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Our ref: 11215131-Poulos-25

October 25, 2022

Ms. Lauren Poulos
Remedial Project Manager
United States Environmental Protection Agency (EPA), Superfund Division (6SF-RA)
1201 Elm Street, Suite 500
Dallas, Texas 75270 2102

Southern Impoundment Supporting Deliverables
San Jacinto River Waste Pits Site
Harris County, Texas
EPA Region 6, CERCLA Docket No. 06-05-21 for Remedial Action

Dear Ms. Poulos:

GHD Services Inc. (GHD), on behalf of International Paper Company (Respondent), submits to the United States Environmental Protection Agency (EPA) this Health and Safety Plan (HASP). This HASP is being submitted with the requirement that it be updated and resubmitted, following selection of the Remedial Contractor (RC) for the Southern Impoundment Remedial Action (RA), in order to incorporate the RC's input into the HASP.

Should you have any questions or require additional information regarding this submittal, please contact GHD at (713) 734-3090.

Regards,

Charles Munce
MidCon Region Market Leader

+1 832 380-7655
charles.munce@ghd.com

CM/kdn/25

Encl: Attachment 1 - Health and Safety Plan

Copy to: Robert Appelt, EPA
Katie Delbecq, Texas Commission on Environmental Quality (TCEQ)
Brent Sasser, IPC

100028296

The Power of Commitment

Attachments

Attachment 1

Health and Safety Plan

Site-Specific Health and Safety Plan

SJRWP Southern Impoundment Remediation

International Paper

October 14 2022
11215131|---|--
Approval Date: 10-14-2022

HEALTH AND SAFETY PLAN

Signature page

This HASP was electronically signed by the Project Manager and Safety Group within the HASP Builder Software. Fully approved HASP is printed without a DRAFT watermark.

Project Name: SJRWP South Impoundment Remediation

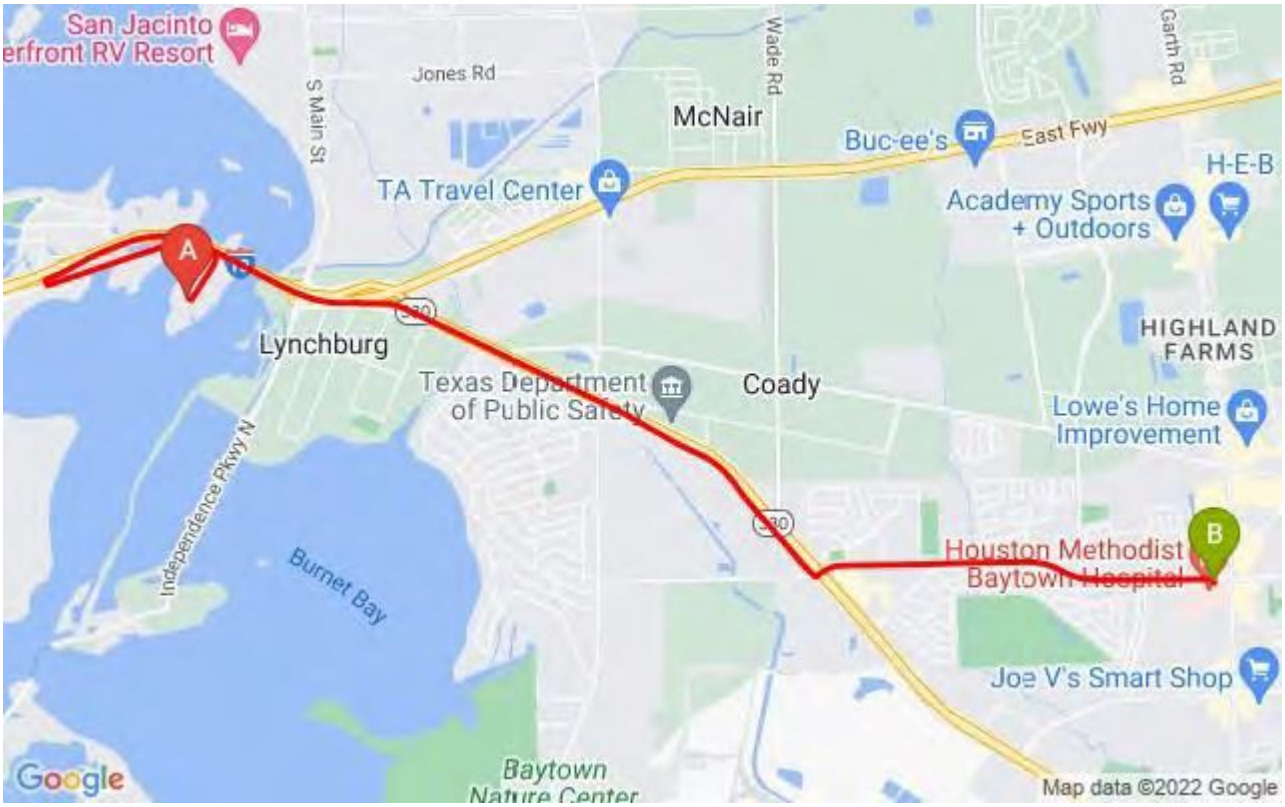
Project Manager Approval Date: Nathaniel (wells) Richard, 10-14-2022 Safety Group Approval Date: Vicky Pickard, 10-14-2022

Project Number: 11215131

Emergency Information

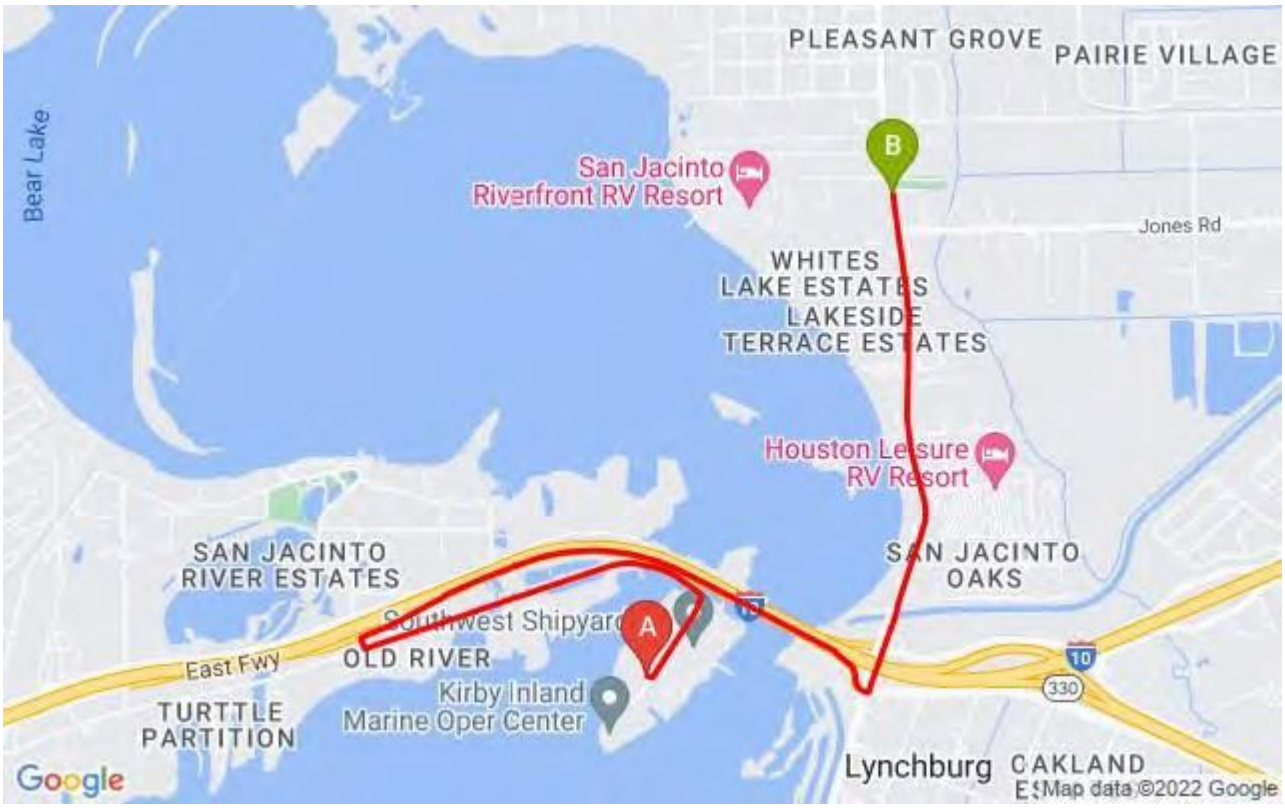
Contact	Phone Number	
Local Police	911 713-637-0014	**Hospital Directions** Directions: 1. Head **east** toward **Market St** Restricted usage road 2. Turn **left** onto **Market St** 3. Turn **right** onto **Monmouth St** 4. Turn **right** to merge onto **1-10 E** 5. Keep **right** at the fork to continue on **TX-330 Spur S,** follow signs for **Baytown** 6. Take the exit toward **Wade Rd/Baker Rd** 7. Merge onto **Decker Dr** 8. Keep **right** to stay on **Decker Dr** 9. Turn **left** onto **W Baker Rd** Pass by Dairy Queen (on the right) 10. Turn **right** Destination will be on the right Driving Time: 13 mins Driving Distance: 7.9 mi
Fire Department	911 281-452-5782	
Ambulance	911	
Local Hospital Houston Methodist Baytown Hospital 4401 Garth Road Baytown, Texas United States 77521	281-420-8600	
National Poison Center	800-222-1222	GHD - HSE Help Line Please call **(866) 529-4886** and provide: • Name and location of caller • Description of incident • Name of injured person(s) • Description of injuries • Phone number for return call
Project Manager Nathaniel (wells) Richard	Work: 225-296-6508 Cell: 225-454-4363	
Jason Davis	Cell: 432-413-5156	
GHD Regional S&H Manager Vicky Pickard	Work: 832-485-5215 Cell: 832-693-1177	
Client Contact **Brent Sasser**	**901-413-6890**	
Client Site Contact		
Other Contact National Response Center Texas Emergency Response System EPA Environmental Response Team United States Coast Guard GHD Incident Reporting Hotline	 Work: 800-424-8802 Cell: Work: 512-424-2138 Cell: Work: 201-321-6600 Cell: Work: 713-578-3000 Cell: Work: 866-529-4886 Cell:	
Site Health Officer Christopher Mattair	Phone: 720-470-1513	
Person to verify hospital route:	Signature:	

Hospital Driving Directions



1. Head east toward Market St
   Restricted usage road
2. Turn left onto Market St
3. Turn right onto Monmouth St
4. Turn right to merge onto I-10 E
5. Keep right at the fork to continue on TX-330 Spur S, follow signs for Baytown
6. Take the exit toward Wade Rd/Baker Rd
7. Merge onto Decker Dr
8. Keep right to stay on Decker Dr
9. Turn left onto W Baker Rd
   Pass by Dairy Queen (on the right)
10. Turn right
    Destination will be on the right

Medical Clinic Driving Directions



1. Head east toward Market St
   Restricted usage road
2. Turn left onto Market St
3. Turn right onto Monmouth St
4. Turn right to merge onto 1-10 E
5. Take exit 787 for Crosby - Lynchburg Rd
6. Turn left onto Crosby Lynchburg Rd/S Main St
7. Continue straight onto S Main St
   Destination will be on the left

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Clearing-Skid Steer Operation
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1. Introduction

1.1 GHD Values and Integrity Management Policy

At GHD, we commit to safe, ethical and respectful business behavior in regard to both the internal conduct of our business and our engagement with external stakeholders and the public. The core values of Safety, Teamwork, Respect and Integrity will guide all of our activities. We will only seek work and participate in business transactions under high standards of corporate ethics and with complete integrity. Our projects will be undertaken in a manner that places safety as the top priority, with each of our employees empowered with Stop Work Authority throughout the execution of project work. GHD expects that all of its projects will be undertaken in an environment of teamwork and mutual respect, free from discrimination, harassment, bullying or other inappropriate behavior. We foster an open environment in which our people can report any improper practices or behavior without fear of reprisal. All reported incidents will be investigated promptly with appropriate and equitable follow-up. GHD's integrity management policy and guidelines are available at http://www.ghdcanada.com/global/about-us/integrity- management.

1.2 Purpose

The purpose of this site specific health and safety plan (HASP) is to provide guidelines and establish procedures for reducing and controlling hazard exposure to the public, property, and personnel. The HASP is a living document and must continually evolve as site conditions and knowledge of the site activities develop.

This document has been developed to meet or exceed the requirements set forth by federal, state, and provincial legislation. If any procedure outlined in this plan conflicts with federal, state/provincial, and/or municipal law, prescribed standards, or client requirements, then the most stringent set of standards applies.

1.3 Stop Work Authority

All employees are empowered and expected to stop the work of coworkers, subcontractors, client employees, or other contractors if any person's safety or the environment are at risk. No repercussions will result from this action. Reporting of unsafe acts/condition (UA or UC) or Stop Work Authority (SWA) is completed with BWise and/or the GHD HSE app. Unsafe acts, conditions, stop work authority are now reported via the GHD HSE app.

The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated results in the removal of site personnel from that area and re-evaluation of the hazard and the levels of protection.

1.4 Short Service Employee

The Employee is considered a Short Service Employee (SSE) if he/she has less than 6 months experience with his/her present employee, or in his/her present role. The individual is required to wear a fluorescent orange hardhat, as an obvious indicator of SSE status. Training and mentoring allows them to gain knowledge and experience in procedures and methods. In order for a new employee to work in the field, the following minimum training requirements must be met:

1. GHD New Employee Safety & Health Orientation training (on-line).
2. GHD HAZCOM (US)/WHIMIS (Canada)(on-line).
3. On-boarding completed with Human Resources.
4. Compliance training defined on the QSF-20 as it applies to field work to be conducted.
5. Client specific safety training.

A SSE's primary mentor is their direct Supervisor. GHD Supervisors are responsible for ensuring that a SSE completes the safety, field method, and quality training as appropriate to the work they are assigned. A SSE requires an On-site Mentor for all fieldwork. The On-site Mentor must have experience in the work they are mentoring and they are responsible for the close monitoring of the SSE.

Project team SSE make-up requirements are:

- A one-person project team cannot be a SSE.
- A two-person to four-person project team can have only one SSE.
- A five-person or more project team cannot have more than 20 percent SSE without a written variance from the GHD Corporate Manager of Safety & Health.

New hire employees that can provide sufficient documentation supporting previous experience in working under HSE program(s) similar to GHD's may be exempt from GHD's SSE program These exemptions are handled on a case-by-case basis and must be authorized by one of the following staff: the Corporate Manager of Safety & Health or a Senior Regional Safety & Health Manager.

Details of the exemptions are covered in the full SSE Policy.

Clients may define specific SSE requirements for work at their facility or on their project. It is the responsibility of the Project Manager to communicate a client's specific requirements to the appropriate staff within GHD and project subcontractors. Client-specific SSE standards shall be posted on the Safety & Health Portal SSE Folder.

1.5 Project Management And Safety Organization

Project Manager - GHD - Nathaniel (wells) Richard

The GHD Project Manager (PM) is responsible for the overall implementation, review, and approval of the HASP, and for ensuring that all safety and health (S&H) responsibilities are carried out. The PM will also ensure that appropriate resources are provided to support the project.

Site Supervisor - GHD - Jason Davis

The Site Supervisor (SS) is responsible for:

- Ensuring that the HASP is reviewed, approved, and implemented.
- Communicating site requirements to site project personnel and subcontractors through site orientation.
- Consulting with the client/site representative regarding appropriate changes to the HASP. Conducting a daily tailgate safety meeting that communicates the site specific hazards. This meeting must be documented on the Tailgate Safety Meeting form in the appendix.
- Ensuring that all necessary clean-up and maintenance of safety equipment is conducted by project personnel.
- Verifying emergency phone numbers and services, including hospital and clinic locations.
- Completing, filing, and correctly submitting the forms attached to the HASP, including daily tailgate meetings, job safety analysis, and daily inspection checklists.
- Implementing risk-based safety procedures on all activities and enforcing safe work practices for project employees
- Observing ill effects on any crew member, especially those symptoms caused by cold/heat stress or chemical exposure.
- Overseeing the safety of visitors who enter the site.
- Maintaining communication with the client site representative(s) and/or government inspectors/agencies.
- Providing and enforcing the use of safety equipment, personal protective equipment (PPE), and other items necessary for employee or community safety.

- Conducting job site inspections as a part of quality assurance for safety and health.
- Ordering the immediate shutdown of site activities in case of a medical emergency, unsafe condition, or unsafe practice.
- Reporting safety and health concerns to site and/or project management as necessary.

Regional HSE Manager GHD - Vicky Pickard

The Regional HSE Manager is a full time GHD employee who is trained as a safety and health professional and serves in a consulting role to the PM and SS regarding potential safety and health issues. The HSE Manager or trained designee must review, coordinate required changes with PM and provide the final approval of the HASP prior to work beginning on site.

Site personnel

All employees have a role in GHD's HSE program and a responsibility to implement the program. GHD personnel are responsible for:

- Engaging in all aspects of their tasks and jobs when they are prepared to do the job safely, well rested, and mentally prepared for work.
- Utilizing the STAR process before initiating work.
- Implementing Stop Work Authority for any operations that may cause injury, illness, or unsafe conditions to employees, subcontractors, or others.
- Assisting in the development and revision of Job Safety Analysis (JSA) forms that are appropriate to their current scope of work.
- Use, inspect and maintain PPE as required by JSA and site conditions.
- Preparing, submitting, and reviewing safety observations using the GHD HSE app or appropriate forms
- Inspecting tools and other equipment before each use or as manufacturer dictates and documenting any defects.
- Correcting job site hazards when possible without endangering life or health.
- Reporting safety and health concerns to the SS, PM, HSE Manager, or SHO (if appointed).

