

HEALTH AND SAFETY PLAN (HASP)

for

In-Situ Solidification/Stabilization

**Two Rivers Former MGP Site Remediation
2000 21st Street
Two Rivers, WI**

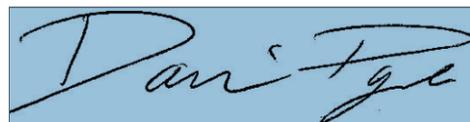
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1.0 INTRODUCTION AND SITE DESCRIPTION

Geo-Solutions, Inc. (GSI) is proposing to perform In-Situ Solidification (ISS) and associated activities at the Two Rivers Former MGP Site in Two Rivers, WI.

The Site is a former Manufactured Gas Plant and encompasses approximately 4 acres. The Site is bounded by 2022 School Street to the south, owned by Manitowoc County. The School Street right of way and the following private properties to the east. (2100 School Street, 2104 School Street, 2110 School Street and 1913 22nd Street), 1926 22nd Street to the north, owned by the US Oil Company, Inc. and the West Twin River to the west. Site features include historic concrete building foundations. A chain link fence secures the site perimeter. A wetland exists in the center and western portion of the property. Large portions of the Site east of the wetland are covered in crushed stone. The vegetation in the wetland consists of a fringe scrub/shrub on the eastern edge of the wetland dominated by aspen and dogwood. Emergent and wet meadow species such as green bulrush and horsetail, are located closer to the bank of the West Twin River.

This Health and Safety Plan (HASP) has been developed to provide safe work procedures and practices for GSI personnel and subcontractors engaged in construction activities. The HASP is designed to provide such personnel with information to protect themselves from chemical and physical hazards that may be encountered during work at the site. It is only applicable to GSI activities, GSI employees and GSI subcontractor personnel. GSI and its subcontractors are required to adhere to the requirements under 29 CFR 1910 and 29 CFR 1926 with respect to GSI's scope of work.

Components of this HASP are based upon the requirements set forth in 29 CFR 1910.120, the Occupational Safety and Health Administration's (OSHA) Hazardous Waste Operations and Emergency Response Standard and the *Request for Proposal for Two Rivers Former MGP Site Remediation dated June 6, 2014*. As/if additional site characterization data is made available to GSI, a further evaluation of chemical/exposure hazards can be made and levels of protection used to initiate site activities in this HASP will be reviewed. Field conditions and information gathered during field activities may also provide additional information, which would require that this document be modified. Major modifications outside the scope of this HASP will be approved by GSI management (Health and Safety Coordinator or designee and Project Manager) and communicated to applicable personnel. Changes to the HASP will be in the form of addenda that will be forwarded to Natural Resource Technology, Inc. (NRT) and/or Integrys Business Support, LLC, (IBS) and the project file if such modifications are necessary.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES RELATIVE TO HEALTH AND SAFETY

Health and safety is a line management responsibility, and as such, the GSI Project Manager (PM) and Site Superintendent(s) are responsible for the overall onsite direction, implementation, and enforcement of health and safety for this project.

The PM, is ultimately responsible for ensuring GSI's Health and Safety Program is being implemented throughout the duration of the project; coordinating all health and safety submittals; providing the appropriate technical information to write submittals; qualifying/directing subcontractors relative to health and safety compliance; determining which aspect of the health

and safety program and GSI's Standard Work Procedures (SWPs) apply to this project; and providing necessary resources (e.g. financial support, equipment, personnel, etc.) for compliance.

The GSI Health and Safety Officer's (HSO) main function is to serve as a technical advisor to GSI line management in matters regarding health and safety. As such, he will primarily be responsible for the technical and administrative functions relative to GSI's health and safety during on-site activities (i.e., site-specific training, site-safety audits, verifying compliance with the Site Health and Safety Program protocols, specific facility requirements, Site SWPs, etc.). Most of these responsibilities are detailed in the site specific HASP and GSI's Health and Safety Program. The SSO has the authority to stop work if he believes an imminently dangerous situation exists. Such a situation will be immediately reviewed by appropriate line management (Project Management), and Health and Safety personnel (Health and Safety Coordinator) for resolution. Personnel designated for this project and the terminology used throughout this HASP includes:

- GSI Site Supervisor (SS) – Keith Adamson (designated as “competent person” as per OSHA)
- GSI ISS Superintendent – Keith Adamson
- GSI Project Engineer – John Scott
- GSI Health and Safety Officer (HSO)– Aaron Handel
- GSI Project Manager (PM) – Darin Payne

All other GSI personnel and subcontractors working at the site will report to the SS and, in keeping with OSHA requirements and GSI management principles, are required to comply with all procedures outlined in the HASP and GSI's Health and Safety Program. Additionally, from a program standpoint, all department heads are required to enforce the health and safety program and project constituents, as they relate to specific employees.

3.0 SCOPE OF WORK

The scope of work for this site specific project HASP consists of ISS of and associated activities to in-situ soil mixing work to be performed.

1. Clearing and grubbing of site vegetation.
2. Site preparation, removal of subsurface foundations or historical structures, construction installation and maintenance of temporary gravel access roads, parking area, and batch plant pad and removal at the project.
3. Removal of surface soil, peat and soil as required for obstruction removal, estimated at 17,000 cubic yards
4. Pre-excavation to a minimum depth of 15 feet bgs within the ISS Area to remove subsurface obstructions, if present
5. ISS of approximately 71,000 cubic yards of soil
6. Management and grading of ISS swell material
7. Site restoration, including seeding and mulching and placement of ½ foot of topsoil and removal of temporary construction infrastructure

4.0 HAZARD ASSESSMENT

4.1 Introduction

The hazard assessment posed during onsite activities depends upon a variety of contributing factors. The primary concern is that of the contaminants in question and the task(s) or operation(s) being performed. The method of conducting the operation, plus the location of the operation also impacts the hazard potential.

The hazard assessment outlined in the following paragraphs is designed to communicate the hazards associated with construction activities to both GSI personnel and subcontractors. It is designed to be as comprehensive as possible, but it is impossible to predict all the hazards that may be encountered in every given situation. The hazard assessment is broken into the following major headings:

- Overview of Primary Chemical Hazard Health Effects.
- Analysis of Chemical Exposure Risk.
- Mechanical, Physical, and Related Hazards.
- Weather-related Hazards.
- Chemical Hazard Communication.

Often the aforementioned hazards interrelate and more than one can be associated with various tasks and operations. As previously discussed, the main objective of this HASP is to provide personnel with the information necessary for them to recognize the hazards associated with their specific job responsibility.

4.2 Overview of Primary Chemical Hazard Health Effects

4.2.1 *Overview of Chemical Exposure Risk*

GSI has based the development of its hazard evaluation on the information provided in the bid documents and our past experience on MGP sites. It is assumed that the primary contaminants of concern (COC) are benzene, ethylbenzene, naphthalene, toluene, xylene, and PAHs. Based on this information, GSI will conduct work under the assumption that these COCs are the primary contaminants presenting a potential exposure concern on this site.

4.2.2 *Overview of Chemical Health Effects*¹

Benzene² **CAS 71-43-2; RTECS CY1400000; UN 1114**

Benzene is a clear, volatile, colorless, highly flammable liquid with a characteristic odor. The odor threshold in air varies from 0.3-5 ppm and 4.9 mg/m³; the odor threshold in water is 2.0 mg/liter.

¹ Information for this section was obtained from the Handbook of Toxic and Hazardous Chemicals and Carcinogens, Marshall Sittig© 1991; 29 CFR 1910 (Section 1910.1000 to end), July 1, 2001; NIOSH Pocket Guide to Chemical Hazards, March 21, 2002; 2002 TLV Booklet; ACGIH Guide to Occupational Exposure Values 2002; General Chemistry, Ebbing 1990.

² C.A.S. (Chemical Abstract Service), registry number is the unique identification number for a chemical. The number identifying the chemical in the NIOSH Registry of Toxic Effects of Chemical Substances (RTECS) is a nine-digit number. UN identifies the United Nations number specific to a chemical.

Benzene's boiling point is 80°C with a flash point of 11°C. Its LEL is 1.4% and UEL is 7.5%. Synonyms are benzol, phenyl hydride, coal naphtha, phene, benxole, and cyclohexatriene.

Benzene is used as a constituent in motor fuels, as a solvent for fats, inks, oils, paints, plastics, and rubber, in the extraction of oils from seeds and nuts, and in photogravure printing. It is also used as a chemical intermediate. By alkylation, chlorination, nitration, and sulfonation, chemicals such as styrene, phenols, and maleic anhydride are produced. Benzene is also used in the manufacturer of detergents, explosives, pharmaceuticals, and dye-stuffs.

Increased concern for benzene as a significant environmental pollutant arises from public exposure to the presence of benzene in gasoline and the increased content in gasoline due to requirements for unleaded fuels for automobiles equipped with catalytic exhaust converters.

The benzene standard 29 (CFR 1910.1028) establishes an action level of 0.5 ppm, a PEL of 1 ppm, and a short-term exposure limit (STEL) of 2.5 ppm. The ACGIH has designated benzene as an "Industrial Substance Suspect of Carcinogenic Potential for Man" with a 2002 ACGIH TLV of 0.5 ppm (1.6 mg/m³). The NIOSH recommended exposure limit (REL) is 0.1 ppm. The IDLH is 500 ppm.

Routes of entry consist of inhalation of vapor, ingestion, skin and eye contact. Points of attack consist of the blood, central nervous system, skin, bone marrow, eyes and respiratory system. Harmful effects and symptoms of short-term exposure consist of the following:

- *Inhalation* - Benzene may produce both nerve and blood effects. Irritation of the nose, throat and lungs may occur (3,000 ppm may be tolerated for only 30 to 60 minutes). Lung congestion may occur. Nerve effects may include an exaggerated feeling of well-being, excitement, headache, dizziness and slurred speech. At high levels, slowed breathing and death may result. Death has occurred at exposures of 20,000 ppm for 5 to 10 minutes, or 7,500 ppm for 30 minutes.
- *Skin* - Irritation may occur, with redness and blistering if not promptly removed. Benzene is poorly absorbed. Whole body exposure for 30 minutes has been reported with no health effects.
- *Eyes* - May cause severe irritation.
- *Ingestion* - May cause irritation of the mouth, throat and stomach. Symptoms are similar to those listed under inhalation. One tablespoon may cause collapse, bronchitis, pneumonia and death.

Harmful effects and symptoms of long term exposure may cause loss of appetite, nausea, weight loss, fatigue, muscle weakness, headache, dizziness, nervousness and irritability. Mild anemia has been reported from exposures of 25 ppm for several years and 100 ppm for 3 months. At levels between 100 and 200 ppm for periods of 6 months or more, severe irreversible blood changes and damage to liver and heart may occur. Temporary partial paralysis has been reported. Benzene is a known human carcinogen. Exposure has been linked to increased risk of several forms of leukemia.

Level C (full-face with organic vapor cartridge) protection can be used up to 50 ppm. Above this value, level B is required. Determination in air for personal exposure consists of collection on charcoal adhering to NIOSH Methods 1500, 1501 or 3700.

Ethylbenzene

CAS 100-41-4; RTECS DA0700000; UN 1175

Ethylbenzene is a colorless liquid with a pungent aromatic odor. The odor threshold is 140 ppm in air. The boiling point is 136°C with a flash point of 21°C. The LEL is 1.0%, and the UEL is 6.7%. Synonyms are ethylbenzol, phenylethane and EB.

Ethylbenzene is used in the manufacture of cellulose acetate, styrene, and synthetic rubber. It is also used as a solvent or diluent and as a component of automotive and aviation gasoline. Significant quantities of ethylbenzene are present in mixed xylenes. These are used as diluents in the paint industry, in agricultural sprays for insecticides and in gasoline blends (which may contain as much as 20% ethylbenzene). In light of the large quantities of ethylbenzene produced and the diversity of products in which it is found, there exist many environmental sources for ethylbenzene, e.g., vaporization during solvent use, pyrolysis of gasoline and emitted vapors at filling stations.

The PEL, REL and TLV are 100 ppm (435 mg/m³ [TLV 434 mg/m³]). The STEL is 125 ppm (545 mg/m³). The IDLH level is 800 ppm (10% LEL).

Routes of entry are via inhalation, ingestion, eye and skin contact. Points of attack are the eyes, upper respiratory system, skin and central nervous system.

Kidney disease, liver disease, chronic respiratory disease, and skin disease are associated health effects. The kidney is the primary route of excretion of ethylbenzene and its metabolites. Ethylbenzene is metabolized by the liver, which may potentially damage tissue. Inflammation of the pulmonary system might occur following exposure to ethylbenzene. Individuals with impaired pulmonary function might be at risk. Ethylbenzene is a defatting agent and may cause dermatitis following prolonged exposure. Individuals with pre-existing skin problems may be more sensitive to ethylbenzene. Other symptoms of exposure are irritation of eyes and mucous membranes; headaches, dermatitis; narcosis; and coma. A concentration of 200 ppm can cause irritation.

Air purifying respirators (full-face with an organic vapor cartridge) can be used up to 800 ppm. Above this value, Level B is required. Determination in air is via collection on charcoal adhering to NIOSH method 1501.

Naphthalene

CAS 91-20-3; RTECS QJ0525000; UN 1334 AND 2304 (MOLTEN)

Naphthalene, is a white crystalline solid with a characteristic "moth ball" odor. The odor threshold ranges between 0.03 ppm and 0.084 ppm. Synonyms are naphthalin, moth flake, tar camphor, white tar, and mothballs.

Naphthalene is used as a chemical intermediate or feedstock for synthesis of phthalic, anthranilic, hydroxyl (naphthols), amino (naphthylamines), and sulfonic compounds, which are used in the manufacture of various dyes. Naphthalene is also used in the manufacture of hydronaphthalenes,

synthetic resins, lampblack, smokeless powder, and celluloid. Naphthalene has been used as a moth repellent.

The PEL and REL are 10 ppm (50 mg/m³). The 2002 TLV is 10 ppm (52 mg/m³). The STEL value is 15 ppm (75 mg/m³). The IDLH level is 250 ppm.

Routes of entry are via inhalation of vapor or dust, skin absorption, ingestion, skin and eye contact. Harmful effects and symptoms associated with short-term exposure are as follows:

- *Inhalation* - Levels above 10 ppm may cause headache, nausea, excessive sweating and vomiting.
- *Skin* - May cause irritation. If hypersensitive to naphthalene, severe irritation may occur.
- *Eyes* - Levels above 15 ppm may cause irritation. Direct contact may cause severe irritation, injury to the cornea and a blurring of vision.
- *Ingestion* - Ingestion of 1/2 gram (1/60 ounce) may cause nausea, vomiting, abdominal pain, irritation of the bladder, and brown or black coloration of the urine. The symptoms usually disappear after a few days. Animal studies indicate that the probable lethal dose for an adult is 5 to 15 grams (1/16 to 1/2 ounce).

Harmful effects associated with long-term exposure consist of clouding of the eye with repeated ingestion. Inhalation of levels above 10 ppm may cause headaches, nausea, vomiting and a feeling of general discomfort. Chronic skin problems are rare, except in cases of hypersensitivity.

For 3M, level C (half-face respirator with OV cartridges) can be used up to 100 ppm. For MSA, level C (half-face respirator with organic vapor cartridges with dust/mist filter) can be used for naphthalene up to 100 ppm (full-face can be used up to 250 ppm). For North, level C (full-face respirator approved for use against organic vapor and non-oil particulates) can be used up to 200 ppm. Determination in air is collection on charcoal adhering to NIOSH Methods 1501-aromatic hydrocarbons, and 5506 and 5515 for polynuclear aromatics. See also OSHA Method 35.

Polynuclear Aromatic Hydrocarbons

PNAs can be formed in any hydrocarbon combustion process and the major sources are stationary sources such as heat and power generation, refuse burning and industrial activity, such as coke ovens, and coal refuse heaps. Additionally, adding aromatics to gasoline has the effect of increasing PNAs emitted in exhaust. Examples of PNAs include naphthalene, 2-methyl naphthalene, fluorene, phenathene, etc.

Not all PNAs are carcinogenic, but several are so that this class of material is always suspect. Several PNAs are known to have carcinogenic activity at least by animal experiment; however, the two lowest (or first) members of this (PNA) series, naphthalene and anthracene, have shown no carcinogenic activity.

As these materials are found in smoke and in suspended particulate air pollution, the suspicion is that they may cause lung or skin cancer in man and possibly stomach cancer as well. The routes

of entry into the body include inhalation of particulates and/or vapors. Instances of human cancer caused by this class of compounds are rare in literature.

An exposure limit of 0.2 mg/m³ will be used as a conservative approach. Determination in air is via collection on a membrane filter, benzene extraction, chromatographic separation, and measurement by fluorometry or using level C, with a combination OV, acid gas. A HEPA filter can be used up to 10 mg/m³.

Toluene

CAS 108-88-3; RTECS XS5250000; UN 1294

Toluene is a clear, colorless, noncorrosive liquid with a sweet, pungent, benzene-like odor. The odor threshold in air is variously given as 0.17 ppm, 2.9 ppm, 8 ppm, and 40 ppm. The odor threshold in water is 0.04-1.0 mg/l. Synonyms are toluol, methylbenzene, phenylmethane and methylbenzol.

Toluene may be encountered in the manufacture of benzene. It is also used as a chemical feed for toluene diisocyanate, phenol, benzyl and benzoyl derivatives, benzoic acid, toluene sulfonates, nitrotoluenes, vinyltoluene, and saccharin; as a solvent for paints and coatings; or as a component of automobile and aviation fuels.

The transitional PEL is 200 ppm³. The final rule PEL and REL are 100 ppm (375 mg/m³) and the OSHA STEL is 150 ppm (560 mg/m³). The IDLH level is 500 ppm. The 2002 ACGIH TLV is 50 ppm (188 mg/m³) with a "skin" notation.

Routes of entry are through inhalation of vapor, percutaneous absorption of liquid, ingestion, skin and eye contact. Harmful effects and symptoms related to short-term exposure are as follows:

- *Inhalation* - 100 ppm exposure can cause dizziness, drowsiness and hallucinations. 100-200 ppm can cause depression, 200-500 ppm can cause headaches, nausea, loss of appetite, loss of energy, loss of coordination and coma. In addition to the above, death has resulted from exposure, for an unknown time, to 10,000 ppm.
- *Skin* - Can cause dryness and irritation. Absorption may cause or increase the severity of symptoms listed above.
- *Eyes* - Can cause irritation at 300 ppm.
- *Ingestion* - Can cause a burning sensation in the mouth and stomach, upper abdominal pain, cough, hoarseness, headache, nausea, loss of appetite, loss of energy, loss of coordination and coma.

³ Transitional limit PELs were the limits adopted in the original tables Z of 29 CFR 1910.1000, May 29, 1971. The final rule limit PELs were issued in 1989 and were to replace the transition limits in 1993. Due to legal challenges, the final rule limits were thrown out and the transitional limits reinstated. GSI will use the most conservative limit between the two.

Long-term exposure to levels below 200 ppm may produce headache, tiredness and nausea. From 200 to 750 ppm, symptoms may include insomnia, irritability, dizziness, some loss of memory, loss of appetite, a feeling of drunkenness and disturbed menstruation. Levels up to 1,500 ppm may cause heart palpitations and loss of coordination. Blood effects and anemia have been reported but are probably due to contamination by benzene. Most of these effects are believed to go away when exposure ceases.

Level C (full-face with an organic vapor cartridge) has been approved for concentrations up to 500 ppm. Above this value, level B protection must be used. Determination in air is via collection on charcoal adhering to NIOSH Methods 1500, 1501, or 4000.

m,o,p-Xylene

CAS 1330-20-7; RTECS ZE2100000; UN 1307

Xylene is a flammable liquid, which exists in three isomeric forms, ortho-, meta- and para-xylene. Commercial xylene is a mixture of these three isomers and may also contain ethylbenzene as well as small amounts of toluene, trimethylbenzene, phenol, thiophene, pyridine, and other non-aromatic hydrocarbons. m-Xylene is predominant in commercial xylene. Synonyms are xylol and dimethylbenzene.

Xylene is used as a solvent; as a constituent of paint, lacquers, varnishes, inks, dyes, adhesives, cements, cleaning fluids and aviation fuels; and as a chemical feed-stock for xylidines, benzoic acid, phthalic anhydride, isophthalic, and terephthalic acids, as well as their esters (which are specifically used in the manufacture of plastic materials and synthetic textile fabrics). Xylene is also used in the manufacture of quartz crystal oscillators, hydrogen peroxide, perfumes, insect repellants, epoxy resins, pharmaceuticals, and in the leather industry.

The OSHA PEL, NIOSH REL and ACGIH TLV are 100 ppm (435 mg/m³) for all isomers. The ACGIH STEL is 150 ppm. The IDLH is 900 ppm.

Routes of entry are via inhalation of vapor and, to a small extent, percutaneous absorption of liquid, ingestion and skin and eye contact. Harmful effects and symptoms associated with short-term exposure are as follows:

- *Inhalation* - Exposure to vapor can cause irritation to the nose and throat. Inhalation of vapor at concentrations above 200 ppm for 3-5 minutes can lead to xylene intoxication. Symptoms include headache, dizziness and nausea. If exposure should continue, central nervous system depression characterized by shallow breathing and weak pulse can occur. Levels of 230 ppm for 15 minutes may cause lightheadedness without loss of equilibrium. Reversible liver and kidney damage in man has followed exposure to sudden high concentrations of vapor. Such high levels may also give rise to lung congestion. Exposure to extremely high concentrations (10,000 ppm) of xylene vapors can lead to a strong narcotic effect with symptoms of slurred speech, stupor and coma.
- *Skin* – Contact with vapor or liquid can cause drying and defatting which may lead to irritation.
- *Eyes* – Vapor and liquid may be irritating to the eye and eyelids at levels of 100 ppm for 15 minutes.

- *Ingestion* - Swallowing liquid xylene will bring about an immediate burning sensation in the mouth and throat. Irritation of the stomach and intestine can give rise to sharp stomach pains. Symptoms are the same as inhalation, except that lung congestion will not usually develop.

Long term exposure to xylene vapors and skin contact with liquid are the two most probable routes of long-term exposure. Symptoms of inhalation are dizziness, headache and nausea. Long-term exposure has been associated with liver and kidney damage, intestinal tract disturbances and central nervous system depression. These effects are reversible and disappear once the chemical has been removed. Prolonged contact with skin can lead to irritation.

Level C protection is approved up to 900 ppm. Above this value, level B is required. Determination in air is via adsorption on charcoal, adhering to NIOSH Method 1501 for aromatic hydrocarbons.

Hydrogen Cyanide

CAS 74-90-8; RTECS MW6825000;

UN 1051 (anhydrous)

1613 (solution)

1614 (absorbed)

Prussic acid is a colorless gas or liquid which boils at 26°C and is intensely poisonous with the odor of bitter almonds. The odor threshold is 1.0 mg/m³. It is highly flammable and explosive and is a very weak acid. The flash point is -18°C. Its LEL is 5.6% and UEL is 40.0%. Synonyms are hydrocyanic acid and prussic acid.

Hydrogen cyanide is used as a fumigant, in electroplating, and in chemical synthesis of acrylates and nitriles, particularly acrylonitrile. It may be generated in blast furnaces, gas works, and coke ovens. Cyanide salts have a wide variety of uses, including electroplating, steel hardening, fumigating, gold and silver extraction from ores, and chemical synthesis. Prussic acid is incompatible with bases such as caustics and amines.

The OSHA transitional PEL is 10 ppm (11 mg/m³). The final rule STEL and the ACGIH STEL are 4.7 ppm (5 mg/m³). The notation "skin" is added to indicate the possibility of cutaneous absorption. The IDLH level is 50 ppm.

Routes of entry are via inhalation of vapor, percutaneous absorption of liquid and concentrated vapor, ingestion and eye and skin contact. Points of attack are the liver, kidneys, cardiovascular system and central nervous system.

Signs and symptoms of acute exposure to hydrogen cyanide may include hypertension (high blood pressure) and tachycardia (rapid heart rate), followed by hypotension (low blood pressure) and bradycardia (slow heart rate). Cherry red mucous membranes and blood may be noted. Cardiac arrhythmias and other cardiac abnormalities are common. Cyanosis (blue tint to the skin and mucous membranes) may be observed. Weakness, headaches, vertigo (dizziness), agitation, giddiness, salivation, nausea, and vomiting may be followed by combative behavior, convulsions, paralysis, protruding eyeballs, dilated and unreactive pupils, and coma. Tachypnea (rapid, shallow respirations) or hyperpnea (rapid, deep respirations) may be followed by respiratory depression. Lung hemorrhage and pulmonary edema may also occur. Prussic acid

may be irritating to the skin, eyes, and mucous membranes. Lacrimation (tearing) and a burning sensation of the mouth and throat are common.

