire pressure, uneven tire wear, or tire damage. Also the operator shall check for any improper operation of controls. 4) The operator shall NEVER operate equipment if damaged in any way. Improperly operating equipment must be repaired before using. 5) The operator shall wear proper clothing for the job. Wear protective equipment as required by federal, state, or local regulations. The operator MUST wear a safety harness and lanyard at all times and abide fall protection standards outlined in <i>Section 20.0</i> of the HASP. 6) The operator shall locate, read, and follow all directions and warnings displayed on the equipment. 7) The operator shall inspect the equipment for “DO NOT USE” tags. NEVER use equipment tagged in this way until all repairs are made and all “DO NOT USE” tags are removed by authorized maintenance personnel. 8) The operator shall make sure the basket and platform surfaces are free of mud, grease, or other slippery material to reduce the possibility of slipping. 9) The operator shall NEVER allow other improperly trained personnel to operate this equipment. Only trained and authorized personnel shall be allowed to operate this equipment.
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		<ol style="list-style-type: none">10) The operator shall NEVER operate this equipment while under the influence of alcohol or drugs, or if feeling ill, dizzy, or unsteady in any way. Operators must be physically fit, thoroughly trained, and not easily excitable.11) The operator shall NEVER modify, alter, or change the equipment in any way that would affect its original design or operation in any way.12) The operator shall NEVER operate this equipment in ways for which it is not intended.13) The operator shall position the lift far enough away from power sources to ensure that no part of the lift can accidentally reach into an unsafe area. This includes full extension of the scissor lift.14) The operator shall operate only on a firm and level surface. NEVER use on surfaces that do not support the equipment with its rated load capacity.15) The operator shall keep clear and make sure all other personnel stay away from potential pinch or shear points.16) The operator shall report any misuse of equipment to onsite management personnel. Horseplay is strictly prohibited.17) The operator shall maintain good footing on the work platform. NEVER wear slippery soled shoes.18) The operator shall make certain all personnel are clear and there are no obstructions before raising, lowering and repositioning the lift.19) When possible, operating personnel shall cordon off area around the scissor lift to keep other personnel, bystanders and other equipment away from it while in use.20) The operator shall stay clear of wires, cables, and other overhead obstructions.21) Operating personnel shall NEVER allow electrode contact with any part of the basket if welding is being performed from the platform.22) The operator shall NEVER override or by-pass manufacturer's safety devices.23) The operator shall NEVER attach a safety harness to an adjacent structure, pole, or equipment while working from the boom platform.24) The operator shall NEVER try to move the scissor lift while the basket is extended.25) The operator shall NEVER stand or sit on cage bars. The operator shall work only within the work cage and will not lean out over the cage to perform work.26) The operator shall NEVER attempt to increase working height with boxes, ladders, or other means.27) The operator shall NEVER operate this equipment when exposed to high winds,
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		<p>thunderstorms, ice, or any other weather conditions that would compromise operator safety.</p> <p>28) The operator shall NEVER allow ropes, electric cords, hoses, etc. to become entangled in the equipment when the basket is being raised or lowered.</p> <p>29) The operator shall NEVER exceed manufacturer's load limits or use the lift as a crane for lifting heavy materials. Make sure all tools and equipment are safely stowed.</p> <p>30) The operator shall NEVER exceed load ratings by transferring loads to the basket at elevated heights.</p> <p>31) The operator shall NEVER use the cage to carry materials and shall never allow overhang of materials when raising or lowering the basket.</p> <p>32) The operator shall NEVER use the scissor lift to place a "dead man" load against any structure, materials, or equipment.</p> <p>33) Operating personnel shall NEVER climb up or down the scissor lift.</p> <p>34) Operating personnel shall NEVER leave the keys in the scissor lift while unattended or not in use.</p> <p>Fall Protection: Boom lift baskets shall serve as passive fall arrest systems. Active fall arrest systems will be utilized by all workers performing work activities at elevations greater than six (6) feet where no passive fall arrest systems (railings, platforms, etc.) exist. Contractor personnel performing work in elevated areas shall be familiar with and adhere to fall protection policies and protocols outlined in <i>Section 20.0</i> of the HASP.</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Qualified and experienced Contractor personnel may utilize a vacuum truck to recover rinsewater from high pressure water washing activities.</p>	<p>Environmental contamination and employee chemical exposure to potentially contaminated rinsewaters.</p> <p>Slip, trip, and fall as well as crushing, pinching, and struck-by hazards are associated with heavy equipment use.</p> <p>Other hazards associated with vacuum truck operation may include:</p> <ul style="list-style-type: none"> - Improper selection and use of hoses for material being collected. - Improper inspection, monitoring and maintenance of pressure relief systems. - Improper inspection and use of safety shut down systems. 	<p>PPE:</p> <ul style="list-style-type: none"> - The vacuum truck operator and any foot personnel assisting with collection of rinse water shall utilize <i>Level D Modified PPE</i> consisting of hard hats, safety glasses, rubber steel toe chemical resistant boots, chemical resistant gloves and yellow poly propylene chemical resistant suit with bright orange or green reflective safety vests. - The vacuum truck operator and any foot personnel assisting with collection of rinse water shall have immediately available a full face APR with appropriate cartridge configuration based on the anticipated chemical hazard. - Hearing protection shall be kept on hand at all times in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA. <p>Safe Operating Practices – Vacuum Truck Personnel operating heavy equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Section 25.0</i> of the HASP. In general, Contractor personnel operating the vacuum truck shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained and qualified Contractor personnel are permitted operate the vacuum truck.

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	<p>- Failure to ground vehicle before operating vacuum systems.</p>	<ol style="list-style-type: none"> 2) The operator shall perform a pre-operational check of the equipment and be familiar with operator's manual. The operator shall check backup alarms, tire pressure, engine fluids, lights, turn indicators, and vacuum equipment daily as part of the pre-equipment operation inspection process. 3) The operator shall inspect pressure relief systems and safety shut-off systems as part of the pre-equipment operation inspection process. 4) The operator shall be responsible for lock out and tag out of damaged and unsafe equipment and equipment controls. The operator shall promptly report all needed repairs to the site supervisor. 5) Seat belts must always be worn when driving the vacuum truck. 6) The operator shall keep windshield, windshield wipers, side windows and mirrors clean. Mirrors shall be adjusted to provide the largest possible view of the rear of the equipment. 7) When mounting or dismounting the vehicle, the operator shall only use the designated steps and handholds provided on the equipment. Operators are not permitted to jump from equipment at any time. 8) Whenever possible, the operator shall plan ahead to minimize or eliminate the need for backing. When available, the operator shall use an observer to assist with backing up of the equipment. The operator shall make sure back-up alarms are working properly as part of the pre-equipment operation inspection process. 9) The operator shall always wear appropriate personal protective equipment consistent with the immediate hazards on hand. 10) The operator shall keep hearing protection on hand at all times in case noise from equipment operation or noise from nearby construction activities exceeds 90 dBA. 11) The operator shall inspect fire extinguisher locations on the equipment as part of the pre-equipment operation inspection process. 12) The operator shall always be aware of employees and others on foot in the immediate work zone. 13) Other than within the cab of the vehicle, no riders are allowed anywhere on the equipment. 14) The operator shall inspect hoses and cam fittings prior to use. The operator shall only utilize manufacturer-approved attachments. 15) The operator shall always use the same diameter hose along its entire length for maximum efficiency and to eliminate stop-ups. 16) Whenever possible, the operator shall utilize smooth bore hoses to ensure maximum efficiency and eliminate stop-ups.
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		<ol style="list-style-type: none"> 17) At no time shall the operator be permitted to change hoses while the equipment is running. 18) The operator shall set the emergency brake and chalk the tires prior to vacuum operations. 19) The operator shall ground the truck prior to vacuum operations. 20) The vacuum truck shall be operated only in areas that are as level as possible. 21) Other than low levels of dissolved solids, soils, and sediments in the waste water. The operator shall not intentionally mix wet and dry materials or any materials with unidentified hazards in the same tank. 22) The operator shall maintain safe vehicle distance (minimum of 2-feet) from open trenches. 23) The vacuum truck tank shall be treated as a confined space. At no time shall personnel be permitted to enter the tank until vehicle is decommissioned, locked-out and tagged-out, and permit required confined space entry procedures are reviewed and followed. 24) When parking the equipment, the operator shall be mindful of safe parking locations and avoid parking in high traffic areas and in other equipment's blind spots.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel may utilize fixed, enclosed ladder systems to access elevated areas in the HWMUs. Contractor personnel may also utilize portable ladders to access lesser elevated areas at the work site.	Slip, trip and fall are hazards associated with improper use of fixed and portable ladder systems.	<p>Portable Ladders: Active fall arrest systems will be utilized by all workers performing work activities on ladders at elevations greater than six (6) feet. Contractor personnel utilizing portable ladders shall be familiar with and adhere to policies and procedures outlined in <i>Section 22.0</i> of the HASP.</p> <p>Fall Protection: Active fall arrest systems will be utilized by all workers performing work activities at elevations greater than six (6) feet where no passive fall arrest systems (railings, platforms, etc.) exist. Contractor personnel performing work in elevated areas shall be familiar with and adhere to fall protection policies and protocols outlined in <i>Section 20.0</i> of the HASP</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel may be performing work in chemical resistant, non-breathable PPE and/or working in areas where elevated temperatures are likely.	The potential for heat related illnesses are a factor when performing work activities in chemical resistant, non-breathable PPE especially in summer months where elevated temperatures are likely. When the body is unable to cool itself by sweating, several heat induced illnesses such as heat stress or heat exhaustion or the more severe heat stroke can occur and result in serious injury or illness or even death. High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; certain medications; and inadequate tolerances for hot workplaces are all factors which can lead	<p>Heat Illness Prevention: All Contractor employees shall adhere to heat illness prevention protocols outlined in <i>Section 18.0</i> of the HASP for work activities performed in non-breathable chemical resistant PPE both indoor and outdoor where environmental risk factors for heat illness are present. In general, personnel shall take into consideration the following preventative measures to reduce the risk of heat related illness:</p> <ol style="list-style-type: none"> 1) Learning and understanding the signs and symptoms of heat illnesses and what to do to help affected employees. 2) Employee training on heat induced illnesses. 3) When possible, try to perform heaviest work during coolest part of the day. 4) <i>Acclimatization</i> – build up tolerance to heat and work activity (takes up to two weeks). 5) Use the buddy system (work in pairs)

Activity Hazard Analysis

	to heat stress and heat related illness.	<ul style="list-style-type: none">6) Drink plenty of cool water (one small cup every 15-20 minutes).7) Wear light, loose fitting, breathable clothing.8) Take frequent short breaks in cool, shaded areas allowing the body to cool down9) Avoid eating large, heavy meals before working in hot environments10) Avoid caffeinated beverages as they make the body lose water and increase the risk of heat illnesses.
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Activity Hazard Analysis

Date:	August 15, 2008
Project:	Romic Phase I Facility Closure Project
Site Safety Officer:	Mr. Jason M. Costello
Activity Description:	Distillation Column Decontamination and Dismantlement Activities

Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel will utilize high pressure water washing equipment to effectively wash and decontaminate exterior and interior surfaces of the distillation columns, the condenser, the heat exchanger, the reboiler and associated piping and pumps.	<p>Bruising, cutting, tearing and major bodily harm are hazards associated with improper operation and lack of experience and training regarding use of concentrated high pressure water.</p> <p>Ground surfaces and footing areas may become wet and present potential slip, trip and fall hazards.</p> <p>Environmental and personnel chemical exposure (dermal and inhalation) due to overspray are hazards associated with high pressure water washing.</p>	<p>PPE: All personnel performing high pressure water washing activities shall utilize <i>Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>Safe Operating Practices – Pressure Washing Equipment: The SSO shall ensure all power tools are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Power tool inspection checklists will be turned into the SSO and maintained in an inspection checklist binder. Contractor personnel operating high pressure water washing equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Sections 23.0</i> and <i>25.0</i> of the HASP. In general, Contractor personnel performing pressure washing activities shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained (experienced) personnel shall operate high pressure washing equipment 2) The operator shall insure that all electrical controls are either fail safe, low voltage, or protected with an approved ground fault circuit interrupter. 3) At no time shall the operator operate the equipment above the manufacturers rated pressure maximum. 4) The operator shall always increase pressure slowly until required working pressure is reached. 5) High pressure water can puncture splash suits and other personal protective clothing. At no time shall the operator point the pressure washer nozzle in the direction of other personnel. 6) Water spray will be directed downward to minimize misting and overspray.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Qualified and experienced Contractor personnel will operate boom lifts to access elevated areas of the distillation columns during decontamination and dismantlement activities	<p>Slip, trip, fall, crushing, pinching and struck-by hazards are potential health and safety hazards associated with improper operation and lack of experience and training regarding use of aerial lift devices.</p> <p>Struck-by hazards associated with</p>	<p>PPE: Personnel operating boom lifts who are <u>not</u> exposed to chemical hazards (ie. performing pressure washing activities) must, at a minimum, utilize <i>Level D</i> PPE including steel toe work boots, leather gloves, hard hat, safety glasses and bright colored protective safety vests. Hearing protection shall be immediately available in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA.</p>