Subcontractors

Subcontractors are responsible for:

- Developing and implementing their own HASP and complying with its contents.
- Attending an initial site orientation and subsequent safety meetings.
- Ensuring that their employees adhere to all site personnel requirements.
- Submitting required documentation to the SS regarding federal, state, or provincial requirements before beginning any work.
- Obtaining approval for the use of GHD's equipment.
- Observing and obeying all GHD/client requirements as well as any specific direction given by GHD's management team.
- Wearing any personal protective equipment required by their HASP and GHD at all times.
- Meeting all governing legislation/regulation/industry standards for equipment used on GHD projects.
- Verifying that all subcontractor employees have required training, medical clearance, and substance abuse testing as required by project.
- Not being in possession or under the influence of alcohol, incapacitating drugs, or medications.

In the event of conflicting safety procedures or requirements, personnel must implement those safety practices that afford the highest level of safety and protection. In addition, noncompliance with safety and health policies

and procedures may subject the subcontractor to disciplinary action up to and including termination of their contract with GHD.

Equipment Operators

All equipment operators must meet all the requirements of site personnel listed above and are responsible for the safe operation of heavy equipment. Operators are responsible for conducting documented daily inspections on their equipment to ensure safe performance. Brakes, hydraulic lines, backup alarms, and fire extinguishers must be inspected routinely throughout the project. Equipment will be taken out of service if an unsafe condition occurs. Daily inspections must be provided to the GHD site supervisor prior to the equipment being used.

Authorized Visitors

Authorized visitors, as approved by **Nathaniel (wells) Richard,** are provided with all relevant information regarding site operations and hazards as applicable to the purpose of their visit. Visitors may be required to be accompanied by authorized personnel.

1.6 Site Safety And Health Officer

The site safety and health officer (SHO) Christopher Mattair (cra\cmattair) is responsible for assisting in the communication of site requirements to site project personnel and subcontractors and for carrying out the health and safety responsibilities include the ones listed under the site supervisor. The SHO has prior experience in working at similar sites. The SHO operates under the supervision of the PM, SS, and HSE Manager.

1.7 Recordkeeping

The SS shall establish and maintain records of all necessary and prudent monitoring activities as described below:

- Name and job classification of the employees involved on specific tasks.
- Air monitoring/sampling results and instrument calibration logs.
- Records of training acknowledgment forms (site specific training, toolbox meetings, etc.).
- Documentation of site inspections, results of inspections, and corrective actions implemented.
- Emergency reports describing any incidents or accidents.

1.8 Site HASP Amendments

Any change to the scope of work must be evaluated for its impact on the overall health and safety of the project and associated personnel. A minor change is one that adjusts already-documented hazards within the HASP and does not expose site personnel to chemicals above exposure limits, such as the introduction of a new JSA, or PPE that does not involve a change in respiratory protection. Amendments must be documented on the Site Health and Safety Plan Amendment Form located in Appendix, in addition to notifications to key personnel.

Significant changes to the scope of work require a rewrite by the PM and review/approval of the HASP by a HSE Manager.

1.9 Training Requirements

All personnel conducting work at this site shall have completed the appropriate safety and health training, as applicable to their job/task duties as it relates to the GHD Tiered Training System. The required training is referenced throughout the HASP and identified on each JSA form

1.10 Site Specific Training

An initial site specific training session or briefing shall be conducted by the PM or SS prior to commencement of work activities. During this initial training session, employees shall be instructed on the following topics:

- Personnel responsibilities
- Content and implementation of the HASP
- Site hazards and controls
- Site specific hazardous procedures (e.g., drilling, excavations, etc.)
- Training requirements
- PPE requirements
- Emergency information, including local emergency response team phone numbers, route to nearest hospital, incident reporting procedures, and emergency response procedures
- Instruction in the completion of required inspections and forms
- Location of safety equipment, such as portable eyewash, first aid kit, fire extinguishers, etc.

The various components of the project HASP will be presented, followed by an opportunity to ask questions to ensure that each attendee understands the HASP. Personnel will not be permitted to enter or work in potentially contaminated areas of the site until they have completed the site specific training session. Personnel successfully completing the training session shall sign the HASP Acknowledgement Form, which is presented as an Appendix.

In addition to the initial site briefing conducted at the commencement of the project, supplemental brief safety meetings shall be conducted by the SS to discuss potential safety and health hazards associated with upcoming tasks and necessary precautions to be taken.

1.11 Safety Meeting/ HASP Review

"Tailgate" safety meetings will take place each day prior to beginning the day's work. All site personnel will attend these safety meetings conducted by the SS. The safety meetings will cover specific safety and health issues, including the appropriate JSAs, site activities, changes in site conditions, and a review of topics covered in the site specific pre-entry briefing. The safety meetings will be documented each day with written sign in sheets containing a list of topics discussed. To assist with the compliance of documentation of the Tailgate safety meetings, there is a Tailgate Safety Meeting form located in the Appendix.

1.12 Fatigue Management

GHD employees and subcontractors are responsible for ensuring they are both physically and mentally fit to perform their job functions safely as part of GHD's Fatigue Management Program. GHD will use the following control measures to minimize fatigue during the project:

- Alter the work schedule to reduce the overall time a worker will perform physically demanding work.
- Monitoring employee behaviors for signs of fatigue.
- Eliminate or reduce where practicable the need to work extended hours, night shifts, or overtime.
- Use work-rest patterns during repetitive tasks to control fatigue and increase mental fitness.

GHD's work/rest balance requirements are referenced based on weight of the vehicle. Less than 10,000 lbs/4536 kg (passenger cars, pickup trucks, SUV) will follow the following guidelines:

- Maximum working time and/or driving and working time within one work day: 14 hours (extendable up to 16 hours if drive time< 4 hours and/or airplane travel is involved; this approach can be taken three times in a 7 day period)

- Maximum continuous drive time: 3 hours followed by a 15 minute break
- Maximum drive time per day: 9 hours (extendable up to 10 hours twice in 7 day period)

Employees that drive vehicles greater than 10,000 lbs/4,536 kg must meet the requirements of the transportation agency for which they work and travel.

Management, as represented by an employee's manager, Project Manager or any Principal, may grant a documented variance to the standard work/rest balance for specific employees for a period covering no longer than one week. Additional variances can be issued after for each week. For further information see Fatigue Management Program on the portal.

1.13 Management Of Change

Safety incidents are known to occur when key changes are not communicated to all stakeholders related to a project. Management of Change is covered by the GHD Quality Manual Section 7.3.7 Control of Project Changes and is documented using QSF-006 Management of Change Form (see Appendix).

The types of changes that are to be documented and communicated are:

- Project management/Resources (key personnel)
- Equipment
- Safety - this would not include daily changes to JSA when dirtied in the field.
- Field Operations/SOP

Form QSF-006 is the tool to document and communicate the change. The completed QSF-006 is to be filed in the GHD field folder of the project file.

1.14 Field Notes

All activities undertaken in the field must be correctly and completely recorded in bound field books, Quality System Field Data Record forms (QSF 200, QSF 400, and QSF 500 Series D), or in some other GHD approved format (i.e., electronically, loose paper). All records will be kept in the GHD approved format specified for the activities undertaken. The formats have been established to ensure completeness and to provide consistency amongst the field staff regardless of which office they are from. Refer to Section 7 - Control of Monitoring and Measuring Equipment of the GHD Quality System Manual and Section 3.4.1- Field Notes of the GHD Field Training Manual for more information regarding field note content requirements.

These field notes may be called as evidence in a court of law.

In addition to the formal field notes, field personnel are expected to keep running tables that summarize the field activities so that when questioned at any time during the project, a detailed status of the work completed and that yet to be done can be provided. These lists also serve as checklists to confirm that the correct number and sequence of samples, wells, boreholes, etc. have been collected or completed.

Upon completion of each project, all of the field documentation is brought back and suitably stored at the GHD office in which the field staff who performed the field work are located.

GHD demands that all field note entries are factual and accurate. Everyone recognizes that errors and omissions will be made on occasion. While GHD does not condone a level of effort that is incomplete or inaccurate, it is recognized that it may happen and most of our clients will understand these situations. However, anyone who is caught falsifying any record, no matter how small, will be immediately dismissed.

2. History & Scope

2.1 Site History/Background

LOCATION

The SJRWP Site is located in Harris County, Texas, east of the City of Houston, between two unincorporated areas known as Channelview and Highlands. The Southern Impoundment is approximately 20 acres in size and is located on a small peninsula that extends south of the Interstate Highway 10 (1-10) bridge. A vicinity map is shown on Figure 1, the SJRWP Site is depicted on Figure 2, and the Southern Impoundment excavation areas are shown on Figure 3. Figure 4 shows the work site and job trailer location for Season 1. Figure 5 shows the work site and job trailer location for Season 1. Figure 6 shows the route from the work site to Interstate 1-10.

The work site has one excavation area north of the Glendale Boat Works (Glendale) and three overlapping excavation areas south of Glendale:

- Northeast (north of Glendale) Season 1
- North Central (south of Glendale) Season 1
- South Central (south of Glendale) Season 2
- Southwest (south of Glendale) Season 2

BACKGROUND

The Southern Impoundment was constructed in the mid-1960s and used at that time for disposal of solid and liquid pulp and paper mill material. Anthropogenic waste including fragments of glass and ceramic, asphalt shingles, brass pipe fitting, plastic, and wood were also identified in soil cores taken from the Southern Impoundment and were reportedly disposed of by third parties after 1972. The primary constituents of concern identified within the Southern Impoundment are polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans. The entire peninsula south of 1-10 was subject to continuous and significant modification from the early 1970s through the 1980s.

There are several active businesses operating on the peninsula, including Kirby Inland Marine (Kirby), Glendale, and Southwest Shipyards. The current work site is located on property owned by Musgrove Towing Service, Inc. (Musgrove) and leased to Kirby. Market Street bounds the work site to the east and is the only ingress/egress route for the peninsula. Kirby is an operational fleeting facility that maintains barges along the western shoreline of the Southern Impoundment and Kirby's facility operates under the United States Coast Guard Maritime Security (MARSEC) system. Contractor personnel will be required to maintain a current Transportation Worker Identification Credential (TWIC) card.

The excavation areas that will be part of the Southern Impoundment RA activities have been delineated based upon soil sampling data from the Remedial Investigation (RI) conducted in 2011 and 2012, the Pre-Design Investigations (PDI) conducted in 2018 and 2019, and the Pre-Construction Confirmation Sampling Event (PC-FSE) conducted in 2021 and 2022. The PC-FSE was completed prior to the RA to fully delineate the vertical extent of overburden located above the zone of impact and the horizontal and vertical extent of impacted soils. Each excavation area has been divided into polygons of one-half acre or less which correspond to the soil boring results from the RI, PDIs, and PC-FSE which exceeded the 240 nanogram per kilogram (ng/kg) toxicity equivalent for mammals(TEQDF,M) clean-up level based on a depth-weighted average (DWA).

The RA involves excavation of approximately 92,000 cubic yards (cy) of material. Approximately 63,200 cy of this material is impacted with 2,3,7,8-tetrachlorinated dibenzo-p-dioxin (dioxin, TCDD) TEQDF,M to a maximum depth of 10 feet below ground surface (ft bgs) and will be transported off-site for disposal. As part of excavation activities, approximately 28,800 cy of overburden located above the delineated zone of impact within the excavation area will be removed and stockpiled for re-use as backfill after impacted soils beneath the

overburden has been excavated. Approximately 63,200 cy of clean fill material will need to be imported to bring the excavations up to grade. The delineated zone of impact for each polygon area consists of one or more 2-ft vertical intervals to be removed as impacted soil during excavation.

2.2 Scope of Work Tasks

It is anticipated that the excavation and backfill activities will require two separate seasons, during non-hurricane season (November to April) to avoid potential high river water levels and elevated potential for significant weather conditions, to complete the RA scope of work. Demobilization activities can extend into May, but excavation activities will stop at the end of April. On-site EPA oversight through the duration of the RA is likely. It is anticipated during the first season, the Northeast and North Central excavation areas will be completed, followed by the South Central and Southwest excavations the second season. Each area will need to be restored post-excavation. Additionally, following excavation of the southwest area, the bulkhead will be removed, and the area will be restored to pre-excavation conditions. The following details the main elements of each season.

SEASON 1

1. Mobilization
2. Site preparations and clearing including building and concrete pad demolition, temporary facilities, controls, and fencing
3. WTS and effluent tanks construction
4. Excavation and backfill (estimated to complete the Northeast and North Central excavations)
5. WTS operation
6. Transportation and disposal
7. Restoration
8. WTS and effluent tanks demobilization
9. Site demobilization

SEASON 2

1. Mobilization
2. Site preparations and clearing including temporary facilities, controls, and fencing
3. WTS and effluent tanks construction
4. Installation of bulkhead along the southwest corner
5. Excavation and backfill (estimated to complete the South Central and Southwest excavations)
6. WTS operation
7. Transportation and disposal
8. Restoration including replacement of Kirby features such as the concrete pad, storage cover in lieu of the demolished building structure, gravel parking lot, and lighting
9. Removal of bulkhead
10. WTS and effluent tanks demobilization

This HASP covers the specific site activities that will be conducted by GHD personnel and their subcontractors. These activities listed here, and in the attached JSAs cover the tasks being performed onsite.

Driving, Site Reconnaissance and Walk through Activities, Mob/Demob of personnel, material, and equipment, Oversight of Monitoring Well Installation, Monitoring Well Sampling, Collection of Soil Samples, Collection of Soil Samples from an Excavator bucket, Collection of Surface Water Samples, Excavation Oversight, Vacuum Truck Operation Oversight, Asbestos Surveys, Decontamination of Sampling Equipment and Personnel, Monitoring Well Abandonment, Land Surveying for elevation and location, Soil Boring (Drilling), Derived Waste Drum

Moving and Handling, Site Inspection(Construction), Haz/Non-Haz Waste Sampling (Drums), Decommissioning and Demolition Oversight Activities

If site operations are altered or if additional tasks are assigned, an addendum to this HASP shall be developed to address the specific hazards associated with these changes.

All addendums will be required to be developed in conjunction with project management and a GHD safety professional.

3. Chemical Hazards

3.1 Introduction To Chemical Hazards

This section identifies and evaluates the potential chemical hazards that may be encountered during the completion of this project. These hazards and the anticipated initial exposure levels are based on client data, historical data, etc.

Chemical exposures occur via four major routes of entry: absorption, inhalation, ingestion, and injection. A listing of the chemical contaminants of concern is found in the **Chemical Table** (Table 1) and The **Safety Data Sheets {SDSs},** for chemical products used on site, are also included in the Appendices. Both the Chemical Table and SDSs include exposure limits, signs and symptoms of exposure, chemical properties, and physical characteristics.

3.2 Control Measures

Before the proper control(s) can be selected, GHD personnel conduct a hazard evaluation of the process, activity, or material. A hazard evaluation may include reviewing information from a chemical container label, SDS, manufacturer, National Institute for Occupational Safety and Health (NIOSH) website, and other resources as needed; identifying route(s) of exposure; and evaluating the process/activity to determine if an exposure evaluation is needed. If necessary, a HSE Manager conducts and documents exposure evaluations.

Exposure to potential on site contaminants/chemicals, such as those listed in Table 1.0 and SDSs, include the following methods:

- Engineering controls such as wetting methods, ventilation, elimination, or substation.
- Administrative controls such as work rotation, training, or proper hygiene practices (washing facilities).
- Monitoring air concentrations with appropriate equipment in the breathing zone.
- Selecting and using personal protective equipment (PPE) such as gloves or respiratory protection.

JSAs are developed and revised to list the associated hazard controls on a task-specific basis.

3.3 Safety Data Sheets

SDSs are documents created by the chemical manufacturer that describe the substance. Some information found on an SDS includes: hazardous and physical characteristics, handling requirements, storage and disposal information, and signs and symptoms of exposure.

When working with hazardous chemicals, readily available and up-to-date SDSs are required for each chemical. GHD personnel and its subcontractors are responsible for obtaining and maintaining SDSs for their controlled products and for products that they are bringing onto site. All projects maintain an inventory of SDS and are made readily available to all employees and visitors.

3.4 Container Labels

All hazardous materials, hazardous waste, chemical containers, and chemical storage areas are appropriately labeled indicating the chemical identity, hazards present, and any relevant regulatory requirements. Labeling of all chemical containers assists emergency personnel and others in identifying hazards if a spill occurs or emergency situation arises.

Chemical container labeling is the responsibility of the individual who fills and/or uses the chemicals. All containers into which chemicals are transferred are legibly labeled in the language that can be understood by the employees who work with or in proximity (English, French, Spanish, etc.) and include the name of the chemical and appropriate hazard warnings.

3.5 Workers Training

All employees who may work in proximity to controlled products has and maintains current applicable training as appropriate to client, state, provincial or federal requirements, which may include: HAZCOM, WHMIS, TDG, or DOT. Records of training are readily available upon request.