Harmful effects of short term exposure are as follows;

Inhalation - At less than 20 ppm, exposure to prussic acid may produce headache, dizziness, nausea and vomiting. Concentrations greater than 50 ppm may cause difficulty in breathing, rapid throbbing of the heart, paralysis, unconsciousness, respiratory arrest or death. Thirty (30) minutes exposure to 135 ppm may cause death. Two hundred seventy (270) ppm has caused immediate death.

Skin – Hydrogen cyanide is readily absorbed through the skin. Symptoms are similar to the above.

Eyes – Hydrogen cyanide is irritating to the eye and rapidly absorbed.

Ingestion - Symptoms are similar to the above. Death has resulted from ingestion of 570 mg/kg or 1.4 oz for a 150 pound person.

Long term exposure can cause an itching scarlet rash, red bumps, severe nose itch leading to bleeding, and possibly holes in the nose. Headache, nausea, vomiting, weakness and enlarged thyroid gland have also been reported at exposures from 4 to 12 ppm. Most of these symptoms disappear after exposure stops.

Level B is required above the PEL. Determination in air is via filtration of particulates then collection in a KOH bubbler adhering to NIOSH Method 7904 or OSHA Method ID 120.

Cadmium

(FOR CADMIUM METAL) CAS 7440-43-9; RTECS EU9800000

(FOR CADMIUM COMPOUNDS) UN 2570

Cadmium is a bluish-white metal. The only cadmium mineral, greenockite, is rare; however, small amounts of cadmium are found in zinc, copper, and lead ores. It is generally produced as a by-product of these metals, particularly zinc, copper, and lead ores. Cadmium is insoluble in water but is soluble in acids. "Cadmium dust" includes dust of various cadmium compounds such as $CdCl_2$. "Cadmium fume" has the composition Cd/CdO .

Cadmium is highly corrosion resistant and is used as a protective coating for iron, steel, and copper; it is generally applied by electroplating, but hot dipping and spraying are possible. Cadmium may be alloyed with copper, nickel, gold, silver, bismuth, and aluminum to form easily fusible compounds. These alloys may be used as coatings for other materials, welding electrodes, solders, etc. It is also utilized in electrodes of alkaline storage batteries, as a neutron absorber in nuclear reactors, a stabilizer for polyvinyl chloride plastics, a deoxidizer in nickel plating, an amalgam in dentistry, in the manufacture of fluorescent lamps, semiconductors, photocells, and jewelry, in process engraving, in the automobile and aircraft industries, and to charge Jones reducers.

Various cadmium compounds find use as fungicides, insecticides, nematocides, polymerization catalysts, pigments, paints, and glass. They are used in the photographic industry and in glazes. Cadmium is also a contaminant of superphosphate fertilizers.

Human exposure to cadmium and certain cadmium compounds occurs through inhalation and ingestion. The entire population is exposed to low levels of cadmium in the diet because of the entry of cadmium into the food chain as a result of its natural occurrence. Tobacco smokers are exposed to an estimated 17 ug/cigarette. Cadmium is present in relatively low amounts in the earth's crust, as a component of zinc ores, and cadmium may be released into the environment around smelters.

The PEL for cadmium dust, as indicated in 29 CFR 1910.1027, is 0.005 mg/m³. The OSHA action level is 0.0025 mg/m³. The TLV is 0.01 mg/m³ for inhalable fraction and 0.002 mg/m³ for the respirable fraction of cadmium dust. The IDLH is 9 mg/m³.

Routes of entry are through inhalation or ingestion of fumes or dust. Points of attack are the respiratory system, lungs, kidneys, prostate and blood. Harmful effects and symptoms of short-term exposure are as follows:

Inhalation - Dust may cause irritation of the nose and throat. Non-fatal lung inflammation has been reported from concentrations of 0.5 to 2.5 mg/m³. In 4 to 10 hours after exposure severe chest pain, with persistent cough and difficult breathing, headache, chills, muscle aches, nausea, vomiting, and diarrhea can occur. Fluid in the lungs and dark-purple coloration of the skin may occur. Breathing becomes more difficult and is accompanied by wheezing or coughing of blood. Other symptoms which may occur 12 to 36 hours after exposure in addition to those above include dizziness, irritability, gastrointestinal disturbances, shortness of breath, fever, profuse sweating, exhaustion and inflammation of the lungs. Death may result within 7 to 10 days after exposure. The average concentrations of fume responsible for fatalities have been 40 to 50 mg/m³ for 1 hour, 9 mg/m³ for 5 hours, or 5 mg/m³ for 8 hours.

Skin - Absorption is negligible.

Eyes - Cadmium compound dust may cause irritation. No injury to the eyes of human beings has been reported.

Ingestion - A dose of 15-30 mg (1/1000 oz.) of metal or soluble compounds may cause increased salivation, choking, vomiting, abdominal pain, anemia, kidney malfunction, diarrhea, and persistent desire to empty the bladder. Symptoms may occur within 15-30 minutes after ingestion. May cause heart and lung failure.

Long term exposure to low levels of cadmium in air may cause irreversible lung injury, abnormal lung function and kidney disease. Other consequences of cadmium exposures are inflammation of the nose and throat, open sores in the nose, soreness, bleeding and reduced nose size, loss of sense of smell, damage to the olfactory nerve, yellow cadmium stains on teeth, sleeplessness, nausea, lack of appetite, weight loss, anemia, lung distention with scar formation, and liver damage. Bone disease characterized by softening, bending and reduction in bone size may occur. Difficulty walking, pain in back and extremities, and spontaneous fractures may result. Inhalation of 0.06 mg/m³-0.68 mg/m³ for 4 to 8 years may cause throat irritation, cough, chest pain, upset stomach and fatigue. Exposure to levels of 3.0 - 15.0 mg/m³ of fumes or dust over a period of 20 years has caused lung distention, anemia, protein in urine and kidney dysfunction.

Studies indicate that there is an increased incidence of prostatic cancer and possible kidney and respiratory cancer in cadmium workers.

Level C (full-face with a HEPA filter) can be worn up to 0.25 mg/m^3 for dust. Level B is required above this value. Determination in air is via collection of particles on a filter adhering to NIOSH Methods 7048 and 7300.

Lead-Metallic and Inorganic
CAS 7439-92-1; RTECS OF7525000

Inorganic lead, includes lead oxides, metallic lead, lead salts, and organic salts such as lead soaps, but excludes lead arsenate and organic lead compounds. Lead is a blue-grey metal which is very soft and malleable.

Metallic lead is used for lining tanks, piping, and other equipment where pliability and corrosion resistance are required such as in the chemical industry in handling corrosive gases and liquids used in the manufacture of sulfuric acid; in petroleum refining; and in halogenation, sulfonation, extraction, and condensation processes; and in the building industry.

It is also used as an ingredient in solder, a filler in the automobile industry, and a shielding material for x-rays and atomic radiation; in manufacture of tetraethyl lead and organic and inorganic lead compounds, pigments for paints and varnishes, storage batteries, flint glass, vitreous enameling, ceramics as a glaze, litharge rubber, plastics, and electronic devices. Lead is utilized in metallurgy and may be added to bronze, brass, steel, and other alloys to improve their characteristics. It forms alloys with antimony, tin, copper, etc. It is also used in metallizing to provide protective coatings and as a heat treatment bath in wire drawing.

Exposures to lead dust may occur during mining, smelting, and refining, and to fume, during high temperature (above 500°C) operations such as welding or spray coating of metals with molten lead. There are numerous applications for lead compounds, some of the more common being in the plates of electric batteries and accumulators, as compounding agents in rubber manufacture, as ingredients in paints, glazes, enamels, glass, pigments, and in the chemical industry.

In addition to these usual levels of exposure from environmental media, there exists miscellaneous sources which are hazardous. The level of exposure resulting from contact is highly variable. Certain adults may also be exposed to hazardous concentrations of lead in the workplace, notably in lead smelters and storage battery manufacturing plants. Again, the range of exposure is highly variable. Women in the workplace are more likely to experience adverse effects from lead exposure than men due to the fact that their hematopoietic system is more lead-sensitive than men's.

Lead is regulated under 29 CFR 1910.1025. The PEL for lead is 50 ug/m^3 (0.05 mg/m^3) with an action level of 30 ug/m^3 (0.03 mg/m^3). The NIOSH REL is less than 0.1 mg/m^3 and the ACGIH TLV is 0.05 mg/m^3 . The IDLH is 100 mg/m^3 .

4.3 Chemical Exposure Hazard Analyses

4.3.1 *Introduction*

The primary potential exposure risks associated with GSI's work will be through the ISS operation, spoils management and contact with contaminated soil obtained through QC sampling. The action levels for altering the type of personal protection and the real-time monitoring instrumentation selected have been based upon the contaminants of concern typically associated with MGP sites.

Initiation of work in modified level D should be acceptable as contamination levels can be readily detected through air monitoring and sampling techniques, and upgrading the level of protection prior to time-weighted average (TWA) exposure can occur. Proper spoils handling techniques will assist in controlling vapor emissions relative to sample collection. This observation is based upon GSI's past experience with mixing/sampling. Dermal protection will be required for personnel that have the potential to come in contact with contaminated materials. Guidelines and control measures in this HASP have been established to ensure employees are protected as much as is reasonably possible. PPE will control dermal exposure, while enforcement of "no hand-to-mouth contact" (i.e., no smoking, eating, etc.) onsite and good personal hygiene practices will prevent exposure via ingestion.

Contaminant Exposure Task Hazard Analysis

As per GSI requirements, the chemical hazard analysis per task is summarized as follows:

- 1) Mobilization – Mobilization does not involve contact with contaminated material. There should be no potential for exposure.
- 2) Site Preparation – The only task that may involve contact with potentially contaminated materials is the pre-excavation. Pre-excavation is an intrusive work activity that may present a potential for exposure due to vapor emissions from contaminated materials. Real-time monitoring performed as work progresses will provide insight relative to inhalation concerns. Dermal exposure concerns do exist if contact with soils/product occurs.
- 3) Excavation – Excavation is an intrusive work activity that may present a potential for exposure due to vapor emissions from contaminated materials. Real-time monitoring performed as work progresses will provide insight relative to inhalation concerns. Dermal exposure concerns do exist if contact with soils/product occurs.
- 4) In-Situ Soil Mixing – This task may involve contact with potentially contaminated material. This operation by nature, will be performed in-situ, by drilling and mixing with slurry which should minimize emissions. Dermal exposure concerns does exist via splash or if contact with contaminated materials occurs.
- 5) Solidification Reagent Batch Plant – This operation involves mixing of slag, cement, bentonite and site water to support the SSM operation. The batch plant is typically set up in an area that is considered "clean" or where there is no potential for exposure. Batch plant operations do however, present exposure concerns for dust. Efforts will be taken to minimize dust generated at the plant to ensure personnel are not exposed and site action levels are not exceeded.
- 6) Fugitive Dust Management - This task may involve contact with potentially contaminated material. Dermal exposure concerns do exist via splash or if contact with contaminated materials occurs.
- 7) Management and grading of ISS swell material – This task may involve contact with potentially contaminated materials, "spoils". Initially, the excess soils generated by the SSM operation or "spoils" should present limited potential for exposure due to inhalation, with the slurry acting to help suppress vapor emissions.. However, GSI's past experience indicates that the potential for

exposure due to inhalation may increase when handling the cured spoils. Real-time monitoring performed as work progresses will provide insight relative to inhalation concerns. Dermal exposure concerns do exist.

- 8) Decontamination – Chemical hazard exposure for this task will be dependent upon the task where equipment or personnel are arriving.
- 9) Demobilization and Site Restoration – These tasks do not involve contact with contaminated materials. There should be no potential for exposure.

4.3.2 *Control Methods*

Methods employed to control exposure include the following:

- Engineering
 - The use of standard operating procedures for Soil Mixing Operations (i.e., controlling amount and flow of slurry as practicable to minimize the amount of “spoils” to be handled)
 - Mixing with slurry and application of odor suppressant foam and/or Biosolve to help suppress vapor emissions.
- Administrative
 - Keeping unnecessary personnel clear of the work area
 - Limiting and controlling the mixing areas.
 - Distance between worker and actual contaminated area, i.e., placing heavy equipment on clean side during certain activities to provide some measure of remoteness to the operation.
 - Staying upwind from contaminant emissions.
 - Ensuring only essential personnel are in work areas.
 - Smoking only to designated areas on site.
- PPE
 - Use of respiratory and dermal protection as required.

Most of these control methods are further detailed in other sections of this HASP. Additionally, ongoing evaluation with respect to site conditions will occur via use of monitoring instruments.

4.4 Mechanical, Physical, and Related Hazards

Mechanical, physical, and related hazards include exposure to heavy equipment, energized sources, and other general construction hazards. Soil Mixing involves a drill rig and heavy equipment operations and inherent hazards associated with such heavy equipment.

4.4.1 Equipment Hazards

Operating hazards during construction activities may include work near construction and heavy equipment use, noise, electrical equipment, and power lines. The employees who are at risk of being injured are individuals unfamiliar with the site and/or construction equipment. Site specific training will include a review of the equipment to be used on-site, operating hazards and precautions, and the assignment of only trained and qualified personnel to operate equipment.

Working Near Construction Equipment

- Never stand directly in front of a backhoe or front end loader; the operator cannot see you.
- Never stand or walk under a backhoe shovel or crane boom.
- Never walk or stand under loading or unloading equipment, also beware that equipment such as cranes and trucks with hydraulic lift beds can tip. Avoid standing next to them when in use.
- Wear light or brightly colored clothing. This may include safety vests.
- Maintain visual contact with machine operators. Coordinate with the operators a safe to stand when you're not directly involved with site activities such as sampling or air monitoring.
- Prearrange a hand signal communication system with machine operators. The use of whistles, hand radios, and horns to communicate is also appropriate.
- If you are not familiar with the hand signals to guide heavy equipment operations or cranes do not attempt to direct their activities. Only trained signal persons may direct crane and other activities that use specialized hand signals.
- Two or more people should not simultaneously climb a ladder or access/egress ramp.
- Communicate with machine operators to ensure that your means of access/egress is not blocked by equipment.

4.4.1.1 In-Situ Soil Mixing

Below are the hazard controls and safe work practices to follow when working around the mixing rig or performing In Situ Soil Mixing

- The operator is to verify that the rig is properly leveled and stabilized before the start of soil mixing
- Personnel should be cleared from the side and rear of the rig before the mast is raised.
- Driller must check for overhead power lines before raising the mast. Maintain a minimum distance of 10 feet (3 meters) between mast and overhead line (<50 kV) and an additional 0.4 inches for every 1 kV over 50 kV. Verify voltage of nearby overhead power lines to determine the minimal distance.
- Personnel should stand clear before rig startup
- Operator is to verify that the rig is in neutral when the driller is not at the controls
- Become familiar with the hazards associated with the drilling method used.
- Do not wear loose-fitting clothing, watches, etc., that could get caught in moving parts

- Do not smoke or permit other spark-producing equipment around drill rig.
- Operator is to verify that the rig is properly maintained.

4.4.1.2 Lifting Equipment Hazards

Cranes will be present on site to facilitate the off-loading of construction equipment during the off-loading of construction equipment during the mobilization phase of the project. The initial site orientation by GSI should include a review of the equipment to be used on-site. Operating hazards and precautions, and the assignment of only trained and qualified personnel to operate crane equipment.

- Never approach operating equipment from the rear. Always make positive contact with the operator, and confirm that the operator has stopped the motion of the equipment.
- Never approach the side of operating equipment.
- Never turn your back on any operating equipment
- Never climb onto operating equipment or operate contractor/subcontractor equipment
- Never ride contractor/subcontractor equipment unless it is designed to accommodate passengers and equipped with firmly attached passenger seat.
- Never work or walk under a suspended load
- Never use equipment as personnel lift; do not ride excavator buckets or crane hooks
- Always stay alert and maintain a safe distance from operating equipment, especially equipment on cross slopes and unstable terrain.
- Wear a high visibility safety vest or high visibility clothing

4.4.1.3 Forklift Hazards

Rough terrain forklifts will be in operation to facilitate the offloading of construction equipment during the mobilization phase of this project, and also to facilitate the batch plant operations. The following safe operating rules apply to GSI employees who operate a forklift. Violations of safe operating rules can and will result in retraining and/or disciplinary action.

- Only trained and certified employees shall be authorized to operate forklifts.
- Forklift shall be inspected prior to the start of work each day
- Stunt driving and horseplay shall not be permitted
- Absolutely no electronic communication devices (cell phones, iPods, etc.) that distract the operator from the task at hand shall be used while operating the forklift.
- Forklifts shall be equipped with a seat belt to be utilized by the operator when in use.
- Personnel are not permitted to ride on forklifts except in designated seats that are part of the equipment design.
- Forklifts shall be equipped with a portable fire extinguisher.
- Under travel conditions, the forklift shall be operated at a speed that will permit it to bring to a stop in a safe manner.
- Traffic regulations shall be observed, including authorized work site speed limits. A safe distance shall be maintained approximately three forklift lengths from the forklift truck ahead.
- The driver shall be required to slow down and sound the horn at areas where the operator's vision is obstructed.

- The driver shall be required to look in the direction of, and keep a clear view of the path of travel.
- Forklifts shall have a functional horn and back-up alarm with a distinctive sound, loud enough to be heard clearly above the background noises.
- Copies of the manufacturer's operating instructions for each type of forklift shall be readily available for review by operators and supervisory personnel.
- The forklift shall have the rated capacity clearly posted on the vehicle so as to be clearly visible to the operator.
- No modifications or additions, which affect the capacity or safe operation of the equipment, shall be made without the manufacture's written approval.
- Railroad tracks shall be crossed diagonally wherever possible. Parking closer than 8 feet from the center of railroad tracks is prohibited.
- Grades shall be ascended or descended slowly.
- When ascending or descending grades in excess of 10 percent, loaded forklifts shall be driven with the load upgrade.
- Unloaded forklifts should be operated on all grades with the load engaging means downgrade.
- On grades, the load and load engaging means shall be tilted back if applicable and raised only as far as necessary to clear the road surface.
- No person shall be allowed to stand or pass under the elevated portion of any forklift, whether loaded or empty.
- When a forklift is left unattended, load engaging means shall be fully lowered, controls shall be neutralized, power shall be shutoff, and brakes set.
- Employees shall not jump off a forklift
- Forklift operators shall yield to pedestrians
- Loads carried shall be secured on the forks to prevent upset/overturn

4.4.2 Noise

Project activities that include working in close proximity to heavy equipment or using power tools that generate noise levels exceeding the decibel range of 85 dBA will require the use of hearing protection with a Noise Reduction Rating (NRR) of at least 20. Hearing protection (earplugs/muffs) will be available to personnel and visitors that would require entry into these areas.

When it is difficult to hear a coworker at normal conversation distance, the noise level is approaching or exceeding 85 dBA, and hearing protection is necessary.

4.4.3 Utility Clearances

Underground utilities, if present, shall be clearly marked and identified prior to commencement of work. It is not expected that any utilities are within the work area.

Personnel involved with intrusive work shall:

- Review available site drawings.
- Communicate with the site contact to confirm proposed excavation limits and traffic routes.

- Physically inspect the Site for manholes, catch basins, valve boxes, etc. that may indicate the presence and direction/depth of underground utilities.

4.4.4 Vehicle Traffic Control

The following safety measures are to be taken by GSI personnel that have the potential to be exposed to vehicle traffic:

- High visibility safety clothing, meeting ANSI Class II garment requirements, is to be worn at all times.
- Employees will work using the "buddy system".
- Cones, physical barriers, etc. will be used to demarcate a safe work zone around the active work area(s).
- Appropriate signage will be posted as necessary to inform roadway users of any additional control measures necessary to protect the public and GSI Services employees.

4.4.5 Manual Lifting

When lifting objects, use the following proper lifting techniques:

- Feet must be parted, with one foot alongside the object being lifted and one foot behind. When the feet are comfortably spread, a more stable lift can occur and the rear foot is in a better position for the upward thrust of the lift.
- Use the squat position and keep the back straight - but remember that straight does not mean vertical. A straight back keeps the spine, back muscles, and organs of the body in correct alignment. It minimizes the compression of the guts that can cause a hernia.
- Grip is one of the most important elements of correct lifting. The fingers and the hand are extended around the object you're going to lift - using the full palm. Fingers have very little power - use the strength of your entire hand.
- The load must be drawn close, and the arms and elbows must be tucked into the side of the body. Holding the arms away from the body increases the strain on the arms and elbows. Keeping the arms tucked in helps keep the body weight centered.
- The body must be positioned so that the weight of the body is centered over the feet. This provides a more powerful line of thrust and also ensures better balance. Start the lift with a thrust of the rear foot. Do not twist.

4.4.6 Hand Tools

- Hand tools must meet the manufacturer's safety standards.
- Hand tools must not be altered in any way.
- At a minimum, eye protection must be used when working with hand tools.
- Wrenches (including adjustable, pipe, end, and socket wrenches) must not be used when jaws are sprung to the point that slippage occurs.
- Impact tools (such as drift pins, wedges, and chisels) must be kept free of mushroom heads.
- Wooden handles must be free of splinters or cracks and secured tightly to the tool.

4.4.7 Excavations

At a minimum, the following safety guidelines shall be adhered to while conducting excavation and trenching activities:

- The estimated location of all underground installations must be determined before excavation begins.
- If there are any nearby buildings, walls, sidewalks, trees, or roads that may be threatened or undermined by the excavation, where the stability of any of these items may be endangered by the excavation, they must be removed or supported by adequate shoring, bracing, or underpinning.

Atmosphere Monitoring and Testing

There are three parameters by which air quality is measured:

- 1) oxygen concentration
- 2) flammability, and
- 3) the presence of hazardous substances.

Employees should not be exposed to atmospheres containing less than 19.5 percent oxygen, or having a lower flammable limit greater than 10 percent, and employees should not be exposed to hazardous levels of atmospheric contaminants.

Whenever potentially hazardous atmospheres are suspected in excavations and trenches, the atmosphere shall be tested by a competent person in accordance with Section 11.0 MONITORING INSTRUMENTATION of this HASP.

Daily Inspections

The competent person shall perform daily inspections of excavation area, along with the adjacent areas for any indications of cracking or potential trench wall failure.

Additionally, the competent person shall be aware of the potential for confined space situations and other hazardous work conditions. The competent person has the authority to immediately suspend work if any unsafe condition is detected.

4.4.8 Slip/Trip/Hit/Fall

Slip/trip/hit/fall injuries are the most frequent of all injuries to workers. They occur for a wide variety of reasons, but can be minimized by the following prudent practices:

- Spot check the work area to identify hazards;
- Establish and utilize a pathway which is most free of slip and trip hazards;
- Beware of trip hazards such as wet soils and uneven surfaces or terrain;
- Carry only loads which you can see over;
- Keep work areas clean and free of clutter, especially near the trenches;
- Communicate hazards to on-site personnel;
- Secure all loose clothing and ties, and remove jewelry while around machinery;
- Report and/or remove hazards; and

- Keep a safe buffer zone between workers using equipment and tools.

4.4.9 *Electrical Hazards*

No employee shall be permitted to work on any part of an electrical power circuit unless the person is protected against electric shock by de-energizing the circuit and grounding it, or ensure that it has been locked and tagged out:

- All electrical wiring and equipment shall be a type listed by Underwriters' Laboratories (UL) or Factory Mutual (FM) for the specific application.
- All installations shall comply with the National Electric Code (NEC) and the National Electric Safety Code (NESC).
- All electrical circuits shall be grounded according to NEC and NESC Code. GFCIs shall be used in the absence of properly grounded circuitry or when portable tools must be used around wet areas.
- Generators and like equipment will be grounded.
- All live wiring or equipment shall be guarded to protect all persons or objects from harm.

4.5 Weather-Related Hazards

4.5.1 *Introduction*

Weather-related hazards will directly correlate to the type of weather involved. Hot, dry weather may cause greater dust emissions, particularly during intrusive activities. Rain or snow may increase slip/trip hazards, particularly for ground workers. Control efforts are discussed in the Health and Safety SWP Manual.