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	<p>dropped or falling objects are hazards associated with elevated, overhead work.</p>	<p>Personnel operating boom lifts who are also involved in high pressure water washing activities shall utilize <i>Leve C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>The SSO shall ensure all heavy equipment are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Heavy equipment checklists shall posted with the equipment for the operator(s) to review for the remainder of the day.</p> <p>Safe Operating Practices – Boom Lift: All personnel operating heavy equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Section 25.0</i> of the HASP. In general, Contractor personnel operating boom lifts shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) The operator shall survey the usage area for potential hazards such as untamped earth fills, unlevel surfaces, overhead obstructions, and electrically charged conductors or wires. The operator shall be aware of any potential hazards and always consider what could happen. Watch for moving vehicles and other personnel in the operating area at all times. 2) The operator shall read, understand, and follow the procedures in the safety and operations manual before attempting to operate the equipment. 3) The operator shall inspect the equipment for damaged or worn parts. Check for cracked welds, hydraulic leaks, damaged wiring, loose wire connectors, damaged out-riggers, low tire pressure, uneven tire wear, or tire damage. Also the operator shall check for any improper operation. 4) The operator shall NEVER operate equipment if damaged in any way. Improperly operating equipment must be repaired before using. 5) The operator shall wear proper clothing for the job. Wear protective equipment as required by federal, state, or local regulations. The operator MUST wear a safety harness and lanyard at all times and abide fall protection standards outlined in <i>Section 20.0</i> of the HASP. 6) The operator shall locate, read, and follow all directions and warnings displayed on the equipment. 7) The operator shall inspect the equipment for “DO NOT USE” tags. NEVER use equipment tagged in this way until all repairs are made and all “DO NOT USE” tags are removed by authorized maintenance personnel. 8) The operator shall make sure the basket and outrigger shoes are free of mud, grease, or other slippery material to reduce the possibility of slipping. 9) The operator shall NEVER allow improperly trained personnel to operate this equipment. Only trained and authorized personnel shall be allowed to operate this equipment. 10) The operator shall NEVER operate this equipment while under the influence of alcohol or
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		<p>drugs, or if feeling ill, dizzy, or unsteady in any way. Operators must be physically fit, thoroughly trained, and not easily excitable.</p> <ol style="list-style-type: none"> 11) The operator shall NEVER modify, alter, or change the equipment in any way that would affect its original design or operation in any way. 12) The operator shall NEVER operate this equipment in ways for which it is not intended. 13) The operator shall position the lift far enough away from power sources to ensure that no part of the lift can accidentally reach into an unsafe area. This includes full extension of the boom through 360 degrees rotation. 14) The operator shall operate only on a firm and level surface. NEVER use on surfaces that do not support the equipment with its rated load capacity and the resulting force exerted on the outriggers during boom extension and rotation. 15) The operator shall keep clear and make sure all other personnel stay away from potential pinch or shear points. 16) The operator shall report any misuse of equipment to onsite management personnel. Horseplay is strictly prohibited. 17) The operator shall maintain good footing on the work platform. NEVER wear slippery soled shoes. 18) The operator shall make certain all personnel are clear and there are no obstructions before repositioning basket. 19) Operating personnel shall cordon off area around the outriggers to keep other personnel, bystanders and other equipment away from it while in use. 20) The operator shall stay clear of wires, cables, and other overhead obstructions. 21) Boom travel locking pins shall always be engaged before towing the trailer. 22) Operating personnel shall NEVER allow electrode contact with any part of the basket if welding is being performed from the platform. 23) The operator shall NEVER use the equipment without the outriggers fully extended and firmly based. 24) The operator shall NEVER override or by-pass manufacturer's safety devices. 25) The operator shall NEVER attach a safety harness to an adjacent structure, pole, or equipment while working from the boom platform. 26) The operator shall NEVER move unit with a person or materials on board. 27) The operator shall NEVER try to move the trailer with the boom extended. 28) The operator shall NEVER stand or sit on cage bars. The operator shall work only within
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		<p>the work cage and will not lean out over the cage to perform work.</p> <p>29) The operator shall NEVER attempt to increase working height with boxes, ladders, or other means.</p> <p>30) The operator shall NEVER operate this equipment when exposed to high winds, thunderstorms, ice, or any other weather conditions that would compromise operator safety.</p> <p>31) The operator shall NEVER allow ropes, electric cords, hoses, etc. to become entangled in the equipment when the basket is being raised or lowered.</p> <p>32) The operator shall NEVER exceed manufacturer's load limits or use the lift as a crane for lifting heavy materials. Make sure all tools and equipment are safely stowed.</p> <p>33) The operator shall NEVER exceed load ratings by transferring loads to the basket at elevated heights.</p> <p>34) The operator shall NEVER use the cage to carry materials and shall never allow overhang of materials when raising or lowering the basket.</p> <p>35) The operator shall NEVER push or pull with the boom or basket and shall NEVER use the boom to lift any part of the trailer.</p> <p>36) The operator shall NEVER use the boom or basket to place a "dead man" load against any structure, materials, or equipment.</p> <p>37) Operating personnel shall NEVER climb up or down boom.</p> <p>38) Operating personnel shall NEVER leave the keys in the boom lift while unattended or not in use.</p> <p>Fall Protection: Boom lift baskets shall serve as passive fall arrest systems. Active fall arrest systems will be utilized by all workers performing work activities at elevations greater than six (6) feet where no passive fall arrest systems (railings, platforms, etc.) exist. Contractor personnel performing work in elevated areas shall be familiar with and adhere to fall protection policies and protocols outlined in <i>Section 20.0</i> of the HASP.</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Overhead power lines are located with 100 feet to the West of the production area where the distillation columns, condensers, and reboilers are situated.	Electrocution resulting in serious bodily injury and death may occur if proper engineering controls and overhead power line clearances are not recognized.	<p>Removal of the tank farm and pipe rack on the East side of the production area will make it significantly safer to access the tops of the columns using man lifts from the East side of the columns and away from the power lines.</p> <p>Warning signs reading "Danger Overhead Power Lines" or equivalent, shall be posted at all times in locations where vehicle traffic, heavy equipment and personnel are permitted to pass under areas where overhead power lines are situated. Prior to the start of work, the SSO in conjunction with the equipment operator(s) shall designate and mark safe routes where cranes and other aerial lifting devices can travel beneath power lines. Personnel working on site shall be aware of the locations of all overhead power lines and shall adhere to the proper clearances and safe work distances outlined in <i>Section 16.0</i> of the HASP.</p>

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		<p>Personnel operating heavy equipment and/or aerial lifting devices near overhead power lines shall be aware of the electrocution hazards associated with such operations. To protect workers against electrocution when operating or working around cranes and other aerial lifting devices near overhead power lines the following safe work practices shall be implemented:</p> <ol style="list-style-type: none"> 1. Operating personnel shall be aware of the location and voltage of all overhead power lines at the project site. 2. Operating personnel shall evaluate the job site before beginning work to decide the size and type of machinery to use and the safest areas for machinery operation and material storage. 3. If practical engineering controls such as de-energizing power lines and erecting insulated barriers to prevent physical contact with the energized lines shall be implemented. Operating personnel shall adhere to Cal/OSHA proper clearances and safe work distances at all times. 4. Warning signs shall be posted on cranes and other aerial lifting devices cautioning operators to maintain safe clearances between energized power lines and their equipment. 5. Before the start of work, the site safety officer in conjunction with the equipment operator(s) shall designated and mark safe routes where cranes and other aerial lifting devices can travel beneath power lines. 6. Operating personnel shall assume all power lines are energized and maintain Cal/OSHA proper clearances and safe work distances at all times. 7. Only personnel trained in safe operating procedures and Cal/OSHA regulations shall be allowed to operated a crane on the project site. 8. Operating personnel shall be instructed to operate cranes and other aerial lifting devices at a slower-than-normal rate in areas where overhead power lines are present. 9. Operating personnel shall use extreme caution when moving over uneven ground that could cause the crane and/or aerial lifting device to weave or bob into power lines. 10. Operating personnel shall use extreme caution near long spans of overhead power lines and shall be aware that wind conditions may cause power lines to sway back and forth and reduce clearances and safe working distances. 11. Crane operators shall understand that cage-type boom guards, insulated lines, ground rods, nonconductive links, and proximity warning devices shall not be used as a substitute for de-energizing and grounding lines and/or maintaining safe clearances. 12. Where it is difficult for the crane operator to see the power lines or see the clearance during crane movement, a signal person shall be assigned to watch and give immediate warning when the crane comes close to the limits of safe clearance. 13. Under no circumstances are nearby personnel permitted to touch a crane or its load until
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		<p style="text-align: center;">the signal person says it is safe to do so.</p> <p>14. Nearby personnel shall maintain a safe distance from cranes and other aerial lifting devices working in close proximity to overhead power lines.</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Contractor personnel may have to enter all or part of their bodies into confined spaces as part of the effective strategy for distillation column decontamination activities. Trained and qualified personnel shall perform these tasks under permit required confined space entry protocols.</p>	<p>Chemical exposure, lack of oxygen, fire and explosion hazards are associated with confined space entry activities.</p> <p>Major bodily injury and death resulting from improper de-energizing and/or improper lock out tag out procedures are hazards associated with confined space entry activities.</p>	<p>PPE: All permit required confined space entry activities in which full entry is required shall be performed in <i>Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirators with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>Permit required confined space entry activities which <u>only</u> involve hands and arms in the confined space, and there is no chemical fume exposure, may be performed utilizing <i>modified Level D</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, safety glasses and hard hat with face shield.</p> <p>Energized Equipment: In and effort to eliminate detailed lock out tag out procedures for individual equipment and process, Contractor anticipates disconnecting all power to the plant portion of the facility prior to commencing work. Should lock out tag be required, Contractor shall adhere to detailed lock out tag out protocols and procedures outlined in <i>Section 21.0</i> of the HASP.</p> <p>Permit Required Confined Space Entry: Contractor personnel shall perform all permit required confined space entry activities in accordance with regulations outlined in 29 CFR 1910.146 and in accordance with protocols and procedures outlined in <i>Section 11.0</i> of the HASP. In general, Contractor personnel shall perform permit required confined space entry activities in accordance with the following safe operating practices:</p> <ul style="list-style-type: none"> - The confined space entry team shall review detailed confined space entry protocols outlined in <i>Section 11.0</i> of the HASP. -The confined space entry team shall consist of an entrant, an attendant, floating supervisor and one stand-by rescue. All team members shall have documented confined space entry training. In addition to confined space entry training, the floating supervisor and stand by rescue shall have documented confined space rescue training. Only personnel trained and knowledgeable of the requirements of confined space entry procedures shall be authorized to serve as an entrant, attendant, or supervisor. -The entrant and stand by rescue shall utilize <i>Level C PPE</i> consisting of hard hat, full face APR with organic vapor HEPA filter stack cartridges, rubber steel toe chemical resistant work boots, chemical resistant gloves, yellow chemical resistant poly propylene suit with safety harness and life line. - The attendant shall utilize <i>Modified Level D PPE</i> consisting of hard hats, safety glasses, steel toe work boots, leather gloves and a yellow chemical resistant polypropylene suit. The attendant shall have chemical resistant gloves and full face APR with HEPA filter stack cartridges immediately on hand to assist with confined space rescue activities if needed. - The floating supervisor shall utilize <i>Level D Modified PPE</i> consisting of hard hat, safety glasses, steel toe work boots, and a white tyvek suit. The floating supervisor shall have <i>Level C PPE</i> including full face APR with HEPA filter stack cartridges immediately on hand to assist with confined space rescue activities if needed.

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		<ul style="list-style-type: none"> - A Confined Space Entry Permit (CSEP) will be obtained before any confined space entry activities begin. The CSEP shall be posted in the immediate work areas during confined space entry activities. - Permit required confined spaces shall be identified with a posted sign which reads: "Caution – Permit Required Confined Space." - A combination percent oxygen meter and explosive gas meter (LEL) shall be utilized for air monitoring prior to and during permit required confined space entry activities. -Engineering controls for proper ventilation shall be used unless it is determined that natural ventilation is sufficient. - The confined space entry team shall ensure all chemicals are removed from the vicinity if positive/forced mechanical air-moving equipment is used to provide ventilation. - The attendant shall remain posted in direct line of sight and/or verbal contact with the entrant at all times. - The stand-by rescue shall remain posted in direct line of sight and/or verbal contact with the attendant at all times. - Explosion proof equipment will be used if flammable liquids, gases, or vapors are contained within the confined space. All equipment shall be positively grounded. - No cell phones shall be permitted at any time within the confined space. - The confined space entry team shall ensure all sources of ignition and tank contents are adequately removed. - The confined space entry team shall ensure break and blank-out of all feed lines to the tank(s). Lock-out/tag-out of identified sources of electrical or mechanical energy shall be performed prior to entering the tank(s). Lock-out/tag-out procedures shall be documented in the CSEP. -If required, lights used in the confined spaces will be equipped with guards preventing contact with the bulb and will be explosion proof. - At no time shall personnel enter into an untested or Immediately Dangerous to Life and Health (IDLH) confined space. - At no time shall personnel smoke in or nearby confined spaces or during confined space entry activities.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Qualified and experienced Contractor personnel will utilize a vacuum truck to recover rinsewater from the bottom port of the distillation columns.	<p>Environmental contamination and employee chemical exposure to potentially contaminated rinsewaters.</p> <p>Slip, trip, and fall as well as crushing, pinching, and struck-by hazards are</p>	<p>PPE:</p> <ul style="list-style-type: none"> - The vacuum truck operator and any foot personnel assisting with collection of rinse water shall utilize <i>Level D Modified PPE</i> consisting of hard hats, safety glasses, rubber steel toe chemical resistant boots, chemical resistant gloves and yellow poly propylene chemical resistant suit with bright orange or green reflective safety vests.