4. Physical Hazards

4.1 Introduction To Physical Hazards

Physical Hazards are factors within the environment that can harm the body without necessarily touching it. Vibration and noise are examples of physical hazards. Physical hazards for this site have been identified in the following section. If the hazards change due to site conditions or additions to the scope of work, a Stop Work must be implemented and the conditions identified to the PM and **RHSM.**

In addition, personnel must be aware that the protective equipment identified in the JSA may limit dexterity and visibility and may increase the difficulty of performing some tasks.

4.2 Heavy Equipment

The following practices are adhered to by personnel operating heavy equipment (such as backhoes, excavators, bull dozers, rock trucks) and personnel working in the vicinity of heavy equipment.

- Heavy equipment is only operated by authorized, qualified operators.
- All equipment is inspected when equipment is initially mobilized, delivered to a job site, or after it is repaired and returned to service, to ensure that it meets all manufacturer and legislative specifications. Documentation of maintenance records must be available upon request.
- The operator inspects the equipment prior to each use and documents the first use on a daily basis. Documentation of this daily pre operational inspection is available upon request, and, if required, filed with the project files.
- Ensure operator conducts a 360-degree walk around of the equipment prior to entering the equipment
- Seat belts/restraining devices are used on heavy equipment that is not designed for stand up operation.
- Equipment/vehicles that are loaded by crane, excavator, loader, etc. have a cab shield and/or canopy to protect the operator.
- Personnel only ride in equipment that is designed for transporting individuals and have a fully functional seat and available restraining devices. "Piggybacking," such as riding on fender steps or any place outside the cab, is not allowed.

- Personnel are not raised/lowered in buckets.
- Before leaving the equipment controls, the equipment is in its safe resting position or cribbed in a "dead" or neutral position. No controls are abandoned while under load.
- Before raising any booms, buckets, etc., overhead obstructions are checked.
- A competent spotter is used when moving heavy equipment, working within 10 feet of a stationary object, encroaching overhead utilities clearance minimums, in tight quarters, or with limited visibility.
- Employees involved in the operation do not wear any loose fitting clothing, as it can be caught in moving machinery.
- Personnel must wear an approved high-visibility safety vest where any vehicular traffic occurs.
- The work site should be designed to limit the operations being performed in reverse.
- Working areas are properly delineated to keep unauthorized individuals out. Personnel should never proceed into a work zone without making eye contact and receiving authorization from the operator or spotter to cross the path of heavy equipment. Authorization is given from outside the blind or crushing zones of the equipment.

4.3 Drilling Equipment

GHD field staff should minimize time spent in close proximity to an operating drill rig, including during set-up/teardown time. It is critical to maintain a safe work distance from the drill rig crew to allow them the necessary room to perform their tasks. GHD field personnel should only be near the drill rig when their work activity, such as air monitoring, soil sampling, and confirmation of borehole locations, dictates.

Drill staff are responsible for all activities related to drill rig setup and operations. The drilling contractor briefs GHD personnel and crew during the tailgate safety meeting on the rig's critical safety features and identifies known hazards when working near the rig.

The GHD site supervisor ensures the following:

- All PPE and protective hazard mitigation is in place prior to work starting.
- JSAs are reviewed and applied.
- The Daily Pre-Use Inspection checklist is completed by the operator to ensure that the equipment is functioning as intended.
- The emergency switches are functional and verified to be operational during the documented daily equipment check.
- The QSF-019 Property Access/Utility Clearance Data Sheet is signed and that all utility clearances are obtained, reviewed, understood, and confirmed before drilling activities begin.
- No rig operators are wearing any loose fitting clothing, including untied shoe/boot laces, drawstrings, etc., due to the potential of being caught in rotating machinery.
- Overhead hazards including utility lines are checked .
- Before the mast of a drill rig is raised, the drill rig is first leveled and stabilized with leveling jacks and/or cribbing, the drill rig is re-leveled if settling occurs after initial setup, the mast is lowered only when the leveling jacks are down, and the leveling jack pads remain deployed until the mast is lowered completely.
- The work area is properly demarcated with rope, caution tape, and fencing, and marked or posted to keep the area clear of pedestrian traffic or spectators.
- Before leaving the controls, the operator shifts the transmission controlling the rotary drive into neutral and places the feed lever in the neutral position.
- Before leaving the vicinity of the drill, the operator shuts down the drill engine.

4.4 Excavations

All GHD excavation and trenching operations that employees shall enter will be observed by a designated competent person. The competent person shall be responsible for evaluating and inspecting excavation and trenching operations to prevent possible cave-in and entrapment, and to avoid other hazards presented by excavation activities.

Each employee in an excavation shall be protected from cave-ins by one of three systems:

- Sloping and benching systems
- Shoring
- Shielding systems

All excavation and trenching operations shall be conducted in accordance and in compliance with OSHA's Standards for the Construction Industry, specifically outlined in GHD's Safety and Health Program for excavation and trenching activities. At a minimum, the following safety guidelines shall be adhered to while conducting excavation and trenching activities:

- Excavation and trenching operations require pre planning to determine whether sloping or shoring systems are required, and to develop appropriate designs for such systems. Also, the estimated location of all underground installations must be determined before digging/drilling begins. Necessary clearances must be observed.
- If there are any nearby buildings, walls, sidewalks, trees, or roads that may be threatened or undermined by the excavation, or 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.
- Excavations may not go below the base of footings, foundations, or retaining walls unless they are adequately supported or a person who is registered as a Professional Engineer (PE) has determined that they will not be affected by the soil removal. Civil engineers or those with licenses in a related discipline and experience should be consulted in the design and use of sloping and shoring systems. PE qualifications must be documented in writing.

Access and Egress

Personnel access and egress from trench and/or excavations are as follows:

- A stairway, ladder, ramp, or other means of egress must be provided in trenches greater than 4 feet deep and for every 25 feet of lateral travel.
- All ladders shall extend 3 feet above the top of the excavation.
- Structural ramps used for access or egress of equipment will be designed by a competent person qualified in structural design or by a licensed professional engineer.

Atmosphere Monitoring and Testing

Air quality is measured using three parameters: oxygen concentration, flammability, and 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. Detector tubes, gas monitors, and explosion meters are examples of monitoring equipment that may be used.

In the event that an unusual odor or liquid is suspected in excavations and trenches, the competent person shall stop work on the site and arrange for an air quality assessment and mitigation, if necessary.

Atmospheric testing and monitoring shall be performed bin excavations in or adjacent to landfill areas, in areas where hazardous materials are/were stored, or in areas where the presence of hazardous materials is suspected.

Daily Inspections

The competent person shall perform daily inspections of excavations, the adjacent areas, and all protective systems for situations that could potentially result in slope failure.

Additionally, the competent person shall be aware of the potential for confined space situations and other hazardous work conditions.

The competent person shall inspect, evaluate, and complete the excavation checklist at the following intervals:

– Prior to the start of work, after each extended halt in work, and as needed throughout the shift, as new sections of the excavation or trench are opened.
– After every rainstorm and other natural or man made event that may increase the load on the walls of the excavation, or otherwise affect their stability.

The inspections shall be documented using the GHD Excavation Inspection Checklist attached to this HASP.

The competent person shall stop the work and instruct all employees to leave the excavation or trench when any potential hazards are detected. The competent person has the authority to immediately suspend work if any unsafe condition is detected.

4.5 Utility Clearances - OSHA

Extreme caution is needed when working around electrical power lines. Electricity flows through metal, wood, and many other conducting materials, including human beings. Elevated equipment such as drill rigs, backhoes, scaffolding, ladders, etc must remain the required distance away according to the local/state/provincial regulations.

These minimum requirements are:

Occupational safety and health act 1926.SS0(a){lS)

Operating voltage of overhead power	Operating voltage of overhead power safe limit of approach distance for persons and equipment
<50 kv	10 feet
>50 kv	20 feet

For lines rated over 50 kv, minimum clearance between the lines and any part of the crane or load shall be 10 feet plus 0.4 inch for each 1 kv, over 50 kv, or twice the length of the line insulator, but never less than 10 feet.

– If any part of a machine may encroach these parameters, SWA is implemented, a review of the SOW is conducted with the PM and RHSM, and a spotter is used.
– If the client has requirements that exceed the above minimums, then the client requirements are used.

Underground Utilities

Underground utilities, if present, are to be clearly marked and identified prior to commencement of work. Follow applicable regulations and client requirements with regards to utility-locating requirements (e.g., One Call).

Personnel involved in intrusive work will:

- Confirm proposed excavation(s) and heavy truck routes are not in the area of subsurface utilities. This meeting is to be documented.
- Review and adhere to GHD's Subsurface Utility Clearance Protocol SOP at a minimum. Use air knifing or vacuum truck digging techniques inside 5 feet of the outside edge of an underground facility.
- Pre-clear holes to 120% of the drill diameter to a minimum depth of 5 feet below ground surface. Consider pre-clearing to greater depths in close proximity to process piping such as loading racks
- Locate boreholes a minimum distances of 5 feet perpendicular from utility mark-out lines
- Complete the Property Access/Utility Clearance Data Sheet (QSF 019) prior to initiating excavation activities.
- On private property, request that the owner of the service, locate and mark the service.
- If a service may pose a hazard and cannot be shut off or disconnected, request that the owner of the service supervise the uncovering of the service during the work.
- Identify the work that can be conducted with the assistance of the locator line service, coordinate document drawing review, and inspect the site for manholes, catch basins, valve boxes, etc. that may indicate the direction/depth of underground installations. Marking indicates only the approximate location of buried lines.

The following are the Uniform Color Codes for utility locates:

White	proposed excavation
pink	temporary survey marking
red	electrical power lines,cables, conduit and lighting cables yellow gas,oil, steam,petroleum or gaseous material
orange	communication, alarm or signal lines,cables or conduit blue potable water
purple	reclaimed water, irrigation and slurry lines green sewers and drain lines

4.6 Vacuum Truck

Working around vacuum trucks can be dangerous because of the operator's limited field of vision and the noise levels that can be produced by the truck. The following practices shall be adhered to by operators and GHD employees when working around vacuum trucks:

- All vacuum trucks must arrive on site empty of any product in the cargo tank. Product in the tank can cause cross contamination and a potentially explosive atmosphere within the tank.
- Vacuum trucks cargo tank will be depressurized.
- Before beginning operations, operators shall conduct an inspection and document their findings on the inspection checklist.
- Vacuum trucks shall be operated in accordance with manufacturers specifications.
- Parking brakes shall always be applied on parked equipment.
- All personnel shall leave the vacuum truck cab during loading and off loading operations.
- All personnel around the vacuum truck shall wear hearing protection while the vacuum truck is in operation.
- Atmospheric air monitoring shall be conducted prior to and during operations involving hazardous materials.
- The vacuum transfer system shall be bonded to achieve a continuous conductive path from the truck through the hose and nozzle to the tank or other container and grounded to earth. Grounding may be achieved by connecting to any properly grounded object like a metal building, tank frame, a fire hydrant, or a metal light post.
- Vacuum truck operators shall monitor the transfer operation and be ready to quickly close the product valve and stop the pump in the event of a blocked line or release of material.
- All vacuum trucks being used in the exclusion zone shall remain in the exclusion zone until decontaminated.

4.7 Material Handling

Material handling and storage practices are conducted at the project site. Proper lifting reduces the hazard out of moving objects. No one person should handle, lift, or move SO pounds or more by themself. Even if the object weighs less than SO pounds, the configuration or shape of the object should be evaluated to see if two people should be used to lift the object.

Manual Lifting

Consider the following prior to a lift.

- Establish that you can lift the load safely.
- Inspect route to be travelled, confirming sufficient clearance.
- Look for any obstructions or spills.
- Inspect the object to determine how it should be grasped.
- Select and use containers with handles where practical.
- Look for any sharp edges, slivers, or other things that may cause personal injury.
- Do not move any object that will obstruct your field of vision when transporting the load.
- When lifting objects, use proper lifting techniques. Position the body so that the weight of the body is centered over the feet, which provides a more powerful line of thrust and ensures better balance. Start the lift with a thrust of the rear foot. Do not twist.

General Storage Practices

Storage of materials and supplies must not create a hazard. General storage area practices include the following:

- Bags, containers, bundles, etc. stored in tiers must be stacked, blocked, interlocked, and limited in height so that they are stable and secure against sliding or collapse.
- All stacked materials, cargo, etc. must be examined for sharp edges, protrusions, signs of damage, or other factors likely to cause injury to persons handling these objects. Defects are to be corrected as they are detected.
- Storage areas must be kept free from accumulation of materials that constitute hazards from tripping, fire, explosion, or pest harborage.
- Storage areas have provisions to minimize manual lifting and carrying. Aisles and passageways provide for the movement of mechanical lifting and conveyance devices.
- Stored materials do not block or obstruct access to emergency exits, fire extinguishers, alarm boxes, first aid equipment, lights, electrical control panels, or other control boxes.
- Hazardous materials are stored in accordance with the details outlined in the MSDS, or accepted guidelines from reputable agencies. Guidelines include details about the materials reactivity, corrosivity, flammability, etc., as well as appropriate signage.

4.8 Noise

Hearing protection is required for project activities when working in close proximity to machinery, drilling operations, or impact/power tools where noise levels may exceed the decibel range of 85 dBA.

When hearing a coworker at normal conversation distance is difficult or the noise level is approaching or exceeding 85 dBA, hearing protection such as earplugs or muffs must be available/worn by all site personnel and visitors that may be exposed to elevated levels of noise. Individuals who wear hearing protection are to be adequately trained in the safe use and handling of hearing PPE.

GHD employees who have the potential to be exposed to noise exceeding 85dba in the work environment will be enrolled in the GHD Hearing Conservation Program.

4.9 Rigging And Hoisting

If hoisting and rigging operations occur, the following standards apply as minimum guidelines.

- Only qualified competent personnel trained in safe rigging procedures are authorized to engage in rigging procedures. This includes understanding and use of recognized rigging methods and crane signals. Records of Training are available on site.
- Wire ropes, chains, ropes, and other rigging equipment are inspected prior to each use and as necessary during use to ensure their safety. Defective rigging equipment are tagged and immediately removed from service.
- No equipment is modified or used outside of its intended design.
- Rigging is not used unless the weight of the load falls within the rigging's manufacturer's safe work operating range. This must be verified by the authorized rigger prior to any "pick" or lifting operation.
- The proper length of rope or chain slings is used to avoid wide angle lifts and dangerous slack. Knotted ropes or lengths of ropes reduced by bolts, knots, or other keepers are not used.
- Tag lines are used during load movements unless they create an unsafe condition.
- Job or shop hooks and links and other makeshift fasteners are not used. When U bolts are used for eye splices, the U bolt is applied so the "U" section is in contact with the dead end of the rope.
- Wire ropes, chains, ropes, and other rigging equipment are stored where they will remain clean, dry, and protected from the weather, traffic, and corrosive fumes.

4.10 Fall Hazards

Personnel that will use ladders and have the potential hazard of working on elevated surfaces or platforms of 6 feet or greater during project activities shall follow GHD's Safety and Health Program for fall protection. The program requirements can be located in the Appendix. The fall protection program includes leading edge work, rooftop work, aerial lifts, ladders, and scaffolds. Specific guidelines for portable ladders are outlined below.

The emergency rescue plan for retrieving any worker who has fallen and is suspended in air is to be done any way possible without putting other employees in danger. Time is of the essence to prevent the development of a life threatening condition, such as orthostatic intolerance or suspension trauma, due to being suspended for a period of time. Rescue methods and equipment will be specific to the project site; however, the following information provides examples of typical rescue methods/equipment:

- A scissor lift or articulating boom already on site.
- Lower/raise worker by an acceptable physical and/or mechanical means (self rescue not acceptable as primary rescue method).
- A rescue team trained in above ground rescue techniques.
- A rope or cable system to lower employee to ground (requires point of attachment for rigging tackle).
- A crane man basket setup in advance for rescue.

4.11 Manlifts/Aerial Lift

The following should be considered when using manlifts (aerial lifts)/platforms:

- Lift controls shall be tested and documented using the inspection checklist found in the Appendix of this HASP each day prior to use to verify they are in a safe working condition.
- Belting off to an adjacent pole, structure, or equipment while working from a manlift is not permitted.

- Articulating boom and extendible boom platform lifts shall have both platform (upper) and lower controls. Controls shall be plainly marked as to their function. Lower level controls shall not be operated unless permission is obtained from the personnel working in the lift.
- If the machine is to be unattended, lower the platform, shut off engine, engage parking brake, and remove key.
- Never attempt to mount or dismount a moving machine.
- The insulated portion of the manlift shall not be altered in any way that might reduce its insulating value.
- Check overhead clearances and note any obstructions.
- Only proficient operators shall operate an aerial lift.
- Personal fall protection (e.g., harness and lanyard) shall be worn and attached to an appropriate anchorage while in the aerial lift basket.
- Employees must always stand firmly on the floor of the basket.
- Boom and load limits specified by the manufacturer shall not be exceeded.
- Vehicle brakes, outriggers, and wheel chocks should be used when required and/or available.
- The aerial lift truck shall not be moved when the boom is elevated with people in the basket unless the aerial lift is designed to do so (i.e., controls to move truck are located in and may be operated while in the basket). In these cases, the movement of the lift truck shall be for work positioning only and not for movement from one work location to another.