4.5.2 *Heat/Cold Stress*

Heat and Cold stress are caused by several interacting factors such as environmental conditions, clothing, physical condition and characteristics of the employee, and the type of PPE required for the work task. Dependent upon the type of PPE worn, this equipment can add considerable weight, increase the body's expenditure of energy, and reduce the body's normal heat-exchange mechanisms. Heat/cold stress monitoring will occur at the discretion of the HSO based upon ambient conditions and observations of the work force. Heat stress or cold stress monitoring will typically occur when ambient temperatures are above 78°F (when wearing PPE) or below 40°F respectively. Details on heat and cold stress monitoring can be found in the Health and Safety **Heat Stress SWP #20 and Cold Stress SWP#21** and will be discussed as part of the site-specific training.

4.5.3 *Severe Weather*

Be alert to changing weather conditions. Look for danger signs of tornadoes: dark, often greenish sky, large hail, a large, dark, low-lying cloud (particularly if rotating), loud roar, similar to a freight train. Track storms via internet www.weather.com or www.wunderground.com and/or listen to NOAA Weather Radio or to commercial radio for storm watches and warnings. If storms are tracking close to the work area, they will be tracked using methods listed above. If



lightning is seen near the work area, work stops, booms of excavators grounded and workers evacuated to the jobsite trailer for a head count.

If workers see approaching storms or any of the danger signs, they must be prepared to take shelter immediately.

4.6 Chemical Hazard Communication

Hazard communication requirements will be met by adhering to GSI **SWP #10, Hazard Communication**. Material Safety Data Sheets for chemical products will be submitted to the Engineer before they are brought on the premises throughout the duration of the project.

4.7 Biological Hazards

Site workers should avoid encounters with any animals, insects, or poisonous plants while working on the jobsite. Disease or harmful effects (such as rabies or poisons) can be transmitted through bites, stings, or through direct contact with insects or through ingestion of foods contaminated by certain insects. It is important to report any bites or stings to your supervisor immediately so that appropriate case management and treatment can occur.

Examples of diseases transmitted by insect bites include encephalitis, malaria, and West Nile virus from contaminated mosquitoes and Lyme disease and spotted fever from contaminated ticks.

The possible presence of poisonous plants should be anticipated for field activities in wooded or heavily vegetated areas. Poison ivy is a climbing plant with alternate green and red leaves (arranged in threes) with white berries. Poison oak is similar to poison ivy and sumac but its leaves are oak-like in form. Dermal contact with these plants should be avoided; this is why identification is important.

Any field activity where exposure to medical wastes or other sources of bloodborne pathogens (including administering first aid) can be reasonably anticipated, will be conducted in accordance with the OSHA (29 CFR 1910.1030) Bloodborne Pathogens standard and GSI's Health and Safety SOP #20, Bloodborne Pathogens.

5.0 **MEDICAL SURVEILLANCE**

GSI employees and GSI subcontractors will comply with medical surveillance requirements outlined in 29 CFR 1910.120(f) and GSI's Medical Surveillance program. Prior to the initiation of field activities in the exclusion zone or any other area on site where potential exposure exists, the PE will ensure that documentation attesting to compliance is in place on site. GSI's medical consultant will be responsible for providing this documentation to the PE.

GSI's medical consultant is WorkCare. WorkCare specializes in occupational medicine and uses the expertise of occupational physicians to ensure GSI's compliance with 29 CFR 1910.120(f). They determine medical protocols, coordinate the clinic network, review all test results, assure QA/QC and archive GSI medical records. GSI maintains written verification from WorkCare that the individual complies with the requirements of 29 CFR 1910.120 and 1910.134 (medically fit to

wear a respirator). Workers who are required to wear a respirator and are medically fit to wear a respirator will be fit-tested via GSI's SWP #12 Respiratory Protection, Attachment B, Fit-Test Procedures. Copies of this written verification for individuals working on the jobsite are maintained in the site health safety file.

6.0 TRAINING

Project personnel must meet the health and safety training regulations outlined in 29 CFR 1910.120(e). The SS and/or SSO will verify and document that employees meet the introductory (40-hour), 8-hour refresher (when applicable), and the 8-hour supervisory training requirements (when applicable), as dictated by OSHA. At least one of GSI's supervisory personnel will have current First Aid/CPR training on the jobsite. Additionally, Confined Space Entry training is required for all workers involved in confined space entries and Competent Person training in excavations for the Site Supervisor. All information will be compiled, kept onsite, and forwarded to the project file.

To comply with OSHA's site-specific training requirements, the HSO, with input from the SS, will conduct a training session immediately preceding field activities. This training will be attended by applicable Geo-Con personnel and Geo-Con subcontractors governed by the HASP and will consist of the following:

- General background information regarding the site, including names of personnel and alternates responsible for health and safety.
- Safety, health, and other hazards present on site.
- Proper use of personal protective equipment.
- Work practices and restrictions to minimize hazard potentials on site.
- Medical surveillance requirements including the recognition of symptoms for overexposure to substances known or suspected to be on site.
- Monitoring instrumentation to be used on site.
- The contents of the HASP.
- Decontamination procedures.
- Standard Operating Procedures.
- Emergency procedures (including use of fire extinguishers).
- Hazard Communication.

The HSO will document the training (i.e., date, attendees, and specific subject matter covered) in the health and safety logbook or via use of training logs. Attendees will be required to sign the

logbook or the logs indicating that they have attended the session and understood its contents, the contents of the HASP, and will comply with the HASP.

The SS, with input from the HSO as necessary, will conduct a brief (5-minute) toolbox safety meeting. The SS and the HSO will determine the frequency of these meetings. At a minimum, however, safety meetings shall be held daily. Topics may include a review of monitoring instrument data, JSA reviews for the day's activities, work zones and levels of protection, general construction safety requirements, etc. Documentation methods for toolbox meetings will be the same as those described for site-specific training.

7.0 EXEMPTIONS/EXCEPTIONS TO MEDICAL SURVEILLANCE (5.0) AND TRAINING (6.0)

The support zone is defined as the work zone where no contamination is present and no potential for exposure exists. Therefore, GSI personnel who remain in the support zone and who are not exposed to potential emissions from the work area and never enter into active work areas where intrusive work is occurring will not be subject to exposure potential. Therefore, they are exempt from exposure provisions of the 29 CFR 1910.120 HAZWOPER Standard but must be debriefed on the potential hazards and procedures set forth in GSI's HASP to be followed in the event of an emergency on the jobsite. This exemption to the standard holds true for all personnel working in situations where lack of exposure potential can be demonstrated. (i.e. office personnel, deliveries, visitors for site meetings, etc.)

Any personnel entering into GSI's exclusion zone shall meet the minimum PPE requirements of GSI's HASP.

8.0 PERSONAL PROTECTIVE EQUIPMENT

Although certain engineering and administrative controls, as discussed in other sections of this HASP, will be instituted during remedial activities, personal protective equipment (PPE) will be used as a primary method to minimize personnel exposure to hazardous materials. Decision-making criteria for PPE requirements include:

- Historical information.
- Known/suspected contamination.
- Work location/duration.
- Task being performed/method of operation.
- OSHA requirements.

Typically, the parameters listed above directly impact exposure potential and subsequent PPE controls that are warranted. Therefore, this section of the HASP will directly interface with the hazard assessment section, and the two sections should be used in tandem.



As activities progress, PPE requirements may need to be upgraded or downgraded due to environmental concerns/site conditions (i.e., visual contamination, exceeding monitoring instrument action levels) and/or if any investigative or analytical data becomes available which suggests an increased or decreased level of hazard. All modifications will be directed by the SS upon concurrence with the Health and Safety Coordinator.

OSHA requirements (29 CFR 1910.120) dictate that when PPE is used, a PPE program shall be developed. Similarly, separate requirements are dictated by OSHA for respiratory protection. However, it is recognized that there is much overlap between PPE and respiratory protection. To address these OSHA requirements, GSI will use **SWP # 12, Respiratory Protection** and **SOP # 11, Personal Protective Equipment** as guidelines. The HASP used in tandem with SWPs # 12 and # 11 will address site specific requirements.

Table 8-1 indicates the level of protection required to initiate each task. The level of dermal protection has been provided with the level of respiratory protection.

TABLE 8-1	
TASK	MINIMUM LEVEL OF PROTECTION
1) Mobilization	D1
2) Site Preparation	D1
3) Excavation	D1 ⁽²⁾ /D2 ⁽³⁾
4) In-Situ Soil Mixing	D1 ⁽²⁾ /D2 ⁽³⁾
5) Solidification Reagent Batch Plant	D1/ D2 / C2 ⁽¹⁾
6) Fugitive Emissions Management	D1 ⁽²⁾ /D2 ⁽³⁾
7) On-Site Management of Materials	D1 ⁽²⁾ /D2 ⁽³⁾
8) Decontamination	(4)
9) Demobilization and Site Restoration	D1

- (1) Batch plant operations are required to adhere to manufacturer's recommendations with respect to respiratory protection and dermal protection.
- (2) Personnel who do not have the potential to be splashed or come in contact with potentially contaminated material.
- (3) Workers who have potential to come in contact with potentially contaminated material.
- (4) The level of protection will be dependent upon the task from where the equipment and personnel are arriving.

See below for details on circumstances when each level will be used.

NOTE: In the event that there is a potential for contact with contaminated soils/fluids, Level 3 is recommended.

The descriptions necessary to use Table 8-1 effectively are as follows:

Level D Respiratory Protection - No respiratory protective equipment is required.

Level C Respiratory Protection - Air-purifying respirator (MSHA/NIOSH approved) half-face or full-face, HEPA filter cartridges are to be used for batch plant operations as warranted. Also, air purifying respirator (MSHA/NIOSH-approved) half-face or full-face, organic vapor filter cartridges are to be in adherence with the action levels provided in Section 11.0 (i.e., benzene, ethylbenzene, toluene, etc. detected during SSM operations).

Level B Respiratory Protection - Supplied air-respirator (MSHA/NIOSH approved). Respirators must be a positive pressure-demand self-contained breathing apparatus (SCBA) or a positive pressure-demand airline respirator (with escape bottle for IDLH or potential IDLH atmosphere). Level B is not anticipated, and as such, will not be onsite.

HEARING PROTECTION WILL BE REQUIRED AROUND ALL OPERATING AND HEAVY EQUIPMENT (E.G., ISS RIGS, TRACKHOE, BATCH PLANT AREA, CEMENT STORAGE BLOWERS ETC.) WARNING SIGNS WILL BE PLACED IN AREAS OF CONCERN.

For the purposes of this HASP, "**Level 1**" protective clothing will be used when no dermal hazards are foreseen. Level 1 will be used when there is no chance of contact with hazardous chemicals or materials that pose a threat via the dermal route. Personal protective equipment for Level 1 includes:

- Standard field clothes.

- Steel-toe work boots or shoes. Boot covers as delineated by the Health and Safety Coordinator and/or GSI SS.
- Leather or cotton work gloves (optional).
- ANSI-approved (Z87.1) safety glasses with rigid side shields.
- Hard hat.
- Fluorescent Orange/Yellow safety vests or safety fluorescent orange/yellow t-shirts

"**Level 2**" protective equipment clothing will be used when there is a likelihood of contacting chemicals that are dermally active (i.e., intrusive activity into contaminated materials) but have a moderate level of danger to the individual. Personnel involved with excavation and handling of waste materials and/or coming in direct contact with the potentially contaminated material would be required to wear level D2 protection. Personal protective equipment for Level 2 includes:

- Standard field clothes.
- Tyvek coveralls.
- Steel-toe work boots or shoes with boot covers.
- Inner latex gloves.
- Outer nitrile gloves.
- ANSI-approved (Z87.1) safety glasses with rigid side shields.
- Hard hat.

"**Level 3**" protection is the same as Level 2 except that the Tyvek coveralls are polycoated with "Saranex", PE or PVC. This will be worn when there is potential for contact with contaminated material for extended periods (i.e., decontamination, standing in wet contaminated material, etc.) where the Tyvek coveralls would become compromised. Use of Level 3 will be delineated by the HSO and/or GSI SS based upon the scope of work and site conditions.

In all scenarios as discussed previously, the HSO, upon consultation with the GSI Health and Safety Department, has the option of modifying individual parameters of PPE (i.e., requiring standard Tyvek over work uniforms for tasks where this is not specifically required in the HASP, substituting standard Tyvek for poly-coated Tyvek) based upon specific site conditions.

9.0 DECONTAMINATION

9.1 Introduction

Decontamination of personnel and equipment will take place during construction activities to prevent the spread of contamination into clean zones, as well as to reduce exposure to personnel

and the environment. The personnel and equipment decontamination areas will be designated and visually flagged. The zoning of site work areas, in combination with decontamination procedures and the correct doffing of PPE (Section 8.0) should effectively minimize cross contamination and subsequent exposure potential.

9.2 Personnel Decontamination

The following personnel decontamination procedures will be employed at the decontamination station chosen onsite:

1. Travel to decontamination line, exit vehicle and/or drop equipment. If on airline, determine logistics regarding disconnecting air (i.e., when/where) with SS and/or HSO prior to decontamination.
2. Wash boot covers and outer gloves.
3. Rinse boot covers and outer gloves.
4. Remove tape if worn (dispose).
5. Remove disposable coverall by rolling down (dispose).
6. Remove boot covers, dispose if grossly contaminated.
7. Remove outer gloves (dispose).
8. Remove eye and/or respiratory protection if worn.
9. Remove inner gloves (dispose).
10. Wash respirators in disinfectant solution (if applicable) and dispose of cartridges.
11. Rinse respirator and allow to air dry (if applicable).
12. Wash hands and face. Shower as soon as possible after leaving site for day.

Note: The above decontamination sequence provides for all levels of protection excluding Level A. It is understood that decontamination procedures directly relate to the type of personal protective equipment worn and task being performed. For example, if a task only requires minimal PPE and certain garments are not required, decontamination will be simplified and several steps will be eliminated. During breaks, steps 10, 11 will be omitted. Additionally, if reusing Tyvek, steps 5 and 6 may be reversed.

Any equipment that is not disposed of following decontamination and will be reused (i.e., boot covers, Tyvek in limited scenarios) must be thoroughly decontaminated and inspected by the user prior to storage in a designated area. The user will primarily inspect for visual signs of contamination, and the SS and/or HSO will periodically audit compliance to this procedure. Used



decontamination fluids will be collected and stored for disposal. Used PPE will be decontaminated and stored in a designated area onsite for final disposal. Once PPE is decontaminated it is to be disposed of as municipal waste.

9.3 Heavy Equipment Decontamination

Heavy equipment decontamination will occur at an area as designated by GSI. Heavy equipment will be decontaminated, as deemed necessary by the SS, prior to leaving the site. This typically will be required on equipment that has come in contact with potentially contaminated soils. Before the soil mixing rig is taken offsite, the SS will visually inspect it for signs of contamination. Any resultant decontamination fluids and used PPE will be disposed of as required.

10.0 SITE CONTROL MEASURES

GSI will establish work zones for GSI work areas that will be instituted and enforced during field activities by the SS. Such work zones will be designed to prevent or reduce the migration of potentially contaminated materials, and to prevent the entry of unauthorized personnel into GSI's work areas. A three-zone approach will be used to maintain site control. GSI will monitor and control access of its personnel and GSI subcontractors. GSI will be responsible for controlling other individuals entering into GSI work areas.

GSI's exclusion zone will be designated as the specific location where field activities typically involving potential exposure (i.e., excavation of contaminated soils) are taking place. Specifically during remedial work, GSI will physically barricade this area or areas by the use of cones, caution tape, snow fence and/or flagging to serve as a visual indicator to personnel to wear the prescribed PPE in the designated area. The exact method specifically chosen to delineate exclusion zone(s) marking will be communicated to personnel during site-specific training. Physically marking the respective exclusion zone(s) also will aid in controlling pedestrian traffic. Exclusion zone areas may change in location and extent as the remedial work progresses and will be updated by the SS as per OSHA requirements. Also, there may be instances where there will be varying levels of protection in the exclusion zone(s) based upon tasks, monitoring instrument readings, potential exposure, wind direction, etc. Rationale for such scenarios will be thoroughly explained to onsite personnel.

The Support Zone (SZ) will be in an area where contamination is not suspected. Decontamination will occur in a designated CRZ or decontamination line within the work area. Additionally, the storage of any contaminated materials in the support zone will be expressly prohibited. All details concerning the decontamination procedures are included in Section 9.0 of the HASP.

The SS and/or HSO will determine the location of GSI's site zones prior to commencement of work in any given area. Decision-making criteria for each work zone will take into account the following:

- Site historical information.
- Suspected dimensions of the contaminated area.

- Physical and topographical features on the site.
- Weather conditions.
- Access requirements.
- Physical, chemical, toxicological, and other characteristics of the substances present.
- Clean-up activities required.
- Potential for fire.
- Area needed to conduct operations.
- Decontamination procedures.
- Potential for exposure.

Personnel are to be advised that the three-zone approach involves a worst-case scenario. In situations involving negligible exposure potential (i.e., mobilization), site-zoning procedures will be minimal or inapplicable. In all instances, applicable information will be appropriately communicated to onsite personnel. As previously indicated, no GSI employees/subcontractors will be permitted to enter any area where there is a potential for chemical exposure unless they have the appropriate medical clearance and training. Current medical and training documentation will be kept onsite for such personnel to enable the SS to ensure that unauthorized personnel do not enter a restricted work area.

Workers assigned to the task will be dressed in proper PPE (face-shield over safety glasses, protective suit, nitrile inner and outer gloves, boot covers or rubber or neoprene steel toed boots). They will use a clean source of water to spray off gross contamination (hose or pressure washer) from the truck (especially tires). They will log trucks leaving the site and note that they were properly decontaminated before leaving the jobsite.

11.0 MONITORING INSTRUMENTATION

11.1 Introduction

To monitor the health and safety of GSI personnel and document no exposure in accordance with OSHA regulations including 29 CFR 1910.120 and 29 CFR 1910 subpart Z (benzene, lead and cadmium) real-time monitoring instruments will be used during intrusive activities to aid in detecting airborne chemical hazards. Such instruments provide information on the quality of air in the work zone. During specific tasks, instruments used shall include a Photo-Ionization Detector / Flame Ionization Detector (PID) / (FID) and colorimetric tubes. Area air sampling may be used to verify real-time readings.

Manufacturer's maintenance and calibration procedures will be followed for all instrumentation. Instruction manuals containing this information will be kept onsite; and therefore, are incorporated into this HASP by reference.

Air monitoring action levels shall be established to provide guidance for the following:

- Level of personal protective equipment to be employed.
- When to shut down or take action regarding site operations due to the presence of a hazardous atmosphere (i.e., LEL above acceptable limits).

Organic Vapor Monitors

A MiniRae 3000 or similar PID/FID or equivalent will be used to monitor for volatile organic contamination. The PID/FID will be calibrated to isobutylene/methane. Since the PID/FID is a qualitative instrument, typically it can only provide a general indication that contamination may be present and does not indicate if exposure limits have been exceeded. If sustained readings are detected via the PID/FID above action levels (in the workers' breathing zone), personnel protection will be upgraded to the levels of protection identified in Table 11-1 as follows:

TABLE 11-1	
ACTION LEVEL Sustained Breathing Zone Readings	CORRECTIVE ACTION
1) PID reading > 1 ppm . a) Positive indication for benzene on colorimetric tube i) ≥ 1 ppm and < 5 ppm on colorimetric tube ii) ≥ 5 ppm and < 50 ppm on colorimetric tube iii) > 50 ppm on colorimetric tube b) Negative response for benzene	1) Pull colorimetric tube for benzene a) Positive indication for benzene on colorimetric tube i) Level C, half-mask with organic vapor cartridge ii) Level C, full-face mask with organic vapor cartridge iii) Level B b) Go to #2
2) No benzene; PID ≥ 5 ppm a) Positive indication for naphthalene on colorimetric tube i) ≥ 5 ppm and < 100 ppm on colorimetric tube ii) ≥ 100 ppm and < 250 ppm on colorimetric tube iii) ≥ 250 ppm on colorimetric tube b) Negative response for naphthalene	2) Pull colorimetric tube for naphthalene a) Positive indication for naphthalene on colorimetric tube i) Level C, half-face mask, with organic vapor cartridge. ii) Level C, full-face mask with organic vapor cartridge. iii) Level B b) Go to #3

TABLE 11-1	
ACTION LEVEL Sustained Breathing Zone Readings	CORRECTIVE ACTION
3) No naphthalene detected, PID reading > 100 ppm. a) Positive indication for ethylbenzene, toluene, or xylene > 100 ppm, on colorimetric tube i) > 100 ppm on colorimetric tube ii) ≥ 250 ppm on colorimetric tube b) Negative response for naphthalene, ethylbenzene, toluene, and xylene.	3) Pull colorimetric tubes for ethylbenzene, toluene, and xylene. a) Positive indication for ethylbenzene, toluene, or xylene > 100 ppm. i) Level C (half mask APR with organic vapor cartridge.) ii) Level B b) Go to #4.
4) PID reading > 250 and none of the COC detected on the colorimetric tubes above.	4) Check FID readings
5) Action levels for the use of the FID. No VOCs detected above action levels on PID. i) < 5 ppm ii) ≥ 5 and < 25 ppm iii) ≥ 25 ppm and < 50 ppm iiii) ≥ 50 ppm	5) Levels of Protection i) Level D ii) Level C, half-face mask, with organic vapor cartridge iii) Level C, full-face mask with organic vapor cartridge. iiii) Level B
6) PID > 250 ppm and FID > 50 ppm, none of the COC detected via colorimetric tubes or sampling. No PAHs detected above 0.2 mg/m ³ via air sampling.	6) GSI will upgrade to level B protection. NRT and/or IBS will need to provide additional information as to the identity of the contaminants in order to permit use of level C. If NRT and/or IBS is unable to identify and quantify the contaminants, level B will be required when the PID/FID readings are greater than background as the contaminant will be unknown and NIOSH, OSHA, and manufacturer's use requirements for APRs will not be met. If readings subside, workers can downgrade to level D.

11.2 Colorimetric Tubes

Colorimetric tubes may be used to determine the presence of BTEX and naphthalene as indicated in Table 11-1. The frequency of the evaluations will be based upon the results of real-time monitoring. Additional details on sampling guidelines are available in the manufacturer's directions.

11.3 LEL/O₂

When monitoring for explosive situations, readings should be obtained right at the potential source of contamination/ignition. To account for the relative ratio of response differential between the calibration gas and the contaminant(s) being detected, NIOSH action levels will be followed.

- If any readings ≥ 10 percent LEL are obtained, limit all activities in the area to those that will not generate sparks; wear non-sparking gear and use non-sparking tools. Proceed with caution and consult the HSO.
- If any readings ≥ 20 percent LEL are obtained, cease all activities and retreat to a safe atmosphere. Consult the GSI Health and Safety Department and Project Management.

Monitoring for oxygen deficient atmospheres is of primary importance in the site workers' general work area and during Confined Space/Limited Egress (CS/LE) work. The OSHA action level for oxygen deficient atmospheres will be followed:

- If oxygen concentrations < 19.5 percent are obtained in any personnel work area, supplied-air respiratory protection will be required.

Monitoring for oxygen-enriched atmospheres is also necessary, since these atmospheres increase the potential for fires and/or explosion. The action level for this situation is as follows:

- If any oxygen concentrations ≥ 23.5 percent are obtained in any work area, retreat to a safe atmosphere. Consult the GSI Health and Safety Department and Project Management for guidance.

Based upon the scope of work involved and historical information, oxygen enriched atmospheres are not anticipated.

11.4 Hydrogen Cyanide

Real-time monitoring for hydrogen cyanide will be performed as required onsite.

- If any HCN concentrations ≥ 10 ppm are obtained in any work area, retreat to a safe atmosphere. Consult the GSI Health and Safety Department and Project Management for guidance.

11.5 Total Dust Monitor (PDR)

A real-time aerosol monitor, Personal Data Ram (PDR), may be used to identify the level of total dust on a real-time basis. Dust control measures may need to be implemented to limit the excessive emission of visible dust onsite and engineering controls will be used to limit the amount of dust generated at the batch plant. Therefore, the action level for total dust is as follows:

Nuisance Dust Monitoring MAP Area:
<ul style="list-style-type: none"> • 0-2.5 mg/m³ above background (breathing zone) Level D. • > 2.5 mg/m³ above background (breathing zone) Level D. Implement dust control measures.
Batch Plant Monitoring:
<ul style="list-style-type: none"> • 0- 0.830 mg/m³ above background, worker breathing zone, level D protection. • > 0.830 mg/m³ above background, upgrade to level C half-mask respirator with HEPA cartridge. As per specification requirements, dust control procedures must be implemented to

return dust levels below upgrade/PEL exposure values. Personnel air sampling data may be used to further assess potential exposures to site workers.
<ul style="list-style-type: none"> These action levels are based on all the particulate COC but due to its low PEL, silica is the primary exposure concern.