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	<p>associated with heavy equipment use.</p> <p>Other hazards associated with vacuum truck operation may include:</p> <ul style="list-style-type: none"> - Improper selection and use of hoses for material being collected. - Improper inspection, monitoring and maintenance of pressure relief systems. - Improper inspection and use of safety shut down systems. - Failure to ground vehicle before operating vacuum systems. 	<ul style="list-style-type: none"> - The vacuum truck operator and any foot personnel assisting with collection of rinse water shall have immediately available a full face APR with appropriate cartridge configuration based on the anticipated chemical hazard. - Hearing protection shall be kept on hand at all times in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA. <p>Safe Operating Practices – Vacuum Truck</p> <p>Personnel operating heavy equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Section 25.0</i> of the HASP. In general, Contractor personnel operating the vacuum truck shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained and qualified Contractor personnel are permitted operate the vacuum truck. 2) The operator shall perform a pre-operational check of the equipment and be familiar with operator's manual. The operator shall check backup alarms, tire pressure, engine fluids, lights, turn indicators, and vacuum equipment daily as part of the pre-equipment operation inspection process. 3) The operator shall inspect pressure relief systems and safety shut-off systems as part of the pre-equipment operation inspection process. 4) The operator shall be responsible for lock out and tag out of damaged and unsafe equipment and equipment controls. The operator shall promptly report all needed repairs to the site supervisor. 5) Seat belts must always be worn when driving the vacuum truck. 6) The operator shall keep windshield, windshield wipers, side windows and mirrors clean. Mirrors shall be adjusted to provide the largest possible view of the rear of the equipment. 7) When mounting or dismounting the vehicle, the operator shall only use the designated steps and handholds provided on the equipment. Operators are not permitted to jump from equipment at any time. 8) Whenever possible, the operator shall plan ahead to minimize or eliminate the need for backing. When available, the operator shall use an observer to assist with backing up of the equipment. The operator shall make sure back-up alarms are working properly as part of the pre-equipment operation inspection process. 9) The operator shall always wear appropriate personal protective equipment consistent with the immediate hazards on hand. 10) The operator shall keep hearing protection on hand at all times in case noise from equipment operation or noise from nearby construction activities exceeds 90 dBA. 11) The operator shall inspect fire extinguisher locations on the equipment as part of the pre-equipment operation inspection process. 12) The operator shall always be aware of employees and others on foot in the immediate
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		<p>work zone.</p> <p>13) Other than within the cab of the vehicle, no riders are allowed anywhere on the equipment.</p> <p>14) The operator shall inspect hoses and cam fittings prior to use. The operator shall only utilize manufacturer-approved attachments.</p> <p>15) The operator shall always use the same diameter hose along its entire length for maximum efficiency and to eliminate stop-ups.</p> <p>16) Whenever possible, the operator shall utilize smooth bore hoses to ensure maximum efficiency and eliminate stop-ups.</p> <p>17) At no time shall the operator be permitted to change hoses while the equipment is running.</p> <p>18) The operator shall set the emergency brake and chalk the tires prior to vacuum operations.</p> <p>19) The operator shall ground the truck prior to vacuum operations.</p> <p>20) The vacuum truck shall be operated only in areas that are as level as possible.</p> <p>21) Other than low levels of dissolved solids, soils, and sediments in the waste water. The operator shall not intentionally mix wet and dry materials or any materials with unidentified hazards in the same tank.</p> <p>22) The operator shall maintain safe vehicle distance (minimum of 2-feet) from open trenches.</p> <p>23) The vacuum truck tank shall be treated as a confined space. At no time shall personnel be permitted to enter the tank until vehicle is decommissioned, locked-out and tagged-out, and permit required confined space entry procedures are reviewed and followed.</p> <p>24) When parking the equipment, the operator shall be mindful of safe parking locations and avoid parking in high traffic areas and in other equipment's blind spots.</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Qualified and experienced Contractor personnel may utilize pneumatic tools and torch cutting equipment when dismantling and disconnecting distillation column sections and associated piping, railings, ladders and platforms.</p>	<p>Cutting, pinching, skin burns, and eye damage from glare are hazards associated with improper operation of torch cutting equipment</p> <p>Air tool systems may present significant health hazards if not properly inspected before each use. Cutting, pinching and major bodily harm may result from improper use of pneumatic tools or an accidental release of pressurized air due to ruptured hoses and fittings.</p>	<p>PPE: Personnel performing torch cutting operations shall utilize <i>Modified Level D</i> PPE including hard toe work boots, leather gloves, long sleeve shirts, hard hat with protective face shield. Hearing protection shall be immediately available in case noise from tool operation and/or noise from other nearby construction activities exceed 90 dBA.</p> <p>Safe Operating Practices – Torch Cutting All personnel performing torch cutting activities shall be familiar with and shall adhere to all the safe operating policies and procedures outlined in <i>Section 24.0</i> of the HASP.</p> <p>Air Tools: Air tool system shall be inspected before each use to check for worn fittings and compromised hoses. Pneumatic power tools should be secured to the hose or whip in a positive manner to prevent accidental disconnection. Safety clips or retainers should be securely installed and maintained on pneumatic</p>

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		<p>impact tools to prevent attachments from being accidentally expelled. The manufacturer's safety operating pressure for all fittings should not be exceeded. All hoses exceeding 1/2-inch inside diameter should have a safety device at the source of supply or branch line to reduce pressure in case of hose failure.</p> <p>Safe Operating Practices – Air Compressors</p> <ol style="list-style-type: none"> 1. Only trained (experienced) personnel shall operate air compressors. Compressor operators shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Section 25.0</i> of the HASP. 2. When using electric air compressors, the operator shall avoid using the air compressor in wet or damp locations to avoid the potential for electric shock. 3. Diesel powered, tow behind air compressors shall not be towed at speeds exceeding 50 miles per hour. Safety chains shall be attached all times during towing. 4. The operator shall avoid wearing jewelry or loose clothing that can be caught in moving parts while operating the compressor. 5. DO NOT BREATHE COMPRESSED AIR. Compressor exhaust gases contain carbon monoxide. Compressors shall only be operated in well ventilated areas. 6. Air compressor noise may exceed 90 dB. The operator and all nearby personnel and/or bystanders shall utilize hearing protection at all times. 7. Tow behind air compressors shall be parked and operated on level surfaces to prevent potential roll over during operation. 8. Before operating diesel powered, tow behind compressors, the operator shall ensure all compartment doors, guards and panels are secured so as prevent coming loose and causing personnel injury and/or equipment damage. 9. Never refill diesel powered compressors while they are in operation. The operator shall allow engine to cool before refueling and/or removing radiator and oil filter caps. Operating personnel shall always be aware of hot surfaces including mufflers, exhaust manifolds, and other engine parts.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel may utilize fixed, enclosed ladder systems to access elevated areas on the distillation columns. Contractor personnel may also utilize portable ladders to access lesser elevated areas at the work site.	Slip, trip and fall are hazards associated with improper use of fixed and portable ladder systems.	<p>Portable Ladders: Active fall arrest systems will be utilized by all workers performing work activities on ladders at elevations greater than six (6) feet. Contractor personnel utilizing portable ladders shall be familiar with and adhere to policies and procedures outlined in <i>Section 22.0</i> of the HASP.</p> <p>Fall Protection: Active fall arrest systems will be utilized by all workers performing work activities at elevations greater than six (6) feet where no passive fall arrest systems (railings, platforms, etc.) exist. Contractor personnel performing work in elevated areas shall be familiar with and adhere to fall protection policies and protocols outlined in <i>Section 20.0</i> of the HASP</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures

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<p>Contractor personnel may be performing work in chemical resistant, non-breathable PPE and/or working in areas where elevated temperatures are likely.</p>	<p>The potential for heat related illnesses are a factor when performing work activities in chemical resistant, non-breathable PPE especially in summer months where elevated temperatures are likely. When the body is unable to cool itself by sweating, several heat induced illnesses such as heat stress or heat exhaustion or the more severe heat stroke can occur and result in serious injury or illness or even death. High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; certain medications; and inadequate tolerances for hot workplaces are all factors which can lead to heat stress and heat related illness.</p>	<p>Heat Illness Prevention: All Contractor employees shall adhere to heat illness prevention protocols outlined in <i>Section 18.0</i> of the HASP for work activities performed in non-breathable chemical resistant PPE both indoor and outdoor where environmental risk factors for heat illness are present. In general, personnel shall take into consideration the following preventative measures to reduce the risk of heat related illness:</p> <ol style="list-style-type: none"> 1) Learning and understanding the signs and symptoms of heat illnesses and what to do to help affected employees. 2) Employee training on heat induced illnesses. 3) When possible, try to perform heaviest work during coolest part of the day. 4) <i>Acclimatization</i> – build up tolerance to heat and work activity (takes up to two weeks). 5) Use the buddy system (work in pairs) 6) Drink plenty of cool water (one small cup every 15-20 minutes). 7) Wear light, loose fitting, breathable clothing. 8) Take frequent short breaks in cool, shaded areas allowing the body to cool down 9) Avoid eating large, heavy meals before working in hot environments 10) Avoid caffeinated beverages as they make the body lose water and increase the risk of heat illnesses.
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Activity Hazard Analysis

Date:	August 15, 2008
Project:	Romic Phase I Facility Closure Project
Site Safety Officer:	Mr. Jason M. Costello
Activity Description:	Decontamination of Drum Crushing Units

Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Drum crushing units shall be decontaminated by pressure washing and handled as either sold items or scrap metal.	<p>Bruising, cutting, tearing and major bodily harm are hazards associated with improper operation and lack of experience and training regarding use of concentrated high pressure water.</p> <p>Ground surfaces and footing areas may become wet and present potential slip, trip and fall hazards.</p> <p>Environmental and personnel chemical exposure (dermal and inhalation) due to overspray are hazards associated with high pressure water washing.</p>	<p>PPE: All personnel performing high pressure water washing activities shall utilize <i>Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>Safe Operating Practices – Pressure Washing Equipment: The SSO shall ensure all power tools are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Power tool inspection checklists will be turned into the SSO and maintained in an inspection checklist binder. Contractor personnel operating high pressure water washing equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Sections 23.0 and 25.0</i> of the HASP. In general, Contractor personnel performing pressure washing activities shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained (experienced) personnel shall operate high pressure washing equipment 2) The operator shall insure that all electrical controls are either fail safe, low voltage, or protected with an approved ground fault circuit interrupter. 3) At no time shall the operator operate the equipment above the manufacturers rated pressure maximum. 4) The operator shall always increase pressure slowly until required working pressure is reached. 5) High pressure water can puncture splash suits and other personal protective clothing. At no time shall the operator point the pressure washer nozzle in the direction of other personnel. 6) Water spray will be directed downward to minimize misting and overspray.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Qualified and experienced Contractor personnel may operate scissor lifts to access elevated areas near and around the drum crushing units.	Slip, trip, fall, crushing, pinching and struck-by hazards are potential health and safety hazards associated with improper operation and lack of experience and training regarding use of aerial lift devices.	<p>PPE: Personnel operating scissor lifts who are <u>not</u> exposed to chemical hazards (ie. performing pressure washing activities) must, at a minimum, utilize <i>Level D</i> PPE including steel toe work boots, leather gloves, hard hat, safety glasses and bright colored protective safety vests. Hearing protection shall be immediately available in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA.</p>

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	<p>Struck-by hazards associated with dropped or falling objects are hazards associated with elevated, overhead work.</p>	<p>Personnel operating scissor lifts who are also involved in high pressure water washing activities shall utilize <i>Leve C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>The SSO shall ensure all heavy equipment are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Heavy equipment checklists shall posted with the equipment for the operator(s) to review for the remainder of the day.</p> <p>Safe Operating Practices – Scissor Lift: All personnel operating heavy equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Section 25.0</i> of the HASP. In general, Contractor personnel operating scissor lifts shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) The operator shall survey the usage area for potential hazards such as untamped earth fills, unlevel surfaces, overhead obstructions, and electrically charged conductors or wires. The operator shall be aware of any potential hazards and always consider what could happen. Watch for moving vehicles and other personnel the operating area at all times. 2) The operator shall read, understand, and follow the procedures in the safety and operations manual before attempting to operate the equipment. 3) The operator shall inspect the equipment for damaged or worn parts. Check for cracked welds, hydraulic leaks, damaged wiring, loose wire connectors, low tire pressure, uneven tire wear, or tire damage. Also the operator shall check for any improper operation of controls. 4) The operator shall NEVER operate equipment if damaged in any way. Improperly operating equipment must be repaired before using. 5) The operator shall wear proper clothing for the job. Wear protective equipment as required by federal, state, or local regulations. The operator MUST wear a safety harness and lanyard at all times and abide fall protection standards outlined in <i>Section 20.0</i> of the HASP. 6) The operator shall locate, read, and follow all directions and warnings displayed on the equipment. 7) The operator shall inspect the equipment for “DO NOT USE” tags. NEVER use equipment tagged in this way until all repairs are made and all “DO NOT USE” tags are removed by authorized maintenance personnel. 8) The operator shall make sure the basket and platform surfaces are free of mud, grease, or other slippery material to reduce the possibility of slipping. 9) The operator shall NEVER allow other improperly trained personnel to operate this equipment. Only trained and authorized personnel shall be allowed to operate this equipment.
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		<ol style="list-style-type: none"> 10) The operator shall NEVER operate this equipment while under the influence of alcohol or drugs, or if feeling ill, dizzy, or unsteady in any way. Operators must be physically fit, thoroughly trained, and not easily excitable. 11) The operator shall NEVER modify, alter, or change the equipment in any way that would affect its original design or operation in any way. 12) The operator shall NEVER operate this equipment in ways for which it is not intended. 13) The operator shall position the lift far enough away from power sources to ensure that no part of the lift can accidentally reach into an unsafe area. This includes full extension of the scissor lift. 14) The operator shall operate only on a firm and level surface. NEVER use on surfaces that do not support the equipment with its rated load capacity. 15) The operator shall keep clear and make sure all other personnel stay away from potential pinch or shear points. 16) The operator shall report any misuse of equipment to onsite management personnel. Horseplay is strictly prohibited. 17) The operator shall maintain good footing on the work platform. NEVER wear slippery soled shoes. 18) The operator shall make certain all personnel are clear and there are no obstructions before raising, lowering and repositioning the lift. 19) When possible, operating personnel shall cordon off area around the scissor lift to keep other personnel, bystanders and other equipment away from it while in use. 20) The operator shall stay clear of wires, cables, and other overhead obstructions. 21) Operating personnel shall NEVER allow electrode contact with any part of the basket if welding is being performed from the platform. 22) The operator shall NEVER override or by-pass manufacturer's safety devices. 23) The operator shall NEVER attach a safety harness to an adjacent structure, pole, or equipment while working from the boom platform. 24) The operator shall NEVER try to move the scissor lift while the basket is extended. 25) The operator shall NEVER stand or sit on cage bars. The operator shall work only within the work cage and will not lean out over the cage to perform work. 26) The operator shall NEVER attempt to increase working height with boxes, ladders, or other means. 27) The operator shall NEVER operate this equipment when exposed to high winds,
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		<p>thunderstorms, ice, or any other weather conditions that would compromise operator safety.</p> <p>28) The operator shall NEVER allow ropes, electric cords, hoses, etc. to become entangled in the equipment when the basket is being raised or lowered.</p> <p>29) The operator shall NEVER exceed manufacturer's load limits or use the lift as a crane for lifting heavy materials. Make sure all tools and equipment are safely stowed.</p> <p>30) The operator shall NEVER exceed load ratings by transferring loads to the basket at elevated heights.</p> <p>31) The operator shall NEVER use the cage to carry materials and shall never allow overhang of materials when raising or lowering the basket.</p> <p>32) The operator shall NEVER use the scissor lift to place a "dead man" load against any structure, materials, or equipment.</p> <p>33) Operating personnel shall NEVER climb up or down the scissor lift.</p> <p>34) Operating personnel shall NEVER leave the keys in the scissor lift while unattended or not in use.</p> <p>Fall Protection: Boom lift baskets shall serve as passive fall arrest systems. Active fall arrest systems will be utilized by all workers performing work activities at elevations greater than six (6) feet where no passive fall arrest systems (railings, platforms, etc.) exist. Contractor personnel performing work in elevated areas shall be familiar with and adhere to fall protection policies and protocols outlined in <i>Section 20.0</i> of the HASP.</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Qualified and experienced Contractor personnel may utilize a vacuum truck to recover rinsewater from high pressure water washing activities.</p>	<p>Environmental contamination and employee chemical exposure to potentially contaminated rinsewaters.</p> <p>Slip, trip, and fall as well as crushing, pinching, and struck-by hazards are associated with heavy equipment use.</p> <p>Other hazards associated with vacuum truck operation may include:</p> <ul style="list-style-type: none"> - Improper selection and use of hoses for material being collected. - Improper inspection, monitoring and maintenance of pressure relief systems. - Improper inspection and use of safety shut down systems. 	<p>PPE:</p> <ul style="list-style-type: none"> - The vacuum truck operator and any foot personnel assisting with collection of rinse water shall utilize <i>Level D Modified PPE</i> consisting of hard hats, safety glasses, rubber steel toe chemical resistant boots, chemical resistant gloves and yellow poly propylene chemical resistant suit with bright orange or green reflective safety vests. - The vacuum truck operator and any foot personnel assisting with collection of rinse water shall have immediately available a full face APR with appropriate cartridge configuration based on the anticipated chemical hazard. - Hearing protection shall be kept on hand at all times in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA. <p>Safe Operating Practices – Vacuum Truck Personnel operating heavy equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Section 25.0</i> of the HASP. In general, Contractor personnel operating the vacuum truck shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained and qualified Contractor personnel are permitted operate the vacuum truck.