4.12 Scaffolding

Use of scaffolding should be consistent with the following guidelines:

- No one shall erect, move, dismantle, or alter scaffolding, except under the supervision of a competent person. A competent person may recommend changes or alterations of the scaffolding that are as stringent or even stricter than regulations to protect employees.
- Personnel subject to periods of dizziness should not work on a scaffold.
- A survey shall be made for hazardous conditions in the area where the scaffold will be erected.
- Scaffolds shall not be altered or moved horizontally while they are in use or occupied.
- Scaffolds shall not be loaded in excess of the working load they are designed to hold.
- Footing or anchorage for scaffolds shall be sound, rigid, and capable of carrying the maximum intended load without settling or displacement.
- Scaffolds and their components shall be maintained in a safe condition. Any broken, bent, excessively rusted, altered, or otherwise structurally damaged frames or accessories shall be taken out of service.
- Scaffolds and their components shall be inspected before each work shift and after any incident that could affect the structure of the scaffold by the competent person.
- Scaffolds shall be continually inspected by the users to ensure that the scaffold is maintained in a safe condition. Unsafe conditions are to be reported to the supervisor.
- Scaffolds shall be tied to or securely braced against the structure horizontally and/or vertically as required for support.
- Scaffolds shall be constructed to support at least four times the maximum intended loads.
- Scaffold platforms shall be equipped with standard guardrails and mid rails, be completely decked with safety planks or scaffold decking, and have rigidly secured toe boards on sides and ends as determined by the scaffolding competent person.
- Tools and materials on scaffold platforms must be placed in such a manner that they will not create a tripping hazard or become dislodged and fall.
- Tools, materials, and debris should not be allowed to accumulate in quantities to cause a hazard.

- Slippery conditions on scaffolds should be eliminated as soon as possible after they occur.
- Work on scaffolds shall be suspended during storms or high winds.
- Windscreens (plastic coverings) shall be inspected to ensure the system can accommodate the anticipated wind loads. This system is to be approved by a structural engineer before use as wind can easily topple a scaffold system.
- A ladder or stairway must be used for proper access to a scaffold platform.
- Personal fall arrest systems are required when erecting, dismantling, or working on scaffolding, unless the employee is sufficiently guarded from falling by other fall control measures.

4.13 Working Near Water

The procedures outlined in this section are to be implemented by all GHD and subcontractor personnel when there is the potential for slipping or falling into water that is greater than 3 feet in depth. Additionally, these procedures are to be adhered to when water is flowing and has the potential to carry personnel away.

- When working in or around water implement the buddy system
- When working at ground level, a 5 foot "no entry zone" can be established between the work area and the water hazard. The no entry zone is to be clearly defined and/or demarcated. Personnel will not be permitted to enter into this area unless the other provisions of this section are in place.
- Standard guardrails are required on any walking/working surface over or near water.
- Where guardrails are not practical due to impairment of work being performed, other types of safeguarding, such as safety harnesses, lifelines, and lanyards may be used (see GHD's Fall Protection SOP).
- If providing fall protection is not feasible due to the scope of work or location, personnel will be required to wear U.S. Coast Guard/Transport Canada approved life jackets or buoyant work vests. Prior to each use and after each use, the buoyant work vests and life preservers must be inspected for defects that would affect strength and/or buoyancy. Any damaged or defective buoyant work vest or life preserver cannot be used.
- Call in or make prearranged contacts after each activity posing a drowning hazard is completed.
- If work on wet or slippery surfaces above water is necessary, non slip tape or other methods are to be used to increase traction.
- Ring buoys with a minimum 90 feet of line must be readily available for emergency operations. The distance between buoys cannot exceed 200 feet.
- Due to the anticipated scope of work, a life saving skiff may be necessary. However, the SS in conjunction with the RSHM will evaluate current site conditions to determine if a skiff is required.

4.14 ATV/UTV Operations

This section provides the minimum requirements for safe work practices during the operation of all terrain vehicles (ATVs) and utility task vehicles (UTVs) (i.e., Kawasaki Mule, Yamaha Rhino, John Deere Gator, etc.) as these vehicles are specifically designed for off road use only. These vehicles operate and maneuver differently than a passenger vehicle (i.e., cars, trucks, etc.) when driving on uneven terrain and or in muddy, rocky and heavily vegetated areas. Personnel having to use such vehicles will be required to be properly instructed and trained on the units prior to operation.

Personnel will be familiar with the operations and maintenance of the units accordingly to the manufacturer's "owner's" manual.

Prior to operating these vehicles, authorized personnel will complete a "daily" pre ride inspection. Remove all debris (e.g., mud, weeds) from moving components and perform housekeeping in and around the cab area. Each vehicle shall be equipped with a minimum of a 2.5 pound ABC rated fire extinguisher and a high visibility flag that is set in a vertical position and extends at least 3 feet above the canopy or roll bar.

All authorized personnel shall operate such vehicles in a safe and responsible manner accordingly to the owner's manual. Excessive speeding or horseplay will not be tolerated when operating these vehicles. Based on certain models and types of vehicles, seat belts are provided and must be worn by the operator and passenger at all times. These types of vehicles (model) are susceptible to tipping/rolling over when operations are being conducted on steep inclines. Avoid operating across bodies of water (e.g., rivers, creeks) until depth of water has been verified and confirmed by the operator.

Transporting of materials/supplies when using utility task vehicles should be loaded uniformly for weight distribution and secured. Refer to the owner's manual for maximum load capacities

4.15 Electrical Safety

Employees do not accept unnecessary exposure to hazards, such as working on energized electrical installations. When possible, circuits are de - energized according to the GHD Lockout/Tagout program and client requirements to achieve safe working conditions. When it is not possible to de- energize circuits, the Workplace Electrical Safety Program (WESP) requirements ensure that safe conditions and work practices are implemented.

The WESP is the electrical safety program that covers all electrical work performed at GHD facilities and work performed by GHD at client facilities. It also provides mandatory program requirements and is used in conjunction with all other procedures and practices on the site to ensure that electrical work is accomplished safely.

To protect employees from shock and/or arc flash hazards, only individuals who are "qualified" in accordance with the NFPA 70E or CSA Z462 Standards will be allowed to perform Arc Flash Hazards Analysis, LOTO, diagnostic testing, work on live electrical circuits or perform electrical work on equipment. The term "qualified" does not relate to a job title or job assignment, but rather to the activity being performed. Employees who perform electrical work must successfully complete the "Electrical Safety for Qualified Persons" training to be authorized as "qualified". Only persons who have received this training and are knowledgeable in the construction and operation of equipment or a specific work method, and are trained to recognize and avoid the electrical hazards that may be present with respect to that equipment or work practice are allowed to perform this type of work. Consult the GHD Workplace Electrical Safety Program for additional program requirements and permits.

4.16 Control of Hazardous Energy (Loto)

Hazardous energy sources may be encountered during the servicing and maintenance of machines and equipment, in which the unexpected energization or start-up of the machines or equipment could cause injury to employees.

The minimum performance requirements to control hazardous energy requires that employers develop and implement an energy control program. The elements of an energy control program are as follows:

- Lockout/tagout
- Employee protection
- Energy control procedure
- Protective materials and hardware
- Periodic inspections
- Training and communication
- Energy isolation
- Employee notification

Project personnel who are required to conduct operations and maintenance activities that will require the isolation of an energy hazard through the use of a lockout/tagout device shall follow the GHD program

requirements and written procedures for that operation. The program requirements can be located in the Appendix.

Employee Training

Employees authorized to attach and remove lockout/tagout devices shall be provided with initial training regarding the safe application, usage, and removal of such devices. Each authorized employee will receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the associated energy, and the methods necessary for energy isolation and control.

All authorized employees will be provided with refresher training annually, or at more frequent intervals whenever the following conditions apply:

- A job assignment change.
- A change in machinery or equipment, or a process change that presents new hazards.
- A change in the energy control procedures.
- Possible deficiencies in the employee's understanding of the following:
  - The hazards associated with the energy that controls the machinery or equipment in the employee's work area.
  - Application and removal procedures for lockout/tagout devices.

Employees who work in areas where lockout/tagout procedures are used shall receive initial and annual refresher training in the purpose and use of lockout/tagout devices and principles behind their use.

4.17 Compressed Gas Cylinders

Compressed gases cylinders present several hazards from the gas itself and contents under pressure. In addition to being properly stored or handled, the cylinder is properly labeled, hazardous properties are identified (toxicity, flammability, presence of an oxidizer, etc.), and an SDS is supplied by the manufacturer.

Regardless of the gas properties, any gas under pressure can explode if the cylinder is improperly stored or handled. The following are general safe storage and handling procedures for compressed gas cylinders.

- Store cylinders in an area specifically designated for that purpose. This area protects the cylinders from being struck by another object. The area is well ventilated, away from sources of heat, and at least 20 feet away from highly combustible materials. Oxidizers are stored at least 20 feet away from flammable gases.
- Chain and rack cylinders in an upright position during use and storage. When transporting cylinders, secure them from falling.
- When moving a cylinder, even for a short distance, all the valves are closed, the regulators removed, and valve caps installed. Never use a valve cap, sling, or magnet to move a cylinder. If using a crane or some other lifting device to move a cylinder, use a cradle or boat designed for that purpose.
- Never permit cylinders to contact live electrical equipment or grounding cables.
- Protect cylinders from temperature extremes, the sun's direct rays, and ice and snow accumulation.
- Before the gas is used, install the proper pressure reducing regulator on the valve. After installation, verify the regulator is working, all gauges are operating correctly, and all connections are tight with no leaks. When using the gas, open the valve with your hands. Never use a wrench or other tool. If you cannot open it with your hands, do not use it.

4.18 Heat Stress

Heat stress is one of the most common illnesses faced by project personnel when working in elevated temperatures and/or humidity.

Prevention

The following procedures will be carried out to reduce heat stress:

- Heat stress monitoring.
- Acclimatization.
- Sun exposures.
- Work/rest regimes (schedule of breaks) in accordance with Occupational Health Clinics for Ontario Workers (OHCOW).
- Humidex Heat Stress Response Plan - mandatory breaks scheduled in summer months or during high risk activities for heat stress (based on ACGIH)
- Heat stress safety PPE (e.g., cool vests, bandanas)
- Cool potable water available
- Use of buddy system
- Seek shade - Shade is a good source of protection, but keep in mind that shade structures (e.g., trees, umbrellas, canopies) do not offer complete sun protection.

OHCOW Humidex Heat Stress Response Plan		
°F	**°C**	**Response**
77- 84°F	25- 29°C	•supply water to workers on an "as needed" basis
86- 91°F	30- 33°C	•post "heat stress alert" notice •encourage workers to drink extra water •start recording hourly temperature and relative humidity
93- 98°F	3437°C	•post "heat stress warning" notice •notify workers that they are drinking extra water •ensure workers are trained to recognize symptoms
100- 102°F	38 39°C	•provide 15 minutes relief per hour •provide adequate cool (10 15°C) water, at least 1 cup (240 ml) of water every 20 minutes •workers with symptoms should seek medical attention
104- 107°F	4042°C	•provide 30 minutes relief per hour in addition to the provisions listed previously
109- 111°F	43 44°C	•if feasible provide 45 minutes relief per hour in addition to the provisions listed above •if a 75% relief period is not feasible then stop work until the humidex is 42°C or less
113°F	45°C or over	•stop work until the humidex is 44°C or less
Note: Humidex plan is a simplified way of protecting workers from heat stress which is based on the 2007 ACGIH heat stress TLV® (threshold limit value®) which uses wet bulb globe temperatures (WBGT) to estimate heat strain. These WBGT's were translated into humidex		

Sun Exposure

Overexposure to sunlight is a common concern when field activities occur during warm weather conditions. Overexposure can occur on clear, sunny days, as well as on overcast and cloudy days. The following steps should be taken to protect against overexposure to sunlight:

- Always use sunscreen on exposed body parts.
- Cover up.
- Wear safety rated sunglasses.
- Limit time in the midday sun.

4.19 Cold Stress

Cold stress is similar to heat stress in that it is caused by a number of interacting factors including environmental conditions, clothing, and workload, as well as the physical and conditioning characteristics of the individual.

Prevention

A variety of measures can be implemented to prevent or reduce the likelihood of employees developing cold related ailments and disorders.

- Acclimatization.
- Fluid and electrolyte replenishment.
- Eat a well-balanced diet.
- Wear warm clothing.
- Follow work/rest regimes.

The parts of the body most important to keep warm are the feet, hands, head, and face. As much as 40 percent of body heat can be lost when the head is exposed.

TLVs Work/Warm Up Schedule for 4 Hour Shift

THRESHOLD LIMIT VALUES WORK/WARM-UP SCHEDULE FOR FOUR-HOUR SHIFT*											
Air Temperature Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind	
° C (approx)	° F (approx)	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks
-26° to -28°	-15° to -19°	(Norm breaks) 1		(Norm breaks) 1		75 min.	2	55 min.	3	40 min.	4
-29° to -31°	-20° to -24°	(Norm breaks) 1		75 min.	2	55 min.	3	40 min.	4	30 min.	5
-32° to -34°	-25° to -29°	75 min.	2	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease ↓	
-35° to -37°	-30° to -34°	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease ↓			
-38° to -39°	-35° to -39°	40 min.	4	30 min.	5	Non-emergency work should cease ↓					
-40° to -42°	-40° to -44°	30 min.	5	Non-emergency work should cease ↓							
-43° to below	-45° & below	Non-emergency work should cease									

*2014 TLVs and BEls - Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. Cincinnati: American Conference of Governmental Industrial Hygienists (ACGIH), 2014

4.20 Hand And Power Tools

Hand Tools

- Hand tools must meet the manufacturer's safety standards.
- Hand tools are not to be altered in any way.
- At a minimum, appropriate eye and face protection that meets current applicable standards (ANSI/CSA) must be used.
- Wrenches, including adjustable, pipe, end, and socket wrenches, are not used when jaws are sprung to the point that slippage occurs.
- Impact tools such as drift pins, wedges, and chisels are kept free of mushroom heads.
- Wooden handles are free of splinters or cracks and secured tightly to the tool.
- Any damaged or defective tools are immediately removed from service and tagged for destruction.

Power Tools

- All power tools must be inspected regularly and used in accordance with the manufacturer's instructions and the tool's capabilities.

- Electric tools are not used in areas subject to fire or explosion hazards, unless they are approved for that purpose.
- Corded portable electric tools are connected to a ground fault circuit interrupter (GFCI) when working in wet areas.
- Coiled cords/extension cords are uncoiled when plugged in to allow for dissipation of heat.
- Cords/extension cords rated appropriately for the temperature are used.
- Appropriate eye and face protection that meets current applicable standards (ANSI/CSA) are used.
- Personnel are trained in the proper use of the tool.
- Any damaged or defective power tools must be immediately tagged and removed from service.
- Repairs to hand or power tools are only made by qualified individuals and in accordance with the manufacturer's standards.
- Field or shop modifications to tools or equipment are only made by qualified individuals and in accordance with either manufacturer or engineer-approved specifications.

4.21 Night Work

Doing project work at night is very dangerous and should be avoided if possible. Night work increases risk due to lighting blind spots and fatigued workers on the site. Accidents can be greatly reduced by establishing and following certain guidelines.

- Schedule heavy or demanding work at times when you are most alert or at peak performance, which is afternoon and early evening. If possible, avoid doing the heaviest or most dangerous work in the middle of the night or early morning hours. Especially avoid heavy or dangerous work if you are at the end of a 12 hour shift in the early morning hours. Extra fatigue from long work hours can combine with early morning sleepiness to increase accident risk.
- Use adequate lighting in the work zone. Avoid standing in shadows as shadows reduce your visibility and the lack of light may put you at risk of falling asleep.
- Wear reflective clothing to increase your level of visibility to others.
- Avoid walking underneath material handling or lifting equipment, such as cranes and man lifts.
- Clearly mark trenches and excavations, using reflective barricades and/or lighting. Flag tripping hazards (such as holes and obstructions). Keep pathways clear and clean up spills right away.

Establish a buddy system at the beginning of every night shift before heading out to the site. Create teams of two or more who look out for each other while on the job. Review the safety plan for the work site on a daily basis or more often.

4.22 Portable Ladders

When portable ladders are in use on work sites, the following guidelines apply as a minimum standard.

- All ladders must be made of fiberglass. No wooden or metal ladders are allowed. This is a client requirement for this project.
- Use the 4 to 1 ratio. The ladder feet are 1 foot away from what it leans against for every 4 feet in height to the point where the ladder rests.
- Never use a ladder in a horizontal position as a runway or a scaffold.
- Never place a ladder in front of a door that opens toward it unless the door is locked, blocked, or guarded by a person.
- Place a portable ladder so that both side rails provide secure footing on soft ground to prevent the ladder from sinking.

- Place the ladder's feet on a substantial and level base, not on a movable object.
- On uneven surfaces, use a block, wedge, or ladder foot.
- Always lash, block, or otherwise secure a ladder's footing on wet or oily pavement, a smooth floor, or an icy or metal surface..
- Do not lean a ladder against unsafe backing, such as loose boxes or barrels.
- Securely lash or otherwise fasten the ladder to prevent it from slipping when using a ladder to access to high places.
- Always extend the ladder at least three rungs (3 feet) above the point of support when gaining access to a roof or elevated platform.
- Always maintain three points of contact when ascending or descending. If material must be handled, place in a bag or bucket and raise or lower it with a rope.
- Always face the ladder when ascending or descending.
- Maintain clean, dry footwear as much as possible to prevent slipping on the rungs.