Silica has been identified as the primary indicator for the reagents used at the batch plant, Nuisance dust action levels above will be adhered to for all other tasks in GSI's work area. As indicated earlier, the dust control measures that are to be implemented onsite should control dust emissions.

As indicated in Section 8, level C will be required at the batch plant if the product specific action level is exceeded.

11.6 General Real-Time Monitoring Requirements

The table below summarizes the types of monitoring to be performed during site activities:

TABLE 11-2	
GENERAL TASKS	MONITORING
1) Mobilization	PDR; primarily to establish background levels. Frequency and need to be determined by the SSO.
2) Site Preparation	PID/FID; LEL/O ₂ ; PDR; Frequency and need to be determined by the SSO.
3) Excavation	PID/FID; LEL/O ₂ ; PDR; Frequency and need to be determined by the HSO.
4) In-Situ Soil Mixing	PID/FID; LEL/O ₂ ; PDR; Frequency and need to be determined by the SSO.
5) Solidification Reagent Batch Plant	PDR; Frequency and need to be determined by the SSO.
6) Fugitive Emissions Management	PID/FID; LEL/O ₂ ; PDR; Frequency and need to be determined by the SSO.
7) On-Site Management of Materials	PID/FID; LEL/O ₂ ; PDR; Frequency and need to be determined by the SSO.
8) Decontamination	PID/FID; LEL/O ₂ ; PDR; Frequency and need to be determined by the SSO.
9) Demobilization and Site Restoration	None required.

Minimum guidelines for real-time monitoring will be the following:

- Real-time monitoring via the PID/FID//LEL/O₂/PDR shall be performed at a predetermined area of the support zone at the start of the work shift to establish background levels. When measuring background levels, care shall be taken to ensure that such readings are not taken downwind from potential offsite emissions.
- Worker breathing zones shall be monitored for levels of vapor emissions using the necessary monitoring equipment whenever excavation is occurring.

- Real-time monitoring shall be used, as deemed necessary by the HSO, to establish that levels of airborne contaminants are below action levels for respiratory protection at exclusion zone boundaries.

As more information becomes available from real-time monitoring, the type, frequency, and location of monitoring will be at the discretion of the HSO. Also, the Health and Safety Coordinator will continually evaluate the real-time monitoring program.

Finally, tasks requiring the use of monitoring instruments require that all data be documented. Information to be recorded includes:

- Day.
- Date.
- Time.
- Site location.
- Instrument being used, including model number and serial number.
- Background reading.
- Readings above background.
- Type of reading (i.e., work zone, breathing zone, etc.).
- Specific location of detected reading (i.e., breathing zone, etc.).
- Task being monitored.

If no elevated readings are obtained, this too shall be recorded. Methods of complying with these requirements will be discussed in Section 15.0, Onsite Reference/Documentation Recordkeeping and Reporting of this HASP, which deals specifically with recordkeeping requirements.

11.7 Personal/Perimeter Time Weighted Average (TWA) Air Sampling

As per the GSI proposal, GSI will perform real-time air monitoring for GSI workers and work areas only. Worker TWA air sampling may be performed to verify the contaminants/levels involved in causing elevated real-time air monitoring results and ensure that personnel overexposures do not occur on the project. Real-time air monitoring or TWA air sampling at the site perimeter will be the responsibility of others.

12.0 EMERGENCY RESPONSE PLAN (ERP)

12.5 Anticipated Site Emergencies

There are several emergencies which can reasonably be anticipated during remedial activities at the site including:

- Personal injury/illness.
- Incipient stage, non-structural fires (Class A, B, or C).
- Environmental releases and/or spills.

12.6 Personal Roles and Lines of Authority

The lines of authority and responsibilities for emergency actions coincide with the health and safety responsibilities discussed in this HASP. The SS/HSO shall be responsible for the overall direction and implementation of this ERP and for overall coordination of any emergency response actions with respect to GSI's work. He will notify NRT and/or IBS of any emergency situation noted by GSI or affiliated with GSI activities. GSI is responsible for notifying the appropriate outside emergency assistance, as needed.

12.6.1 Communications/Emergency Information

The SS will serve as the focal point for all emergency communications.

Emergency information (i.e., directions to the hospital, phone numbers, etc.) will be posted in GSI office facilities and/or vehicle. The SS and/or HSO is responsible for verifying directions and all telephone numbers upon mobilization. The SS and/or HSO is to call the hospital during mobilization to confirm they are equipped to provide emergency services for injuries/exposures that may be possible for this type of construction work and jobsite.

12.6.2 Buddy System

During all site activities, the buddy system will be required, at least to the point where line-of-sight is maintained with those in the exclusion zone. Personnel must be visible by at least one person while in the exclusion zone, enabling a quick response to any situation that may arise.

12.6.3 Emergency Recognition and Prevention

Compliance with this HASP can assist in the prevention of anticipated site emergencies. These emergency situations can typically be recognized by visual observations, worker complaints or real-time monitoring instrument readings

12.6.4 Safe Distances, Places of Refuge and Evacuation Routes

Safe distances, places of refuge and evacuation routes are to be determined by the SS and/or HSO on an emergency-specific basis. Considerations shall include wind direction and site topography. In the event of an evacuation, personnel will attempt to reconvene at a job trailer or designated rally point for personnel accountability. In the event this area cannot be utilized due to the incident involved, two back-up meeting locations will be designated during the site-specific training session as alternates. The SS and/or HSO will select alternate evacuation locations during mobilization. These locations will be used if the proximity of the incident and/or wind direction prevents the use of the primary meeting point.

12.6.5 Site Security and Control

The site SS and/or HSO shall isolate any emergency scene to prevent adverse effects to unprotected or unsuspecting persons.

12.6.6 Response Procedures

The information provided in this subsection is presented as a guideline to assist personnel in safe and effective response to anticipated site emergencies. This information is in no way designed to take the place of reasonable decisions based on incident-specific information. It is expected that GSI personnel would only provide minimal or first line response to all emergencies. Local emergency response units would be notified and take over response activities as necessary.

First Priority

- Prevent further injury or illness by:
 - Protecting response personnel.
 - Isolating the scene to authorized personnel only.
 - Rescuing the injured parties.
 - Notifying outside emergency assistance.

Second Priority

- Provide first aid/obtain medical treatment for those persons with life threatening injuries or illnesses.

Third Priority

- Alleviate the immediate hazards by:
 - Extinguishing incipient stage fires.
 - Confining any spills.
- De-energize electrical equipment when possible.

Fourth Priority

- Provide first aid to those persons with non-life-threatening injuries or illnesses and further efforts to alleviate the hazard.
- All persons with known or suspected chemically related injuries or illnesses shall be immediately examined by a licensed physician.

NOTE: All injuries and/or illnesses no matter how minor are to be immediately reported to the involved individual's supervisor. The SS and/or HSO will assess the need for treatment. The SS/HSO and/or alternate will evaluate the injured/ill individual's condition and provide first aid treatment as necessary. All procedures instituted will adhere to the guidelines as specified in the American Red Cross training book (or equivalent). If first aid cannot be administered onsite, the individual will be transported to the nearest hospital for evaluation and treatment. Additionally, GSI has access to 24-hour medical consultation with an Occupational Physician through WorkCare. In the event occupational exposure to onsite contamination is suspected, the physician can be reached at 1-800-455-6155 to provide guidance to the treating physician.

Last Priority

- Complete an incident report, critique the response and prevent recurrence.

12.7 Environmental Releases and Spills

Risks associated with environmental releases are dependent upon the task being performed. Engineering and administrative controls should prevent releases or spills into clean areas of the site. In the unlikely event a clean area becomes contaminated, GSI will cordon it off and restrict access. GSI will confer with NRT and/or IBS as to the best alternative with respect to cleaning up the affected area.

12.7.1 Spills

The potential does exist for excavated material to be spilled. Precautions are to be taken to limit the amount of uncontrolled spillage (i.e., equipment inspections). Other spills anticipated relative to GSI's work would be spilled diesel during fueling or leaks from the SSM rig and other heavy equipment. The following information is a summary of the procedures for handling a spill or discharge if such an event occurs. These events will initially be considered an emergency.

The SS/HSO will immediately notify NRT and/or IBS to report the spill. GSI personnel in the vicinity will take actions to control the spill and to confine it to within site boundaries. These actions will include the following:

- Isolating the spill area, keeping unnecessary personnel away.
- Not allowing anyone to contact spilled material.
- Instructing all personnel to stay upwind of the spill area to avoid contacting released materials.
- Keeping combustible material away from diesel spills as needed.

Following confinement of spilled materials, absorbing and disposal of material will be performed as necessary. The method to be used will depend on the physical form of the spilled material. The following guidelines will be used:

Solid Spills

In the event of a solid spill, the spilled solid will be excavated along with surrounding soils that have contacted the spilled material. The material will be disposed of as required by job specifications.

Liquid Spills

Liquid spills will be absorbed with sand, clean fill or other non-combustible absorbent material. The absorbent/spill mixture will be temporarily placed into an onsite area with ultimate disposition as required by job specifications.

Notification of Spills and Discharges

The SS/HSO will notify NRT and/or IBS verbally of spills as soon as possible. The SS/HSO will provide a written report of any spill, as indicated in Section 12.7, to NRT and/or IBS.

12.8 PPE and Emergency Equipment

This section provides guidelines for selecting the appropriate PPE and emergency equipment for response to anticipated site emergencies:

Incipient Stage, Non-structural Fires (Class A, B, or C)

- Class ABC fire extinguisher. Fire extinguishers will be located in accordance with OSHA standards.
- Flammable liquids storage cabinets
- Approach from upwind side.
- No special PPE required unless fire has moved out of its incipient stage to an uncontrolled burn or if an upwind approach is not possible. In either of these cases, do not attempt to extinguish the flames.

Personal Injury or Illness

- First-aid kit (located in the site office trailer)
- Emergency Eyewash (located in the site office trailer and at the batch plant area)
- Personnel decontamination facilities and equipment
- Heavy blanket

Spills

- Utilize PPE based upon nature of spill/correlation to monitoring instrument readings. Consult the HSO/Health and Safety Manager.

12.9 Decontamination and First Aid

Decontamination of injured or ill personnel shall consist of removing contaminated clothing. If worker's street clothes are grossly contaminated, remove them to prevent chemical exposure and wrap the injured party in a blanket.

12.10 Follow-Up

Any emergency supplies will be restocked as soon as possible after any incidents, including first aid supplies that may have been exhausted. Reasons for the incident and future preventive measures will be communicated when they become known.

12.11 Reporting

GSI will immediately notify NRT and/or IBS in the event that an incident occurs, and a report will be written by the SS/HSO, with assistance from the Corporate Health and Safety Manager and submitted to NRT and/or IBS (within 24 hours). The report shall include the following items:

- Name, organization, telephone number, and location of the incident.
- Name and title of the person(s) reporting.
- Date and time of incident.
- Location of incident, i.e., site location, facility name.
- Brief summary of incident giving pertinent details including type of operation ongoing at time of incident.
- Cause/nature of incident, if known.
- Casualties.
- Details of any chemical hazard contamination.
- Action taken to ensure safety and security.
- Other damage or injuries sustained (public or private).
- Any reporting to any outside agencies regarding environmental issues (spills, release, etc.) will be the responsibility of GSI. Reference SWP #4, Incident Recording and Recordkeeping, which provide information on incident notification.

13.0 CONFINED SPACE/LIMITED EGRESS (CS/LE)

A confined space is a condition/location involving limited access/egress and one or more of the listed components below are present causing a physical and/or health hazard:

- Oxygen deficiency.
- Combustible gases.
- Toxic gases or vapors.
- Engulfment by solids or liquids.

CS/LE work may be required in the event that reagent mixers, silos and/or contact water storage tanks need to be cleaned out. Every effort will be made to clean the vessels from outside the spaces. If CS/LE work is required, it will be addressed via use of GSI's Health and Safety, SWP #9, Confined Space/Limited Egress and JSA # 20 Cleaning Mixer will be reviewed with all workers prior to entry.

14.0 HEALTH AND SAFETY SWPs

All GSI personnel are responsible for complying with all GSI Health and Safety regulations as dictated in GSI's Health and Safety Program, Health and Safety SWP Manual and the Employee Safety Handbook, all of which will be kept onsite.

If there is a discrepancy between GSI's Health and Safety Program and NRT and/or IBS requirements, the difference will be resolved by the GSI Project Manager and/or the NRT and/or IBS Project Manager or representative with technical input, as required, from their respective Health and Safety Departments.

15.0 ONSITE REFERENCE/DOCUMENTATION RECORDKEEPING AND REPORTING

Required References

The following reference material is available for use as needed:

- The State of Wisconsin postings are to be obtained by contacting the New Kensington, PA office.
- Operation manual for all health and safety equipment.
- 29 CFR 1910.
- 29 CFR 1926.
- Safety equipment catalogs.
- General first aid and facility/outside emergency information-posted.



Required Documentation (See GSI Health and Safety SWP#1.)

The following documentation must be readily accessible from the onsite health and safety file:

- OSHA Forms 300 and 301 (or 301 equivalent).
- Written hazard communication program which includes hazardous material inventory and MSDSs.
- Training records for all site workers for the following:
 - 40-hour introductory course.
 - 8-hour supervisory course when applicable.
 - 8-hour refresher course.
 - Site-specific training.
- Medical clearance for all site workers covered under 29 CFR 1910.120.
- Equipment/jobsite inspection checklists.
- Calibration/measurement logs for all site health and safety equipment.
- Health and safety log.
- Respiratory protection program, which meets the requirements of 29 CFR 1910.134 (if respiratory protection is worn).
- Personal protective equipment program, which meets the requirements of 29 CFR 1910.120.
- Fit-test records for all employees on all types of respiratory protection they are required to wear onsite.

Required Records

As discussed, the information required to be documented shall be recorded in an official logbook and/or on log sheets, which shall serve as a document that can be audited to ensure the information's validity and completeness. Examples of this information are the daily safety logs, air monitoring/sampling logs, incident reports, etc. (as these relate to GSI's work). All this information will be maintained onsite for the duration of the job. Once the job officially has been completed, all records will be maintained with the project files.

NOTE: Sample logsheets are found in the GSI Health and Safety SWPs.

Daily Information

The following information must be documented on a daily basis for site workers:

- Operation(s) performed.
- Time spent on each operation.
- PPE used for each operation (specific).
- Equipment utilized.

The following information must be documented on a daily basis for the overall project:

- Environmental conditions (i.e., temperature, precipitation, cloud cover, wind speed, wind direction, etc.).
- Site visitors (include name, affiliation, areas/operation observed, PPE used, training/medical release, site training received).
- Observations regarding health and safety of each operation, including site inspections.
- Training conducted (NOTE: attendance records will be maintained using log sheets found in GSI's Health and Safety SWPs).
- Health and safety problems encountered.
 - Personnel.
 - Equipment.
- Telephone/Site Meetings.
 - Health and safety concerns discussed.
 - Health and safety decisions and rationale.

Accident Reporting and Recordkeeping

All incidents will be recorded as per Section 12.0.

16.0 SITE VISITORS

Any site visitor who is not employed by GSI is required to comply with the following requirements:

- Must not enter any exclusion zone, CRZ or any area where a potential for exposure exists. Visitors will be required to remain in the support zone. PPE worn should meet or exceed that worn by GSI personnel.
- Must at a minimum wear long pants and long-sleeved shirts (short-sleeved fluorescent orange or fluorescent yellow t-shirts are permitted in heat stress scenarios), fluorescent orange or fluorescent yellow colored safety vest, hard-toed leather boots, a hard hat and safety glasses with rigid side shields.

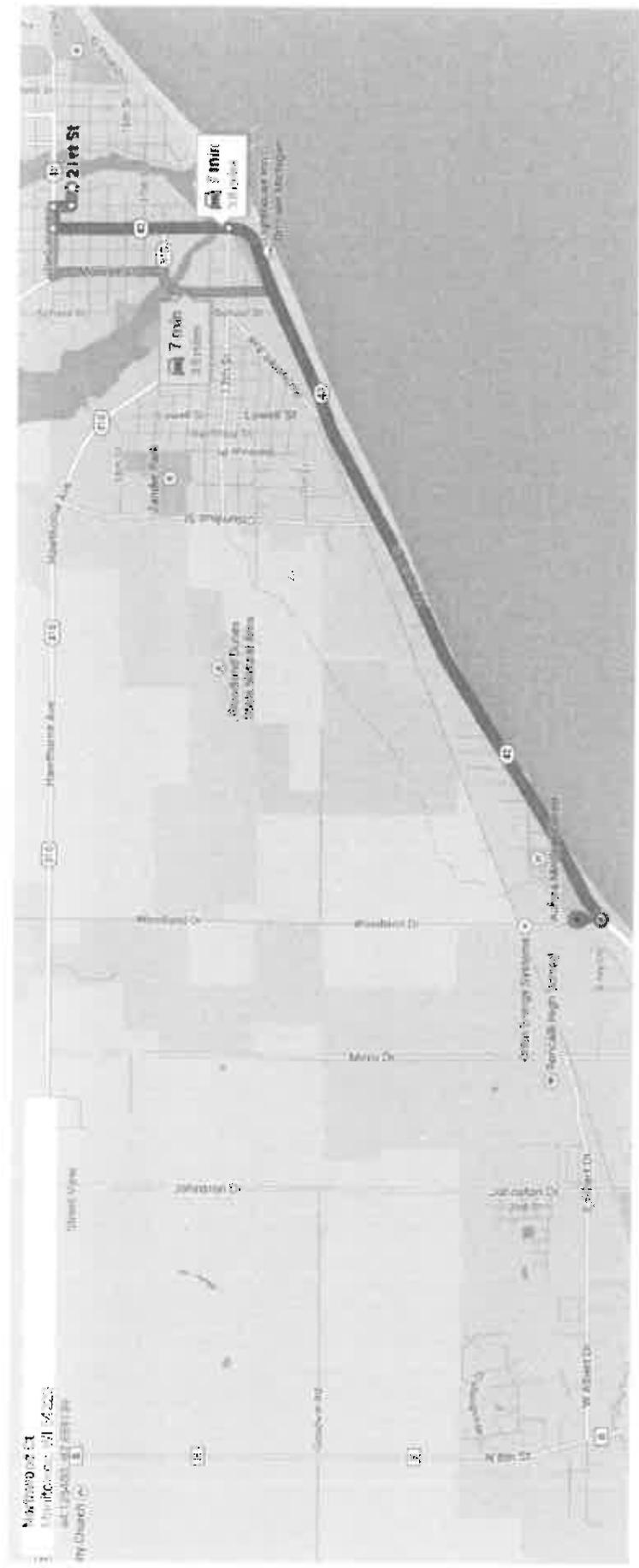
APPENDIX A

FORMS

1. EMERGENCY CONTACT SHEET
2. HASP ACKNOWLEDGEMENT FORM
3. TAILGATE SAFETY MEETING FORM
4. ACCIDENT REPORTING FORM

EMERGENCY INFORMATION		
Contact	Phone Number	Hospital Directions
Local Police	911	1) Head south on School St toward 21st St 2) Take the 1st left onto 21 St 3) Take the 2nd right onto Monroe St 4) Turn Right onto 16th St 5) Continue onto Madison St 6) Turn right onto Memorial Dr 7) Turn right onto Woodland Dr 8) Destination on right
Fire Department	911	
Ambulance	911	
Hospital Aurora Medical Center 5000 Memorial Drive Two Rivers, WI 54241	(920) 794-5000	
National Poison Center	800-332-3073	
Project Manager Work Cell	Darin Payne 724-335-7273 727-385-9552	
Corporate Safety Work Cell	Rob Winters 724-335-7273 412-720-1407	
Corporate Safety Work Cell	Bill Bzorek 724-335-7273 412-737-7417	
Site Supervisor Work Cell	Keith Adamson 724-335-7273 724-992-1666	
NRT Project Manager	Ken Mika 414-837-3572 414-416-9619	
NRT Site Manager	Andrea Salus 414-630-5935 Dan Vachon 920-619-4877 Mark Walters 608-220-2480	
NRT H&S Manager	Steve Wiskes 414-837-3614 608-770-0547	

* Hospital Route must be field validated before site work commences.



Map data ©2014 Google 2000 ft



TAILGATE SAFETY MEETING FORM

Date: _____ Time: _____

Site Location: _____

Site Personnel in attendance:

Print Name	Signature	Company
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Safety Topics/Items discussed:

Supervisor

Name: _____ Date: _____



GSI ACCIDENT REPORTING FORM

Instructions: For Personal Injuries, Occupational Illnesses, and Property Damage, complete Sections 1 and 2.
For Vehicle Accidents, Complete Sections 1, 2, and 4.