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	<p>- Failure to ground vehicle before operating vacuum systems.</p>	<ol style="list-style-type: none"> 2) The operator shall perform a pre-operational check of the equipment and be familiar with operator's manual. The operator shall check backup alarms, tire pressure, engine fluids, lights, turn indicators, and vacuum equipment daily as part of the pre-equipment operation inspection process. 3) The operator shall inspect pressure relief systems and safety shut-off systems as part of the pre-equipment operation inspection process. 4) The operator shall be responsible for lock out and tag out of damaged and unsafe equipment and equipment controls. The operator shall promptly report all needed repairs to the site supervisor. 5) Seat belts must always be worn when driving the vacuum truck. 6) The operator shall keep windshield, windshield wipers, side windows and mirrors clean. Mirrors shall be adjusted to provide the largest possible view of the rear of the equipment. 7) When mounting or dismounting the vehicle, the operator shall only use the designated steps and handholds provided on the equipment. Operators are not permitted to jump from equipment at any time. 8) Whenever possible, the operator shall plan ahead to minimize or eliminate the need for backing. When available, the operator shall use an observer to assist with backing up of the equipment. The operator shall make sure back-up alarms are working properly as part of the pre-equipment operation inspection process. 9) The operator shall always wear appropriate personal protective equipment consistent with the immediate hazards on hand. 10) The operator shall keep hearing protection on hand at all times in case noise from equipment operation or noise from nearby construction activities exceeds 90 dBA. 11) The operator shall inspect fire extinguisher locations on the equipment as part of the pre-equipment operation inspection process. 12) The operator shall always be aware of employees and others on foot in the immediate work zone. 13) Other than within the cab of the vehicle, no riders are allowed anywhere on the equipment. 14) The operator shall inspect hoses and cam fittings prior to use. The operator shall only utilize manufacturer-approved attachments. 15) The operator shall always use the same diameter hose along its entire length for maximum efficiency and to eliminate stop-ups. 16) Whenever possible, the operator shall utilize smooth bore hoses to ensure maximum efficiency and eliminate stop-ups.
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		<ol style="list-style-type: none"> 17) At no time shall the operator be permitted to change hoses while the equipment is running. 18) The operator shall set the emergency brake and chalk the tires prior to vacuum operations. 19) The operator shall ground the truck prior to vacuum operations. 20) The vacuum truck shall be operated only in areas that are as level as possible. 21) Other than low levels of dissolved solids, soils, and sediments in the waste water. The operator shall not intentionally mix wet and dry materials or any materials with unidentified hazards in the same tank. 22) The operator shall maintain safe vehicle distance (minimum of 2-feet) from open trenches. 23) The vacuum truck tank shall be treated as a confined space. At no time shall personnel be permitted to enter the tank until vehicle is decommissioned, locked-out and tagged-out, and permit required confined space entry procedures are reviewed and followed. 24) When parking the equipment, the operator shall be mindful of safe parking locations and avoid parking in high traffic areas and in other equipment's blind spots.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel may utilize fixed, enclosed ladder systems to access elevated areas near and around the drum crushing units. Contractor personnel may also utilize portable ladders to access lesser elevated areas at the work site.	Slip, trip and fall are hazards associated with improper use of fixed and portable ladder systems.	<p>Portable Ladders: Active fall arrest systems will be utilized by all workers performing work activities on ladders at elevations greater than six (6) feet. Contractor personnel utilizing portable ladders shall be familiar with and adhere to policies and procedures outlined in <i>Section 22.0</i> of the HASP.</p> <p>Fall Protection: Active fall arrest systems will be utilized by all workers performing work activities at elevations greater than six (6) feet where no passive fall arrest systems (railings, platforms, etc.) exist. All Contractor personnel performing work in elevated areas shall be familiar with and adhere to fall protection policies and protocols outlined in <i>Section 20.0</i> of the HASP</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel may be performing work in chemical resistant, non-breathable PPE and/or working in areas where elevated temperatures are likely.	The potential for heat related illnesses are a factor when performing work activities in chemical resistant, non-breathable PPE especially in summer months where elevated temperatures are likely. When the body is unable to cool itself by sweating, several heat induced illnesses such as heat stress or heat exhaustion or the more severe heat stroke can occur and result in serious injury or illness or even death. High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; certain medications; and inadequate tolerances for hot	<p>Heat Illness Prevention: All Contractor employees shall adhere to heat illness prevention protocols outlined in <i>Section 18.0</i> of the HASP for work activities performed in non-breathable chemical resistant PPE both indoor and outdoor where environmental risk factors for heat illness are present. In general, personnel shall take into consideration the following preventative measures to reduce the risk of heat related illness:</p> <ol style="list-style-type: none"> 1) Learning and understanding the signs and symptoms of heat illnesses and what to do to help affected employees. 2) Employee training on heat induced illnesses. 3) When possible, try to perform heaviest work during coolest part of the day. 4) <i>Acclimatization</i> – build up tolerance to heat and work activity (takes up to two weeks).

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	workplaces are all factors which can lead to heat stress and heat related illness.	<ol style="list-style-type: none">5) Use the buddy system (work in pairs)6) Drink plenty of cool water (one small cup every 15-20 minutes).7) Wear light, loose fitting, breathable clothing.8) Take frequent short breaks in cool, shaded areas allowing the body to cool down9) Avoid eating large, heavy meals before working in hot environments10) Avoid caffeinated beverages as they make the body lose water and increase the risk of heat illnesses.
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Activity Hazard Analysis

Date:	August 15, 2008
Project:	Romic Phase I Facility Closure Project
Site Safety Officer:	Mr. Jason M. Costello
Activity Description:	Decontamination of Debris Shredder, Liquefaction Unit, and Drum and Debris Building

Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
The debris shredder, liquefaction unit and building surfaces shall be decontaminated via high pressure water washing activities.	<p>Bruising, cutting, tearing and major bodily harm are hazards associated with improper operation and lack of experience and training regarding use of concentrated high pressure water.</p> <p>Ground surfaces and footing areas may become wet and present potential slip, trip and fall hazards.</p> <p>Environmental and personnel chemical exposure (dermal and inhalation) due to overspray are hazards associated with high pressure water washing.</p>	<p>PPE: All personnel performing high pressure water washing activities shall utilize <i>Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>Safe Operating Practices – Pressure Washing Equipment: The SSO shall ensure all power tools are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Power tool inspection checklists will be turned into the SSO and maintained in an inspection checklist binder. Contractor personnel operating high pressure water washing equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Sections 23.0</i> and <i>25.0</i> of the HASP. In general, Contractor personnel performing pressure washing activities shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained (experienced) personnel shall operate high pressure washing equipment 2) The operator shall insure that all electrical controls are either fail safe, low voltage, or protected with an approved ground fault circuit interrupter. 3) At no time shall the operator operate the equipment above the manufacturers rated pressure maximum. 4) The operator shall always increase pressure slowly until required working pressure is reached. 5) High pressure water can puncture splash suits and other personal protective clothing. At no time shall the operator point the pressure washer nozzle in the direction of other personnel. 6) Water spray will be directed downward to minimize misting and overspray.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Qualified and experienced Contractor personnel may operate scissor lifts to access elevated areas near and around the drum and debris building.	Slip, trip, fall, crushing, pinching and struck-by hazards are potential health and safety hazards associated with improper operation and lack of experience and training regarding use of aerial lift devices.	<p>PPE: Personnel operating scissor lifts who are <u>not</u> exposed to chemical hazards (ie. performing pressure washing activities) must, at a minimum, utilize <i>Level D</i> PPE including steel toe work boots, leather gloves, hard hat, safety glasses and bright colored protective safety vests. Hearing protection shall be immediately available in case noise from nearby equipment operation or noise from other nearby</p>

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	<p>Struck-by hazards associated with dropped or falling objects are hazards associated with elevated, overhead work.</p>	<p>construction activities exceeds 90 dBA.</p> <p>Personnel operating scissor lifts who are also involved in high pressure water washing activities shall utilize <i>Leve C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>The SSO shall ensure all heavy equipment are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Heavy equipment checklists shall posted with the equipment for the operator(s) to review for the remainder of the day.</p> <p>Safe Operating Practices – Scissor Lift: All personnel operating heavy equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Section 25.0</i> of the HASP. In general, Contractor personnel operating scissor lifts shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) The operator shall survey the usage area for potential hazards such as untamped earth fills, unlevel surfaces, overhead obstructions, and electrically charged conductors or wires. The operator shall be aware of any potential hazards and always consider what could happen. Watch for moving vehicles and other personnel the operating area at all times. 2) The operator shall read, understand, and follow the procedures in the safety and operations manual before attempting to operate the equipment. 3) The operator shall inspect the equipment for damaged or worn parts. Check for cracked welds, hydraulic leaks, damaged wiring, loose wire connectors, low tire pressure, uneven tire wear, or tire damage. Also the operator shall check for any improper operation of controls. 4) The operator shall NEVER operate equipment if damaged in any way. Improperly operating equipment must be repaired before using. 5) The operator shall wear proper clothing for the job. Wear protective equipment as required by federal, state, or local regulations. The operator MUST wear a safety harness and lanyard at all times and abide fall protection standards outlined in <i>Section 20.0</i> of the HASP. 6) The operator shall locate, read, and follow all directions and warnings displayed on the equipment. 7) The operator shall inspect the equipment for “DO NOT USE” tags. NEVER use equipment tagged in this way until all repairs are made and all “DO NOT USE” tags are removed by authorized maintenance personnel. 8) The operator shall make sure the basket and platform surfaces are free of mud, grease, or other slippery material to reduce the possibility of slipping. 9) The operator shall NEVER allow other improperly trained personnel to operate this equipment. Only trained and authorized personnel shall be allowed to operate this
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		<p>equipment.</p> <ol style="list-style-type: none"> 10) The operator shall NEVER operate this equipment while under the influence of alcohol or drugs, or if feeling ill, dizzy, or unsteady in any way. Operators must be physically fit, thoroughly trained, and not easily excitable. 11) The operator shall NEVER modify, alter, or change the equipment in any way that would affect its original design or operation in any way. 12) The operator shall NEVER operate this equipment in ways for which it is not intended. 13) The operator shall position the lift far enough away from power sources to ensure that no part of the lift can accidentally reach into an unsafe area. This includes full extension of the scissor lift. 14) The operator shall operate only on a firm and level surface. NEVER use on surfaces that do not support the equipment with its rated load capacity. 15) The operator shall keep clear and make sure all other personnel stay away from potential pinch or shear points. 16) The operator shall report any misuse of equipment to onsite management personnel. Horseplay is strictly prohibited. 17) The operator shall maintain good footing on the work platform. NEVER wear slippery soled shoes. 18) The operator shall make certain all personnel are clear and there are no obstructions before raising, lowering and repositioning the lift. 19) When possible, operating personnel shall cordon off area around the scissor lift to keep other personnel, bystanders and other equipment away from it while in use. 20) The operator shall stay clear of wires, cables, and other overhead obstructions. 21) Operating personnel shall NEVER allow electrode contact with any part of the basket if welding is being performed from the platform. 22) The operator shall NEVER override or by-pass manufacturer's safety devices. 23) The operator shall NEVER attach a safety harness to an adjacent structure, pole, or equipment while working from the boom platform. 24) The operator shall NEVER try to move the scissor lift while the basket is extended. 25) The operator shall NEVER stand or sit on cage bars. The operator shall work only within the work cage and will not lean out over the cage to perform work. 26) The operator shall NEVER attempt to increase working height with boxes, ladders, or other means.
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		<p>27) The operator shall NEVER operate this equipment when exposed to high winds, thunderstorms, ice, or any other weather conditions that would compromise operator safety.</p> <p>28) The operator shall NEVER allow ropes, electric cords, hoses, etc. to become entangled in the equipment when the basket is being raised or lowered.</p> <p>29) The operator shall NEVER exceed manufacturer's load limits or use the lift as a crane for lifting heavy materials. Make sure all tools and equipment are safely stowed.</p> <p>30) The operator shall NEVER exceed load ratings by transferring loads to the basket at elevated heights.</p> <p>31) The operator shall NEVER use the cage to carry materials and shall never allow overhang of materials when raising or lowering the basket.</p> <p>32) The operator shall NEVER use the scissor lift to place a "dead man" load against any structure, materials, or equipment.</p> <p>33) Operating personnel shall NEVER climb up or down the scissor lift.</p> <p>34) Operating personnel shall NEVER leave the keys in the scissor lift while unattended or not in use.</p> <p>Fall Protection: Boom lift baskets shall serve as passive fall arrest systems. Active fall arrest systems will be utilized by all workers performing work activities at elevations greater than six (6) feet where no passive fall arrest systems (railings, platforms, etc.) exist. Contractor personnel performing work in elevated areas shall be familiar with and adhere to fall protection policies and protocols outlined in <i>Section 20.0</i> of the HASP.</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Qualified and experienced Contractor personnel may utilize a vacuum truck to recover rinsewater from high pressure water washing activities.</p>	<p>Environmental contamination and employee chemical exposure to potentially contaminated rinsewaters.</p> <p>Slip, trip, and fall as well as crushing, pinching, and struck-by hazards are associated with heavy equipment use.</p> <p>Other hazards associated with vacuum truck operation may include:</p> <ul style="list-style-type: none"> - Improper selection and use of hoses for material being collected. - Improper inspection, monitoring and maintenance of pressure relief systems. - Improper inspection and use of safety shut down systems. 	<p>PPE:</p> <ul style="list-style-type: none"> - The vacuum truck operator and any foot personnel assisting with collection of rinse water shall utilize <i>Level D Modified PPE</i> consisting of hard hats, safety glasses, rubber steel toe chemical resistant boots, chemical resistant gloves and yellow poly propylene chemical resistant suit with bright orange or green reflective safety vests. - The vacuum truck operator and any foot personnel assisting with collection of rinse water shall have immediately available a full face APR with appropriate cartridge configuration based on the anticipated chemical hazard. - Hearing protection shall be kept on hand at all times in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA. <p>Safe Operating Practices – Vacuum Truck Personnel operating heavy equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Section 25.0</i> of the HASP. In general, Contractor personnel operating the vacuum truck shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained and qualified Contractor personnel are permitted operate the vacuum truck.