4.23 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 and communicate hazards to on site personnel.
- Update/dirty the JSA to reflect changes.
- Keep work areas clean and free of clutter, especially in storage areas and walkways.
- Secure all loose clothing and ties, and remove jewelry that may pose an entanglement hazard.
- Establish, maintain, and utilize walkways that are free of slip and trip hazards.
- Utilize/install appropriate lighting for walking paths and working areas.
- Beware of slip/trip hazards such as wet floors, slippery floors, and uneven surfaces or terrain.
- Carry only loads you can see over (Refer to Material Handling for additional information).
- Refrain from the use of portable communication devices (cell phones, two-way radios) while traversing the site.
- Keep a safe buffer zone between workers using equipment and tools.

4.24 Aggressive Or Menacing Behavior

When confronted by an individual whose behavior becomes aggressive or menacing, remain as calm as possible. Avoid arguing with or physically confronting the individual. Attempt to distance yourself from the individual. Advise others in the area to leave the scene and request police assistance by having someone call the emergency number listed on the Emergency Contact Sheet. Use the team approach. A staff member who is physically unable to break away from an attacker should shout for help.

The use of physical force is justified when a person believes that such force is necessary to protect himself or herself against the use or imminent use of unlawful physical force by another person.

Should an aggressor only be interested in the taking or damaging of property, do not interfere. Obtain a description of the individual to provide to local authorities, including height, weight, race, sex, clothing, accent, unusual markings such as tattoos, piercings, scars, hair color, and weapon, if any.

Contact the HSE Help Line and file an incident report with your immediate supervisor as soon as it's safe to do so.

4.25 Adverse Weather Conditions

Adverse weather is the existence of or impending weather conditions such as heavy rain, freezing rain, sleet, snow, high winds (50km/30mph), dust storms, tornadoes, hurricanes, lightning, or any combination of weather that is either not reasonable or not safe for employee exposure. Stop Work Authority (SWA) is executed prior to these conditions as reasonably possible. The site is evacuated according to the emergency plan developed and listed in this Health and Safety Plan.

Based on their expertise and knowledge of manufacturer's recommendations for the equipment being operated, heavy equipment operators such as crane and drill rigs are responsible for advising the site supervisor whether it is safe to continue operations.

The site supervisor decides on the continuation or discontinuation of work based on current and pending weather conditions, the equipment manufacturer recommendations, and the equipment operator's recommendations.

4.26 Flammable & Combustible Liquids

The storage, dispensing, and handling of flammable and combustible liquids must be in accordance with industry standards such as National Fire Protection Agency (NFPA) guidelines. The specific flammable or combustible liquids used at the site may include gasoline, diesel, kerosene, oils, and solvents.

Flammable and combustible liquids are classified according to flash point. This is the temperature at which the liquid gives off sufficient vapors to readily ignite. Flammable liquids have flash points below 100 QF (37.8QC). Combustible liquids have flash points above 100 QF (37.8 QC) and below 200 QF (93.3 QC),

Storage

Many flammables can ignite at temperatures at or below room temperature. They are far more dangerous than combustibles when they are heated. As a result, these products must be handled very carefully. At normal temperatures, these liquids can release vapors that are explosive and hazardous to employee health. Exposure to heat can cause some of these liquids to break down into acids, corrosives, or toxic gases. For this reason, flammable and combustible liquids should be stored in cool, well ventilated areas away from any source of ignition. Always consult the MSDS of the product for specific information.

Flammable and combustible liquids must be stored in designated areas. Such areas must be isolated from equipment and work activity that may produce flames, sparks, heat, or any form of ignition, including smoking. The most practical method is the use of one or more approved (commercially available) flammable/combustible liquid storage cabinets.

Cabinets must be labeled "Flammable- Keep Fire Away." Doors must be kept closed and labeled accordingly. Containers must be kept in the cabinet when not in use.

General Requirements:

- Keep containers of flammable/combustible liquids closed when not in use.
- Keep flammable/combustible liquids in designated areas and approved cabinets.
- Do not allow use of unapproved containers for transfer or storage. Use only approved safety cans (5 gallon maximum) with a spring closing lid and spout cover, designated to safely relieve internal pressure when exposed to heat or fire.
- Use only approved self closing spigots, faucets, and manual pumps when drawing flammable/combustible liquids from larger containers/barrels.
- Use only approved metal waste cans with lids for disposal of shop towels/oily rags.
- Designate "Smoking" and "No Smoking" areas.
- Designate fueling areas.

– Observe all signs indicating "No Smoking," "No Flames," and "No Ignition."

Transferring Flammable/Combustible Liquids

This seemingly routine task can be hazardous if certain precautions are not followed. Grounding and bonding must be observed at all times to prevent the accumulation of static electricity when transferring containers/barrels/drums one to another.

– Drums should be grounded to a grounding rod using a #4 copper conductor.
– Bonding is necessary between conductive containers (e.g., a barrel/drum and a 5 gallon container).

4.27 Decommissioning and Demolition Oversight Activities

Decommissioning and demolition oversight activities are encountered by GHD employees at our client's facilities. The equipment, materials and techniques utilized to decommission and demolish a structure require an individual to use a high level of hazard awareness. The structural integrity of a building is deliberately compromised during demolition. Unforeseen conditions are created during demolition. The physical stresses on a structure combined with the force of gravity and powerful heavy equipment create unpredictable hazards as demolition occurs.

GHD employees are typically contracted in an oversight role as our client's representative and should never enter the active demolition zone. Observing demolition activities even from a perceived "safe distance" can place an individual in harm's way. Each demolition area is subject to rapid change as the work continues. The Health and Safety Plan for decommissioning and demolition work applies only to those activities outside the active demolition area.

Prior to permitting employees to start demolition operations, an engineering survey shall be completed as per local, state, or provincial requirements. This survey will be the responsibility of the demolition contractor's designated competent person to determine the condition of the framing, floors, and walls, and possibility of unplanned collapse of any portion of the structure. Any adjacent structure where employees may be exposed shall also be similarly checked. The employer shall have in writing evidence that such a survey has been performed.

Demolition safety and all demolition activities are the direct responsibility of the qualified demolition contractor. All GHD personnel involved in Decommissioning/Demolition services are required to take the Decom/Demo Oversight course which can be found in LMS but will not direct, advise or otherwise participate in demolition planning and implementation.

4.28 Special Conditions

GHD may be asked to conduct work that requires special precautions/considerations. Potential exposure factors are identified on the left, with associated mandatory conditions identified on the right.

– Remote work locations
– Working alone is not permitted. Submit a Journey Management Plan. Use call-in procedure to include use of satellite phone if no cell or direct line access.
– Project site is in an area known for high crime or violence activity
– Working alone is not permitted. A police or security escort is required.
– Entry into abandoned buildings
– Working alone is not permitted. Use call-in procedure.
– Entry into wooded areas during hunting season
– Working alone is not permitted. Use a reflective vest. Submit a Journey Management Plan. Use call- in procedure.

- Project work involving single employees (lone worker)
- Use call-in procedure.

If these situations are possible, please consult with your RSHM to develop a plan prior to your project's start date.

5. Biological Hazards

5.1 Infection Control

Infection Control

During an infectious outbreak (e.g., epidemic, or pandemic virus), all persons experiencing flu-like symptoms must stay home and away from the workplace to protect themselves, co-workers and the community. Persons, who believe they have been exposed to another illustrating symptoms or developed symptoms themselves, must notify their Supervisor, Project Manager, People Team or HSE Team member for advice and completion of a risk assessment when applicable.

In the event of an infectious outbreak in the community the GHD Standard Operating Procedure HSE Infection Control HSE339 will be initiated along with the activation of the local Crisis Management Team. Should the above occur, both office and field employees will be required to:

- Know the symptoms
- Adhere to local government Public Health and GHD protocols
- Complete personal health screening (including GHD vendors and/or visitors) as required Not attend work if they exhibit any of the symptoms
- Sneeze and cough into their sleeve or a tissue which is then disposed of
- If air borne transmission is confirmed, wear appropriate respiratory protection (surgical style or cloth mask)
- Carry and use infection control cleaning/disinfection supplies and PPE (e.g. nitrile gloves, etc.)
- Wash their hands with soap and water for at least 20 seconds followed by alcohol-based hand sanitizer that contains> 60% alcohol
- Maintain physical distancing of 2 meter/6 feet at all times from others Discontinue face-to-face meetings
- Avoid close contact exposure defined as:
    - Greater than 15 minutes face to face less than 2meter/6 feet apart without the use of face mask/covering
    - Sharing of a closed space with suspected/confirmed case(s)

Note: This is not the exhaustive list. Further protective measures will be included in the HASP should Public Health Authorities provide additional guidance specific to the biological hazard.

5.2 Introduction To Biological Hazards

GHD employees conduct numerous project activities where they may encounter biological hazards such as listed in the following table. This section identifies the problems associated with these biological hazards and the precautions to be taken if these hazards are encountered.

The biological hazards identified are applicable to this site. If you are bitten, stung, or attacked by any of the listed hazards, contact the GHD HSE Help Line at 1-866-529-4886

5.3 Wildlife

Tick and Chiggers	•Wear light colored clothing •Keep clothing buttoned or zipped •Keep socks tucked in •Apply repellent containing DEET or Permethrin to clothing and exposed skin •Check hair and clothing periodically using buddy system	– Remove tick with tweezers or fingers and tissue •Grab tick as close as possible to attachment site and pull firmly •Inspect tick to ensure that no parts remain in attachment site – Apply AfterBite containing antiseptic to affected areas •Call GHD HSE Help Line
Flying, Stinging, Biting Insects: Bees, Wasps	•Avoid wearing perfume, hairspray, cologne, and scented deodorant while working outside •If eating outside, keep all food and drinks covered; sweet foods and strong scents attract stinging insects •Never swat or swing at the insect; wait for it to leave, softly blow it away, or gently brush it aside •Inspect areas carefully as bees, wasps, and hornets can nest both in the ground and above ground •If the nests pose a threat, have them professionally removed	– Apply AfterBite containing to affected areas or place an ice cube or ice pack over the sting to reduce pain – Remove the stinger with tweezers or scratch with a credit card (catch barbs with card and pull out) Seek medical attention when the reaction to a sting includes welling, itching, dizziness, and shortness of breath – Call GHD HSE Help Line
Mosquitoes	•Wear light colored clothing •Keep your body covered as much as possible; wear a hat or mosquito screen •Apply repellent containing DEET or Permethrin to clothing and exposed skin	– Apply AfterBite containing antiseptic to affected areas – If moderate to extreme itchiness is experienced, use over the counter antihistamines
Venomous Snakes	Watch where you step, sit, or put your hands •Wear appropriate clothing, boots, and snake chaps •Stay on your feet as much as possible or clear work area before starting	– Call 911 or the local emergency number – Wash the wound

		– Keep injured area still and lower than the heart – Do not apply ice – Do not apply suction – Do not apply a tourniquet – Call GHD HSE Help Line
Venomous Spiders - Brown Recluse, Black **Widow**	– Shake out clothing and shoes before getting dressed Practice good housekeeping skills – Exercise care when handling materials that have been undisturbed for some time; wear appropriate gloves – Check voids and dark cluttered areas before inserting hands – Always wear gloves	– Retain specimen of spider if possible – Apply AfterBite containing antiseptic to affected areas – Seek medical attention immediately – Do not drive if bitten by a black widow – Call GHD HSE Help Line
Fire Ants	•Be cautious around large open areas •Avoid applying strongly scented lotions •Keep an eye on the ground to watch for ant activity; stay in the shade and cooler areas, as fire ants prefer sunny locations •If you notice the pinch of a fire ant bite, brush the ant off quickly before it has a chance to sting •Always wear high socks, boots, pants, and gloves when working; it may help to tape the pant cuff to the boot •Inspect all vehicles, including cars and UTVs, to ensure no ants are inside •Inspect clothing and equipment used on site to ensure no ants are attached •Check area you are standing in and do not stay in one spot for prolonged periods •Shake out clothing and shoes before getting dressed •Practice good housekeeping skills •Exercise care when handling materials that have been undisturbed for some time; wear leather gloves •Check voids and dark cluttered areas before inserting hands •Always wear gloves	– Move away from the nest to prevent more bites – Remove all clothes as soon as you can, as ants may still be in them – Wash the affected area with cold soapy water – Ice the affected area to calm swelling •Use alcohol to disinfect the area – Be careful not to open the bite blisters – Retain specimen of ant if possible – Apply AfterBite containing antiseptic to affected areas •Call GHD HSE Help Line
Threatening Dogs	•Stop walking, face the dog, and be relaxed •Keep the dog in your peripheral vision as it circles •If it tries to bite -yell "NO" in a loud stern voice •If you have an item such as a briefcase or field book, keep it between you and the dog	– If bitten and the skin is not broken, clean with antiseptic

	•If the dog continues to nip or attacks, fight back; protect your throat and if possible hit the dog in the nose, or kick it in the rib cage, which may stun it and deter it from continuing the attack	– Notify Supervisor/PM – If skin is broken, clean with antiseptic, cover, and seek medical attention – Notify Supervisor/PM – Call GHD HSE Help Line
Rodents/Rats	•Inspect work area for rodent droppings •For low amounts of droppings, use Level C with N95 disposable respiratory protection •For heavy accumulation, use Level C Full Face PAPR with PlO0 cartridge or, in severe cases, Level B •Soak dead mice, nests, and droppings thoroughly with a 1:10 solution of sodium hypochlorite (household bleach); bleach kills the virus and reduces the chance of further transmission •Place contaminated material in a plastic bag and seal for disposal •Disinfect by wet wiping all reusable respirator surfaces, gloves, rubber boots, and goggles with bleach solution •Place all disposable protective clothing, gloves, and respirators in plastic bags and seal for disposal •Thoroughly wash hands with soap and water after removing gloves	– If bitten by a rodent, clean with antiseptic – Cover the wound – Retain specimen if possible and seek medical attention – Notify Supervisor/PM – Call GHD HSE Help Line
Alligator/Crocodiles	•Leave alligators alone •Keep an eye on your surroundings near fresh or brackish waters •Work during daylight hours only, as alligators are most active at night •Use the buddy system when working near known areas •Be extra aware during mating season, as most attacks happen from May to September	– If charged by an alligator, run away, but NOT in zigzag; you may trip and fall – If attacked, fight back – If bitten or scratched, seek medical attention immediately due to bacteria and fungus in animal's mouth – Call GHD HSE Help Line

Bats	•Bat urine and droppings cause the health issue •Droppings carry Histoplasmosis, a respiratory disease •Avoid handling due to rabies, lice, fleas, and other parasites	– Consider contaminated areas due to nesting to be hazardous locations – Use Level C protection in cases of colony location – Do not disturb dropping- enriched soils – Dampen with water to prevent dust – Clean footwear before leaving the site to prevent spore dissemination in cars, the office, at home, and elsewhere – Call GHD HSE Help Line
Scorpions	•Only one common scorpion in North America is dangerous to humans: the bark scorpion •The bark scorpion hides during daytime under rocks, woodpiles, and loose boards •Primarily located in southern United States	– For scorpion stings showing signs of anaphylactic shock, such as hives, wheezing, dizziness, chest pain, or shortness of breath, provide emergency medical care as soon as possible – For scorpion stings without a serious reaction, treat with ice on the sting and over-the-counter pain medication – If the scorpion is still at the scene, trap it in a jar for proper identification – Call GHD HSE Help Line

5.4 Biological

Histoplasmosis	Look for evidence of bird or bat colonies. •Before you work in or dig soil that's likely to harbor the fungus that causes histoplasmosis, spray it thoroughly with water. •Wear appropriate PPE for the task. •Clean footwear before leaving the site to prevent spore dissemination in cars, the office, at home, and elsewhere	– Wash hands with soap and warm water after removing your gloves. – If you have persistent flu like symptoms, see your doctor. Tell then if you have been around a bird or bat colony. – Call GHD HSE Help Line
antavirus	•Inspect work area for rodent droppings •For low amounts of droppings, use Level C with N95 disposable respiratory protection •For heavy accumulation, use Level C Full Face PAPR with PlO0 cartridge or, in severe cases, Level B •Soak dead mice, nests, and droppings thoroughly with a 1:10 solution of sodium hypochlorite (household bleach); bleach kills the virus and reduces the chance of further transmission •Place contaminated material in a plastic bag and seal for disposal •Disinfect all equipment	– Wash gloved hands with soap and water or spray a disinfectant or bleach solution on gloves before taking them off. – Wash hands with soap and warm water after removing your gloves. – If you have been around rodents and have symptoms of fever, deep muscle aches, and severe shortness of breath, see your doctor immediately – Call GHD HSE Help Line
Waterborne Pathogens	•Wear proper PPE when working near water sources •Use standard guard rails for working near water •Follow GHD's Fall Protection SOP If fall protection isn't feasible, personnel are required to wear a regulation life jacket to prevent drowning •Call-in or make prearranged contacts after each activity posing a drowning hazard is complete •Ensure all employees have been vaccinated •Keep vaccination records up to date	– Stay hydrated with clear liquids including water, broth, herbal tea and light fruit juices – Consult a physician if symptoms persist. – Call GHD HSE Help Line
Blood-borne Pathogens	Exposure comes through work activities such as landfill, sewage treatment, sewers, contaminated medical waste• Virus, Bacteria, Fungus, and Parasites are considered blood- borne • Proper hygiene is extremely important to prevent ingestion • Wear proper PPE in known areas (gloves, long sleeves, long pants, safety glasses)	– All human blood and human body fluids treated as infectious • Cover all nicks and cuts to prevent cross-contamination. • Disinfect hands with sanitizer• Proper hygiene extremely important to prevent ingestion and eye contact – More information review GHD blood-borne policy • Call GHD HSE – Help Line if exposed.
Psittacosis - Bird Droppings	Breathing in the organism when the urine, respiratory secretion, or dried feces • Other sources of exposure include mouth-to-beak contact, a bite from an infected bird. • Bacteria starts an infection that varies in severity from a mild flu-like illness to severe pneumonia • PPE may include gloves, protective clothing, boots, and where appropriate, a respirator	– Adequate ventilation systems including the use of high efficiency particulate air (HEPA) filters to reduce the spread of contaminated air. – Disinfectants area with ammonium compounds, isopropyl

		alcohol, 70% ethanol, household bleach (diluted to 1%) – Wetting the wastes before removal decreases aerosolization – Call GHD HSE Help Line if exposed
Legionella	•Minimize water misting, stagnant water, and dead zones •Manage water temperature •Implement a preventative maintenance and inspection program to monitor equipment •Conduct Legionella testing of water systems and equipment	– •If you are suffering a respiratory ailment, notify your supervisor and contact the GHD HSE Help Line