SECTION 1

A. Employee Identification					<input type="checkbox"/> GSI Employee	<input type="checkbox"/> Temporary Employee	<input type="checkbox"/> Subcontractor
Employee No.	Last Name	First Name		Middle Name/Initial	M or F		
Area Code ()	Telephone Number	Address (Street, City, State, Province, Zip Code)					
Date of Hire / /	Position/Title	Supervisor			Employee's Company/Office Location		
B. General Information							
Where did the accident occur? () Office () Project Site		Type of Occurrence () Employee Injury/Illness () Vehicle Accident () Property Damage Only					
Date and Hour of Accident		Date and Hour Reported to Employer		Date and Hour Last Worked		Time Employee Began Work	
Month	Day	Year	() a.m. () p.m.	Month	Day	Year	() a.m. () p.m.
Normal Work Hours on Last Day Worked		Witnesses?		Witness Name and Telephone Number			
From:	() a.m. () p.m.	() Yes	() No				
To:	() a.m. () p.m.						
C. Project Information (Project Related Accidents Only)							
Project #	Project Name	Project Manager	Site Telephone Number ()	Employee Cell Number ()			
Was the Client Advised of the Accident? () Yes () No		Project Address (Street, City, State, Province, Zip Code)					
Name:		Specific Location of Accident					

SECTION 2

A. Details of the Accident	
1.	What job/task was being performed when the accident occurred? (Example: collecting groundwater samples).
2.	Provide a detailed description of the employee's specific activities at the time of the accident. Include details of equipment/materials being used, including the size and weights of objects being handled. If necessary, attach additional pages to the report.
3.	For injuries, identify the specific part of body injured, and specify left or right side. For illnesses, identify and describe the affected area/body part.
4.	Identify the object or substance that directly injured employee and how. Include size and weight of object, quantity of substance, etc.
5.	Identify property damaged and how it was damaged (include owner of property, nature and source of damage, model and serial number, if appropriate).
B. Health Care/Medical Treatment	
Employee received health care? () Yes () No	Identify the type of health care provided and where it was performed. (Check all that apply). () First Aid () Medical treatment other than first aid (sutures, etc.) () Hospitalized () Clinic () Hospital emergency room () On site by EMT
Name of Health Care Provider, Physician's Name, Address (Street, City, Province/State, and Postal/Zip Code)	



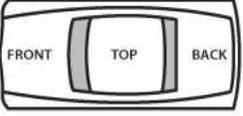
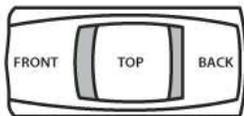
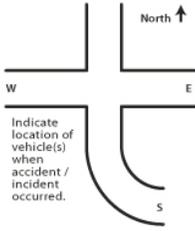
Section 2 (Continued)

C. Accident Investigation		
H&S plan prepared and on site? <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable	Did the safety plan identify and provide safety procedures for the specific tasks the employee was conducting when injured? <input type="checkbox"/> Yes <input type="checkbox"/> No If no, why not? (Explain)	
Did the employee have the proper safety training to conduct these tasks or use the equipment? <input type="checkbox"/> Yes <input type="checkbox"/> No If not, why not?		
Identify all of the potential contributing factors and how they led to the occurrence of the accident. (Lack of attention, wrong use of equipment, lack of training, hurrying/rushing, sort-cutting, environmental conditions, time of day, etc.)		
What contributing factor(s) above was the underlying root cause of the accident.		
Is any training or retraining recommended? If yes, describe.		
What actions have been or will be taken to correct this accident from reoccurring? Verify that these actions will be taken with the PM and/or employee supervisor.		
Additional information: Attach photos, witness statement(s), affected employee statement, accident diagrams, as applicable, to the end of this document.		
Report Date Month Day Year	Report Prepared by: (please print)	Report Prepared by: (signature)

Fax Completed Form to GSI Headquarters Fax: (724) 335-7271

VEHICLE ACCIDENT SECTION

(Complete this Section for all Vehicle Accidents)

A. GSI Vehicle													
License Plate No.	State/Province	Police Department	City	State/Province									
Vehicle Year/Make/Model		Odometer Reading at Time of Accident	Police Report Number	Weather Conditions									
Name of Person Operating Vehicle			"X" IN AREA OF VEHICLE DAMAGE  <div style="font-size: small; margin-top: 5px;"> CIRCLE 0 No Damage 1 Light 2 Moderate 3 Heavy 4 Rolled 5 Burned </div>										
Address													
City	State/Province	Zip Code											
Telephone: Area Code ()													
Vehicle Type: () Personal () Rental () GSI-Own													
Description of Vehicle Damage:													
B. Other Vehicles Involved													
Name of Owner		Address	City/State/Prov./Zip	Area Code and Telephone Number ()									
Operator's Name (if different from above)		Address	City/State/Prov./Zip	Area Code and Telephone Number ()									
Year/Make/Model	Description of Property Damage:		"X" IN AREA OF VEHICLE DAMAGE  <div style="font-size: small; margin-top: 5px;"> CIRCLE 0 No Damage 1 Light 2 Moderate 3 Heavy 4 Rolled 5 Burned </div>										
Insurance Co. Name & Telephone													
License Plate No./State/Province													
C. Injured Persons													
Name	Address Street, City, State/Prov./Zip Code	Phone Number	Nature of Injury	Indicate if Injured was a Vehicle Driver/ Passenger, Employee, Other, or Pedestrian									
1.													
2.													
3.													
D. Witnesses													
Name		Address Street, City, State/Prov./Zip Code		Area Code and Telephone Number									
1.				()									
2.				()									
E. Description of Accident													
<div style="display: flex; justify-content: space-between;"> <div style="width: 20%; font-size: x-small;"> PLEASE COMPLETE OR ATTACH SEPARATE DIAGRAM  <p style="font-size: x-small;">Indicate location of vehicle(s) when accident / incident occurred.</p> </div> <div style="width: 80%;"> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;">Was Ticket Issued:</td> <td style="width: 50%; border: none;">Reason:</td> </tr> <tr> <td style="border: none;">Other Operator <input type="checkbox"/></td> <td style="border: none;">_____</td> </tr> <tr> <td style="border: none;">GSI Operator <input type="checkbox"/></td> <td style="border: none;">_____</td> </tr> <tr> <td style="border: none;"> </td> <td style="border: none;">_____</td> </tr> </table> </div> </div>						Was Ticket Issued:	Reason:	Other Operator <input type="checkbox"/>	_____	GSI Operator <input type="checkbox"/>	_____		_____
Was Ticket Issued:	Reason:												
Other Operator <input type="checkbox"/>	_____												
GSI Operator <input type="checkbox"/>	_____												

Report Date Month Day Year		Report Prepared by: (please print)		Report Prepared by: (signature)									



APPENDIX B

JOB SAFETY ANALYSIS FORMS

Project No./Location: 14-063 Two Rivers, WI
 JSA No.: 001
 Analysis Developed By _____

 Date: June 30, 2014
 Job/Operation Title: ISSS Mobilization
 Analysis Reviewed By _____

In case of an incident, the following people will be contacted:

Site Supervisor:	Phone No. _____	Emergency:
Project Engineer:	Phone No. _____	Fire:
Safety Officer:	Phone No. _____	Police:

Examine each step carefully to find and identify hazards or potential dangers that could lead to injury, illness or damage.

Chemical Hazard:	Biological Hazard:	Physical Hazards:	Ergonomic Hazards:
<input type="checkbox"/> Inhalation	<input type="checkbox"/> Blood Borne Pathogens	<input type="checkbox"/> Electrical	<input type="checkbox"/> Repetition
<input type="checkbox"/> Skin Contact	<input type="checkbox"/> Mold	<input type="checkbox"/> Fire/Explosion	<input checked="" type="checkbox"/> Forceful Exertion
<input type="checkbox"/> Absorption	<input type="checkbox"/> Plant/Insect/Animal	<input checked="" type="checkbox"/> Noise	<input type="checkbox"/> Awkward Posture
<input type="checkbox"/> Injection	<input type="checkbox"/> Other	<input type="checkbox"/> Radiation	<input type="checkbox"/> Contact Stress
<input type="checkbox"/> Ingestion		<input type="checkbox"/> Heat Related Illness	<input type="checkbox"/> Vibration
<input type="checkbox"/> Other		<input type="checkbox"/> Cold Weather Problems	<input type="checkbox"/> Work Area Design
		<input checked="" type="checkbox"/> Pinch Point/Line of Fire	<input type="checkbox"/> Other
		<input checked="" type="checkbox"/> Slips/Trips/Falls	
		<input checked="" type="checkbox"/> Strike Against/Struck By	
		<input type="checkbox"/> Other	

Personal Protective Equipment Required:

<input type="checkbox"/> Chemical Protective Clothing	<input checked="" type="checkbox"/> Hard Hat	Other: _____
<input type="checkbox"/> Chemical Resistant Gloves	<input checked="" type="checkbox"/> Hard Toe Boots	_____
<input checked="" type="checkbox"/> General Work Gloves	<input type="checkbox"/> Hearing Protection	_____
<input checked="" type="checkbox"/> Eye Protection	<input checked="" type="checkbox"/> Hi Visibility/Reflective Vest	_____
<input type="checkbox"/> Face Shield	<input type="checkbox"/> Respiratory Protection	_____
<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Rubber Boots	_____

Required Permits/Safe Work Plans

<input type="checkbox"/> Confined Space Entry	<input checked="" type="checkbox"/> Lift Plan/Crane Operations
<input type="checkbox"/> Excavation and Trenching	<input type="checkbox"/> Work in Proximity to Overhead Conductors
<input type="checkbox"/> General Safe Work Permit (SWP)	<input checked="" type="checkbox"/> Other: <u>Prior to mobilization, contact Wisconsin Diggers Hotline to locate & mark</u>
<input type="checkbox"/> Hot Work Permit	<u>underground utilities.</u>

Air Monitoring Equipment Needed

<input type="checkbox"/> Detection Tubes	<input type="checkbox"/> MiniRAE 3000	Other: _____
<input type="checkbox"/> Dust Monitor	<input type="checkbox"/> 4-Way Monitor	_____

Site Controls

- | | |
|--|---|
| <input type="checkbox"/> Barricades | <input type="checkbox"/> Exclusion Zone Delineation |
| <input checked="" type="checkbox"/> Caution Tape | <input type="checkbox"/> Heavy Equipment Spotter |
| <input checked="" type="checkbox"/> Designated Area For Vehicles | <input type="checkbox"/> Posted Signs |
| <input checked="" type="checkbox"/> Established Meet and Greet Process | <input type="checkbox"/> Other: _____ |

Hazardous Energy Control

- | | | |
|--|---|--------------|
| <input type="checkbox"/> Chemical | <input type="checkbox"/> LO/TO Checklist Complete | Other: _____ |
| <input type="checkbox"/> Electrical | <input type="checkbox"/> LO/TO Devise in place | _____ |
| <input type="checkbox"/> Energy Isolation Verified | <input type="checkbox"/> Mechanical | _____ |
| <input type="checkbox"/> Hydraulic | <input type="checkbox"/> Pneumatic | _____ |
| <input type="checkbox"/> Line of Fire | <input type="checkbox"/> Stored Energy | _____ |

Tools and Equipment

- | | |
|--|---|
| <input checked="" type="checkbox"/> Pre-Use Inspection Complete | |
| <input checked="" type="checkbox"/> Tool/Equipment Training Complete | |
| <input checked="" type="checkbox"/> List Tools/Equipment in Use: | <u>Crane Operator will inspect crane, qualified Rigger to inspect rigging, Conduct pre shift inspection on Forklift</u> |

Required Training

- | | |
|---|---|
| <input checked="" type="checkbox"/> 40 Hour HAZWOPER | Other: <u>Trained/Licensed Crane operator, Qualified Rigger</u> |
| <input checked="" type="checkbox"/> 8 Hour HAZWOPER Refresher | <u>Trained/Certified Forklift Operators Trained</u> |
| <input checked="" type="checkbox"/> Site Specific HASP | _____ |

Environmental Conditions

- | | |
|--------------|----------------------------------|
| Weather: | <u>(to be filled out onsite)</u> |
| Temperature: | <u>(to be filled out onsite)</u> |
| Terrain: | <u>(to be filled out onsite)</u> |
| Other: | <u>(to be filled out onsite)</u> |

Hazardous Substance Material Data Safety Sheet (MSDS) Review

- | | |
|------------------------------|-------|
| Review of MSDS | |
| <input type="checkbox"/> YES | |
| <input type="checkbox"/> NO | |
| List MSDS Reviewed: | _____ |

Action		Potential Hazards of This Job	Recommended Action/Procedure
1	Tailgate meeting/planning of work	N/A	<ul style="list-style-type: none"> -Address potential hazards, go over lift plan for crane lifts -Plan work around arrival of trucks on site -Familiarize crew with project specific HASP -Dress appropriately for weather conditions -Use proper lifting techniques -Supervisor responsible for informing crane operator of weights & dimensions of loads to be lifted
2	Arrival of equipment/materials to site	-Traffic/Congestion	<ul style="list-style-type: none"> -Establish good communication with drivers -If needed, escort driver onto the work site -Confirm driver has all required PPE on site
3	Delivery/Offloading of equipment (Crane)	<ul style="list-style-type: none"> -Truck movement -Cranes/Lifting equipment -Uneven loading -Pinch Points 	<ul style="list-style-type: none"> -Upon arrival, confirm driver has applied parking break -Designate off loading area for equipment -Inspect all equipment and rigging -Ensure all loads are within lifting capacity of equipment -Delineate lifting area and swing radius of crane -All personnel is to be clear of swing radius -Ensure load is properly rigged to avoid shifting -Use tag lines to handle suspended loads
4	Delivery/Offloading of equipment (Forklift)	<ul style="list-style-type: none"> -Truck movement -Traffic congestion -Forklift traffic -Blind Spots -Uneven loads 	<ul style="list-style-type: none"> -Communicate traffic plan and off load area with all crew members prior to beginning task -Stay out of blind spots -Operator to communicate movements to ground crew -Ensure loads are within the designed weight capacity -Ensure all personnel are clear of traffic area -Stay clear of trucks leaving site

JSA Reviewed By: _____

Date: _____

Signatures: _____

Project No./Location: 14-063 Two Rivers, WI

Date: June 30, 2014

JSA No.: 002

Job/Operation Title: ISSS Setup of Flammable/Fuel Storage Area

Analysis Developed By]

Analysis Reviewed By

In case of an incident, the following people will be contacted:

Site Supervisor:

Phone No.

Emergency:

Project Engineer:

Phone No.

Fire:

Safety Officer:

Phone No.

Police:

Examine each step carefully to find and identify hazards or potential dangers that could lead to injury, illness or damage.
Chemical Hazard:
Biological Hazard:
Physical Hazards:
Ergonomic Hazards:
 Inhalation
 Skin Contact
 Absorption
 Injection
 Ingestion
 Other

 Blood Borne Pathogens
 Mold
 Plant/Insect/Animal
 Other

 Electrical
 Fire/Explosion
 Noise
 Radiation
 Heat Related Illness
 Cold Weather Problems
 Pinch Point/Line of Fire
 Slips/Trips/Falls
 Strike Against/Struck By
 Other

 Repetition
 Forceful Exertion
 Awkward Posture
 Contact Stress
 Vibration
 Work Area Design
 Other

Personal Protective Equipment Required:
 Chemical Protective Clothing
 Chemical Resistant Gloves
 General Purpose Glove
 Eye Protection
 Face Shield
 Fall Protection

 Hard Hat
 Hard Toe Boots
 Hearing Protection
 Hi Visibility/Reflective Vest
 Respiratory Protection
 Rubber Boots

 Other: _____

Required Permits/Safe Work Plans
 Confined Space Entry
 Excavation and Trenching
 General Safe Work Permit (SWP)
 Hot Work Permit

 Lift Plan/Crane Operations
 Work in Proximity to Overhead Conductors
 Other: _____

Air Monitoring Equipment Needed
 Detection Tubes
 Dust Monitor

 MiniRAE 3000
 4-Way Monitor

 Other: _____

Site Controls

<input type="checkbox"/> Barricades	<input type="checkbox"/> Exclusion Zone Delineation
<input type="checkbox"/> Caution Tape	<input checked="" type="checkbox"/> Heavy Equipment Spotter
<input type="checkbox"/> Designated Area For Vehicles	<input checked="" type="checkbox"/> Posted Signs
<input checked="" type="checkbox"/> Established Meet and Greet Process	Other: _____

Hazardous Energy Control

<input type="checkbox"/> Chemical	<input type="checkbox"/> LO/TO Checklist Complete	Other: _____
<input type="checkbox"/> Electrical	<input type="checkbox"/> LO/TO Devise in place	_____
<input type="checkbox"/> Energy Isolation Verified	<input type="checkbox"/> Mechanical	_____
<input type="checkbox"/> Hydraulic	<input type="checkbox"/> Pneumatic	_____
<input checked="" type="checkbox"/> Line of Fire	<input type="checkbox"/> Stored Energy	_____

Tools and Equipment

<input checked="" type="checkbox"/> Pre-Use Inspection Complete	
<input checked="" type="checkbox"/> Tool/Equipment Training Complete	
<input checked="" type="checkbox"/> List Tools/Equipment in Use:	<u>Forklift-Ensure Pre Shift Inspection Complete</u>

Required Training

<input checked="" type="checkbox"/> 40 Hour HAZWOPER	Other: <u>Trained/Certified Forklift Operator</u>
<input checked="" type="checkbox"/> 8 Hour HAZWOPER Refresher	_____
<input checked="" type="checkbox"/> Site Specific HASP	_____

Environmental Conditions

Weather:	<u>(to be filled out on site)</u>
Temperature:	<u>(to be filled out on site)</u>
Terrain:	<u>(to be filled out on site)</u>
Other:	<u>(to be filled out on site)</u>

Hazardous Substance Material Data Safety Sheet (MSDS) Review

Review of MSDS	
<input type="checkbox"/> YES	
<input type="checkbox"/> NO	
List MSDS Reviewed:	_____

	Action	Potential Hazards of This Job	Recommended Action/Procedure
1	Tailgate safety meeting/planning of work	N/A	<ul style="list-style-type: none"> -Portable fuel storage tanks to be stored in well ventilated areas (outdoors) -Portable fuel storage tanks should not be within 20 ft. of a permanent building structure -Area should be separated from other construction activities by at least 25' -Area should not be near wastewater access point
2	Setup of fuel/flammable storage area	<ul style="list-style-type: none"> -Spills -Fire/Explosion 	<ul style="list-style-type: none"> -NO SMOKING, open flames, or spark generating task will be permitted while in the storage vicinity. -Build spill containment system for fuel systems -Post Flammable Material and NO Smoking signs -Have at minimum, one 20 lb. ABC fire extinguisher
3	Delivery of fuel/flammable materials to site	<ul style="list-style-type: none"> -Traffic congestion -Fire/Explosion 	<ul style="list-style-type: none"> -Establish meet and greet procedures for all deliveries -If necessary, escort driver to storage area
4	Handling and placement of material (Forklift)	<ul style="list-style-type: none"> -Traffic congestion -Pinch points/Line of Fire -Slips/Trips/Falls 	<ul style="list-style-type: none"> -Operators are to know the designated path of travel -Be aware of uneven terrain and obstructions -Ensure no person is between a load and fixed objects -Identify pinch points during the placement of fuel storage containers

JSA Reviewed By: _____

Date: _____

Signatures: _____

Project No./Location: 14-063 Two Rivers, WI

Date: June 30, 2014

JSA No.: 003

Job/Operation Title: Assembly of ISSS Mixing Rig

Analysis Developed By

Analysis Reviewed By

In case of an incident, the following people will be contacted:

Site Supervisor:

Phone No.

Emergency:

Project Engineer:

Phone No.

Fire:

Safety Officer:

Phone No.

Police:

Examine each step carefully to find and identify hazards or potential dangers that could lead to injury, illness or damage.

Chemical Hazard:

Biological Hazard:

Physical Hazards:

Ergonomic Hazards:

 Inhalation

 Blood Borne Pathogens

 Electrical

 Repetition

 Skin Contact

 Mold

 Fire/Explosion

 Forceful Exertion

 Absorption

 Plant/Insect/Animal

 Noise

 Awkward Posture

 Injection

 Other

 Radiation

 Contact Stress

 Ingestion

 Heat Related Illness

 Vibration

 Other

 Cold Weather Problems

 Work Area Design

 Pinch Point/Line of Fire

 Other

 Slips/Trips/Falls

 Strike Against/Struck By

 Other

Personal Protective Equipment Required:
 Chemical Protective Clothing

 Hard Hat

Other:

 Chemical Resistant Gloves

 Hard Toe Boots

 General Purpose Gloves

 Hearing Protection

 Eye Protection

 Hi Visibility/Reflective Vest

 Face Shield

 Respiratory Protection

 Fall Protection

 Rubber Boots

Required Permits/Safe Work Plans
 Confined Space Entry

 Lift Plan/Crane Operations

 Excavation and Trenching

 Work in Proximity to Overhead Conductors

 General Safe Work Permit (SWP)

 Other:

 Hot Work Permit

Air Monitoring Equipment Needed
 Detection Tubes

 MiniRAE 3000

Other:

 Dust Monitor

 4-Way Monitor

Site Controls

<input type="checkbox"/> Barricades	<input type="checkbox"/> Exclusion Zone Delineation
<input type="checkbox"/> Caution Tape	<input checked="" type="checkbox"/> Heavy Equipment Spotter
<input checked="" type="checkbox"/> Designated Area For Vehicles	<input type="checkbox"/> Posted Signs
<input checked="" type="checkbox"/> Established Meet and Greet Process	<input checked="" type="checkbox"/> Other: <u>Traffic Control Plan</u>

Hazardous Energy Control

<input type="checkbox"/> Chemical	<input type="checkbox"/> LO/TO Checklist Complete	Other: _____
<input type="checkbox"/> Electrical	<input type="checkbox"/> LO/TO Devise in place	_____
<input type="checkbox"/> Energy Isolation Verified	<input type="checkbox"/> Mechanical	_____
<input type="checkbox"/> Hydraulic	<input type="checkbox"/> Pneumatic	_____
<input type="checkbox"/> Line of Fire	<input type="checkbox"/> Stored Energy	_____

Tools and Equipment

<input checked="" type="checkbox"/> Pre-Use Inspection Complete	
<input checked="" type="checkbox"/> Tool/Equipment Training Complete	
<input checked="" type="checkbox"/> List Tools/Equipment in Use:	<u>Aerial Lifts, Forklift, Heavy Equipment-Ensure Pre Shift Inspections Complete</u>

Required Training

<input checked="" type="checkbox"/> 40 Hour HAZWOPER	Other: <u>Trained/Certified Forklift Operator</u>
<input checked="" type="checkbox"/> 8 Hour HAZWOPER Refresher	<u>Trained/Certified Aerial Lift Operator</u>
<input checked="" type="checkbox"/> Site Specific HASP	_____

Environmental Conditions

Weather:	<u>(to be filled in on site)</u>
Temperature:	<u>(to be filled in on site)</u>
Terrain:	<u>(to be filled in on site)</u>
Other:	<u>(to be filled in on site)</u>

Hazardous Substance Material Data Safety Sheet (MSDS) Review

Review of MSDS	
<input type="checkbox"/> YES	
<input type="checkbox"/> NO	
List MSDS Reviewed:	_____

Action		Potential Hazards of This Job	Recommended Action/Procedure
1	Tailgate safety meeting/planning of work	N/A	<ul style="list-style-type: none"> -Establish work area for off loading of equipment -Establish work area for assembly of Mixing Rig -Establish meet and greet procedure for deliveries -Establish communication standards -Field test 2-way radios, if applicable -Demarcate work area with caution tape, barricades
2	Arrival of equipment to site	-Traffic congestion	<ul style="list-style-type: none"> -Upon arrival, ensure driver initiates parking break -Ensure that driver is equipped with proper PPE -Escort driver to offloading location
3	Delivery/Offloading of equipment	<ul style="list-style-type: none"> -Unsecure load -Crane/Lifting equipment hazards -Pinch Points -Line of Fire -Contact with/Contact by 	<ul style="list-style-type: none"> -Ensure lifting equipment is rated for loads -Operator is to ensure rigging is applied properly -Use tag lines to control suspended loads -Utilize spotters to keep ground personnel away from swing and turn radius. -Inspect slings prior to use, ensure tags are visible load rating visible
4	Assembly of Mixing Rig (Lifting and conveying sections) (Forklift, aerial lift)	<ul style="list-style-type: none"> -Lifting Equipment Hazards -Pinch Points -Working from elevated surfaces -Working with hand tools 	<ul style="list-style-type: none"> -Establish stable base for aerial lift operations -Inspect hand and power tools prior to use -Identify pinch points -Qualified personnel to operate forklift and aerial lift -Inspect aerial lift prior to commencing work -Use fall arrest equipment while working from basket regardless of height off of ground
5	Assembly of Mixing Rig (Assembly of unloaded equipment)	<ul style="list-style-type: none"> -Forceful Exertion -Awkward Posture -Pinch Points -Crushing Hazards -Manual Lifting - Load Too Heavy/Awkward Lift 	<ul style="list-style-type: none"> -No rush! Be deliberate in your movements -Use proper lifting techniques -Assist with heavy or awkward loads -Take breaks when feeling fatigued

JSA Reviewed By: _____

Date: _____

Signatures: _____

Project No./Location: 14-063 Two Rivers, WI

Date: June 30, 2014

JSA No.: 004

Job/Operation Title: Assembly of Batching Plant

Analysis Developed By

Analysis Reviewed By

In case of an incident, the following people will be contacted:

Site Supervisor:

Phone No.

Emergency:

Project Engineer:

Phone No.

Fire:

Safety Officer:

Phone No.