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	<p>- Failure to ground vehicle before operating vacuum systems.</p>	<ol style="list-style-type: none"> 2) The operator shall perform a pre-operational check of the equipment and be familiar with operator's manual. The operator shall check backup alarms, tire pressure, engine fluids, lights, turn indicators, and vacuum equipment daily as part of the pre-equipment operation inspection process. 3) The operator shall inspect pressure relief systems and safety shut-off systems as part of the pre-equipment operation inspection process. 4) The operator shall be responsible for lock out and tag out of damaged and unsafe equipment and equipment controls. The operator shall promptly report all needed repairs to the site supervisor. 5) Seat belts must always be worn when driving the vacuum truck. 6) The operator shall keep windshield, windshield wipers, side windows and mirrors clean. Mirrors shall be adjusted to provide the largest possible view of the rear of the equipment. 7) When mounting or dismounting the vehicle, the operator shall only use the designated steps and handholds provided on the equipment. Operators are not permitted to jump from equipment at any time. 8) Whenever possible, the operator shall plan ahead to minimize or eliminate the need for backing. When available, the operator shall use an observer to assist with backing up of the equipment. The operator shall make sure back-up alarms are working properly as part of the pre-equipment operation inspection process. 9) The operator shall always wear appropriate personal protective equipment consistent with the immediate hazards on hand. 10) The operator shall keep hearing protection on hand at all times in case noise from equipment operation or noise from nearby construction activities exceeds 90 dBA. 11) The operator shall inspect fire extinguisher locations on the equipment as part of the pre-equipment operation inspection process. 12) The operator shall always be aware of employees and others on foot in the immediate work zone. 13) Other than within the cab of the vehicle, no riders are allowed anywhere on the equipment. 14) The operator shall inspect hoses and cam fittings prior to use. The operator shall only utilize manufacturer-approved attachments. 15) The operator shall always use the same diameter hose along its entire length for maximum efficiency and to eliminate stop-ups. 16) Whenever possible, the operator shall utilize smooth bore hoses to ensure maximum efficiency and eliminate stop-ups.
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		<ul style="list-style-type: none"> 17) At no time shall the operator be permitted to change hoses while the equipment is running. 18) The operator shall set the emergency brake and chalk the tires prior to vacuum operations. 19) The operator shall ground the truck prior to vacuum operations. 20) The vacuum truck shall be operated only in areas that are as level as possible. 21) Other than low levels of dissolved solids, soils, and sediments in the waste water. The operator shall not intentionally mix wet and dry materials or any materials with unidentified hazards in the same tank. 22) The operator shall maintain safe vehicle distance (minimum of 2-feet) from open trenches. 23) The vacuum truck tank shall be treated as a confined space. At no time shall personnel be permitted to enter the tank until vehicle is decommissioned, locked-out and tagged-out, and permit required confined space entry procedures are reviewed and followed. 24) When parking the equipment, the operator shall be mindful of safe parking locations and avoid parking in high traffic areas and in other equipment's blind spots.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel may utilize fixed, enclosed ladder systems to access elevated areas near and around the debris shredder, the liquefaction unit, and the drum and debris building. Contractor personnel may also utilize portable ladders to access lesser elevated areas at the work site.	Slip, trip and fall are hazards associated with improper use of fixed and portable ladder systems.	<p>Portable Ladders: Active fall arrest systems will be utilized by all workers performing work activities on ladders at elevations greater than six (6) feet. Contractor personnel utilizing portable ladders shall be familiar with and adhere to policies and procedures outlined in <i>Section 22.0</i> of the HASP.</p> <p>Fall Protection: Active fall arrest systems will be utilized by all workers performing work activities at elevations greater than six (6) feet where no passive fall arrest systems (railings, platforms, etc.) exist. All Contractor personnel performing work in elevated areas shall be familiar with and adhere to fall protection policies and protocols outlined in <i>Section 20.0</i> of the HASP</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Qualified and experienced Contractor personnel may utilize pneumatic tools and torch cutting equipment when dismantling and disconnecting process equipment.	<p>Cutting, pinching, skin burns, and eye damage from glare are hazards associated with improper operation of torch cutting equipment</p> <p>Air tool systems may present significant health hazards if not properly inspected before each use. Cutting, pinching and major bodily harm may result improper use of pneumatic tools or an accidental release of pressurized air due to ruptured hoses and fittings.</p>	<p>PPE: Personnel performing torch cutting operations shall utilize <i>Modified Level D</i> PPE including hard toe work boots, leather gloves, long sleeve shirts, hard hat with protective face shield. Hearing protection shall be immediately available in case noise from tool operation and/or noise from other nearby construction activities exceed 90 dBA.</p> <p>Safe Operating Practices – Torch Cutting All personnel performing torch cutting activities shall be familiar with and shall adhere to all the safe operating policies and procedures outlined in <i>Section 24.0</i> of the HASP.</p> <p>Air Tools: Air tool system shall be inspected before each use to check for worn fittings and compromised hoses. Pneumatic power tools should be secured to the hose or whip in a positive manner to prevent accidental disconnection. Safety clips or retainers should be securely installed and maintained on pneumatic impact tools to prevent attachments from being accidentally expelled. The manufacturer's safety</p>

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		<p>operating pressure for all fittings should not be exceeded. All hoses exceeding 1/2-inch inside diameter should have a safety device at the source of supply or branch line to reduce pressure in case of hose failure.</p> <p>Safe Operating Practices – Air Compressors</p> <ol style="list-style-type: none"> 1. Only trained (experienced) personnel shall operate air compressors. Compressor operators shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Section 25.0</i> of the HASP. 2. When using electric air compressors, the operator shall avoid using the air compressor in wet or damp locations to avoid the potential for electric shock. 3. Diesel powered, tow behind air compressors shall not be towed at speeds exceeding 50 miles per hour. Safety chains shall be attached all times during towing. 4. The operator shall avoid wearing jewelry or loose clothing that can be caught in moving parts while operating the compressor. 5. DO NOT BREATHE COMPRESSED AIR. Compressor exhaust gases contain carbon monoxide. Compressors shall only be operated in well ventilated areas. 6. Air compressor noise may exceed 90 dB. The operator and all nearby personnel and/or bystanders shall utilize hearing protection at all times. 7. Tow behind air compressors shall be parked and operated on level surfaces to prevent potential roll over during operation. 8. Before operating diesel powered, tow behind compressors, the operator shall ensure all compartment doors, guards and panels are secured so as prevent coming loose and causing personnel injury and/or equipment damage. 9. Never refill diesel powered compressors while they are in operation. The operator shall allow engine to cool before refueling and/or removing radiator and oil filter caps. Operating personnel shall always be aware of hot surfaces including mufflers, exhaust manifolds, and other engine parts.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel may be performing work in chemical resistant, non-breathable PPE and/or working in areas where elevated temperatures are likely.	The potential for heat related illnesses are a factor when performing work activities in chemical resistant, non-breathable PPE especially in summer months where elevated temperatures are likely. When the body is unable to cool itself by sweating, several heat induced illnesses such as heat stress or heat exhaustion or the more severe heat stroke can occur and result in serious injury or illness or even death. High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor	<p>Heat Illness Prevention: All Contractor employees shall adhere to heat illness prevention protocols outlined in <i>Section 18.0</i> of the HASP for work activities performed in non-breathable chemical resistant PPE both indoor and outdoor where environmental risk factors for heat illness are present. In general, personnel shall take into consideration the following preventative measures to reduce the risk of heat related illness:</p> <ol style="list-style-type: none"> 1) Learning and understanding the signs and symptoms of heat illnesses and what to do to help affected employees. 2) Employee training on heat induced illnesses. 3) When possible, try to perform heaviest work during coolest part of the day.

Activity Hazard Analysis

	<p>physical condition; certain medications; and inadequate tolerances for hot workplaces are all factors which can lead to heat stress and heat related illness.</p>	<ol style="list-style-type: none">4) <i>Acclimatization</i> – build up tolerance to heat and work activity (takes up to two weeks).5) Use the buddy system (work in pairs)6) Drink plenty of cool water (one small cup every 15-20 minutes).7) Wear light, loose fitting, breathable clothing.8) Take frequent short breaks in cool, shaded areas allowing the body to cool down9) Avoid eating large, heavy meals before working in hot environments10) Avoid caffeinated beverages as they make the body lose water and increase the risk of heat illnesses.
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Activity Hazard Analysis

Date:	August 15, 2008
Project:	Romic Phase I Facility Closure Project
Site Safety Officer:	Mr. Jason M. Costello
Activity Description:	Decontamination and Demolition of Biological Treatment System

Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel shall wash and decontaminate the biological treatment system and secondary containment surfaces via high pressure water washing activities.	<p>Bruising, cutting, tearing and major bodily harm are hazards associated with improper operation and lack of experience and training regarding use of concentrated high pressure water.</p> <p>Ground surfaces and footing areas may become wet and present potential slip, trip and fall hazards.</p> <p>Environmental and personnel chemical exposure (dermal and inhalation) due to overspray are hazards associated with high pressure water washing.</p>	<p>PPE: All personnel performing high pressure water washing activities shall utilize <i>Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>Safe Operating Practices – Pressure Washing Equipment: The SSO shall ensure all power tools are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Power tool inspection checklists will be turned into the SSO and maintained in an inspection checklist binder. Contractor personnel operating high pressure water washing equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Sections 23.0</i> and <i>25.0</i> of the HASP. In general, Contractor personnel performing pressure washing activities shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained (experienced) personnel shall operate high pressure washing equipment 2) The operator shall insure that all electrical controls are either fail safe, low voltage, or protected with an approved ground fault circuit interrupter. 3) At no time shall the operator operate the equipment above the manufacturers rated pressure maximum. 4) The operator shall always increase pressure slowly until required working pressure is reached. 5) High pressure water can puncture splash suits and other personal protective clothing. At no time shall the operator point the pressure washer nozzle in the direction of other personnel. 6) Water spray will be directed downward to minimize misting and overspray.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Assuming the biological treatment system is not sold, Contractor personnel shall utilize an excavator-mounted sheer to size-reduce the tanks and place the tanks into bins or trailers for recycling as scrap metal.	Slip, trip, and fall as well as crushing, pinching, amputation and struck-by hazards are associated with heavy equipment use.	<p>PPE: Personnel operating the excavator who are <u>not</u> exposed to chemical hazards (ie. excavator operation only) must, at a minimum, utilize <i>Level D</i> PPE including steel toe work boots, leather gloves, hard hat, safety glasses and bright colored protective safety vests. Hearing protection shall be immediately available in case noise from nearby equipment operation or noise from other nearby construction</p>