5.5 Poisonous Plants

Poison Ivy/Poison Oak	•Learn to identify poison ivy and poison oak (leaves of three, let them be) •Urushiol oil is in the wood portion of the plant and is active all year long •Wear proper PPE in known areas (gloves, long sleeves, long pants, safety glasses) •Proper hygiene extremely important to prevent ingestion and eye contact	– You may only have 30 minutes to get the oil off skin before it absorbs, and less time in hotter climates – Rinse with cold water, as hot water will open your pores •Apply alcohol to dissolve oils – Watch for an itchy red skin rash, which is the most common reaction; over time, large blisters may form – Use topical cream to assist with the itching (consult your pharmacy) • – In severe cases, contact your doctor • – Call GHD HSE Help Line
Hogweed	•Resembles large Queen Anne's lace or Cow Parsnip •Sap on the underside of leaves and on stem have the highest concentration of toxin •Do not touch with bare skin •Wear long pants and long sleeved shirts in known areas •Do not cut plant down; contact local environmental authorities and report location	– Wash the affected area thoroughly with soap and cold water as soon as possible – Keep exposed area away from sunlight for 48 hours – If a reaction occurs, topical steroids applied early can reduce the severity of the reaction and ease discomfort – If sap goes in eyes, rinse them with water and wear sunglasses •If a reaction has occurred, the area of skin may be sensitive to sunlight for a few years; apply sun block or keep the affected area covered from the sun when possible

		– See a physician if you have a reaction or any questions – Call GHD HSE Help Line
Poison Sumac	•Learn to identify sumac, which usually has clusters of 7-13 leaves •Urushiol oil is in the wood portion of the plant and is active all year long •Wear proper PPE in known areas (gloves, long sleeves, long pants, safety glasses) •Proper hygiene is extremely important to prevent ingestion and eye contact	– You may only have 30 minutes to get the oil off skin before it absorbs, and less time in hotter climates – Rinse with cold water as hot water will open your pores – Apply alcohol to dissolve oils – Watch for itchy red skin rash, which is the most common reaction; over time, large blisters may form – Use topical cream to assist with the itching (consult your pharmacy) – In severe cases, contact your doctor – Call GHD HSE Help Line
Stinging Nettles	•Common plant found throughout North America •Silky hairs attach to the skin and cause pain and irritation •Wear proper PPE in known areas (gloves, long sleeves, long pants, safety glasses)	– Rinse area with cool water – Use tape to remove hairs if you can see them – Use mix of baking soda and water to create a paste and apply to inflicted area. – Obtain first aid/medical treatment if required – Call GHD HSE Help Line
Poison Hemlock Water, spotted, bulbiferous	•Learn to identify Poison Hemlock •Most poisonous plant in North America •Found in marshy areas across the country •All plant parts are poisonous	– Watch for symptoms including dilation of the pupils, trembling, dizziness, and slowing of the heartbeat – Contact the nearest poison control center (see emergency contact sheet) – Give the victim a tablespoon of salt in a glass of warm water to induce vomiting, and keep the person lying down, warm, and quiet, until help arrives – Call GHD HSE Help Line
Vegetation Overgrowth	•common weeds and tall grasses •increase in trip hazard, and entanglement •risk of fire during summer season •wear proper PPE, long pants, eye protection •increase in rodent, snake,stinging insect hazards	– discuss clearing area with management to reduce risks – use extra caution when walking due to unseen holes or trip hazards

		– watch for grass cuts on arms, contact GHD HSE Help Line if reaction occurs

6. Personal Protective Equipment

6.1 Introduction To PPE

Controlling a hazard at the source is the best way to protect employees. When engineering, work practice, and administrative controls are not able to protect our employees, GHD provides personal protective equipment (PPE) to its employees and ensures that the PPE is used appropriately. PPE is equipment worn as a barrier to minimize exposure to a variety of hazards.

This section covers applicable PPE requirements, which include eye, face, hand, head, foot, and respiratory protection.

6.2 Types of Personal Protective Equipment (PPE)

The type of PPE required for work varies based on the task being performed. The specific PPE required for each individual task is documented in the appropriate task-specific JSA. The recommended minimum PPE for GHD site work is as follows:

- Shirts with a minimum 6-inch sleeve.
- Long pants made from suitable sturdy material .
- Grade 1 protective footwear meeting CSA Z195 M92 (Canada)/ ANSI Z41.1 (US), green patched (triangle), steel-toed/puncture-resistant and electric shock-resistant sole with a 6-inch cuff, fully laced and secured, in material appropriate for weather and task.
- Safety glasses or goggles (based on the type of hazard - dust, splash, etc.), meeting CSA Z94.3 (Canada) or ANSI Z87.1 (US) standards.
- Hand protection such as gloves meeting standards EN 388 and ANSI 105-2000 as appropriate for the task as per JSA, with selection based on the hazards (abrasion, blade cut, tearing, puncture, and impact) associated with the task being performed.
- Reflective garment meeting CSA Z96 02 or ANSI 107 (as required).
- Type 1 Class E hardhat, meeting either CSA Z94.1 05, Z94.1 92, ANSI Z89.1, or Z89.1.
- Hearing protection meeting CSA/ANSI approved NRR of at least 20 dBA if noise levels exceed 85 dBA. Additional minimum requirements for PPE include:
- All PPE are maintained in good condition with no rips, tears, or damage that compromise integrity.
- PPE is not loose fitting as to avoid entanglement issues.
- All PPE is disposed of and/or decontaminated at the conclusion of each workday. The most contaminated PPE is decontaminated first.
- All disposable equipment is removed before meal breaks and at the conclusion of the workday, and replaced with new equipment prior to commencing work.
- Reusable equipment (safety glasses, hard hats, goggles, etc.) is cleaned and sanitized according to GHD and/or manufacturer guidelines.
- Eating, drinking, chewing gum or tobacco, and smoking are prohibited while working in areas where the potential for chemical and/or explosive hazards may be present. Personnel must wash thoroughly before initiating any of the aforementioned activities.

6.3 Types Of Protective Material

No universal protective material exists. All materials will decompose, be permeated, or otherwise fail to protect under certain circumstances. Protective clothing can be constructed from a variety of materials for protection against exposure to specific physical, chemical, or biological hazards.

Fortunately, most manufacturers list guidelines for the use of their products. These guidelines usually concern gloves or coveralls and generally only measure rate of degradation, which is failure to maintain structure. A protective material may not necessarily degrade, but may allow a particular chemical to permeate its surface. For this reason, guidelines must be used with caution. When permeation tables are available, they are used in conjunction with degradation tables.

To obtain optimum usage from PPE, the following procedures are followed by all site personnel using PPE:

- When using disposable coveralls, don a clean, new garment after each rest break or at the beginning of each shift
- Inspect all clothing, gloves, and boots both prior to and during use for:
  - Imperfect seams
  - Non uniform coatings
  - Tears
  - Poorly functioning closures
- Inspect reusable garments, boots, and gloves both prior to and during use for:
  - Visible signs of chemical permeation
  - Swelling
  - Discoloration
  - Stiffness
  - Brittleness
  - Cracks
  - Any sign of puncture
  - Any sign of abrasion

Reusable gloves, boots, or coveralls exhibiting any of the characteristics listed above are discarded. PPE used in areas known or suspected to exhibit elevated concentrations of chemicals are not reused.

6.4 Respiratory Protection

Respiratory protection is sometimes required for personnel during project activities when action levels exceed the occupational exposure levels. When respirators are required, personnel identify and select the appropriate air purifying respirator and supporting cartridge medium, and follow the procedures and guidelines in their respective written Respiratory Protection program.

At a minimum, all personnel required to use this equipment are:

- Instructed in how to properly fit a respirator to achieve the required face piece to face seal for respiratory protective purposes.
- Medically cleared for the use of respiratory protection.
- Appropriately fitted for the selected respirator through established recognized fit testing methods (quantitative/qualitative), and documentation of fit is readily available.
- Free of beards, sideburns, eyeglasses, and upper or lower dentures that could affect the face seal.

Further regulations for the use of respiratory protection include:

- Cartridges are changed prior to breakthrough, daily, or when personnel begin to experience increased inhalation resistance or breakthrough of a chemical warning property.
- Respiratory equipment and other non disposable equipment are fully decontaminated.
- Appropriate action levels are established and documented based on the applicable occupational exposure limits.

NOTE: This HASP is not intended for the use of supplied air operations. For supplied air operations, the project manager and a GHD safety professional conduct a review of the scope of work.

GHD identifies the type of respirator and cartridge and documents on the applicable JSA for the affected tasks and on Table 2.

6.5 Respirator Cleaning

Respirator decontamination is conducted once daily at a minimum. Face pieces are disassembled, the cartridges are thrown away, and all other parts are placed in a cleansing solution. After an appropriate amount of time in the solution, the parts are removed and re seated with tap water.

Face pieces are allowed to air dry before being placed in sanitized bags and stored in a clean area.

6.6 Levels Of Protection

Protection levels provided by PPE selection are upgraded or downgraded based upon a change in site conditions or the review of the results of air monitoring or the initial exposure assessment monitoring program, if one was conducted.

When a significant change occurs, the hazards are reassessed. Some indicators of the need for reassessment are:

- Commencement of a new work phase.
- Change in job tasks during a work phase.
- Change of season/weather.
- Temperature extremes or individual medical considerations limiting the effectiveness of PPE.
- Chemicals other than those expected to be encountered are identified.
- Change in ambient levels of chemicals.
- Change in work scope that affects the degree of contact with areas of potentially elevated chemical presence MUST be re-evaluated.

All proposed changes to protection levels and PPE requirements are reviewed and approved prior to implementation by the SS.

7. Air Monitoring

7.1 Introduction To Air Monitoring

Inhalation hazards are caused from the intake of vapors and contaminated dust. Air monitoring shall be performed while intrusive activities are taking place to detect the presence and relative level of those air contaminants that are inhalation hazards. The purpose of air monitoring is to identify and quantify airborne contaminants in order to determine the level of worker protection needed. Initial screening for identification is often qualitative, but the determination of its concentration (quantification) must await subsequent testing.

All instruments will be calibrated on a daily basis in accordance with the manufacturer's guidelines. Records of all calibrations and real time measurements will be kept in a bound field logbook or documented via air monitoring and calibration log sheets.

Correction factors have been determined by the air monitoring equipment manufacturers that enable the user to quantify a large number of chemicals using only a single calibration gas, typically isobutylene for PIDs and methane for LEL. Applicable Correction Factors (CF) for either LEL or PIDs must be applied for known chemicals of concern. These CFs and how to apply them can be found in the air monitoring instrument operating manual or online from the manufacturer’s website under "Technical Notes".

When air monitoring is required, the workers breathing zone(s) will be monitored and the results recorded. Additionally, when necessary, area samples at the following locations will be taken daily. Record time, location, and results of monitoring and actions taken based on the readings:

- Upwind of work areas to establish background concentrations.
- In support zone to check for contamination or migration of emissions.
- Downwind of work area to track any contaminants/emissions leaving the site.

The data collected throughout the monitoring effort shall be used to determine the appropriate levels of protection. Action levels for upgrading or downgrading of PPE have been established on Table 2 and must be reviewed by your HSE Manager/Safety Professional

7.2 Types Of Devices

Air monitoring equipment to be used during site activities shall consist of:

MULTI-GAS METER

The Multi Gas Meter is a combination gas monitor that detects% oxygen, carbon monoxide, hydrogen sulfide, and combustible gas, which simultaneously analyzes concentrations of each contaminant in air. When used properly, the portable oxygen indicator will read the percent oxygen in the immediate atmosphere. The normal ambient oxygen concentration is 20.9 percent at sea level. It is necessary to be apprised of such readings as they impact LEL readings and vice versa.

Action levels for each contaminant being monitored can be found in Table 2 (On-Site Air Monitoring Program Action Level Table), which includes parameters, action levels, and actions to be taken.

PHOTOIONIZATION DETECTOR (PID)

Exposure to volatile organic compounds (VOCs) shall be monitored with a photoionization detector (PID) with required eV lamp as per Table 1. The PID has the ability to detect organic vapor concentrations from 1 part per million (ppm) to 2,000 ppm. All PID monitoring shall be conducted in the breathing zone.

VISUAL DUST CONTROL

No special equipment will be used to monitor dust. Engineering techniques to reduce dust such as wetting methods, staying upwind of potential sources and operating equipment such that little dust is created will be implemented at the site.

OTHER DEVICES

- DustTrack PM10 dust monitor

7.3 Monitoring Frequency

Monitoring will be conducted continuously during ground intrusive activities or during any activity where airborne hazards (e.g., organic vapors) may be present. The monitoring equipment listed in this HASP for the work activity, relates to the initial levels of protection listed on the TABLE 2. If the results of the first hour of monitoring indicates contaminant concentrations are non detect, and no differing site conditions are observed, then the monitoring frequency may be decreased.

Monitoring results will be legibly documented each work day. They will note project name/number, date, time, serial number, date of last calibration, and the name of person performing calibration, name of person performing monitoring, monitor location within the site, and monitoring results. Daily documentation will be kept with the SS and included in the project file.

7.4 Safety And Health Action Levels

An action level is a point at which increased protection or cessation of activities is required due to

the concentration of contaminants in the work area. All activities shall be initiated as per JSA requirements. The appropriate actions are to be taken at designated action levels. The initial action level(s) for site work can be located in **Table 2.**

In addition to the action level, an upgrade to Level C is required if:

- Any symptoms occur, as described on the Table 1 Signs and Symptoms
- Requested by an individual performing the task
- Any irritation to eye, nose, throat, or skin occurs

A work stoppage and evacuation (cease and desist) at the specific work area is required if levels in the breathing zone exceed the protection factor of the respirator.

7.5 Air Monitoring Plan for Dust

A separate Air Monitoring Plan exists for dust, which is the exposure route of potential concern for the primary constituents of concern identified within the Southern Impoundment (polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans)

Real-time air monitoring for total dust will be performed during normal work operations using TSI Dustrak aerosol or equivalent monitoring instruments. The Dustrak monitors will be placed downwind and upwind of the work area. All instruments will be calibrated and operated in accordance with the manufacturer's specifications or applicable test or method specifications. Real time air monitoring with a hand held dust monitor will also be performed in the work area.

8. Site Control

8.1 Introduction To Site Control

The purpose of site control is to minimize potential contamination of workers and protect the public from hazards found on site. Site control also includes site security for the protection of GHD employee and subcontractor when working in public areas. Site Control is especially important in emergency situations.

Site control, work area demarcation, and site security will be achieved through posting of signage and placement of barricades and or personnel. All controlled areas will have the appropriate signage posted. Barricades and

warning signs will be placed to warn personnel of potential hazards. A standby person (spotter) may be utilized in place of barricades, where appropriate. The following materials may be used to barricade the work area and protect both public and GHD:

- Temporary Fence
- High Visibility Tape, Rope or Chain
- Saw Horses
- Flagging
- Warning Signs
- Permanent Fencing
- Traffic Cones
- Employees at Work Signs

Approved pedestrian and vehicle traffic paths will be determined during Tailgate Safety Meetings based upon current site conditions and work locations. When applicable, one pathway should be established for heavy equipment and one for personnel decontamination.

The majority of site operations, as well as access to the site, could be controlled from the support zone. The support zone will provide for team communications, emergency response, and sanitary facilities. Appropriate safety and support equipment also will be located in this zone.

The support zone will be located upwind of site operations if possible, and would be used as a potential evacuation point if appropriate. No potentially contaminated personnel or materials are allowed in this zone.

8.2 Work Zone Demarcation

When performing work that could put yourself or others at risk, you must demarcate an Exclusion Zone around your work. This is typically done with yellow and black plastic "barricade tape." Use signs, placards, and other postings as necessary to warn others not to enter the demarcated area unless they have business in the area and have authorization to enter. Where appropriate, post special requirements for entry.

The levels and requirements for work zone demarcation is based on the task being performed or the requirements of the client.

8.3 Work Zone Demarcation Level 2

Is required for active or inactive retail sites when there is heavy equipment operation. Level 2 is to be set up to isolate the work area from public access.

- Excavation including test pitting and tank pulls
- Crane and Aerial lifts
- Anytime an excavation is being left open for any duration

These task require sawhorse barrier or temporary fencing which prevents the public from entering the work area. Signs must be posted indicating the required PPE.