Police:

Examine each step carefully to find and identify hazards or potential dangers that could lead to injury, illness or damage.
Chemical Hazard:
Biological Hazard:
Physical Hazards:
Ergonomic Hazards:
 Inhalation

 Blood Borne Pathogens

 Electrical

 Repetition

 Skin Contact

 Mold

 Fire/Explosion

 Forceful Exertion

 Absorption

 Plant/Insect/Animal

 Noise

 Awkward Posture

 Injection

 Other

 Radiation

 Contact Stress

 Ingestion

 Heat Related Illness

 Vibration

 Other

 Cold Weather Problems

 Work Area Design

 Pinch Point/Line of Fire

 Other

 Slips/Trips/Falls

 Strike Against/Struck By

 Other

Personal Protective Equipment Required:
 Chemical Protective Clothing

 Hard Hat

Other:

 Chemical Resistant Gloves

 Hard Toe Boots

 General Purpose Gloves

 Hearing Protection

 Eye Protection

 Hi Visibility/Reflective Vest

 Face Shield

 Respiratory Protection

 Fall Protection

 Rubber Boots

Required Permits/Safe Work Plans
 Confined Space Entry

 Lift Plan/Crane Operations

 Excavation and Trenching

 Work in Proximity to Overhead Conductors

 General Safe Work Permit (SWP)

 Other:

 Hot Work Permit

Air Monitoring Equipment Needed
 Detection Tubes

 MiniRAE 3000

Other:

 Dust Monitor

 4-Way Monitor

Site Controls

<input type="checkbox"/> Barricades	<input type="checkbox"/> Exclusion Zone Delineation
<input type="checkbox"/> Caution Tape	<input checked="" type="checkbox"/> Heavy Equipment Spotter
<input checked="" type="checkbox"/> Designated Area For Vehicles	<input checked="" type="checkbox"/> Posted Signs
<input checked="" type="checkbox"/> Established Meet and Greet Process	<input checked="" type="checkbox"/> Other: <u>Traffic Control Plan</u>

Hazardous Energy Control

<input type="checkbox"/> Chemical	<input type="checkbox"/> LO/TO Checklist Complete	Other: _____
<input type="checkbox"/> Electrical	<input type="checkbox"/> LO/TO Devise in place	_____
<input type="checkbox"/> Energy Isolation Verified	<input type="checkbox"/> Mechanical	_____
<input type="checkbox"/> Hydraulic	<input type="checkbox"/> Pneumatic	_____
<input type="checkbox"/> Line of Fire	<input type="checkbox"/> Stored Energy	_____

Tools and Equipment

<input checked="" type="checkbox"/> Pre-Use Inspection Complete	
<input checked="" type="checkbox"/> Tool/Equipment Training Complete	
<input checked="" type="checkbox"/> List Tools/Equipment in Use:	<u>Forklift-Ensure Pre Shift Inspection Complete; Ensure all Batch Plant Components plug into GFCI</u>

Required Training

<input checked="" type="checkbox"/> 40 Hour HAZWOPER	Other: <u>Trained/Certified Forklift Operator</u>
<input checked="" type="checkbox"/> 8 Hour HAZWOPER Refresher	_____
<input checked="" type="checkbox"/> Site Specific HASP	_____

Environmental Conditions

Weather:	<u>To Be Filled Out on Site</u>
Temperature:	<u>To Be Filled Out on Site</u>
Terrain:	<u>To Be Filled Out on Site</u>
Other:	_____

Hazardous Substance Material Data Safety Sheet (MSDS) Review

Review of MSDS	
<input type="checkbox"/> YES	
<input type="checkbox"/> NO	
List MSDS Reviewed:	_____

	Action	Potential Hazards of This Job	Recommended Action/Procedure
1	Tailgate safety meeting/planning of work	N/A	<ul style="list-style-type: none"> -Establish work area for off loading of equipment -Establish work area for assembly of Batching Plant -Identify pinch points -Establish communication standards -Field test 2-way radios, if applicable -Identify uneven terrain, slip/trip/fall hazards
2	Setup of Batching Plant	<ul style="list-style-type: none"> -Pinch Points -Slips/Trips/Falls -Forceful Exertion -Awkward Posture -Repetition -Line of Fire 	<ul style="list-style-type: none"> -Avoid lifting with back -Take breaks when feeling fatigued -Identify all pinch points -Identify uneven and slippery terrain -Assist in lifting heavy items
3	Applying Power Source to Plant	-Exposure to Energized Electrical Systems	<ul style="list-style-type: none"> -Only trained personnel to perform electrical work -Inspect all electrical components for: Cuts, wearing, kinks, etc. -ALL equipment to be connected to GFCI -ALL equipment to grounded -Take component out of service if damaged

JSA Reviewed By: _____

Date: _____

Signatures: _____

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Project No./Location: 14-063 Two Rivers, WI
 JSA No.: 005
 Analysis Developed By _____

 Date: June 30, 2014
 Job/Operation Title: Fueling of Heavy Equipment
 Analysis Reviewed By _____

In case of an incident, the following people will be contacted:

Site Supervisor:	Phone No.	Emergency:
Project Engineer:	Phone No.	Fire:
Safety Officer:	Phone No.	Police:

Examine each step carefully to find and identify hazards or potential dangers that could lead to injury, illness or damage.

Chemical Hazard:	Biological Hazard:	Physical Hazards:	Ergonomic Hazards:
<input checked="" type="checkbox"/> Inhalation	_____ Blood Borne Pathogens	<input checked="" type="checkbox"/> Electrical	_____ Repetition
<input checked="" type="checkbox"/> Skin Contact	_____ Mold	<input checked="" type="checkbox"/> Fire/Explosion	_____ Forceful Exertion
_____ Absorption	_____ Plant/Insect/Animal	_____ Noise	_____ Awkward Posture
_____ Injection	_____ Other	_____ Radiation	_____ Contact Stress
_____ Ingestion		_____ Heat Related Illness	_____ Vibration
_____ Other		_____ Cold Weather Problems	_____ Work Area Design
		<input checked="" type="checkbox"/> Pinch Point/Line of Fire	_____ Other
		<input checked="" type="checkbox"/> Slips/Trips/Falls	
		<input checked="" type="checkbox"/> Strike Against/Struck By	
		_____ Other	

Personal Protective Equipment Required:

_____ Chemical Protective Clothing	<input checked="" type="checkbox"/> Hard Hat	Other: <u>ABC Rated Fire Extinguisher (Ensure Inspection tag current, annual & monthly)</u>
_____ Chemical Resistant Gloves	<input checked="" type="checkbox"/> Hard Toe Boots	_____
<input checked="" type="checkbox"/> General Purpose Gloves	_____ Hearing Protection	_____
<input checked="" type="checkbox"/> Eye Protection	<input checked="" type="checkbox"/> Hi Visibility/Reflective Vest	_____
_____ Face Shield	_____ Respiratory Protection	_____
_____ Fall Protection	_____ Rubber Boots	_____

Required Permits/Safe Work Plans

_____ Confined Space Entry	_____ Lift Plan/Crane Operations
_____ Excavation and Trenching	_____ Work in Proximity to Overhead Conductors
_____ General Safe Work Permit (SWP)	Other: _____
_____ Hot Work Permit	

Air Monitoring Equipment Needed

_____ Detection Tubes	_____ MiniRAE 3000	Other: _____
_____ Dust Monitor	_____ 4-Way Monitor	_____

Site Controls

<input type="checkbox"/> Barricades	<input type="checkbox"/> Exclusion Zone Delineation
<input type="checkbox"/> Caution Tape	<input type="checkbox"/> Heavy Equipment Spotter
<input type="checkbox"/> Designated Area For Vehicles	<input checked="" type="checkbox"/> Posted Signs
<input type="checkbox"/> Established Meet and Greet Process	<input checked="" type="checkbox"/> Other: <u>Labeled containers to properly store and dispense fuel</u>

Hazardous Energy Control

<input type="checkbox"/> Chemical	<input type="checkbox"/> LO/TO Checklist Complete	Other: _____
<input type="checkbox"/> Electrical	<input type="checkbox"/> LO/TO Devise in place	_____
<input type="checkbox"/> Energy Isolation Verified	<input type="checkbox"/> Mechanical	_____
<input type="checkbox"/> Hydraulic	<input type="checkbox"/> Pneumatic	_____
<input type="checkbox"/> Line of Fire	<input type="checkbox"/> Stored Energy	_____

Tools and Equipment

<input checked="" type="checkbox"/> Pre-Use Inspection Complete	
<input checked="" type="checkbox"/> Tool/Equipment Training Complete	
<input checked="" type="checkbox"/> List Tools/Equipment in Use:	<u>Forklift, Heavy Equipment-Ensure Pre Shift Inspections are complete</u>

Required Training

<input checked="" type="checkbox"/> 40 Hour HAZWOPER	Other: <u>Trained/Certified Forklift Operator</u>
<input checked="" type="checkbox"/> 8 Hour HAZWOPER Refresher	_____
<input checked="" type="checkbox"/> Site Specific HASP	_____

Environmental Conditions

Weather:	<u>(to be filled in on site)</u>
Temperature:	<u>(to be filled in on site)</u>
Terrain:	<u>(to be filled in on site)</u>
Other:	<u>(to be filled in on site)</u>

Hazardous Substance Material Data Safety Sheet (MSDS) Review

Review of MSDS	
<input type="checkbox"/> YES	
<input type="checkbox"/> NO	
List MSDS Reviewed:	_____

	Action	Potential Hazards of This Job	Recommended Action/Procedure
1	Tailgate safety meeting/planning of work	N/A	<ul style="list-style-type: none"> -Establish work area for fueling of equipment -Use only properly labeled containers designed specifically for the storage and dispensing of fuel -Use a bonding, grounding mechanism between the two containers to eliminate static charge -Absolutely NO SMOKING, open flame, spark generating activities while handling/fueling equipment
2	Loading Fuel Cell onto Forklift	-Unstable Loads	<ul style="list-style-type: none"> -It is the responsibility of the operator to ensure fuel cell is stable and securely fastened to forklift carriage -DO NOT COMPLETELY FILL TANK
3	Transporting Fuel Tank	-Spilling of fuel while transporting fuel cell	<ul style="list-style-type: none"> -Drive slowly -Keep forks and carriage level -Keep fuel cell low to ground surface -Avoid uneven terrain and obstructions
4	Lifting Fuel Cell (While Fueling Equipment)	<ul style="list-style-type: none"> -Fumes/Vapors -Traffic Congestion -Contact With/Contact By -Contact with Skin 	<ul style="list-style-type: none"> -Ensure fuel cell is located in a well ventilated area -Fueling takes place in designated fueling area -Use spotter when approaching equipment to avoid collision -Wear appropriate PPE
5	Connecting Fuel Pump to Power Source (Equipment Battery)	-Electrical Hazard	<ul style="list-style-type: none"> -Properly connect fuel pump to equipment battery (Red to positive, black to negative node)
6	Dispensing Fuel	-Spill Hazard	<ul style="list-style-type: none"> -Operator should not trust automatic shutoff -Manually shutoff pump to avoid overflow

JSA Reviewed By: _____

Date: _____

Signatures: _____

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Project No./Location: 14-063 Two Rivers, WI
 JSA No.: 006
 Analysis Developed By

 Date: June 30, 2014
 Job/Operation Title: Erecting Silo
 Analysis Reviewed By

In case of an incident, the following people will be contacted:

Site Supervisor:	Phone No.	Emergency:
Project Engineer:	Phone No.	Fire:
Safety Officer:	Phone No.	Police:

Examine each step carefully to find and identify hazards or potential dangers that could lead to injury, illness or damage.

Chemical Hazard:	Biological Hazard:	Physical Hazards:	Ergonomic Hazards:
<input type="checkbox"/> Inhalation	<input type="checkbox"/> Blood Borne Pathogens	<input type="checkbox"/> Electrical	<input type="checkbox"/> Repetition
<input type="checkbox"/> Skin Contact	<input type="checkbox"/> Mold	<input type="checkbox"/> Fire/Explosion	<input checked="" type="checkbox"/> Forceful Exertion
<input type="checkbox"/> Absorption	<input type="checkbox"/> Plant/Insect/Animal	<input type="checkbox"/> Noise	<input type="checkbox"/> Awkward Posture
<input type="checkbox"/> Injection	<input type="checkbox"/> Other	<input type="checkbox"/> Radiation	<input type="checkbox"/> Contact Stress
<input type="checkbox"/> Ingestion		<input type="checkbox"/> Heat Related Illness	<input type="checkbox"/> Vibration
<input type="checkbox"/> Other		<input type="checkbox"/> Cold Weather Problems	<input checked="" type="checkbox"/> Work Area Design
		<input checked="" type="checkbox"/> Pinch Point/Line of Fire	<input type="checkbox"/> Other
		<input checked="" type="checkbox"/> Slips/Trips/Falls	
		<input checked="" type="checkbox"/> Strike Against/Struck By	
		<input type="checkbox"/> Other	

Personal Protective Equipment Required:

<input type="checkbox"/> Chemical Protective Clothing	<input checked="" type="checkbox"/> Hard Hat	Other: _____
<input type="checkbox"/> Chemical Resistant Gloves	<input checked="" type="checkbox"/> Hard Toe Boots	_____
<input checked="" type="checkbox"/> General Purpose Gloves	<input type="checkbox"/> Hearing Protection	_____
<input checked="" type="checkbox"/> Eye Protection	<input checked="" type="checkbox"/> Hi Visibility/Reflective Vest	_____
<input type="checkbox"/> Face Shield	<input type="checkbox"/> Respiratory Protection	_____
<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Rubber Boots	_____

Required Permits/Safe Work Plans

<input type="checkbox"/> Confined Space Entry	<input type="checkbox"/> Lift Plan/Crane Operations
<input type="checkbox"/> Excavation and Trenching	<input type="checkbox"/> Work in Proximity to Overhead Conductors
<input type="checkbox"/> General Safe Work Permit (SWP)	Other: _____
<input type="checkbox"/> Hot Work Permit	

Air Monitoring Equipment Needed

<input type="checkbox"/> Detection Tubes	<input type="checkbox"/> MiniRAE 3000	Other: _____
<input type="checkbox"/> Dust Monitor	<input type="checkbox"/> 4-Way Monitor	_____

Site Controls

Barricades
 Caution Tape
 Designated Area For Vehicles
 Established Meet and Greet Process

Exclusion Zone Delineation
 Heavy Equipment Spotter
 Posted Signs
 Other: _____

Hazardous Energy Control

Chemical
 Electrical
 Energy Isolation Verified
 Hydraulic
 Line of Fire

LO/TO Checklist Complete
 LO/TO Devise in place
 Mechanical
 Pneumatic
 Stored Energy

Other: _____

Tools and Equipment

Pre-Use Inspection Complete
 Tool/Equipment Training Complete
 List Tools/Equipment in Use:

Crane Operator inspect crane, Qualified Rigger inspect Rigging

Required Training

40 Hour HAZWOPER
 8 Hour HAZWOPER Refresher
 Site Specific HASP

Other: Trained/Licensed Crane Operator
Trained/Qualified Rigger

Environmental Conditions

Weather: To Be Filled Out on Site
 Temperature: To Be Filled Out on Site
 Terrain: To Be Filled Out on Site
 Other: _____

Hazardous Substance Material Data Safety Sheet (MSDS) Review

Review of MSDS
 YES
 NO

List MSDS Reviewed: _____

	Action	Potential Hazards of This Job	Recommended Action/Procedure
1	Tailgate safety meeting/planning of work	N/A	<ul style="list-style-type: none"> -Establish work area for assembly of silo -Identify slip/trip/fall hazards -Outline objective, assign tasks -Remind crew to stay alert and non-complacent -Establish setup area for assembly of silo -Supervisor responsible for informing operator of weight dimensions of silo
2	Arrival of Silo on Site	-Traffic Congestion	<ul style="list-style-type: none"> -Establish meet and greet procedures with driver -If necessary, escort drive to off loading location -Prior to exiting vehicle, ensure driver has required PPE
3	Placing Silo in Staging Area	<ul style="list-style-type: none"> -Pedestrian Hazard -Impact Hazard -Pinch Points -Line of Fire -Contact with/Contact by 	<ul style="list-style-type: none"> -Designate a spotter to assist truck approach -Spotter is to keep travel lanes clear of ground crew -Ensure the spotter is not positioned in blind spots -Spotter is to have high visibility/reflective vest
4	Disconnecting Silo from Truck	<ul style="list-style-type: none"> -Contact with/Contact by -Drifting Silo/Truck -Line of Fire 	<ul style="list-style-type: none"> -Ensure driver initiates parking break before exiting truck -Confirm silo is placed on a level, stable platform -Use caution when positioning fingers/hands near pinch points or not in Line of Sight
5	Silo Erection (Crane)	<ul style="list-style-type: none"> -Traffic Congestion -Suspended Loads -Contact with/Contact by -Working within Swing Radius 	<ul style="list-style-type: none"> -Establish meet and greet procedures with Crane Operator prior to arrival on site -Crane operator shall conduct pre-lift inspection -Establish proper communication channels (Only Trained Signaller to communicate with operator) -Spotter is to clear area of all pedestrian traffic prior to commencing lift -Anchor silo according to manufacturer's specification

JSA Reviewed By: _____

Date: _____

Signatures:

Project No./Location: 14-063 Two Rivers, WI

Date: June 30, 2014

JSA No.: 007

Job/Operation Title: Jump Starting Equipment

Analysis Developed By _____

Analysis Reviewed By _____

In case of an incident, the following people will be contacted:

Site Supervisor:

Phone No.

Emergency:

Project Engineer:

Phone No.

Fire:

Safety Officer:

Phone No.

Police:

Examine each step carefully to find and identify hazards or potential dangers that could lead to injury, illness or damage.

Chemical Hazard:	Biological Hazard:	Physical Hazards:	Ergonomic Hazards:
<input type="checkbox"/> Inhalation	<input type="checkbox"/> Blood Borne Pathogens	<input checked="" type="checkbox"/> Electrical	<input type="checkbox"/> Repetition
<input type="checkbox"/> Skin Contact	<input type="checkbox"/> Mold	<input type="checkbox"/> Fire/Explosion	<input type="checkbox"/> Forceful Exertion
<input type="checkbox"/> Absorption	<input type="checkbox"/> Plant/Insect/Animal	<input type="checkbox"/> Noise	<input type="checkbox"/> Awkward Posture
<input type="checkbox"/> Injection	<input type="checkbox"/> Other	<input type="checkbox"/> Radiation	<input type="checkbox"/> Contact Stress
<input type="checkbox"/> Ingestion		<input type="checkbox"/> Heat Related Illness	<input type="checkbox"/> Vibration
<input type="checkbox"/> Other		<input type="checkbox"/> Cold Weather Problems	<input type="checkbox"/> Work Area Design
		<input checked="" type="checkbox"/> Pinch Point/Line of Fire	<input type="checkbox"/> Other
		<input checked="" type="checkbox"/> Slips/Trips/Falls	
		<input checked="" type="checkbox"/> Strike Against/Struck By	
		<input type="checkbox"/> Other	

Personal Protective Equipment Required:

<input type="checkbox"/> Chemical Protective Clothing	<input checked="" type="checkbox"/> Hard Hat	Other: <u>ABC Fire Extinguisher (Ensure annual & monthly</u>
<input type="checkbox"/> Chemical Resistant Gloves	<input checked="" type="checkbox"/> Hard Toe Boots	<u>inspection current)</u>
<input checked="" type="checkbox"/> General Purpose Gloves	<input type="checkbox"/> Hearing Protection	<u>Rubber Insulated Gloves</u>
<input checked="" type="checkbox"/> Eye Protection	<input checked="" type="checkbox"/> Hi Visibility/Reflective Vest	_____
<input type="checkbox"/> Face Shield	<input type="checkbox"/> Respiratory Protection	_____
<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Rubber Boots	_____

Required Permits/Safe Work Plans

<input type="checkbox"/> Confined Space Entry	<input type="checkbox"/> Lift Plan/Crane Ops
<input type="checkbox"/> Excavation and Trenching	<input type="checkbox"/> Work in Proximity to Overhead Conductors
<input type="checkbox"/> General Safe Work Permit (SWP)	Other: _____
<input type="checkbox"/> Hot Work Permit	

Air Monitoring Equipment Needed

<input type="checkbox"/> Detection Tubes	<input type="checkbox"/> MiniRAE 3000	Other: _____
<input type="checkbox"/> Dust Monitor	<input type="checkbox"/> 4-Way Monitor	_____

Site Controls

- | | |
|---|---|
| <input type="checkbox"/> Barricades | <input type="checkbox"/> Exclusion Zone Delineation |
| <input type="checkbox"/> Caution Tape | <input type="checkbox"/> Heavy Equipment Spotter |
| <input type="checkbox"/> Designated Area For Vehicles | <input type="checkbox"/> Posted Signs |
| <input type="checkbox"/> Established Meet and Greet Process | <input type="checkbox"/> Other: _____ |

Hazardous Energy Control

- | | | |
|--|---|--------------|
| <input type="checkbox"/> Chemical | <input type="checkbox"/> LO/TO Checklist Complete | Other: _____ |
| <input checked="" type="checkbox"/> Electrical | <input type="checkbox"/> LO/TO Devise in place | _____ |
| <input type="checkbox"/> Energy Isolation Verified | <input type="checkbox"/> Mechanical | _____ |
| <input type="checkbox"/> Hydraulic | <input type="checkbox"/> Pneumatic | _____ |
| <input type="checkbox"/> Line of Fire | <input type="checkbox"/> Stored Energy | _____ |

Tools and Equipment

- | | |
|--|--|
| <input checked="" type="checkbox"/> Pre-Use Inspection Complete | |
| <input checked="" type="checkbox"/> Tool/Equipment Training Complete | |
| <input checked="" type="checkbox"/> List Tools/Equipment in Use: | <u>Jumper Cables, inspect prior to start of task</u> |

Required Training

- | | |
|---|--------------|
| <input checked="" type="checkbox"/> 40 Hour HAZWOPER | Other: _____ |
| <input checked="" type="checkbox"/> 8 Hour HAZWOPER Refresher | _____ |
| <input checked="" type="checkbox"/> Site Specific HASP | _____ |

Environmental Conditions

- | | |
|--------------|---------------------------------|
| Weather: | To Be Filled Out on Site |
| Temperature: | To Be Filled Out on Site |
| Terrain: | To Be Filled Out on Site |
| Other: | _____ |

Hazardous Substance Material Data Safety Sheet (MSDS) Review

- | | |
|------------------------------|-------|
| Review of MSDS | |
| <input type="checkbox"/> YES | |
| <input type="checkbox"/> NO | |
| List MSDS Reviewed: | _____ |
| | _____ |

	Action	Potential Hazards of This Job	Recommended Action/Procedure
1	Gather Proper Equipment for Task	N/A	<ul style="list-style-type: none"> -Make sure that the dead battery is of equal voltage to the live battery -Make sure jumper cables are of the appropriate gauge to handle the current transferred between each source -Have fire extinguishers readily available -NO SMOKING during this task -KEEP FLAMABLE LIQUIDS/MATERIALS clear of area during the task
2	Aligning Equipment for Connection (Close Proximity)	<ul style="list-style-type: none"> -Pinch Points -Collision Between Two Vehicles -Contact with/Contact by 	<ul style="list-style-type: none"> -Establish communication between operators prior to vehicle/equipment approach -Spotter is to keep area between the two vehicles clear of unauthorized personal -Maintain visual contact to direct operator into area -Set parking brakes on vehicles then dismount vehicles using three points of contact
3	Connecting Batteries (with Jumper Cables)	-Electrical Spark	<ul style="list-style-type: none"> -Wear proper PPE -Clean all connections -Keep all metal objects clear of batteries -Connect red clamp to positive node of depleted battery -Connect second red clamp to positive live battery -Connect black clamp to negative node of dead battery -Connect remaining clamp to frame ground (Under no circumstance should the lead be connected to dead unit's frame)
4	Starting Equipment	-Electrical Spark	<ul style="list-style-type: none"> -Start live unit and let dead unit charge for 10 minutes -Start dead unit
5	Disconnecting Equipment	-Electrical Spark	<ul style="list-style-type: none"> -Do not touch end of cables while unclamping units -Return equipment to desired area

JSA Reviewed By: _____

Date: _____

Signatures:

Project No./Location: 14-063 Two Rivers, WI

Date: June 30, 2014

JSA No.: 008

Job/Operation Title:

Analysis Developed By _____

Analysis Reviewed By _____

In case of an incident, the following people will be contacted:

Site Supervisor:

Phone No.

Emergency:

Project Engineer:

Phone No.

Fire:

Safety Officer:

Phone No.