Activity Hazard Analysis

	<p>Excavator stability while tanks and associated process equipment may be adversely affected by one of the following conditions:</p> <ul style="list-style-type: none"> - The equipment is not on a level surface when cutting, lifting and loading. - Rear wheels and/or tracks settle unevenly during lifting and unloading. - Wind may exert lateral forces and cause swaying and abnormal stress. - Poor rear suspension systems on one or the other side of the vehicle (non-tracked excavators). - Uneven tire pressures in front or rear wheels (non-tracked excavators). - Worn or inadequate components of the lifting systems such as pins. - Worn or inadequate lifting cylinders. 	<p>activities exceeds 90 dBA.</p> <p>Nearby foot personnel assisting with loading and transfer of tanks, associated piping and process equipment shall utilized <i>Modified Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, hard hats, safety glasses, and bright colored protective safety vests.</p> <p>Safe Operating Practices – Excavator</p> <ol style="list-style-type: none"> 1. Only trained and qualified Contractor personnel are permitted operate the equipment. Training documentation shall be provided to the Client and/or kept onsite at all times. 2. The operator shall perform a pre-operational check of the equipment and be familiar with operator's manual. 3. The operator shall check backup alarms, engine oil, hydraulic oil, fuel, dust collector and grease fittings daily as part of the pre-equipment operation inspection process. 4. When checking for leaks in the hydraulic system, the operator shall use a piece of paper or cardboard. At no time shall the operator use his/her hands since oil from a pin-hole leak under high pressure can penetrate the skin. 5. The operator shall be responsible for lockout and tagout of damaged and unsafe equipment and equipment controls. The operator shall promptly report all needed repairs to the site supervisor. 6. Seat belts and/or shoulder harnesses must always be worn to keep the operator secure within the equipment's cab or roll over protection system (ROPS). 7. The operator shall keep windshield, windshield wipers, side windows and mirrors clean. Mirrors shall be adjusted to provide the largest possible view of the rear of the equipment. 8. When mounting or dismounting equipment, the operator shall only use the designated steps and handholds provided on the equipment. Operators are not permitted to jump from equipment at any time. 9. Whenever possible, the operator shall plan ahead to minimize or eliminate the need for backing and/or excessive rotation. When available, the operator shall use an observer to assist with backing up and rotating the equipment. The operator shall make sure back-up alarms are working properly as part of the pre-equipment operation inspection process. 10. When parking the equipment, the operator shall be mindful of safe parking locations and avoid parking in high traffic areas and in other equipment's blind spots. 11. The operator shall always wear appropriate personal protective equipment consistent with the immediate hazards on hand. 12. The operator shall keep hearing protection on hand at all times in case noise from equipment operation or noise from nearby construction activities exceeds 90 dBA. 13. The operator shall inspect fire extinguisher locations on the equipment as part of the pre-
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Activity Hazard Analysis

		<p>equipment operation inspection process.</p> <ol style="list-style-type: none"> 14. The operator shall always be aware of employees and others on foot in the immediate work zone. 15. The operator shall be mindful of the location of foot personnel before rotating the cab and bucket. 16. The operator shall rotate the cab and bucket with extreme caution and continually check both sides and behind when rotating and backing up the equipment. Excavator maneuverability can be quick and abrupt. The operator shall always be aware of personnel on foot in the immediate area zone and whenever possible, keep all other personnel away from the immediate work area. 17. The operator shall always ensure the attachment locking devices are in place, even when switching attachments for only a few minutes. If not locked, attachments may break free and fall onto nearby personnel or damage nearby equipment. 18. The operator shall only utilize manufacturer-approved attachments and buckets. 19. The operator shall not leave attachments in the raised position when equipment is not in use. 20. No personnel shall be allowed to work in or under a raised bucket at any time. Other than the operator, no riders are allowed anywhere on the equipment. 21. The operator shall always be mindful of overhead power line clearances. Equipment shall not be operated within 10 feet of energized power lines. 22. Whenever possible, the equipment shall be transported from location to location using a truck and trailer. Swing and boom locking pins must be set and equipment must be properly secured prior to transporting. 23. Before digging, the operator shall review trenching and excavation standard operating procedures. 24. The operator shall remain a minimum of 2-feet away from open trenches. 25. When operating on slopes, the operator shall use caution when rotating the cab and bucket in a downhill direction. The operator shall position equipment so that material is dumped on the uphill side of the equipment. 26. The operator shall always keep buckets and/or other attachments at the safest, lowest position when moving the equipment. The operator shall always keep the heaviest end of the bucket pointing uphill when moving up and down inclines with a full bucket. Equipment shall not be operated on slopes of more than 20 degrees. 27. The operator shall select loading areas that are as level as possible. 28. The operator shall never leave the equipment unattended with the engine running. Lower the bucket/attachment to the ground and shut off engine when equipment is not in use.
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Activity Hazard Analysis

Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Qualified and experienced Contractor personnel may utilize a vacuum truck to recover rinsewater from high pressure water washing activities.</p>	<p>Environmental contamination and employee chemical exposure to potentially contaminated rinsewaters.</p> <p>Slip, trip, and fall as well as crushing, pinching, and struck-by hazards are associated with heavy equipment use.</p> <p>Other hazards associated with vacuum truck operation may include:</p> <ul style="list-style-type: none"> - Improper selection and use of hoses for material being collected. - Improper inspection, monitoring and maintenance of pressure relief systems. - Improper inspection and use of safety shut down systems. - Failure to ground vehicle before operating vacuum systems. 	<p>PPE:</p> <ul style="list-style-type: none"> - The vacuum truck operator and any foot personnel assisting with collection of rinse water shall utilize <i>Level D Modified PPE</i> consisting of hard hats, safety glasses, rubber steel toe chemical resistant boots, chemical resistant gloves and yellow poly propylene chemical resistant suit with bright orange or green reflective safety vests. - The vacuum truck operator and any foot personnel assisting with collection of rinse water shall have immediately available a full face APR with appropriate cartridge configuration based on the anticipated chemical hazard. - Hearing protection shall be kept on hand at all times in case noise from nearby equipment operation or noise from other nearby construction activities exceeds 90 dBA. <p>Safe Operating Practices – Vacuum Truck</p> <p>Personnel operating heavy equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Section 25.0</i> of the HASP. In general, Contractor personnel operating the vacuum truck shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1. Only trained and qualified Contractor personnel are permitted operate the vacuum truck. 2. The operator shall perform a pre-operational check of the equipment and be familiar with operator's manual. The operator shall check backup alarms, tire pressure, engine fluids, lights, turn indicators, and vacuum equipment daily as part of the pre-equipment operation inspection process. 3. The operator shall inspect pressure relief systems and safety shut-off systems as part of the pre-equipment operation inspection process. 4. The operator shall be responsible for lock out and tag out of damaged and unsafe equipment and equipment controls. The operator shall promptly report all needed repairs to the site supervisor. 5. Seat belts must always be worn when driving the vacuum truck. 6. The operator shall keep windshield, windshield wipers, side windows and mirrors clean. Mirrors shall be adjusted to provide the largest possible view of the rear of the equipment. 7. When mounting or dismounting the vehicle, the operator shall only use the designated steps and handholds provided on the equipment. Operators are not permitted to jump from equipment at any time. 8. Whenever possible, the operator shall plan ahead to minimize or eliminate the need for backing. When available, the operator shall use an observer to assist with backing up of the equipment. The operator shall make sure back-up alarms are working properly as part of the pre-equipment operation inspection process. 9. The operator shall always wear appropriate personal protective equipment consistent with

Activity Hazard Analysis

		<p>the immediate hazards on hand.</p> <ol style="list-style-type: none"> 10. The operator shall keep hearing protection on hand at all times in case noise from equipment operation or noise from nearby construction activities exceeds 90 dBA. 11. The operator shall inspect fire extinguisher locations on the equipment as part of the pre-equipment operation inspection process. 12. The operator shall always be aware of employees and others on foot in the immediate work zone. 13. Other than within the cab of the vehicle, no riders are allowed anywhere on the equipment. 14. The operator shall inspect hoses and cam fittings prior to use. The operator shall only utilize manufacturer-approved attachments. 15. The operator shall always use the same diameter hose along its entire length for maximum efficiency and to eliminate stop-ups. 16. Whenever possible, the operator shall utilize smooth bore hoses to ensure maximum efficiency and eliminate stop-ups. 17. At no time shall the operator be permitted to change hoses while the equipment is running. 18. The operator shall set the emergency brake and chalk the tires prior to vacuum operations. 19. The operator shall ground the truck prior to vacuum operations. 20. The vacuum truck shall be operated only in areas that are as level as possible. 21. Other than low levels of dissolved solids, soils, and sediments in the waste water. The operator shall not intentionally mix wet and dry materials or any materials with unidentified hazards in the same tank. 22. The operator shall maintain safe vehicle distance (minimum of 2-feet) from open trenches. 23. The vacuum truck tank shall be treated as a confined space. At no time shall personnel be permitted to enter the tank until vehicle is decommissioned, locked-out and tagged-out, and permit required confined space entry procedures are reviewed and followed. 24. When parking the equipment, the operator shall be mindful of safe parking locations and avoid parking in high traffic areas and in other equipment's blind spots.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
Contractor personnel may utilize fixed, enclosed ladder systems to access elevated areas near and around the biological treatment system. Contractor personnel may also utilize portable ladders to access	Slip, trip and fall are hazards associated with improper use of fixed and portable ladder systems.	<p>Portable Ladders: Active fall arrest systems will be utilized by all workers performing work activities on ladders at elevations greater than six (6) feet. Contractor personnel utilizing portable ladders shall be familiar with and adhere to policies and procedures outlined in <i>Section 22.0</i> of the HASP.</p>

Activity Hazard Analysis

lesser elevated areas at the work site.		<p>Fall Protection: Active fall arrest systems will be utilized by all workers performing work activities at elevations greater than six (6) feet where no passive fall arrest systems (railings, platforms, etc.) exist. All Contractor personnel performing work in elevated areas shall be familiar with and adhere to fall protection policies and protocols outlined in <i>Section 20.0</i> of the HASP</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Qualified and experienced Contractor personnel may utilize pneumatic tools and torch cutting equipment when dismantling and disconnecting process equipment and piping.</p>	<p>Cutting, pinching, skin burns, and eye damage from glare are hazards associated with improper operation of torch cutting equipment</p> <p>Air tool systems may present significant health hazards if not properly inspected before each use. Cutting, pinching and major bodily harm may result from improper use of pneumatic tools or an accidental release of pressurized air due to ruptured hoses and fittings.</p>	<p>PPE: Personnel performing torch cutting operations shall utilize <i>Modified Level D</i> PPE including hard toe work boots, leather gloves, long sleeve shirts, hard hat with protective face shield. Hearing protection shall be immediately available in case noise from tool operation and/or noise from other nearby construction activities exceed 90 dBA.</p> <p>Safe Operating Practices – Torch Cutting All personnel performing torch cutting activities shall be familiar with and shall adhere to all the safe operating policies and procedures outlined in <i>Section 24.0</i> of the HASP.</p> <p>Air Tools: Air tool system shall be inspected before each use to check for worn fittings and compromised hoses. Pneumatic power tools should be secured to the hose or whip in a positive manner to prevent accidental disconnection. Safety clips or retainers should be securely installed and maintained on pneumatic impact tools to prevent attachments from being accidentally expelled. The manufacturer's safety operating pressure for all fittings should not be exceeded. All hoses exceeding 1/2-inch inside diameter should have a safety device at the source of supply or branch line to reduce pressure in case of hose failure.</p> <p>Safe Operating Practices – Air Compressors</p> <ol style="list-style-type: none"> 1. Only trained (experienced) personnel shall operate air compressors. Compressor operators shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Section 25.0</i> of the HASP. 2. When using electric air compressors, the operator shall avoid using the air compressor in wet or damp locations to avoid the potential for electric shock. 3. Diesel powered, tow behind air compressors shall not be towed at speeds exceeding 50 miles per hour. Safety chains shall be attached all times during towing. 4. The operator shall avoid wearing jewelry or loose clothing that can be caught in moving parts while operating the compressor. 5. DO NOT BREATHE COMPRESSED AIR. Compressor exhaust gases contain carbon monoxide. Compressors shall only be operated in well ventilated areas. 6. Air compressor noise may exceed 90 dB. The operator and all nearby personnel and/or bystanders shall utilize hearing protection at all times. 7. Tow behind air compressors shall be parked and operated on level surfaces to prevent potential roll over during operation. 8. Before operating diesel powered, tow behind compressors, the operator shall ensure all

Activity Hazard Analysis

		<p>compartment doors, guards and panels are secured so as prevent coming loose and causing personnel injury and/or equipment damage.</p> <p>9. Never refill diesel powered compressors while they are in operation. The operator shall allow engine to cool before refueling and/or removing radiator and oil filter caps. Operating personnel shall always be aware of hot surfaces including mufflers, exhaust manifolds, and other engine parts.</p>
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Contractor personnel may be performing work in chemical resistant, non-breathable PPE and/or working in areas where elevated temperatures are likely.</p>	<p>The potential for heat related illnesses are a factor when performing work activities in chemical resistant, non-breathable PPE especially in summer months where elevated temperatures are likely. When the body is unable to cool itself by sweating, several heat induced illnesses such as heat stress or heat exhaustion or the more severe heat stroke can occur and result in serious injury or illness or even death. High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; certain medications; and inadequate tolerances for hot workplaces are all factors which can lead to heat stress and heat related illness.</p>	<p>Heat Illness Prevention: All Contractor employees shall adhere to heat illness prevention protocols outlined in <i>Section 18.0</i> of the HASP for work activities performed in non-breathable chemical resistant PPE both indoor and outdoor where environmental risk factors for heat illness are present. In general, personnel shall take into consideration the following preventative measures to reduce the risk of heat related illness:</p> <ol style="list-style-type: none"> 1) Learning and understanding the signs and symptoms of heat illnesses and what to do to help affected employees. 2) Employee training on heat induced illnesses. 3) When possible, try to perform heaviest work during coolest part of the day. 4) <i>Acclimatization</i> – build up tolerance to heat and work activity (takes up to two weeks). 5) Use the buddy system (work in pairs) 6) Drink plenty of cool water (one small cup every 15-20 minutes). 7) Wear light, loose fitting, breathable clothing. 8) Take frequent short breaks in cool, shaded areas allowing the body to cool down 9) Avoid eating large, heavy meals before working in hot environments 10) Avoid caffeinated beverages as they make the body lose water and increase the risk of heat illnesses.