8.4 Two-Person Crew/Buddy System

A Two-Person Crew or Buddy System shall be implemented to protect the employees and public when conducting high risk activities such as:

- Working near traffic
- Working ON or NEAR water

- Excessive noise to which hearing traffic or communication is difficult
- Confined or restricted spaces
- In an isolated area such as landfills or wooded areas
- Areas with high crime rates

When using the buddy system, visual contact must be maintained between crew members at all times, and crew members must observe each other for signs of chemical exposure, heat, or cold stress. Indications of adverse effects include, but are not limited to:

- Changes in complexion and skin coloration
- Changes in coordination
- Excessive salivation and pupillary response
- Changes in speech pattern.

Project personnel must also be aware of potential exposure to possible safety hazards, unsafe acts, or noncompliance with safety procedures. Individuals must inform their partners or fellow team members of non visible effects of exposure to toxic materials. The symptoms of such exposure may include:

- Headaches
- Dizziness
- Nausea
- Blurred vision
- Cramps
- Irritation of eyes, skin, or respiratory tract.

If protective equipment or noise levels impair communications, prearranged hand signals must be used for communication. Personnel must stay within line of sight of another team member.

8.5 Communication

Each member of the project team will be able to communicate with other team members at all times. Communications will be by way of:

- Cell Phones/Smart Phones
- Two-Way Radio
- Air Horns
- Hand Signals

The primary means for external communication are telephones and radio. If telephone lines are not installed at a site, all team members should:

- Know the location of the nearest telephone
- Have the necessary telephone numbers readily available

Note: The authorized use of cellular phones must be cleared by the client prior to entering site.

The following procedures will be followed by all site workers when using a cell phone on site:

- No cell phone use while driving or operating equipment.
- No cell phone use while in the Exclusion Zone.
- If using a cell phone on site, find a location where you can safely use the phone. Do not walk around the site while using a cell phone.

Understanding of the following standard hand signals will be mandatory for all employees, regardless of other means of communication:

- Hand gripping throat - Cannot breathe
- Hands on top of head - Need assistance
- Thumbs up - OK, I'm alright, I understand
- Thumbs down - No, negative
- Gripping partner's wrist, or gripping both of your own hands on wrist (if partner is out of reach)- Leave area immediately

8.6 Decontamination And Hygiene

Decontamination

In general, everything that enters the site must either be decontaminated or properly discarded upon exit from the site. Prior to demobilization, potentially contaminated equipment will be decontaminated on a wash pad (decontamination pad), drum, or containment pad which then will be placed into appropriate container, labeled, and will be stored in a designated area until disposal arrangements are made.

The type of decontamination solution to be used is dependent on the type of chemical hazards. The decontamination solution for heavy equipment and for any reusable PPE is Alconox/Liqui nox soap. The MSDSs for Alconox/Liquinox will be located in the Appendix.

Personnel Decontamination Procedures

Personnel decontamination will be completed in accordance with the GHD Safety and Health

Program for personnel decontamination. Wash water and sediments will be collected and stored with any runoff water collected for subsequent treatment/disposal. PPE, trash, etc. will be sent off-Site for disposal. It will be kept separate from trash generated in clean areas of the Site.

All disposable equipment shall be doffed before meal breaks and at the conclusion of the workday and replaced with new equipment prior to commencing work.

Procedures for decontamination must be followed to prevent the spread of contamination and to eliminate the potential for chemical exposure.

Personnel - Decontamination will take place prior to exiting the contaminated work area. Decontamination procedures are as follows:

Step 1 Remove all visible contamination and loose debris by washing with clean water.

Step 2 Remove all outer clothing that came in contact with the contamination (i.e., boot covers and outer gloves) and either dispose of in disposable container or wash in detergent solution and rinse.

Step 3 Remove protective clothing; dispose of in disposable container.

Step 4 Remove respirator, sanitize prior to reuse.

Step 5 Remove inner gloves, dispose of in disposable container.

Step 6 Wash and rinse hands.

General Safety and Personnel Hygiene

- Eating at the site is prohibited, except in specifically designated areas. Designation of eating areas will be identified to each employee. The location of these areas may change over the duration of the project to maintain adequate separation from the active work area(s).

- Smoking at the site is prohibited.
- Individuals getting wet to the skin with effluent from the washing operation must wash the affected area immediately. If clothes in contact with skin are wet, then these must be changed.
- Hands, face, neck, and other exposed areas must be washed with soap and water before eating, drinking, smoking, before using toilets, and before leaving the site.
- All disposable coveralls and soiled gloves will be placed in covered containers at the end of every shift or sooner, if deemed necessary by the SHO. Wastes will be stored until proper disposal arrangements have been made.
- Personnel working on site will not be permitted to wear facial hair that interferes with the mask to face seal on air purifying respirators.
- All personnel performing or supervising work within the EZ must wear appropriate PPE, observe, and adhere to the personal hygiene related provisions of this section.
- Personnel found to be disregarding the personal hygiene related provisions of this HASP will, at the discretion of the SHO, be barred from the site.

8.7 Social Protection

Security Measures

A site assessment should be made prior to performing work in high risk areas for violent crime. Additionally, it may be important to gather as much information as possible from the client, describing the location and social conditions of the area where work will be performed.

In the event it has been determined that this work will occur in an area of high risk, consideration shall be given to providing on site security for the protection of the employee. This option may include services from a security agency, local law enforcement (if available), or the services of an off duty law enforcement officer. The Project Manager and/or Project Coordinator shall be contacted and provide authorization prior to making these arrangements.

Anti-social behavior means different things to different people - noisy neighbors who ruin the lives of those around them, 'crack houses' run by drug dealers, loitering by drunkards, people begging by cash points, abandoned cars, litter and graffiti, young people using airguns to threaten and intimidate or people using fireworks as weapons.

When in this situation, there is no single strategy that always works. Remember these tips when faced with work conditions in volatile neighborhoods:

Street Precautions

When walking to and from your vehicle, or in and around the work site:

- Be alert to your surroundings and the people around you, especially if you are alone or it is dark
- Whenever possible, travel with a colleague
- Stay in well lighted areas as much as possible
- Walk close to the curb; avoid doorways, bushes, and alleys where someone could hide
- Walk confidently, and at a steady pace; make eye contact with people when walking
- Do not respond to conversation from strangers on the street, continue walking

Harm Reduction

Do as much as you can to avoid a confrontation "anticipation and avoidance" are the key words.

- If you get caught up in a situation, try to talk to an aggressor without provoking them.
- Practice relaxation, as appearing fearful or stressed can actually provoke an attack.

- Remember that body language is important in aggressive situations, so maintain a comfortable distance between you and the aggressor.
- It may be more advisable to submit than to resist and risk severe injury or death. You will have to make this decision based on the circumstances. Be especially careful, if your attacker has a weapon.
- Avoid arguing with or physically confronting the individual. Attempt to distance yourself from the individual. Advise others in the area to leave the scene and request police assistance by having someone call the emergency number listed on the Emergency Contact Sheet. Use the team approach. A staff member who is physically unable to break away from an attacker should shout for help.
- Steady yourself if danger threatens. Panic can disable you, so again it's useful to learn how to keep control in a difficult situation.
- If you must fight back, adopt what police term the "bash and dash" approach. Primary targets are the eyes, nose, mouth, ears, throat, groin, knees, or shins; choose whichever is easiest to get to.
- Be aware that your attacker might be stronger than you, or may take what you are using in self defense and use it against you. It is often better just to shout loudly and run away.
- When confronted by an individual whose behavior becomes aggressive or menacing, remain as calm as possible. Avoid arguing with or physically confronting the individual. Attempt to distance yourself from the individual. Advise others in the area to leave the scene and request police assistance by having someone call the emergency number listed on the Emergency Contact Sheet. Use the team approach. If you are physically unable to break away from an attacker, shout for help.
- The use of physical force is justified when a person believes that such force is necessary to protect him or herself against the use or imminent use of unlawful physical force by another person. The use of physical force is also justified in the defense of another party, such as a co worker, who is being subjected to unlawful physical force. You can use any technique of legal self defense in order to halt or distract an attacker until law officers arrive on the scene.
- Should an aggressor only be interested in taking or damaging property, do not interfere. Obtain a description of the individual to provide to local authorities, including height, weight, race, sex, clothing, accent, unusual markings such as tattoos, facial piercing, scars, hair color, and weapon, if any.
- Shout 'fire' rather than 'help' - it can get more results.
- Stay alert and observant so that you can better describe your attacker and the assault to the police.
- Report the incident to the GHD Help Line and BWise and work with your PM and HSE Manager to complete the investigation

Drug Activity

The safe retrieval and disposal of used hypodermic needles and syringes:

- GHD employees must not handle or remove any hypodermic needles or syringes. You should contact the local Police Department, Fire Department, or Health Department for removal from the job site.
- If you are injured by a discarded needle you can receive a vaccination against Hepatitis B within 48 hours of the incident. Notify the GHD Help Line and seek medical attention, call 911 if necessary.
- If an accident occurs where a needle or other sharp object has punctured the skin, then the injured person should:
  - Encourage the wound to bleed gently
  - Wash well with soap under cold running water
  - Cover the wound with a waterproof dressing
  - Seek medical attention as soon as possible
  - Inform the SS and/or PM
  - Complete a GHD Incident Reporting Form

Car Jacking

You can help prevent yourself being a victim of car jacking by:

- Keeping your doors locked in built up areas, and trying to keep the windows wound up, especially at traffic lights
- Being aware of what people are doing around you
- Using the middle lane, if there is one, when waiting at junctions or lights, so that your car is harder to get to from the pavement
- Not stopping to help someone who has broken down (if you really want to help, pull over at the next garage or police station and call for help)
- Driving to the next garage or police station and reporting them if someone tries to pull you over for no reason

A car jackers may 'accidentally' bump into your car, aiming to get you out of the car so they can steal it. If this happens, you may choose not to get out of the car - especially if you do not think it is a genuine accident. Wind the window down a little bit to talk to them if you want to.

Aggressive or Menacing Behavior

Report to the GHD HSE Help Line, BWise and work with your PM and HSE Manager to complete the investigation.

8.8 Site Security

Site security is necessary to prevent the exposure of unauthorized, unprotected people to site hazards and to avoid interference with safe working procedures. Security shall be maintained outside of the actual work area(s) so as to prevent unauthorized entry into the work area(s).

Members of the general public are to be protected from site hazards.

9. Traffic Control

9.1 Introduction to Traffic Control

Temporary traffic control (TTC) procedures standardize and clarify minimum expectations for practices of TTC when performing field activities on or within 3 meters (10 ft) of active roadways. Following the requirements of this procedure helps to reduce the risk posed to employees from distracted drivers.

Responsibilities of supervisors and project managers include the following:

- Identify and communicate areas on site that require proper TTC
- Identify personnel who complete the work and verify that they are adequately trained in TTC procedures, including documentation of training records
- Coach and guide personnel on the proper use and care of equipment required for TTC
- Provide and maintain required TTC equipment
- Complete work site inspections to ensure compliance with TTC procedures
- Prevent unauthorized entrance into the work zone

Responsibilities of employees working on near active roadways consist of the following:

- Cooperate and comply with the TTC procedures contained herein and with procedures outlined by supervisor
- Inspect road area for hazards and revise JSA/JHA as needed

- Maintain equipment used for TTC
- Communicate any issues, including equipment condition, to supervisor
- Issue Stop Work Authority (SWA) when unable to adhere to this program

The levels of TTC are based on the task on hand, the proximity of the roadway, and the duration of the activity.

9.2 Traffic Control Level 2

Level 2 includes general street conditions that are not a highway, or tasks such as monitoring, drilling, or inspection within 3m or 10ft of a active roadway. Basic requirements for Level 2 include:

- Develop a JSA that follows the MUTCD or provincial equivalent for lane closures and redirection of traffic
- Obtain a permit from the municipality if necessary
- Adhere to a maximum speed limit of 50km or 30mph
- Complete a safety and health review
- Use equipment per MUTCD or provincial equivalent

10. Emergency Procedures

10.1 Introduction Emergency Procedures

Emergencies can range from minor to serious conditions. Various procedures for responding to site emergencies are listed in this section. The PM or SS is responsible for contacting local emergency services, if necessary, for specific emergency situations. Various individual site characteristics will determine preliminary action to ensure that these entry procedures are successfully implemented in the event of an emergency. The project team will address necessary facility/client emergency protocols to ensure compatibility between this document and facility/client programs and expectations.

Field employees will identify the primary (on site) and secondary (off site) evacuation routes to muster locations prior to initiating work. A site map is provided in the Appendix.

At client facilities, site emergencies may be indicated by a fog horn or other loud audible sound. If an adjacent facility's alarm is activated, work will stop immediately, equipment will be de energized and/or secured as necessary for safety reasons and personnel will go immediately to the secondary evacuation location as indicated in pre-start and tailgate meetings.

Emergency evacuation drills will be conducted as deemed necessary by the SS, and documentation of the drills will be maintained by the SS in project file.

An Emergency Information Sheet containing the hospital location, directions, government agency phone numbers, emergency phone numbers, and a map with directions to the hospital is located in the Appendix.

10.2 Incident, Injury, Illness Reporting And Investigation

Any work related incident, injury, illness, exposure, vehicle accident, property loss and or security issues must be reported to your supervisor, the SS immediately. Stop Work Authority will be implemented. Provide care for any injured persons and secure the scene.

GHD will call the GHD PM and the GHD HSE Help Line. Personnel on site should maintain the work area as it was at the time of the incident until further directions are given by the GHD PM, a GHD Safety Professional. No GHD person on site has the authority to call a regulatory agency (environmental or OSHA); this shall be completed by GHD Leadership Team in conjunction with the client. Emergency medical care or support of fire departments is not a restricted call if immediately necessary to protect life and property.

The GHD PM and HSE Manager will coordinate with on site personnel to gather critical information. The GHD PM is responsible (or their designee) to enter the information into BWise within a 24 period from time of incident. The GHD PM is also responsible to contact the client, which a positive verbal contact is required. The GHD staff listed above will coordinate the completion of the investigation and placement of information into BWise. This same group of GHD staff will manage further communications with the client.

The report must be filed for the following circumstances:

- Incident, injury, illness, or exposure of an employee.
- Injury of a subcontractor.
- Damage, loss, or theft of property.
- Any motor vehicle accident, regardless of fault, which involves a company vehicle, rental vehicle, or personal vehicle while the employee is acting in the course of employment.
- Any sting, involving a puncture of the skin must immediately be reported to Work Care and follow all GHD reporting requirements
- Security Issues
- Environmental releases or loss of containment.

Occupational incidents resulting in employee injury or illness will be investigated by the SS. This investigation will focus on determining the cause of the incident and modifying future work activities to eliminate the hazard.

All employees have the right and obligation to report unsafe work conditions, previously unrecognized safety hazards, or safety violations of others. If you wish to make such a report, it may be made orally to your supervisor or other member of management, or you may submit your concern in writing, either signed or anonymously.

10.3 Emergency Equipment/First Aid

Safety equipment will be available for use by site personnel, located within 30 feet of the work area(s), and maintained at the site.

- First Aid kit(s), compliant with local jurisdictional requirements according to number of workers present
- Automated External Defibrillators (AEDs) are optional first aid response equipment for conditions related to heart stoppage. If a unit is on site, designated personnel must be trained in the specific AED unit in addition to First Aid and CPR certification, conduct monthly inspections, and contact listed AED Unit coordinator.
- Emergency eyewash bottles and/or an eyewash station lasting 15 minutes.
- Emergency alarms as a means to alert all personnel instantaneously for an emergency.
- Fire extinguisher (at a minimum, a 2A/10BC will be on site).

10.4 Emergency Procedures For Contaminated Personnel

Whenever possible, personnel should be decontaminated in the contamination reduction zone before administering first aid, without causing further harm to the patient.

- Skin Contact: Remove contaminated clothing, wash immediately with water, and use soap, if available.

- Inhalation: Remove victim from contaminated atmosphere. Remove any respiratory protection equipment. Initiate artificial respiration, if necessary. Transport to the hospital.
- Ingestion: Remove from contaminated atmosphere. Do not induce vomiting if victim is unconscious. Never induce vomiting when acids, alkalis, or petroleum products are suspected. Transport to the hospital, if necessary.

Any person transporting an injured/exposed person to a clinic or hospital for treatment should take with them directions to the hospital and a listing of the contaminants of concern to which they may have been exposed.

Any vehicle used to transport contaminated personnel will be cleaned or decontaminated, as necessary.

10.5 Site Evacuations

In the event of an emergency situation such as fire, explosion, or significant release of toxic gases, project personnel in the field will be notified by established communications to evacuate the area. In the event of an emergency, GHD personnel will gather at their primary mustering point for a head count. The SS will determine a primary and secondary muster point to be used as an assembly area in the event of an emergency. The secondary muster point will be located at least 90 degrees from the primary. These locations will be communicated to the work crew(s) during the Tailgate Safety Meeting (TGSM) as part of the site specific training prior to commencement of work activities, weekly thereafter, and prior to the advent of potentially threatening weather.

Muster points will be identified in the site map attached to the HASP.

10.6 Spill And Release Contingencies

If a spill has occurred, the first step is personal safety, then controlling the spread of contamination, if possible. GHD personnel will immediately contact site management to inform them of the spill and activate emergency spill procedures.

11. Environmental Control Program

11.1 Introduction

This section of the HASP outlines measures to be implemented at the site to prevent hazards associated with environmental conditions.

11.2 Weather Monitoring

The SS will be responsible for checking weather forecasts for the next day and week of work to provide advance notification of any severe weather conditions. Severe weather conditions (e.g., heavy rains) may cause unsafe conditions at the site and in some situations work may have to be stopped.