Police:

Examine each step carefully to find and identify hazards or potential dangers that could lead to injury, illness or damage.
Chemical Hazard:

- Inhalation
- Skin Contact
- Absorption
- Injection
- Ingestion
- Other

Biological Hazard:

- Blood Borne Pathogens
- Mold
- Plant/Insect/Animal
- Other

Physical Hazards:

- Electrical
- Fire/Explosion
- Noise
- Radiation
- Heat Related Illness
- Cold Weather Problems
- Pinch Point/Line of Fire
- Slips/Trips/Falls
- Strike Against/Struck By
- Other

Ergonomic Hazards:

- Repetition
- Forceful Exertion
- Awkward Posture
- Contact Stress
- Vibration
- Work Area Design
- Other

Personal Protective Equipment Required:

- Chemical Protective Clothing
- Chemical Resistant Gloves
- General Purpose Gloves
- Eye Protection
- Face Shield
- Fall Protection

- Hard Hat
- Hard Toe Boots
- Hearing Protection
- Hi Visibility/Reflective Vest
- Respiratory Protection
- Rubber Boots

 Other: _____

Required Permits/Safe Work Plans

- Confined Space Entry
- Excavation and Trenching
- General Safe Work Permit (SWP)
- Hot Work Permit

- Lift Plan/Crane Ops
- Work in Proximity to Overhead Conductors
- Other: _____

Air Monitoring Equipment Needed

- Detection Tubes
- Dust Monitor

- MiniRAE 3000
- 4-Way Monitor

 Other: _____

Site Controls

- | | |
|---|---|
| <input type="checkbox"/> Barricades | <input type="checkbox"/> Exclusion Zone Delineation |
| <input type="checkbox"/> Caution Tape | <input type="checkbox"/> Heavy Equipment Spotter |
| <input type="checkbox"/> Designated Area For Vehicles | <input type="checkbox"/> Posted Signs |
| <input type="checkbox"/> Established Meet and Greet Process | <input type="checkbox"/> Other: _____ |

Hazardous Energy Control

- | | | |
|--|---|--------------|
| <input type="checkbox"/> Chemical | <input type="checkbox"/> LO/TO Checklist Complete | Other: _____ |
| <input type="checkbox"/> Electrical | <input type="checkbox"/> LO/TO Devise in place | _____ |
| <input type="checkbox"/> Energy Isolation Verified | <input type="checkbox"/> Mechanical | _____ |
| <input type="checkbox"/> Hydraulic | <input type="checkbox"/> Pneumatic | _____ |
| <input type="checkbox"/> Line of Fire | <input type="checkbox"/> Stored Energy | _____ |

Tools and Equipment

- | | |
|--|--|
| <input checked="" type="checkbox"/> Pre-Use Inspection Complete | |
| <input checked="" type="checkbox"/> Tool/Equipment Training Complete | |
| <input checked="" type="checkbox"/> List Tools/Equipment in Use: | <u>Ensure Equipment Inspection is Documented</u> |

Required Training

- | | |
|---|--------------|
| <input checked="" type="checkbox"/> 40 Hour HAZWOPER | Other: _____ |
| <input checked="" type="checkbox"/> 8 Hour HAZWOPER Refresher | _____ |
| <input checked="" type="checkbox"/> Site Specific HASP | _____ |

Environmental Conditions

- | | |
|--------------|---------------------------------|
| Weather: | <u>To Be Filled Out on Site</u> |
| Temperature: | <u>To Be Filled Out on Site</u> |
| Terrain: | <u>To Be Filled Out on Site</u> |
| Other: | _____ |

Hazardous Substance Material Data Safety Sheet (MSDS) Review

- | | |
|------------------------------|-------|
| Review of MSDS | |
| <input type="checkbox"/> YES | |
| <input type="checkbox"/> NO | |
| List MSDS Reviewed: | _____ |

	Action	Potential Hazards of This Job	Recommended Action/Procedure
1	Tailgate safety meeting/planning of work	N/A	-Equipment Inspection is to be performed every morning prior to vehicle use -Identify slip/trip/fall hazards -If cold or wet, take caution when mounting equipment -Three point contact is required
2	Conducting Equipment Inspection	-Slips/Trips/Falls -Contact Stress -Contact with/Contact by	-Avoid hot surfaces on running engines -Engine guard is to be in place when inspecting moving components -Used three point contact when mounting equipment

JSA Reviewed By: _____

Date: _____

Signatures: _____

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Project No./Location: 14-063 Two Rivers, WI

Date: June 30, 2014

JSA No.: 009

Job/Operation Title: Working in Hot Weather Conditions

Analysis Developed By

Analysis Reviewed By

In case of an incident, the following people will be contacted:

Site Supervisor:

Phone No.

Emergency:

Project Engineer:

Phone No.

Fire:

Safety Officer:

Phone No.

Police:

Examine each step carefully to find and identify hazards or potential dangers that could lead to injury, illness or damage.
Chemical Hazard:
Biological Hazard:
Physical Hazards:
Ergonomic Hazards:
 Inhalation

 Blood Borne Pathogens

 Electrical

 Repetition

 Skin Contact

 Mold

 Fire/Explosion

 Forceful Exertion

 Absorption

 Plant/Insect/Animal

 Noise

 Awkward Posture

 Injection

 Other

 Radiation

 Contact Stress

 Ingestion

 Heat Related Illness

 Vibration

 Other

 Cold Weather Problems

 Work Area Design

 Pinch Point/Line of Fire

 Other

 Slips/Trips/Falls

 Strike Against/Struck By

 Other

Personal Protective Equipment Required:
 Chemical Protective Clothing

 Hard Hat

Other:

 Chemical Resistant Gloves

 Hard Toe Boots

 General Purpose Gloves

 Hearing Protection

 Eye Protection

 Hi Visibility/Reflective Vest

 Face Shield

 Respiratory Protection

 Fall Protection

 Rubber Boots

Required Permits/Safe Work Plans
 Confined Space Entry

 Lift Plan/Crane Ops

 Excavation and Trenching

 Work in Proximity to Overhead Conductors

 General Safe Work Permit (SWP)

 Other:

 Hot Work Permit

Air Monitoring Equipment Needed
 Detection Tubes

 MiniRAE 3000

Other:

 Dust Monitor

 4-Way Monitor

Site Controls

- | | |
|---|---|
| <input type="checkbox"/> Barricades | <input type="checkbox"/> Exclusion Zone Delineation |
| <input type="checkbox"/> Caution Tape | <input type="checkbox"/> Heavy Equipment Spotter |
| <input type="checkbox"/> Designated Area For Vehicles | <input type="checkbox"/> Posted Signs |
| <input type="checkbox"/> Established Meet and Greet Process | <input type="checkbox"/> Other: _____ |

Hazardous Energy Control

- | | | |
|--|---|--------------|
| <input type="checkbox"/> Chemical | <input type="checkbox"/> LO/TO Checklist Complete | Other: _____ |
| <input type="checkbox"/> Electrical | <input type="checkbox"/> LO/TO Devise in place | _____ |
| <input type="checkbox"/> Energy Isolation Verified | <input type="checkbox"/> Mechanical | _____ |
| <input type="checkbox"/> Hydraulic | <input type="checkbox"/> Pneumatic | _____ |
| <input type="checkbox"/> Line of Fire | <input type="checkbox"/> Stored Energy | _____ |

Tools and Equipment

- Pre-Use Inspection Complete
 Tool/Equipment Training Complete
 List Tools/Equipment in Use: _____

Required Training

- | | |
|---|--------------|
| <input checked="" type="checkbox"/> 40 Hour HAZWOPER | Other: _____ |
| <input checked="" type="checkbox"/> 8 Hour HAZWOPER Refresher | _____ |
| <input checked="" type="checkbox"/> Site Specific HASP | _____ |

Environmental Conditions

- Weather: _____
 Temperature: _____
 Terrain: _____
 Other: _____

Hazardous Substance Material Data Safety Sheet (MSDS) Review

- Review of MSDS
 YES
 NO
 List MSDS Reviewed: _____

	Action	Potential Hazards of This Job	Recommended Action/Procedure
1	Tailgate safety meeting/planning of work	-Address Hot Weather Health Problems	<ul style="list-style-type: none"> -Identify weather conditions -Review typical symptoms of heat exposure -Discuss preventative measures -Incorporate frequent breaks -Have sufficient supply of drinking water available -Monitor crew throughout shift -Closely monitor individuals wearing additional PPE as part of individual task assignment

JSA Reviewed By: _____

Date: _____

Signatures: _____

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Project No./Location: 14-063 Two Rivers, WI
 JSA No.: 010
 Analysis Developed By _____

 Date: June 30, 2014
 Job/Operation Title: Working in Cold Weather Conditions
 Analysis Reviewed By _____

In case of an incident, the following people will be contacted:

Site Supervisor:	Phone No.	Emergency:
Project Engineer:	Phone No.	Fire:
Safety Officer:	Phone No.	Police:

Examine each step carefully to find and identify hazards or potential dangers that could lead to injury, illness or damage.

Chemical Hazard:	Biological Hazard:	Physical Hazards:	Ergonomic Hazards:
<input type="checkbox"/> Inhalation	<input type="checkbox"/> Blood Borne Pathogens	<input type="checkbox"/> Electrical	<input type="checkbox"/> Repetition
<input type="checkbox"/> Skin Contact	<input type="checkbox"/> Mold	<input type="checkbox"/> Fire/Explosion	<input type="checkbox"/> Forceful Exertion
<input type="checkbox"/> Absorption	<input type="checkbox"/> Plant/Insect/Animal	<input type="checkbox"/> Noise	<input type="checkbox"/> Awkward Posture
<input type="checkbox"/> Injection	<input type="checkbox"/> Other	<input type="checkbox"/> Radiation	<input type="checkbox"/> Contact Stress
<input type="checkbox"/> Ingestion		<input type="checkbox"/> Heat Related Illness	<input type="checkbox"/> Vibration
<input type="checkbox"/> Other		<input checked="" type="checkbox"/> Cold Weather Problems	<input type="checkbox"/> Work Area Design
		<input type="checkbox"/> Pinch Point/Line of Fire	<input type="checkbox"/> Other
		<input checked="" type="checkbox"/> Slips/Trips/Falls	
		<input type="checkbox"/> Strike Against/Struck By	
		<input type="checkbox"/> Other	

Personal Protective Equipment Required:

<input type="checkbox"/> Chemical Protective Clothing	<input checked="" type="checkbox"/> Hard Hat	Other: <u>Water proof work gear during wet weather</u>
<input type="checkbox"/> Chemical Resistant Gloves	<input checked="" type="checkbox"/> Hard Toe Boots	<u>conditions</u>
<input type="checkbox"/> General Purpose Gloves	<input type="checkbox"/> Hearing Protection	_____
<input checked="" type="checkbox"/> Eye Protection	<input checked="" type="checkbox"/> Hi Visibility/Reflective Vest	_____
<input type="checkbox"/> Face Shield	<input type="checkbox"/> Respiratory Protection	_____
<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Rubber Boots	_____

Required Permits/Safe Work Plans

<input type="checkbox"/> Confined Space Entry	<input type="checkbox"/> Lift Plan/Crane Ops
<input type="checkbox"/> Excavation and Trenching	<input type="checkbox"/> Work in Proximity to Overhead Conductors
<input type="checkbox"/> General Safe Work Permit (SWP)	Other: _____
<input type="checkbox"/> Hot Work Permit	

Air Monitoring Equipment Needed

<input type="checkbox"/> Detection Tubes	<input type="checkbox"/> MiniRAE 3000	Other: _____
<input type="checkbox"/> Dust Monitor	<input type="checkbox"/> 4-Way Monitor	_____

Site Controls

- | | |
|---|---|
| <input type="checkbox"/> Barricades | <input type="checkbox"/> Exclusion Zone Delineation |
| <input type="checkbox"/> Caution Tape | <input type="checkbox"/> Heavy Equipment Spotter |
| <input type="checkbox"/> Designated Area For Vehicles | <input type="checkbox"/> Posted Signs |
| <input type="checkbox"/> Established Meet and Greet Process | <input type="checkbox"/> Other: _____ |

Hazardous Energy Control

- | | | |
|--|---|--------------|
| <input type="checkbox"/> Chemical | <input type="checkbox"/> LO/TO Checklist Complete | Other: _____ |
| <input type="checkbox"/> Electrical | <input type="checkbox"/> LO/TO Devise in place | _____ |
| <input type="checkbox"/> Energy Isolation Verified | <input type="checkbox"/> Mechanical | _____ |
| <input type="checkbox"/> Hydraulic | <input type="checkbox"/> Pneumatic | _____ |
| <input type="checkbox"/> Line of Fire | <input type="checkbox"/> Stored Energy | _____ |

Tools and Equipment

- | |
|---|
| <input type="checkbox"/> Pre-Use Inspection Complete |
| <input type="checkbox"/> Tool/Equipment Training Complete |
| <input type="checkbox"/> List Tools/Equipment in Use: _____ |

Required Training

- | | |
|---|--------------|
| <input checked="" type="checkbox"/> 40 Hour HAZWOPER | Other: _____ |
| <input checked="" type="checkbox"/> 8 Hour HAZWOPER Refresher | _____ |
| <input checked="" type="checkbox"/> Site Specific HASP | _____ |

Environmental Conditions

- | | |
|--------------|---------------------------------|
| Weather: | To Be Filled Out on Site |
| Temperature: | To Be Filled Out on Site |
| Terrain: | To Be Filled Out on Site |
| Other: | _____ |

Hazardous Substance Material Data Safety Sheet (MSDS) Review

- | |
|------------------------------|
| Review of MSDS |
| <input type="checkbox"/> YES |
| <input type="checkbox"/> NO |
| List MSDS Reviewed: _____ |

	Action	Potential Hazards of This Job	Recommended Action/Procedure
1	Tailgate safety meeting/planning of work	<ul style="list-style-type: none"> -Address Cold Weather Health Problems -Slips/Trips/Falls 	<ul style="list-style-type: none"> -Identify weather conditions -Review typical symptoms of hyperthermia -Discuss preventative measures -Incorporate Frequent Breaks in warm areas -Recommend for crew to bring additional clothing -Monitor crew throughout shift -Use caution when mounting equipment -Have ice melt available for use -Incorporate proper housekeeping

JSA Reviewed By: _____

Date: _____

Signatures: _____

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Project No./Location: 14-063 Two Rivers, WI

Date: June 30, 2014

JSA No.: 011

Job/Operation Title: Changing of Kelly Bar Sections on Mixing Rig

Analysis Developed By:

Analysis Reviewed By:

In case of an incident, the following people will be contacted:

Site Supervisor:

Phone No.:

Emergency:

Project Engineer:

Phone No.:

Fire:

Safety Officer:

Phone No.:

Police:

Examine each step carefully to find and identify hazards or potential dangers that could lead to injury, illness or damage.
Chemical Hazard:
Biological Hazard:
Physical Hazards:
Ergonomic Hazards:
 Inhalation

 Blood Borne Pathogens

 Electrical

 Repetition

 Skin Contact

 Mold

 Fire/Explosion

 Forceful Exertion

 Absorption

 Plant/Insect/Animal

 Noise

 Awkward Posture

 Injection

 Other

 Radiation

 Contact Stress

 Ingestion

 Heat Related Illness

 Vibration

 Other

 Cold Weather Problems

 Work Area Design

 Pinch Point/Line of Fire

 Other

 Slips/Trips/Falls

 Strike Against/Struck By

 Other

Personal Protective Equipment Required:
 Chemical Protective Clothing

 Hard Hat

Other:

 Chemical Resistant Gloves

 Hard Toe Boots

 General Purpose Gloves

 Hearing Protection

 Eye Protection

 Hi Visibility/Reflective Vest

 Face Shield

 Respiratory Protection

 Fall Protection

 Rubber Boots

Required Permits/Safe Work Plans
 Confined Space Entry

 Lift Plan/Crane Operations

 Excavation and Trenching

 Work in Proximity to Overhead Conductors

 General Safe Work Permit (SWP)

 Other:

 Hot Work Permit

Air Monitoring Equipment Needed
 Detection Tubes

 MiniRAE 3000

Other:

 Dust Monitor

 4-Way Monitor

Site Controls

- | | |
|--|--|
| <input type="checkbox"/> Barricades | <input type="checkbox"/> Exclusion Zone Delineation |
| <input type="checkbox"/> Caution Tape | <input checked="" type="checkbox"/> Heavy Equipment Spotter |
| <input checked="" type="checkbox"/> Designated Area For Vehicles | <input checked="" type="checkbox"/> Posted Signs |
| <input type="checkbox"/> Established Meet and Greet Process | <input checked="" type="checkbox"/> Other: <u>Spotters to keep people from entering area beneath suspended loads</u> |

Hazardous Energy Control

- | | | |
|--|---|--------------|
| <input type="checkbox"/> Chemical | <input type="checkbox"/> LO/TO Checklist Complete | Other: _____ |
| <input type="checkbox"/> Electrical | <input type="checkbox"/> LO/TO Devise in place | _____ |
| <input type="checkbox"/> Energy Isolation Verified | <input type="checkbox"/> Mechanical | _____ |
| <input type="checkbox"/> Hydraulic | <input type="checkbox"/> Pneumatic | _____ |
| <input type="checkbox"/> Line of Fire | <input type="checkbox"/> Stored Energy | _____ |

Tools and Equipment

- | | |
|--|--|
| <input checked="" type="checkbox"/> Pre-Use Inspection Complete | |
| <input checked="" type="checkbox"/> Tool/Equipment Training Complete | |
| <input checked="" type="checkbox"/> List Tools/Equipment in Use: | <u>Manual Lifting, Aerial Lifts, Forklift, Heavy Equipment-Pre Shift Inspection, Also inspect slings</u> |

Required Training

- | | |
|---|--------------|
| <input checked="" type="checkbox"/> 40 Hour HAZWOPER | Other: _____ |
| <input checked="" type="checkbox"/> 8 Hour HAZWOPER Refresher | _____ |
| <input checked="" type="checkbox"/> Site Specific HASP | _____ |

Environmental Conditions

- | | |
|--------------|---------------------------------|
| Weather: | To Be Filled Out on Site |
| Temperature: | To Be Filled Out on Site |
| Terrain: | To Be Filled Out on Site |
| Other: | _____ |

Hazardous Substance Material Data Safety Sheet (MSDS) Review

- | | |
|------------------------------|-------|
| Review of MSDS | |
| <input type="checkbox"/> YES | |
| <input type="checkbox"/> NO | |
| List MSDS Reviewed: | _____ |
| | _____ |

	Action	Potential Hazards of This Job	Recommended Action/Procedure
1	Tailgate safety meeting/planning of work	N/A	<ul style="list-style-type: none"> -Establish work area for off loading of equipment -Establish work area for changing of Kelly Bar -Utilize caution tape to demarcate zone -Establish communication procedures -Field test 2-way radios, if applicable
2	Inspection of slings lifting devices	<ul style="list-style-type: none"> -Slips/Trips/Falls -Pinch Points -Failing Sling, dropping load 	<ul style="list-style-type: none"> -Inspect lifting equipment (Slings, shackle, tag lines) -Ensure load rating tag still visible -Ensure lifting slings rated for weight of load
3	Securing Kelly Bar for Removal (Slings, shackles, tag lines)	<ul style="list-style-type: none"> -Unsecure load -Crane/Lifting equipment hazards -Pinch Points -Falling Objects -Contact with/Contact by 	<ul style="list-style-type: none"> -Ensure lifting equipment is rated for loads -Operator is to ensure rigging is applied properly -Use tag lines to control suspended loads -Utilize spotters to keep ground personnel away from swing and turn radius. -Tighten sling to prevent bouncing of load or excessive movement
4	Removing Kelly Bar from Rotary Head (Lifting and conveying sections) (Forklift, aerial lift)	<ul style="list-style-type: none"> -Lifting Equipment Hazards -Pinch Points -Working from elevated surfaces -Falling Loads -Suspended Loads 	<ul style="list-style-type: none"> -Establish stable base for aerial lift operations -Inspect hand and power tools prior to use -Identify pinch points -Qualified personnel to operate forklift and aerial lift -Inspect aerial lift prior to commencing work -Personal Fall arrest system is required anytime work is conducted from basket regardless of height
5	Positioning Replacement Section (Lifting and conveying sections) (Forklift, aerial lift)	<ul style="list-style-type: none"> -Lifting Equipment Hazards -Pinch Points -Working from elevated surfaces -Falling Loads -Suspended Loads 	<ul style="list-style-type: none"> -Ensure all personnel is clear of lift zone when positioning Kelly Bar sections -Keep hands off of sections. Use tag lines
6	Inspect/Test Replacement Section	<ul style="list-style-type: none"> -Falling Loads -Contact with/Contact by -Pinch Points 	<ul style="list-style-type: none"> -Ensure all personnel are clear of Mixing Rig during test run of replacement sections -look for signs of sections not properly installed

JSA Reviewed By: _____

Date: _____

Signatures: _____

Project No./Location: 14-063 Two Rivers, WI

Date: June 30, 2014

JSA No.: 012

Job/Operation Title: Tracking/Walking Mixing Rig

Analysis Developed By

Analysis Reviewed By

In case of an incident, the following people will be contacted:

Site Supervisor:

Phone No.

Emergency:

Project Engineer:

Phone No.

Fire:

Safety Officer:

Phone No.

Police:

Examine each step carefully to find and identify hazards or potential dangers that could lead to injury, illness or damage.

Chemical Hazard:

Biological Hazard:

Physical Hazards:

Ergonomic Hazards:

 Inhalation

 Blood Borne Pathogens

 Electrical

 Repetition

 Skin Contact

 Mold

 Fire/Explosion

 Forceful Exertion

 Absorption

 Plant/Insect/Animal

 Noise

 Awkward Posture

 Injection

 Other

 Radiation

 Contact Stress

 Ingestion

 Heat Related Illness

 Vibration

 Other

 Cold Weather Problems

 Work Area Design

 Pinch Point/Line of Fire

 Other

 Slips/Trips/Falls

 Strike Against/Struck By

 Other

Personal Protective Equipment Required:
 Chemical Protective Clothing

 Hard Hat

Other:

 Chemical Resistant Gloves

 Hard Toe Boots

 Cut Resistant/Leather Gloves

 Hearing Protection

 Eye Protection

 Hi Visibility/Reflective Vest

 Face Shield

 Respiratory Protection

 Fall Protection

 Rubber Boots

Required Permits/Safe Work Plans
 Confined Space Entry

 Lift Plan/Crane Operations

 Excavation and Trenching

 Work in Proximity to Overhead Conductors

 General Safe Work Permit (SWP)

 Other: Traffic Control Plan
 Hot Work Permit

Air Monitoring Equipment Needed
 Detection Tubes

 MiniRAE 3000

Other:

 Dust Monitor

 4-Way Monitor

Site Controls

<input type="checkbox"/> Barricades	<input type="checkbox"/> Exclusion Zone Delineation
<input type="checkbox"/> Caution Tape	<input checked="" type="checkbox"/> Heavy Equipment Spotter
<input checked="" type="checkbox"/> Designated Area For Vehicles	<input checked="" type="checkbox"/> Posted Signs
<input type="checkbox"/> Established Meet and Greet Process	Other: _____

Hazardous Energy Control

<input type="checkbox"/> Chemical	<input type="checkbox"/> LO/TO Checklist Complete	Other: _____
<input type="checkbox"/> Electrical	<input type="checkbox"/> LO/TO Devise in place	_____
<input type="checkbox"/> Energy Isolation Verified	<input type="checkbox"/> Mechanical	_____
<input type="checkbox"/> Hydraulic	<input type="checkbox"/> Pneumatic	_____
<input type="checkbox"/> Line of Fire	<input type="checkbox"/> Stored Energy	_____

Tools and Equipment

<input checked="" type="checkbox"/> Pre-Use Inspection Complete
<input checked="" type="checkbox"/> Tool/Equipment Training Complete
List Tools/Equipment in Use: _____

Required Training

<input checked="" type="checkbox"/> 40 Hour HAZWOPER	Other: _____
<input checked="" type="checkbox"/> 8 Hour HAZWOPER Refresher	_____
<input checked="" type="checkbox"/> Site Specific HASP	_____

Environmental Conditions

Weather:	To Be Filled Out on Site
Temperature:	To Be Filled Out on Site
Terrain:	To Be Filled Out on Site
Other:	_____

Hazardous Substance Material Data Safety Sheet (MSDS) Review

Review of MSDS
<input type="checkbox"/> YES
<input type="checkbox"/> NO
List MSDS Reviewed: _____

	Action	Potential Hazards of This Job	Recommended Action/Procedure
1	Tailgate safety meeting/planning of work	N/A	<ul style="list-style-type: none"> -Establish work area for tracking equipment -Communicate with other contractors onsite -Plan route to avoid obstructions/overhead utilities -Establish communication standards -Field test 2-way radios, if applicable
2	Tracking/Walking Mixing Rig	<ul style="list-style-type: none"> -Traffic Congestion -Contact with/Contact by -Overhead Utilities -Obstructions 	<ul style="list-style-type: none"> -Communicate with spotter prior to moving equipment -Escort Mixing Rig towards destination -Follow planned route -Remove vehicles/equipment from planned route

JSA Reviewed By: _____

Date: _____

Signatures: _____

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Project No./Location: 14-063 Two Rivers, WI

Date: June 30, 2014

JSA No.: 013

Job/Operation Title: QA/QC Sample Collection

Analysis Developed By

Analysis Reviewed By

In case of an incident, the following people will be contacted:

Site Supervisor:

Phone No.

Emergency:

Project Engineer:

Phone No.

Fire:

Safety Officer:

Phone No.

Police:

Examine each step carefully to find and identify hazards or potential dangers that could lead to injury, illness or damage.