Activity Hazard Analysis

Date:	August 15, 2008
Project:	Romic Phase I Facility Closure Project
Site Safety Officer:	Mr. Jason M. Costello
Activity Description:	Administrative Building Concrete Floor Washing Activities

Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>The Contractor has noted staining on the locker room floor and concrete entrance ways in the administrative buildings. These surfaces shall be cleaned via high pressure water washing activities.</p>	<p>Bruising, cutting, tearing and major bodily harm are hazards associated with improper operation and lack of experience and training regarding use of concentrated high pressure water.</p> <p>Ground surfaces and footing areas may become wet and present potential slip, trip and fall hazards.</p> <p>Environmental and personnel chemical exposure (dermal and inhalation) due to overspray are hazards associated with high pressure water washing.</p>	<p>PPE: All personnel performing high pressure water washing activities shall utilize <i>Level C</i> PPE including yellow chemical resistant polypropylene suits, rubber chemical resistant steel toe work boots, PVC gloves with nitrile glove inner liners, and full face air purifying respirator (APR) with appropriate cartridge configuration based on the anticipated chemical hazard.</p> <p>Contractor personnel shall tape plastic over the ends of the fume hood and HVAC ducting sections to prevent potential release of contaminants when transferring these materials to designated decontamination stations.</p> <p>Safe Operating Practices – Pressure Washing Equipment: The SSO shall ensure all power tools are inspected each day prior to use. Heavy equipment power tool inspection checklists will be completed by the operator(s) and submitted to the SSO for review. Power tool inspection checklists will be turned into the SSO and maintained in an inspection checklist binder. Contractor personnel operating high pressure water washing equipment shall adhere to the heavy equipment safe operating protocols and procedures outlined in <i>Sections 23.0</i> and <i>25.0</i> of the HASP. In general, Contractor personnel performing pressure washing activities shall adhere to the following safe practices:</p> <ol style="list-style-type: none"> 1) Only trained (experienced) personnel shall operate high pressure washing equipment 2) The operator shall insure that all electrical controls are either fail safe, low voltage, or protected with an approved ground fault circuit interrupter. 3) At no time shall the operator operate the equipment above the manufacturers rated pressure maximum. 4) The operator shall always increase pressure slowly until required working pressure is reached. 5) High pressure water can puncture splash suits and other personal protective clothing. At no time shall the operator point the pressure washer nozzle in the direction of other personnel. 6) Water spray will be directed downward to minimize misting and overspray.
Work Activity / Task	Potential Health & Safety Hazards	Hazard Controls & Mitigation Measures
<p>Contractor personnel may be performing work in chemical resistant, non-breathable PPE and/or working in areas where</p>	<p>The potential for heat related illnesses are a factor when performing work activities in chemical resistant, non-breathable PPE</p>	<p>Heat Illness Prevention: All Contractor employees shall adhere to heat illness prevention protocols outlined in <i>Section 18.0</i> of the HASP for work activities performed in non-breathable chemical resistant PPE both indoor and</p>

Activity Hazard Analysis

<p>elevated temperatures are likely.</p>	<p>especially in summer months where elevated temperatures are likely. When the body is unable to cool itself by sweating, several heat induced illnesses such as heat stress or heat exhaustion or the more severe heat stroke can occur and result in serious injury or illness or even death. High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; certain medications; and inadequate tolerances for hot workplaces are all factors which can lead to heat stress and heat related illness.</p>	<p>outdoor where environmental risk factors for heat illness are present. In general, personnel shall take into consideration the following preventative measures to reduce the risk of heat related illness:</p> <ol style="list-style-type: none"> 1) Learning and understanding the signs and symptoms of heat illnesses and what to do to help affected employees. 2) Employee training on heat induced illnesses. 3) When possible, try to perform heaviest work during coolest part of the day. 4) <i>Acclimatization</i> – build up tolerance to heat and work activity (takes up to two weeks). 5) Use the buddy system (work in pairs) 6) Drink plenty of cool water (one small cup every 15-20 minutes). 7) Wear light, loose fitting, breathable clothing. 8) Take frequent short breaks in cool, shaded areas allowing the body to cool down 9) Avoid eating large, heavy meals before working in hot environments 10) Avoid caffeinated beverages as they make the body lose water and increase the risk of heat illnesses.
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Attachment B

Emergency Information Reporting Form

EMERGENCY INFORMATION REPORTING FORM

LOCAL CUPA: 650-363-4305

STATE OFFICE OF EMERGENCY SERVICES: 800-852-7550 or 916-262-1621

NATIONAL RESPONSE CENTER: 800-424-8802

NAME AND ADDRESS OF FACILITY

NAME OF REPORTER AND PHONE #
WHERE REPORTER MAY BE LOCATED

NAME AND PHONE NUMBERS OF ADDITIONAL CONTACTS FOR INFORMATION

DATE TIME

TYPE OF INCIDENT MEDIA INTO WHICH RELEASE OCCURRED
(SPILL, GAS RELEASE, ETC.) (WATER, AIR, SOIL, ETC.)

IDENTIFICATION OF MATERIAL

IS MATERIAL AN EXTREMELY QUANTITY AND DURATION OF RELEASE HAZARDOUS
SUBSTANCE?
(REF:19 CCR 2770.5, TABLES 2 AND 3)

POSSIBLE HAZARDS TO THE ENVIRONMENT

ASSOCIATED ACUTE OR CHRONIC HEALTH RISKS (KNOWN OR ANTICIPATED)

PRECAUTIONS TO BE TAKEN

EXTENT OF INJURIES

OTHER COMMENTS

Attachment C

Nearby Hospital and Emergency Clinic Location Maps

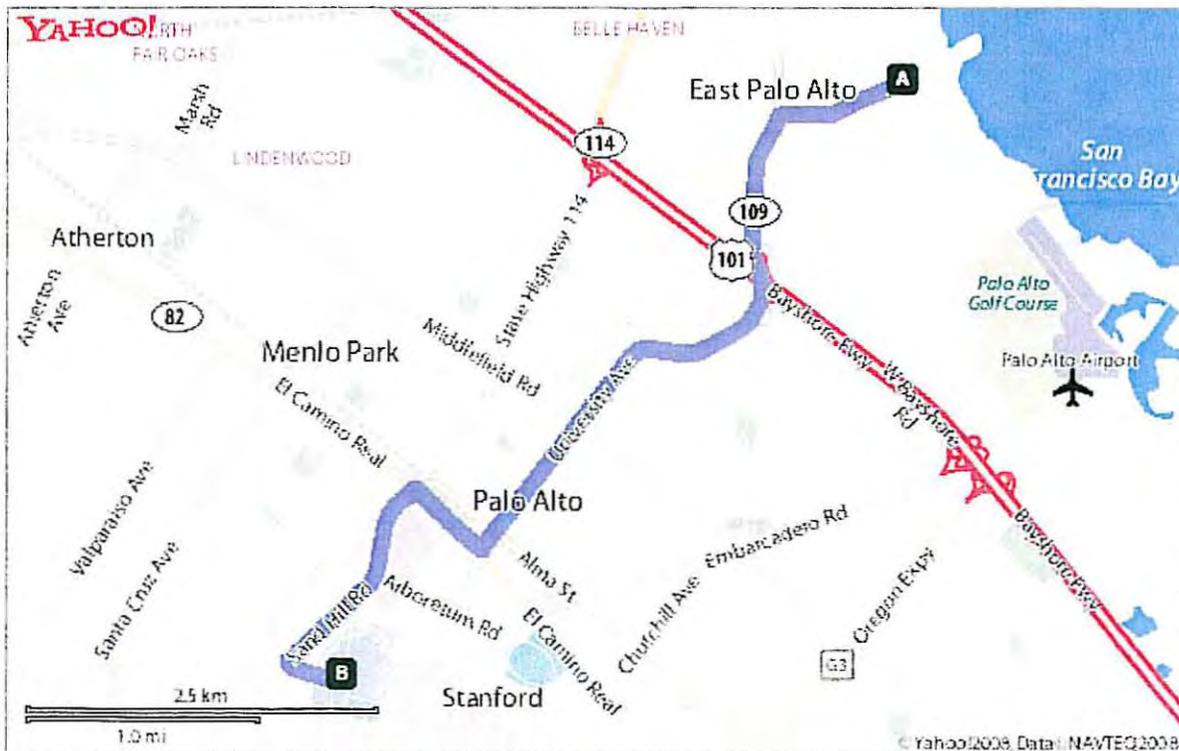
Hospital Location Map

Directions to 300 Pasteur Dr, Palo Alto, CA 94304 **YAHOO!** LOCAL Maps

Total Time: 20 mins, Total Distance: 5.23 miles

	Distance
A 1. Start at 2081 BAY RD, EAST PALO ALTO going toward TARA ST	go 0.63 mi
2. Turn L on UNIVERSITY AVE(CA-109)	go 2.79 mi
3. Turn R to take ramp onto EL CAMINO REAL(CA-82 N)	go 0.43 mi
4. Turn L on SAND HILL RD	go 1.05 mi
5. Turn L on PASTEUR DR	go 0.27 mi
6. Make a U-Turn at BLAKE WILBUR DR onto PASTEUR DR	go 211 ft
B 7. Arrive at 300 PASTEUR DR, PALO ALTO, on the L	

Time: 20 mins, Distance: 5.23 miles



When using any driving directions or map, it's a good idea to do a reality check and make sure the road still exists, watch out for construction, and follow all traffic safety precautions. This is only to be used as an aid in planning.

Nearest Medical Provider Network (MPN) Clinic

Directions to 33560 Alvarado Niles Rd, Union City, CA 94587-3111



Total Time: 20 mins, Total Distance: 12.41 miles

	Distance
A 1. Start at 2081 BAY RD, EAST PALO ALTO going toward TARA ST	go 0.63 mi
2. Turn R on UNIVERSITY AVE(CA-109)	go 1 mi
3. Turn R on CA-84 E	go 7.75 mi
4. Continue on DECOTO RD	go 2.19 mi
5. Turn L on ALVARADO NILES RD	go 0.84 mi
B 6. Arrive at 33560 ALVARADO NILES RD, UNION CITY, on the R	

Time: 20 mins, Distance: 12.41 miles



When using any driving directions or map, it's a good idea to do a reality check and make sure the road still exists, watch out for construction, and follow all traffic safety precautions. This is only to be used as an aid in planning.

Attachment D

Lock Out / Tag Out Procedural Checklist

	<h2 style="margin: 0;">Lockout / Tagout Procedural Checklist</h2> <p style="margin: 0; font-size: small;">(per individual piece of equipment or machine)</p>
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Client Name:	
Client Location:	
Equip. Name / ID Number:	
Equipment Locaton:	

Is there a written procedure for lockout / tagout activities? YES NO

Does the written procedure address the following information?

- | | | |
|--|------------------------------|-----------------------------|
| Job objectives and the equipment involved | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| Detailing energy sources for the equipment | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| Considerations for stored energy | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| Steps for shutting down and securing equipment | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| Steps to verify lockout effectiveness | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| Procedural steps for applying lockout / tag out | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| Procdural steps for re-starting equipment | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| Employees authorized to perform lockout | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| Annual compliance auditing of written procedures | YES <input type="checkbox"/> | NO <input type="checkbox"/> |

Is there written sequence for the following steps?

- | | | |
|------------------------------------|------------------------------|-----------------------------|
| Equipment Access | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| De-energizing | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| Lockout | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| Clearance | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| Release | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| Start-up | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| Notification of Affected Employees | YES <input type="checkbox"/> | NO <input type="checkbox"/> |

Has employee training been performed?

- | | | |
|-------------------------|------------------------------|-----------------------------|
| Authorized Employees | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| Affected Employees | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| Subcontractor Employees | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| Other Employees | YES <input type="checkbox"/> | NO <input type="checkbox"/> |

Has an affected employee contact roster been created and communicated?

YES NO

Project Name:	Job #:
---------------	--------

(Signature)

(Print Name)

(Date)

Attachment E

Equipment Inspection Checklist

Vehicle / Heavy Equipment Inspection Checklist

Date: _____

Vehicle Description:	Equipment Type:	Model/Make:
Mileage/Hours:	Owner (name):	Vendor (if other than owner):
Inspection Location:	Job #:	Inspector (name & title):

Heavy Equipment (Backhoes, Loaders, Excavators, etc.)	Y	N	N/A	Industrial Trucks (Dump Trucks, Vacuum Trucks, Vactors, etc.)	Y	N	N/A
Canopy / roll over protection system (ROPS) secured to main frame?				Steering mechanism in good condition? No excessive free play?			
Lights mounted and working?				Clutch is properly adjusted? Acceptable free travel?			
Blade host brake holding? Operates smoothly? Holds at any point?				Foot and hand brakes in good condition? Hold firm?			
Master clutch operates under load? No slipping?				All gauges functioning properly?			
Brakes function? Hold at half travel?				Horn is in working order?			
All gauges functioning properly?				Back up alarms functioning?			
Fuel system in good condition? No visible leaks?				Rear/side view mirrors and wipers in working order?			
Cooling system fluid level good? Radiator & hoses in good condition?				Windshield and mirrors clean with no cracks or restricted visibility?			
Fan and fan belts in good condition? Not damaged or frayed?				Seat belts function and are in good condition?			
Battery in good condition? Fluid level? Terminal corrosion?				Headlights, tail lights and turn indicators functioning properly?			
Muffler and spark arrester in place? Approved type?				Good air pressure in tires? Good tread depth? No visible damage?			
Engine in good running condition? No knocking?				Muffler/exhaust system in good condition? No leaks/excessive noise?			
Appropriate oil pressure?				Cooling system fluid level good? Radiator and hoses in good condition?			
Transmission and differential in good condition? No visible leaks?				Engine in good running condition? No knocking?			
Tracks and rollers in good condition?				Engine oil good?			
Good air pressure in tires? Good tread depth? No visible damage?				Battery in good condition? Fluid level? Terminal corrosion?			
Proper lubrication? No dry pivot points or grease fittings?				Auxiliary pumps and hoses functioning and in good condition?			
Hydraulic hoses and fittings in good condition?				Transmission and differential in good condition? No visible leaks?			
Attachments in good condition? Securely attached?				Hydraulic systems operating and in good condition? No visible leaks?			
Stabilizers functioning and in good condition?				Hydraulic system failure safety engineering controls in place?			
Operator mounting/dismounting foot holds clean and free of debris?				Pressure vessel (tank) in good condition? No cracks/visible damage?			
Windshield and mirrors clean with no cracks or restricted visibility?				Fume/dust suppression systems in place and operating efficiently?			
Fume/dust suppression systems in place and operating efficiently?				Operator mounting/dismounting foot holds clean and free of debris?			
Backup alarms functioning?				License plates visible/unobstructed?			
Seat belts/shoulder harness systems functioning and in good condition?				Transporter registrations/licenses accessible/readily available?			
Accessories: Fire extinguisher on board? Properly inspected?				Mud flaps in good condition? No visible damage?			
Accessories: Chock blocks accessible /readily available?				Buddy system: Safety communication measures in place? (Vactor)			
				Accessories: Chock blocks accessible /readily available?			
				Accessories: Jack and spare tire available and in good condition?			
				Accessories: Fire Extinguisher onboard and properly inspected			
				Accessories: First aid kit on board and properly stocked			