Chemical Hazard:

Biological Hazard:

Physical Hazards:

Ergonomic Hazards:

 Inhalation

 Blood Borne Pathogens

 Electrical

 Repetition

 Skin Contact

 Mold

 Fire/Explosion

 Forceful Exertion

 Absorption

 Plant/Insect/Animal

 Noise

 Awkward Posture

 Injection

 Other

 Radiation

 Contact Stress

 Ingestion

 Heat Related Illness

 Vibration

 Other

 Cold Weather Problems

 Work Area Design

 Pinch Point/Line of Fire

 Other

 Slips/Trips/Falls

 Strike Against/Struck By

 Other

Personal Protective Equipment Required:
 Chemical Protective Clothing

 Hard Hat

Other:

 Chemical Resistant Gloves

 Hard Toe Boots

 Cut Resistant/Leather Gloves

 Hearing Protection

 Eye Protection

 Hi Visibility/Reflective Vest

 Face Shield

 Respiratory Protection

 Fall Protection

 Rubber Boots

Required Permits/Safe Work Plans
 Confined Space Entry

 Lift Plan/Crane Operations

 Excavation and Trenching

 Work in Proximity to Overhead Conductors

 General Safe Work Permit (SWP)

 Other:

 Hot Work Permit

Air Monitoring Equipment Needed
 Detection Tubes

 MiniRAE 3000

Other:

 Dust Monitor

 4-Way Monitor

Site Controls

<input type="checkbox"/> Barricades	<input checked="" type="checkbox"/> Exclusion Zone Delineation
<input type="checkbox"/> Caution Tape	<input type="checkbox"/> Heavy Equipment Spotter
<input type="checkbox"/> Designated Area For Vehicles	<input checked="" type="checkbox"/> Posted Signs
<input type="checkbox"/> Established Meet and Greet Process	Other: _____

Hazardous Energy Control

<input type="checkbox"/> Chemical	<input type="checkbox"/> LO/TO Checklist Complete	Other: _____
<input type="checkbox"/> Electrical	<input type="checkbox"/> LO/TO Devise in place	_____
<input type="checkbox"/> Energy Isolation Verified	<input type="checkbox"/> Mechanical	_____
<input type="checkbox"/> Hydraulic	<input type="checkbox"/> Pneumatic	_____
<input type="checkbox"/> Line of Fire		_____

Tools and Equipment

<input type="checkbox"/> Pre-Use Inspection Complete
<input type="checkbox"/> Tool/Equipment Training Complete
<input type="checkbox"/> List Tools/Equipment in Use: _____

Required Training

<input checked="" type="checkbox"/> 40 Hour HAZWOPER	Other: _____
<input checked="" type="checkbox"/> 8 Hour HAZWOPER Refresher	_____
<input checked="" type="checkbox"/> Site Specific HASP	_____

Environmental Conditions

Weather:	To Be Filled Out on Site
Temperature:	To Be Filled Out on Site
Terrain:	To Be Filled Out on Site
Other:	_____

Hazardous Substance Material Data Safety Sheet (MSDS) Review

Review of MSDS
<input type="checkbox"/> YES
<input type="checkbox"/> NO
List MSDS Reviewed: _____

	Action	Potential Hazards of This Job	Recommended Action/Procedure
1	Approaching Mixing Area	<ul style="list-style-type: none"> -Swing Radius of Mixing Rig -Movement of Auger -Pinch Points -Contact with/Contact by -Line of Fire 	<ul style="list-style-type: none"> -Notify operator prior to approaching machine -Do not approach machine until receiving permission from operator -Keep clear of mixing auger while operator raises auger out of mixing column -Wear proper PPE
2	Collection of Sample	<ul style="list-style-type: none"> -Heavy Equipment -Soft surfaces -Pinch Points -Contact with/Contact by -Line of Fire -Operator Blind Spots 	<ul style="list-style-type: none"> -Do not approach unit until all moving components have come to a complete stop -Do not step onto newly mixed column as the surface may be extremely soft. If necessary, ask the operator to rotate the mast to an area to avoid stepping onto soft surface. -Operator will resume mixing only when given permission by the person collecting QA/QC samples. -Once completely clear of the swing radius of mixing rig give operator permission via radio or hand signal -Wear proper PPE

JSA Reviewed By: _____

Date: _____

Signatures: _____

Project No./Location: 14-063 Two Rivers, WI

Date: June 30, 2014

JSA No.: 014

Job/Operation Title: Decontamination of Heavy Equipment

Analysis Developed By

Analysis Reviewed By

In case of an incident, the following people will be contacted:

Site Supervisor:

Phone No.

Emergency:

Project Engineer:

Phone No.

Fire:

Safety Officer:

Phone No.

Police:

Examine each step carefully to find and identify hazards or potential dangers that could lead to injury, illness or damage.
Chemical Hazard:
Biological Hazard:
Physical Hazards:
Ergonomic Hazards:
 Inhalation

 Blood Borne Pathogens

 Electrical

 Repetition

 Skin Contact

 Mold

 Fire/Explosion

 Forceful Exertion

 Absorption

 Plant/Insect/Animal

 Noise

 Awkward Posture

 Injection

 Other

 Radiation

 Contact Stress

 Ingestion

 Heat Related Illness

 Vibration

 Other

 Cold Weather Problems

 Work Area Design

 Pinch Point/Line of Fire

 Other

 Slips/Trips/Falls

 Strike Against/Struck By

 Other

Personal Protective Equipment Required:
 Chemical Protective Clothing

 Hard Hat

Other:

 Chemical Resistant Gloves

 Hard Toe Boots

 Cut Resistant/Leather Gloves

 Hearing Protection

 Eye Protection

 Hi Visibility/Reflective Vest

 Face Shield

 Respiratory Protection

 Fall Protection

 Rubber Boots

Required Permits/Safe Work Plans
 Confined Space Entry

 Lift Plan/Crane Operations

 Excavation and Trenching

 Work in Proximity to Overhead Conductors

 General Safe Work Permit (SWP)

 Other: Traffic Control Plan
 Hot Work Permit

Air Monitoring Equipment Needed
 Detection Tubes

 MiniRAE 3000

Other:

 Dust Monitor

 4-Way Monitor

Site Controls

- | | |
|---|---|
| <input type="checkbox"/> Barricades | <input type="checkbox"/> Exclusion Zone Delineation |
| <input type="checkbox"/> Caution Tape | <input type="checkbox"/> Heavy Equipment Spotter |
| <input type="checkbox"/> Designated Area For Vehicles | <input type="checkbox"/> Posted Signs |
| <input type="checkbox"/> Established Meet and Greet Process | <input type="checkbox"/> Other: _____ |

Hazardous Energy Control

- | | | |
|--|---|--------------|
| <input type="checkbox"/> Chemical | <input type="checkbox"/> LO/TO Checklist Complete | Other: _____ |
| <input type="checkbox"/> Electrical | <input type="checkbox"/> LO/TO Devise in place | _____ |
| <input type="checkbox"/> Energy Isolation Verified | <input type="checkbox"/> Mechanical | _____ |
| <input type="checkbox"/> Hydraulic | <input type="checkbox"/> Pneumatic | _____ |
| <input type="checkbox"/> Line of Fire | | _____ |

Tools and Equipment

- | | |
|--|---|
| <input checked="" type="checkbox"/> Pre-Use Inspection Complete | |
| <input checked="" type="checkbox"/> Tool/Equipment Training Complete | |
| <input checked="" type="checkbox"/> List Tools/Equipment in Use: | <u>High Pressure Power Washer, Forklift if necessary to move power washer</u> |

Required Training

- | | |
|---|--------------|
| <input checked="" type="checkbox"/> 40 Hour HAZWOPER | Other: _____ |
| <input checked="" type="checkbox"/> 8 Hour HAZWOPER Refresher | _____ |
| <input checked="" type="checkbox"/> Site Specific HASP | _____ |

Environmental Conditions

- Weather: _____
- Temperature: _____
- Terrain: _____
- Other: _____

Hazardous Substance Material Data Safety Sheet (MSDS) Review

- Review of MSDS
- YES
- NO
- List MSDS Reviewed: _____
- _____

	Action	Potential Hazards of This Job	Recommended Action/Procedure
1	Moving Pressure Washer to Locatio	-Uneven Loading	-Operator's responsibility to ensure load is properly secured onto the forks and carriage
2	Positioning Heavy Equipment	-Heavy Equipment -Traffic Congestion	-Keep open contact with equipment operator while positioning equipment for decontamination -Make sure vehicle is turned off before beginning decontamination of equipment
3	Operating Pressure Washing Unit	-Airborne flying objects and splash hazards -Skin Contact -Slips/Falls	-Wear Tyvek protective clothing, nitrile gloves, and face shield while pressure washing equipment -Walking/working area will become wet/slippery Used proper footwear, ensure proper footing

JSA Reviewed By: _____

Date: _____

Signatures: _____

Project No./Location: 14-063 Two Rivers, WI

Date: June 30, 2014

JSA No.: 015

Job/Operation Title: In-Situ Soil Stabilization and Solidification (ISSS)

Analysis Developed By

Analysis Reviewed By

In case of an incident, the following people will be contacted:

Site Supervisor:

Phone No.

Emergency:

Project Engineer:

Phone No.

Fire:

Safety Officer:

Phone No.

Police:

Examine each step carefully to find and identify hazards or potential dangers that could lead to injury, illness or damage.
Chemical Hazard:

- Inhalation
- Skin Contact
- Absorption
- Injection
- Ingestion
- Other

Biological Hazard:

- Blood Borne Pathogens
- Mold
- Plant/Insect/Animal
- Other

Physical Hazards:

- Electrical
- Fire/Explosion
- Noise
- Radiation
- Heat Related Illness
- Cold Weather Problems
- Pinch Point/Line of Fire
- Slips/Trips/Falls
- Strike Against/Struck By
- Other

Ergonomic Hazards:

- Repetition
- Forceful Exertion
- Awkward Posture
- Contact Stress
- Vibration
- Work Area Design
- Other

Personal Protective Equipment Required:

- Chemical Protective Clothing
- Chemical Resistant Gloves
- Cut Resistant/Leather Gloves
- Eye Protection
- Face Shield
- Fall Protection

- Hard Hat
- Hard Toe Boots
- Hearing Protection
- Hi Visibility/Reflective Vest
- Respiratory Protection
- Rubber Boots

Other:

Required Permits/Safe Work Plans

- Confined Space Entry
- Excavation and Trenching
- General Safe Work Permit (SWP)
- Hot Work Permit

- Lift Plan/Crane Operations
- Work in Proximity to Overhead Conductors
- Other: _____

Air Monitoring Equipment Needed

- Detection Tubes
- Dust Monitor

- MiniRAE 3000
- 4-Way Monitor

Other:

Site Controls

- | | |
|---|--|
| <input type="checkbox"/> Barricades | <input checked="" type="checkbox"/> Exclusion Zone Delineation |
| <input type="checkbox"/> Caution Tape | <input checked="" type="checkbox"/> Heavy Equipment Spotter |
| <input type="checkbox"/> Designated Area For Vehicles | <input checked="" type="checkbox"/> Posted Signs |
| <input type="checkbox"/> Established Meet and Greet Process | Other: _____ |

Hazardous Energy Control

- | | | |
|--|---|--------------|
| <input type="checkbox"/> Chemical | <input type="checkbox"/> LO/TO Checklist Complete | Other: _____ |
| <input type="checkbox"/> Electrical | <input type="checkbox"/> LO/TO Devise in place | _____ |
| <input type="checkbox"/> Energy Isolation Verified | <input type="checkbox"/> Mechanical | _____ |
| <input type="checkbox"/> Hydraulic | <input type="checkbox"/> Pneumatic | _____ |
| <input type="checkbox"/> Line of Fire | | _____ |

Tools and Equipment

- | | |
|--|---|
| <input checked="" type="checkbox"/> Pre-Use Inspection Complete | |
| <input checked="" type="checkbox"/> Tool/Equipment Training Complete | |
| <input checked="" type="checkbox"/> List Tools/Equipment in Use: | <u>ISSS Mixing Rig, Support Excavator-Ensure Pre Work Inspection conducted and documented</u> |

Required Training

- | | |
|---|--------------|
| <input checked="" type="checkbox"/> 40 Hour HAZWOPER | Other: _____ |
| <input checked="" type="checkbox"/> 8 Hour HAZWOPER Refresher | _____ |
| <input checked="" type="checkbox"/> Site Specific HASP | _____ |

Environmental Conditions

- Weather: _____
- Temperature: _____
- Terrain: _____
- Other: _____

Hazardous Substance Material Data Safety Sheet (MSDS) Review

- Review of MSDS
- YES
- NO
- List MSDS Reviewed: _____
- _____

	Action	Potential Hazards of This Job	Recommended Action/Procedure
1	Layout of ISS Columns	-Contact with/Contact by -Skin contact -Pinch Points -Slips/Trips/Falls -Line of Fire	-Don appropriate PPE prior to entering into the exclusion zone -Do not wear loose clothing, jewelry or hair that could get caught in moving rig components -Communicate with mixing rig operator that you will be in the area marking the mixing column -Notify operator when clear of area -Avoid walking on unstable/uneven surfaces
2	Setting Up Over Column Center Poi	-Contact with/Contact by -Pinch Points -Line of Fire	-Maintain good communication with operator while setting up over next column -Stay out of swinging radius of equipment -Refer to Tracking of Mixing Rig JSA
3	Commencing ISS Mixing	-Contact with/Contact by -Pinch Points -Line of Fire	-Responsibility of the operator to ensure that all personnel are clear of swing radius before mixing
4	Air Monitoring	Exposure to: -Dust/Particulates, Odors, Reactive Chemicals -Atmospheric Hazards	-Air monitoring will be done according to Site Specific HASP -Ensure Breathing Zone of operator is monitored according to plan based on HASP
5	Leaving the work area	-Tracking of contaminants outside exclusion zone -Slips/Trips/Falls	-Practice proper decontamination procedures in the contaminant reduction zone prior to entering into the support zone (or clean area)

JSA Reviewed By: _____

Date: _____

Signatures: _____



APPENDIX C

Substance Abuse Program

Drug, Alcohol, and Banned Substances Policy Statement

Geo-Solutions has a fundamental interest in maintaining safe, healthful and efficient working conditions for its employees. Being under the influence of alcohol or drugs on the job poses serious safety and health risks, not only to the user, but to all those who work with or come in contact with the user, (i.e. fellow employees, customers, and the general public). The manufacture, distribution, dispensation, possession, use or sale of an illegal drug or alcohol in the workplace, or during the work day, also poses unacceptable risks for safe, healthful and efficient operations.

Accordingly, it is the right and intent of Geo-Solutions to maintain a working environment that is free of substance abuse. For this reason, Geo-Solutions has established screening procedures designed to prevent the hiring and employment of individuals who use illegal drugs, or whose legal use of alcohol (or other drugs) indicates a potential for impaired, unsafe job performance.

As part of Geo-Solutions' *Drug, Alcohol, and Banned Substance Policy*, you are subject to drug screening during pre-employment screening, pre-access (client required) testing, random testing, reasonable cause testing, post-accident testing, and return to duty testing.

I have read the Geo-Solutions, Inc. *Drug, Alcohol, and Banned Substance Policy* and understand that as a condition of employment here, I am required to adhere to the above policy.

Print Name

Date

Signature



Effective Date January 1, 2013

I. POLICY STATEMENT

GEO-SOLUTIONS, INC. (GSI) prohibits the misuse of legitimate drugs, or the use, possession, distribution, or sale of illicit or unprescribed controlled drugs or paraphernalia on any company premises or work sites. Company vehicles, vehicles leased or rented by GSI, as well as private vehicles parked on client premises or work sites are included within this prohibition. GSI strictly prohibits any employee, visitor or subcontractor from being on company premises, client premises, or work sites while in possession or under the apparent influence of alcohol, or any detectable amount of prohibited drugs, or controlled substances.

Anyone taking a medication, whether available by prescription or over-the-counter, which could have the potential side effect of affecting or impairing judgment, coordination, or other senses, or which may adversely affect the ability to perform work in a safe and productive manner, must notify their immediate supervisor or other management official prior to starting work.

It is the policy of GSI to maintain all drug testing results/notifications and other actions taken as a result of positive drug/alcohol results as confidential. Only employees who have a need to know will be informed of an employee's status per this policy.

II. IMPLEMENTATION

To assure compliance with the policy, the following steps are implemented:

A. Drug and Alcohol Testing

Five types of tests may be administered. A description of each is described below.

1.0 Pre-Access drug testing is conducted upon hire for all GSI employees and on a pre-project basis for all GSI employees as required by specific client sites. All employees working on, or having regular access to sites with client-specific testing requirements will be notified of these requirements.

2.0 Random drug and alcohol testing is conducted on an ongoing basis of all GSI employees who are part of the random pool. The employees who make up the pool are those who participate in the GSI Medical Surveillance Program as well as those employees who work on sites with site-specific testing requirements.

The employees to be tested will be selected by WorkCare using a computer generated random number software program. At least 25% of the pool will be tested annually. Because each random sampling selects from the total pool, it is conceivable that an employee could be tested more than once per year. Once the employee selection is made, WorkCare will provide the GSI Corporate Safety Manager with the names of the employees selected. The GSI Corporate Safety Manager Representative will be responsible for the notification of each individual selected. Once notification is made, the employee must report for testing as directed within that workday.

- 3.0 Reasonable suspicion test for drugs and alcohol** may be required anytime facts or circumstances exist giving rise to a reasonable suspicion that an employee is in violation of this policy. In the event that a manager or supervisor has reasonable suspicion, the Intervention Procedure found in Section II. F will be followed. If after the intervention, the manager or supervisor believes that a reasonable suspicion test is necessary, that manager or supervisor should immediately contact the Corporate Safety Manager to obtain direction and instruction. Under no circumstances should an employee be tested without direct instruction from one of these members of management. However, the manager or site/work supervisor may immediately remove any employee obviously impaired by any cause from the work activity as necessary to provide a safe work environment for the employee and others as well as make necessary arrangements to transport the individual safely home.
- 4.0 Post-incident tests for drugs and alcohol** may be required after any work-related accident or near miss, regardless of injury to person or damage to property. In the event of an incident where the manager or supervisor believes that a post-incident test is necessary, that manager or supervisor should immediately contact the Corporate Safety Manager to obtain direction and instruction. Under no circumstances should an employee be tested without direct instruction from a member of management.
- 5.0 Return to duty tests for drug and alcohol** is required of any employee who has previously failed a drug and/or alcohol test. The employee may not return to safety-sensitive work or work at a client site until he/she has passed the drug and/or alcohol test.

B. Drug Testing Procedures

Urine specimens are collected by a WorkCare approved facility and transferred to an approved Substance Abuse Mental Health Services Administration (SAMHSA) certified laboratory using appropriate chain-of-custody procedures. All specimens are given an initial screening at the laboratory. This initial screen utilizes immunoassay to eliminate true negative specimens from further consideration. For the specimens identified as positive on the initial test, a confirmatory test will be conducted by gas chromatography/mass spectrometry (GC/MS) techniques.

The initial immunoassay testing and the confirmatory testing is considered negative if the specimen does not exceed the following threshold concentrations of drugs or metabolites:

Substance	Threshold Levels (ng/ml)	
	Test Level	Confirmatory Level
Amphetamines	1000	500
Barbiturates	300	100
Benzodiazepines	300	100
Benzoylcegonine (Cocaine)	300	150
Marijuana (THC)	50	15
Methadone	300	100
Opiates	2000	2000
Phencyclidine (PCP)	25	10
Propoxyphene	300	300
Alcohol	20 (.02% BAL)	20 (.02% BAL)

C. Alcohol Testing Procedures

Breath alcohol testing will be conducted at local clinics coordinated through WorkCare. The tests will be administered by a trained Breath Alcohol Technician (BAT) using an Evidential Breath Testing (EBT) device. The device is approved by the National Highway Traffic Safety Administration. During test administration, an individually sealed mouthpiece is attached to the EBT and the employee is asked to blow forcefully into the mouthpiece for at least 6 seconds. A negative result will be less than 0.02 percent blood alcohol level. Subject to a confirmation test, results of 0.02 percent or greater are considered positive. The BAT will

transmit the results to the WorkCare Medical Review Officer (MRO) in a confidential manner. If a clinic or hospital is not readily available to perform a breath alcohol test, a blood alcohol test will be collected with laboratory results transmitted to the WorkCare MRO.

D. Employee/Management Notification of Results

Drug testing results are reported directly from the laboratory to the GSI MRO at WorkCare. The following procedures are used for positive and negative results.

Positive Drug and Alcohol Test Results: If positive drug or alcohol results are obtained, the SAMHSA-certified laboratory will immediately contact the WorkCare MRO who will then contact the GSI Corporate Safety Manager. The MRO will determine if the positive results were obtained as the result of legitimate or illegitimate use of drugs or medications. If the use is determined to be illegitimate by the MRO, WorkCare will then coordinate with GSI management on a need to know basis in compliance with GSI policy.

Any employee confirmed positive, upon his/her written request, shall have the right to access records relating to his/her drug tests and any records relating to the results of any relevant certification, review, or suspension/revocation by certification proceedings.

Negative Drug and Alcohol Test Results: When negative drug and alcohol results are obtained, confirmation of these results will be forwarded to the Corporate Safety Manager for appropriate filing, typically within a seven day period. Employees are not notified of the negative results.

E. Searches and Inspections

GSI reserves the right to conduct unannounced searches or inspections of employees, their personal effects, lockers, lunch boxes, baggage, and vehicles located on GSI premises or client work sites for violations of this policy. Entry onto GSI's premises, client premises, or work sites constitutes consent to search and/or inspections. Any search and inspection will require that the employee and a witness be present. Refusal to consent to a reasonable search may result in disciplinary action, up to and including termination of employment.

Just as GSI reserves the right to conduct a search or inspection of employees for illegal drugs or alcohol while on GSI premises or work sites, GSI recognizes the same right of its clients to conduct searches or inspections of GSI personnel and their personal or company property while on their premises. A witness should be present during a search under these circumstances. The aforementioned searches or inspections may be unannounced.

A search or inspection of an individual employee or the employee's clothing will be conducted by a person of the same sex as the employee being searched. Illegal substance, drugs, stolen property, contraband, and unauthorized items discovered through these searches and inspections, or eyewitness accounts, may result in notification of the proper law enforcement authorities in this regard. Also, any further action as determined by this search will also be taken.

F. Intervention Procedure

An employee suspected of impairment by drugs or alcohol will be taken to a quiet, private area such as an office. Another supervisor or manager will be involved in this process. Once there, the employee should be made aware of the specific, observable behaviors that are believed to be a sign of impairment. Employees should not be accused of being under the influence of alcohol or drugs and the employee must be given an opportunity to explain the basis of the behavior. If a decision is made to test the employee for drugs and/or alcohol, two people, one of the same sex as the employee, will accompany the employee to the WorkCare identified clinic. In addition, precautions will be taken to see that the employee safely reaches home by arranging transportation. No impaired employee should be allowed to drive.

III. PROCEDURAL ISSUES

A. Refusal to Consent to Alcohol or Drug Testing

GSI employees are required, when directed, to test under the policy. Refusal to test will result in termination of employment.

B. Policy Violation

In the case of a violation of this policy, corrective action may include drug and/or alcohol testing, formal referral to a Substance Abuse Assistance Program, and/or disciplinary action up to and including termination of employment. A MRO verified first-time positive test will result in a mandatory supervisory referral to a Substance Abuse Assistance Program. No employee may return to work until verification of enrollment to a Substance Abuse Assistance Treatment program has occurred. Employee refusal to participate in the Substance Abuse Assistance recommended treatment program will be considered a resignation of employment.

Any second verified positive drug or alcohol test will result in termination.

C. Drug Related Convictions

Employees who are convicted, or who plead guilty or "nolo contendere" to alcohol or drug-related violations of state and federal law occurring in the work place must inform the firm within five days of such conviction or plea. Failure to do so will result in disciplinary action, up to and including termination of employment.

Employees convicted, or who plead guilty or "nolo contendere" to such alcohol or drug-related charges may be terminated, or required to successfully complete a substance abuse assistance program or similar program as a condition of continued employment.

IV. BENEFITS AVAILABLE TO EMPLOYEES

A. Employee Assistance Program

Employees and their dependents that may have a substance abuse dependency problem may obtain assistance from the GSI. Employees are strongly encouraged to obtain counseling. GSI will assist employees on obtaining counseling. This counseling is made available on a confidential basis in accordance with this policy. However, the law allows limited program compliance information following a verified positive test be made company representatives on a need-to-know basis. Medical insurance coverage for substance abuse treatment and counseling may also be available.

B At-Will Status

This policy in no way modifies the at-will status of the company's employees and in no way implies, infers, or guarantees continued employment for any definite term.