Vehicle / Heavy Equipment Inspection Checklist (Continued)

Aerial Lift Equipment (Scissor Lifts, Boom Lifts, etc.)	Y	N	N/A	Equipment Vehicles (Pickup Trucks, Box Trucks, Flatbeds, etc.)	Y	N	N/A
Good air pressure in tires? Good tread depth? No visible damage?				Steering mechanism in good condition? No excessive free play?			
All gauges and panel controls functioning properly?				Clutch is properly adjusted? Acceptable free travel?			
Battery in good condition? Fluid level? Terminal corrosion?				Foot and hand brakes in good condition? Hold firm?			
Hydraulic systems operating and in good condition? No visible leaks?				All gauges functioning properly?			
Hydraulic system failure safety engineering controls in place?				Horn is in working order?			
Hoses, cables, and wiring clear of pinch points?				Rear/side view mirrors and wipers in working order?			
Proper lubrication? No dry pivot points or grease fittings?				Windshield and mirrors clean with no cracks or restricted visibility?			
Basket/cage structurally in good condition? No damaged welds?				Seat belts function and are in good condition?			
Basket/cage lifeline tie off points structurally in good condition?				Headlights, tail lights and turn indicators functioning properly?			
Basket/cage entry point has secure hinges and locking mechanism?				Good air pressure in tires? Good tread depth? No visible damage?			
Wiring in good condition? No loose wire connectors?				Muffler/exhaust system in good condition? No leaks/excessive noise?			
Outriggers/stabilizers functioning and in good condition (boom lifts)				Cooling system fluid level good? Radiator and hoses in good condition?			
Check for overhead clearances in work area?				Engine in good running condition? No knocking?			
Check for overhead power lines in work area?				Engine oil good?			
Manufacturer safety devices in place and operating properly?				Battery in good condition? Fluid level? Terminal corrosion?			
Accessories: Active fall arrest equipment readily available?				Transmission and differential in good condition? No visible leaks?			
				License plates visible/unobstructed?			
				Transporter registrations/licenses accessible/readily available?			
				Mud flaps in good condition? No visible damage?			
				Accessories: Jack and spare tire available and in good condition?			
				Accessories: Fire Extinguisher onboard and properly inspected			
				Accessories: First aid kit on board and properly stocked			

Additional Comments / Corrective Actions

Powered Handheld Equipment Inspection Checklist

Date: _____

Equipment Type:	Model/Make:	Equipment ID #:
Hours (if applicable):	Owner (name):	Vendor (if other than owner):
Inspection Location:	Job #:	Inspector (name & title):

High Pressure Water Washing Equipment	Y	N	N/A	General Powered Handheld Equipment (Jack Hammer, Compacter, Air Compressor, etc.)	Y	N	N/A
Area being cleaned adequately barricaded with proper warning signs?				Work area(s) adequately barricaded with proper warning signs?			
Precautions taken to protect all electrical equipment?				Hydraulic systems are in good condition? No leaks?			
Fittings are of the correct pressure rating and in good condition?				Fuel system is in good condition? No leaks?			
Hoses are of the correct pressure rating and in good condition?				Fuel system is in good condition? No leaks?			
Hose guards in good condition?				Pneumatic fittings are of the correct pressure rating and in good condition?			
Pressure relief valves (or bursting discs) in good condition and operating properly?				Hoses are of the correct pressure rating and in good condition?			
Whip checks in place and functioning properly?				Hose guards in good condition?			
Quick couplers are clean and functional / no debris?				Pressure relief valves (or bursting discs) in good condition and operating properly?			
Nozzles are free from plugging and in good condition?				Whip checks in place and functioning properly?			
Precautions are taken to prevent line mole reversal?				Quick couplers are clean and functional / no debris?			
Filter on the pump suction clean and in good condition?				Fluid levels are adequate? Proper lubrication?			
Adequate water supply available?				Tires in good condition? No visible damage?			
Precautions are taken to prevent freezing?				All control systems are operational?			
Fluid levels are adequate? Proper lubrication?				Engineered safety devices operational and in good condition?			
Tires in good condition? No visible damage?				Towing hitches and couplers in good condition (towable units only)?			
All control systems are operational?				Specialized personal protective equipment (PPE) available: Metatarsal covers, face shield, hearing protection, non-slip gloves, etc.			
Engineered safety devices operational and in good condition?				Personnel have proper training to operate the equipment?			
Dump valves operational and in good condition?							
Towing hitches and couplers in good condition (towable units only)?							
Personnel have proper training to operate the equipment?							
Personnel have appropriate personal protective equipment (PPE)?							

Additional Comments / Corrective Actions

Attachment F

Confined Space Entry Activities Permit Form

CONFINED SPACE ENTRY PERMIT

Job #: _____
 Date: _____
 Time: _____

Job Name: _____ Job Location: _____
 Description of Confined Space Work: _____

Tank/Vault #/Name: _____ Tank/Vault Type Const: _____
 Tank/Vault Content: _____
 Person in Charge: _____ Standby: _____

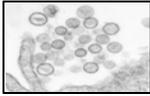
EMPLOYEE SIGN OFF

Name (Please Print)	Signature	Duties

ITEM					YES/NO	COMMENTS
Electrical Service Lockout/Tagout Completed						
Inlet/Outlet Lines Broken/Capped or Blanked						
Work Area Purged, Flushed, and Vented						
Ventilation Equipment in use, Bonded, Grounded						
Area Secured, Warning Signs Posted						
Respiratory Protection Type						
Breathing Air Supply & Alarms Inspected						
Head, Eye, Skin, & Foot Protection Type						
Body Harness, Lifeline/TripodEmergency Escape Unit						
Lighting						
All Ignition Sources Removed, Isolated						
EmergencyEquipment Ready for use (SCBA, Fire Ext,First Aid Kit Etc.)						
Communication Signals/System Checked						
Fire Extinguisher Type ABC Location						
Hot Cut Permit Issued						
Have all Employees Reviewed & Signed Health & Safety Plan						
Have all Employees Signed Confined Space Entry Permit						
Required Test of Air in the Confined Space					Emergency Telephone Numbers	
Time	LEL %	Oxy %	H2S ppm	CO2 ppm	Fire: _____	
					Medical: _____	
					Police: _____	
					Permit Approved By Site Safety Officer	
					Printed Name	
No Entry When Levels Are	>10%	<19.5 >23.5	>300 ppm	>1500ppm	Signature	
Gas Test Name & Check #:	Instrument Used:	Model &/or Type:	Serial &/or Unit #:			

Attachment G

CDC Hantavirus Pulmonary Syndrome (HPS) Fact Sheet



Hantavirus Pulmonary Syndrome (HPS): What You Need To Know

RESERVOIR	The deer mouse (<i>Peromyscus maniculatus</i>) is the primary reservoir of the hantavirus that causes hantavirus pulmonary syndrome (HPS) in the United States.
TRANSMISSION	Infected rodents shed the virus through urine, droppings, and saliva. HPS is transmitted to humans through a process called aerosolization . Aerosolization occurs when dried materials contaminated by rodent excreta or saliva are disturbed. Humans become infected by breathing in these infectious aerosols. HPS in the United States cannot be transmitted from one person to another. HPS in the United States is not known to be transmitted by farm animals, dogs, or cats or from rodents purchased from a pet store.
RISK	Anything that puts you in contact with fresh rodent urine, droppings, saliva or nesting materials can place you at risk for infection.
VIRUS	Hantaviruses have been shown to be viable in the environment for 2 to 3 days at normal room temperature. The ultraviolet rays in sunlight kill hantaviruses.
PREVENTION	Rodent control in and around the home remains the primary strategy for preventing hantavirus infection.
CLEANING	Use a bleach solution or household disinfectant to effectively deactivate hantaviruses when cleaning rodent infestations.

What is hantavirus pulmonary syndrome (HPS)?

Hantavirus pulmonary syndrome (HPS) is a deadly disease transmitted by infected rodents through urine, droppings, or saliva. Humans can contract the disease when they breathe in aerosolized virus.

Who is at risk of getting HPS?

Anyone who comes into contact with rodents that carry hantavirus is at risk of HPS. Rodent infestation in and around the home remains the primary risk for hantavirus exposure. Even healthy individuals are at risk for HPS infection if exposed to the virus.

Which rodents are known to be carriers of hantavirus that cause HPS in humans?

In the United States, deer mice, cotton and rice rats (in the Southeast), and the white-footed mouse (in the Northeast), are the only known rodent carriers of hantaviruses causing HPS.



DEER MOUSE

How is HPS transmitted?

Hantavirus is transmitted by infected rodents through urine, droppings, or saliva. Individuals become infected with HPS after breathing fresh aerosolized urine, droppings, saliva, or nesting materials. Transmission can also occur when these materials are directly introduced into broken skin, the nose or the mouth. If a rodent with the virus bites someone, the virus may be spread to that person, but this type of transmission is rare.

Can you contract HPS from another person?

HPS in the United States cannot be transmitted from one person to another. You cannot get the virus from touching or kissing a person who has HPS or from a health care worker who has treated someone with the disease. In addition, you cannot contract the virus from a blood transfusion in which you receive blood from a person who survived HPS.

Can you contract HPS from other animals?

Hantaviruses that cause HPS in the United States are only known to be transmitted by certain species of rodents. HPS in the United States is not known to be transmitted by farm animals, dogs, or cats or from rodents purchased from a pet store.

Can you contract HPS from the tops of soda pop cans?

There is no evidence that hantavirus can be spread via soda cans. Wiping off the top of soda cans is good practice. However, if you fail to wipe off soda cans it is highly unlikely that an individual would become sick from

hantavirus pulmonary syndrome. For more information, see Hoaxes and Rumors on the CDC Web page (<http://www.cdc.gov/ncidod/hoaxes/hanta-hoax.htm>).

How long can hantavirus remain infectious in the environment?

The length of time hantaviruses can remain infectious in the environment is variable and depends on environmental conditions, such as temperature and humidity, whether the virus is indoors or outdoors or exposed to the sun, and even on the rodent's diet (which would affect the chemistry of its urine). Viability for 2 or 3 days has been shown at normal room temperature. Exposure to sunlight will decrease the time of viability, and freezing temperatures will actually increase the time that the virus remains viable. Since the survival of infectious virus is measured in terms of hours or days, only active infestations of infected rodents result in conditions that are likely to lead to human hantavirus infection.

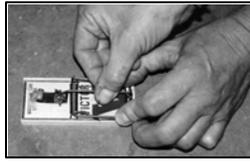
How do I prevent HPS?

SEAL UP, TRAP UP, CLEAN UP

Seal up rodent entry holes or gaps with steel wool, lath metal, or caulk. Trap rats and mice by using an appropriate snap trap. Clean up rodent food sources and nesting sites and take precautions when cleaning rodent-infested areas. See the HPS Prevention Checklist for a complete listing.



SEAL UP



TRAP UP



CLEAN UP

What are the recommendations for cleaning a rodent-infested area?

- Put on rubber, latex, vinyl or nitrile gloves.
- Do not stir up dust by vacuuming, sweeping, or any other means.
- Thoroughly wet contaminated areas with a bleach solution or household disinfectant.
Hypochlorite (bleach) solution: Mix 1 and ½ cups of household bleach in 1 gallon of water.
- Once everything is wet, take up contaminated materials with damp towel and then mop or sponge the area with bleach solution or household disinfectant.
- Spray dead rodents with disinfectant and then double-bag along with all cleaning materials. Bury, burn, or throw out rodent in appropriate waste disposal system.
(Contact your local or state health department concerning other appropriate disposal methods.)
- Disinfect gloves with disinfectant or soap and water before taking them off.
- After taking off the clean gloves, thoroughly wash hands with soap and warm water.

Can I use a vacuum with HEPA filter to clean up rodent-contaminated areas?

HEPA vacuums are not recommended since they blow air around and may create aerosols.

How do I clean papers, books, and delicate items?

Books, papers, and other items that cannot be cleaned with a liquid disinfectant or thrown away should be left outdoors in the sunlight for several hours or in an indoor area free of rodents for approximately 1 week before final cleaning. After that time, the virus should no longer be infectious. Wear rubber, latex, or vinyl gloves and wipe the items with a cloth moistened with disinfectant.

I do not want to bleach my clothes or stuffed animals; is there anything else I can do?

Wash clothing or stuffed animals in the washing machine using hot water and regular detergent. Laundry detergent can break down the virus's lipid envelope, rendering it harmless. Machine dry laundry on a high setting or hang it to air dry in the sun. CDC does not recommend simply running the clothing through the dryer without washing first.

How do I clean rugs, carpets and upholstered furniture?

Disinfect carpets and upholstered furniture with a disinfectant or with a commercial-grade steam cleaner or shampoo.

What precautions should I take if I think I have been exposed to hantavirus?

If you have been exposed to rodents or rodent infestations and have symptoms of fever, deep muscle aches, and severe shortness of breath, see your doctor immediately. Inform your doctor of possible rodent exposure so that he/she is alerted to the possibility of rodent-carried diseases, such as HPS.