11.3 Tornado Safety Policy And Procedures

Tornadoes occur most frequently between April and October from 3:00 to 7:00 p.m. but can occur any time. In most cases, tornadoes move from a west/southwest direction. A typical tornado is a swirling storm of short duration with winds up to 300 miles per hour and a near vacuum at its center. It appears as a rotating funnel shaped cloud, from gray to black in color, extending towards the ground from the base of a thundercloud.

Tornadoes usually only cover a limited geographical area and give off a roaring sound. A tornado is the most concentrated and destructive potential weather event at the work site. Tornadoes are usually the result of the

interaction of a warm, moist air mass with a cool or cold air mass. Secondary effects of tornadoes include flash flooding, electric power outages, transportation system and communication system disruption, and fires.

Whenever weather conditions develop that indicate tornadoes are expected, the National Weather Service will issue a tornado watch to alert people in a designated area for a specific time period (normally 6 hours) to remain alert for approaching storms. The tornado watch is upgraded to a tornado warning when a funnel cloud (tornado) is actually sighted or indicated by weather radar.

When a tornado is approaching, Site personnel will only have a short time to react. Therefore, site personnel must be prepared to react during periods of severe weather. Memorize the following tornado danger signs:

- Approaching clouds of debris can mark the location of a tornado even if a funnel cloud is not visible
- Before a tornado hits, the wind may die down and the air can become very still/calm
- It is not uncommon to see clear, sunlit skies behind a tornado as they usually occur at/near the trailing edge of thunderstorms.

Tornado Evacuation Procedures

GHD and contractor personnel monitor weather related information provided by National Weather Service. If the National Weather Service issues a tornado warning, Site supervisor will activate the emergency response plan.

The "take shelter" warning signal is a "slow wail" of the alarm system. GHD work site personnel will evacuate the work zone(s) when a tornado watch has been issued by the National Weather Service. Personnel will contact the Project Management team to inform them they are leaving the site and provide them a location of the muster point (shelter) they are going. The Site Supervisor are responsible for work areas, they will check remote areas of the work zone(s) to ensure personnel have reacted to the alert. Personnel must proceed to the work site mustering point (shelter) and wait for further instructions. If a tornado watch is upgraded to a tornado warning, personnel will proceed to the designated tornado shelters. Once inside the shelter, conduct a head count to ensure that personnel are accounted for. In general, stay away from all windows and doors that lead to the outside. Remain in the shelter until the "all clear" signal is given by the Site Supervisor.

The tornado shelter most accessible to GHD personnel should be noted on the site map attached to this HASP

Directions to the shelter are to be communicated to work site personnel during initial site safety orientation and throughout the tornado season during subsequent safety meetings.

If unable to reach the designated shelter, the best protection in a tornado is usually an underground area. If an underground area is not available, consider small interior rooms on the lowest floor without windows, hallways on the lowest floor away from doors and windows, rooms constructed with reinforced concrete/brick/block with a heavy concrete floor and roof, and protected areas away from doors and windows.

11.4 Rain And Snow

Excessive amounts of precipitation may cause potential safety hazards for work tasks. The hazards that would be most commonly associated are slipping, tripping, or falling due to slippery surfaces.

Severe weather conditions will result in work stoppage and the implementation of further emergency measures.

11.5 Temperature

Site activities are expected to be conducted year round. Temperature extremes may be experienced which require measures to be implemented to prevent health and safety hazards from occurring. Potential hazards arising from temperature extremes are heat stress and cold exposure.

11.6 Wind

High winds may be encountered at the site and these can cause hazards that may affect site personnel health and safety. Preventative measures that will be implemented if necessary are as follows:

i. Restrict site activities.
ii. Batten down light equipment or building materials.
iii. Partially enclose work areas.
iv. Reduce or Stop Work activities.

11.7 Lightning & Thunder

Light travels at a faster speed than sound, you can see a lightning bolt before the sound of thunder reaches you.

To judge how close lightning is, count the seconds between the flash and the thunder clap. Each second represents about 328 yards/300 meters. If you can count less than 30 seconds between the lightning strike and the thunder, the storm is less than 6.2 miles/10 km away and there is an 80 percent chance the next strike will happen within that 6.2 miles/10 kilometers.

Lightning may strike several miles/kilometers away from the parent cloud and therefore precautions should be taken even if the thunderstorm is not directly overhead.

If you hear thunder or see lightning, stop work immediately and seek safe shelter. Remain sheltered for 30 minutes after hearing the last thunder before returning to work.

11.8 Outdoor Precautions During Severe Weather

- Keep a safe distance from tall objects, such as trees, hilltops, and telephone poles.
- Avoid projecting above the surrounding landscape. Seek shelter in low lying areas such as valleys, ditches, and depressions, but also be aware of flooding.
- Stay away from water. Don't go boating if a storm threatens. Move to land as quickly as possible if you are on the water. Lightning can strike the water and travel some distance from its point of contact. Don't stand in puddles even if you are wearing rubber boots.
- Stay away from objects that conduct electricity, such as tractors, metal fences, motorcycles, lawnmowers, and tall metal objects.
- Avoid being the highest point in an open area. Holding a conductive tool, holding an umbrella, can make you the tallest object and a target for lightning.
- You are safe inside a car during lightning, but don't park near or under trees or other tall objects, which may topple over during a storm. Be aware of downed power lines, which may be touching your car.
- In a forest, seek shelter in a low lying area under a thick growth of small trees or bushes.
- Be alert for flash floods, which are sometimes caused by heavy rainfall, if seeking shelter in a ditch or low lying area.
- If caught in a level field far from shelter and you feel your hair stand on end, lightning may be about to hit you. Kneel on the ground immediately, with feet together, place your hands on your knees and bend forward. Don't lie flat.
- If you are in a group in the open, spread out, keeping people several yards/meters apart.

11.9 Indoor Precautions During Severe Weather

- Before the storm hits, disconnect electrical appliances including radios and television sets. Do not touch them during the storm.

- Don't go outside unless absolutely necessary.
- Stay away from doors, windows, fireplaces, and anything that will conduct electricity, such as radiators, stoves, sinks, and metal pipes. Keep as many walls as possible between you and the outside.
- Don't handle electrical equipment or telephones. Use battery operated appliances only.

11.10 Flash Flooding

Floods are one of the most common hazards in low lying areas, however not all floods are alike. Some floods develop slowly, while others such a flash floods, can develop in just a few minutes and without visible signs of rain. Additionally, floods can be local, impacting a neighborhood or community, or very large, affecting entire river basins and multiple states.

Flash floods can occur within a few minutes or hours of excessive rainfall, a dam or levee failure, or a sudden release of water held by an ice jam. Flash floods often have a dangerous wall of roaring water carrying rocks, mud and other debris.

Be aware of flood hazards no matter where you live or work, but especially if you are in low-lying areas, near water, behind a levee or downstream from a dam. Even very small streams, gullies, creeks, culverts, dry streambeds or low-lying ground that appear harmless in dry weather can flood.

During the flood

- If any possibility of a flash flood, move immediately to higher ground. Do not wait for instructions to move.
- Be aware of stream, drainage channels, canyons and other areas known to flood suddenly.

If you must prepare to evacuate, you should do the following:

- Do not walk-through moving water. Six inches of moving water can make you fall.
- If you have to walk in water, walk where the water is not moving. Use a stick to check the firmness or depth of the ground in front of you.
- Do not drive into flooded areas. If floodwaters rise around your car, abandon the car and move to higher ground if you can do so safely.
- Observe weather in the distance, rain in the hills can cause flooding in the valleys. Do not park your vehicle along streams, rivers or creeks, particularly during threatening conditions.

APPENDIX DOCUMENTS

Chemical Table

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes Of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
Dioxin CAS-1746-01-6	2, 3, 7, 8-tetrachloro-dibenzo-p-dioxin Dioxine TCDBD TCDD 2, 3, 7, 8-TCDD CAS-1746-01-6	TLV: NE PEL: NE STEL: NE IDLH: NE	Inhalation Absorption Ingestion Eye/skin contact	ACUTE: Irritation to the eyes; allergic dermatitis; gastrointestinal disturbance; CHRONIC: Chloracne; Porphyria; possible reproductive and teratogenic effects; liver and kidney damage; hemorrhage. Potential occupational carcinogen.	(FP) NE (VP) 0.000002 mm (IP) NE (UEL) NE (LEL) NE	Colorless to white, crystalline solid. (Exposure may occur through contact at previously contaminated worksites	0.206 mg/kg
Dibenzofuran CAS - 132-64-9	Dibenzofuran	TLV NA PEL NA STEL NA IDLH NA	Inhalation, Ingestion, Eye, Skin	Acute: Inhalation of material may be harmful. Contact may cause burns to skin and eyes Chronic: Inhalation of Asbestos dust may have a damaging effect on the lungs	(FP) 130 °C / 266 °F (VP) 0.00248 mm Hg @ 25 deg C (IP) (UEL) (LEL)	Colorless white crystalline solid	0.206 mg/kg

1. Introduction

This Air Monitoring Plan (AMP) was prepared by GHD Services Inc. (GHD), on behalf of International Paper Company (IPC), to address air monitoring during the remedial action (RA) at the Southern Impoundment of the San Jacinto River Waste Pits Superfund Site. This AMP discusses the development of site-specific action levels protective of potential exposures to dust generated at the Southern Impoundment RA (Work Site), in which dioxins and furans could potentially be present, and the methods for monitoring airborne dust. This AMP was developed to assist in protecting the health and safety of personnel working at the Work Site and off-site personnel working in the surrounding industrial area.

2. Development of Work Site Action Levels

Work Site action levels (WSALs) were developed based on established exposure guidelines and standards, site-specific risk-based screening levels, and equivalent airborne dust concentrations as discussed in the subsections below. The WSALs are designed to provide early indication for the need to implement dust control measures; an exceedance of the WSALs does not necessarily indicate a health concern.

2.1 Occupational Exposure Guidelines and Standards

GHD used established guidelines and limits to establish the WSALs. The US Occupational Safety and Health Administration has established Permissible Exposure Limits (PELs) for workers to dust, based upon a lifetime workplace exposure, 8 hours per day and 40 hours per week for 30 years. These levels are intended to be health protective for potential for long-term exposures and are not an indication of health concerns from a short-term perspective.

Table 1 Exposure Guidelines and Standards for Dust

Contaminant of Interest	Occupational Exposure Limit	Basis	Units
Total Dust	15	OSHA PEL	mg/m^3
Respirable Dust	5	OSHA PEL	mg/m^3
Notes: mg/m^3 – milligram per kilogram			

2.2 Screening Level Development for Dioxins and Furans

GHD used the United States Environmental Protection Agency (USEPA) Regional Screening Level (RSL) calculator to derive a site-specific risk-based Screening Level (SL)[1]. A cancer target risk of 10^{-5} and non-cancer hazard quotient of 1 were used in the calculation. The outdoor worker air scenario was selected, which includes default USEPA exposure assumptions for an outdoor worker: Exposure Time (ET) = 8 hours/day, and Averaging Time (AT) = 365 days. Remedial Actions will occur in two six-month seasons, therefore a work site-specific Exposure Duration (ED) of 2 years and Exposure Frequency (EF) of 112 days/year were chosen. The EF of 112 days / year is based on the USEPA default exposure assumption for an outdoor worker of 225 days / year adjusted for 6 months (225 / 2). These exposure assumptions represent a good faith attempt to estimate the potential exposure to dust generated during excavation activities for both a worker on-site and an off-site worker in the surrounding industrial areas. A SL of 0.00000009 mg/m^3 for 2,3,7,8 TCDD was calculated. This represents the concentration that would have to be sustained for 8 hours per day for 112 days a year to represent a potential risk of developing an adverse health effect.

[1] **https://www.epa.gov/risk/regional-screening-levels-rsls**. Accessed 10/20/2022.

[1] **https://www.epa.gov/risk/regional-screening-levels-rsls**. Accesses 4/28/2022.

Instantaneous or short-term airborne concentrations above this SL do not necessarily indicate a health concern, only that mitigation activities are warranted. Results from the RSL Calculator are summarized in Attachment 1.

2.3 Dioxin and Furan Equivalent Airborne Dust Concentration Development

There is currently not an available real-time method for directly measuring dioxin and furans in air. However, because dust generated from the Work Site could potentially contain dioxins and furans, dust concentrations can conservatively be used as an indicator for potential exposures to these compounds. This assumption is overly conservative because it assumes that all soil that could become airborne would contain dioxins and furans, which is not the case. Based on this highly conservative assumption that all of the excavation areas contain the highest detected concentration of total dioxins and furans (total TEQ), GHD calculated the dioxin and furan Equivalent Airborne Dust Concentration ($EADC_{SL}$); i.e., the total dust concentration that would contain a dioxin and furan concentration equal to the SL.

The $EADC_{SL}$ calculation shows this relationship. The equation for calculating the $EADC_{SL}$ is shown below.

$$EADC_{SL} = SL \times Conc^{-1}_{Contaminated\ soil} \times 10^6$$

Where: SL = Screening Level, mg/m^3
$Conc^{-1}_{Contaminated\ soil}$= Inverse of the soil concentration, kilograms per milligram (kg/mg)

The peak total TEQ soil concentration detected was 0.206 mg/kg$_{soil}$. Using the equation above, the $EADC_{SL}$ was calculated as shown below:

$$\text{Total dust} = \text{EADC}_{SL} = \frac{mg_{soil}}{m^3_{air}} = \left(\frac{0.00000009\ mg}{m^3_{air}}\right)\left(\frac{kg_{soil}}{0.206\ mg}\right)\left(\frac{10^6 mg_{soil}}{kg_{soil}}\right) = 0.43\ \text{mg/m}^3$$

Where: SL = The screening level of 0.00000009 mg/m^3
$Conc^{-1}_{Contaminated\ soil}$ = One kg of soil contains 0.206 mg of total TEQ
10^6 = The amount (in mg) of soil in a kg of soil

Therefore, assuming the highest detected total TEQ concentration is present equally in all Work Site soil (which is known to not be the case), airborne dust concentrations above 0.43 mg/m^3 averaged over an 8-hour period would be required to potentially exceed the calculated SL for Total TEQ. This concentration is the basis for the WSALs for the Southern Impoundment RA, as discussed in Section 3 below.

Table 2 Equivalent Airborne Dust Concentration

Compound of Interest	Soil Concentration (mg/kg)	Community Guideline (mg/m^3)	Community	Units
			$EADC_{SL}$ measured as total dust sustained for 8-hours to reach the guideline.	
Total TEQ	0.206	0.00000009	0.43	mg/m^3

3. Work Site Action Levels

After consideration of the occupational exposure guidelines and limits and the site-specific screening levels of other compounds of interest, the more conservative WSAL of 0.43 mg/m^3, averaged over 1 hour, will be used at the Work Site during the RA. The WSALs are designed to provide early indication for the need to implement dust control measures; an exceedance of the WSALs does not necessarily indicate a health concern. GHD will perform real-time total dust air monitoring on-site and on the perimeter of the Work Site during the RA. The WSALs are summarized in Table 3.

Table 3 Work Site Action Levels

Chemical of Interest	Location	Action Level[1]	Duration	Description of Action
Total Dust Concentrations (Total Dust)	On-site near Work Areas and Perimeter of the Work Site	< 0.43 mg/m^3	1-Hour Average	No action required
		> 0.43 mg/m^3	1-Hour Average	Notify the Project Manager, implement dust suppressant and mitigation measures to reduce dust concentrations below the action level.
Notes: [1]Action levels are based on real-time average concentrations of total dust				

If the WSAL is exceeded, dust suppression and mitigation measures on-site to minimize airborne dust produced from work activities may include, but would not be limited to:

- Reduction of speed of reagent addition during potential solidification mixing,
- Reduction of on-site traffic,
- Reduction in speed of on-site traffic,
- Watering or misting on-site roads,
- Use of appropriate truck covers, and
- Applying or maintaining aggregate, or similar, for on-site roads.

4. Air Monitoring Methods

Real-time air monitoring for total dust will be performed using TSI Dustrak aerosol or equivalent monitoring instruments. Dust monitors will be placed around the perimeter of the Work Site both downwind and upwind of the work area. Additionally, air monitoring will be conducted on-site near work areas. All instruments will be calibrated and operated in accordance with the manufacturer's specifications or applicable test or method specifications.

GHD

Hyland Herring, PhD, DABT

Joseph Cameron, CIH

Site-specific
Outdoor Worker Air Inputs

Variable	Outdoor Worker Air Default Value	Site-Specific Value
AT_{out} (averaging time - outdoor worker)	365	365
ED_{out} (exposure duration - outdoor worker) yr	25	2
EF_{out} (exposure frequency - outdoor worker) day/yr	225	112
ET_{out} (exposure time - outdoor worker) hr	8	8
THQ (target hazard quotient) unitless	0.1	1
LT (lifetime) yr	70	70
TR (target cancer risk) unitless	1.0E-06	1.0E-05

Site-specific

Outdoor Worker Regional Screening Levels (RSL) for Air

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = OW; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	IUR $(ug/m^3)^{-1}$	IUR Ref	RfC (mg/m^3)	RfC Ref	Carcinogenic SL TR=1E-05 (ug/m^3)	Noncarcinogenic SL THI=1 (ug or fibers/m^3)	Screening Level (ug or fibers/m^3)
TCDD, 2,3,7,8-	1746-01-6	No	Yes	Organics	3.80E+01	C	4.00E-08	C	9.00E-05	3.91E-04	9.00E-05 ca**

General Safety Practices

Duration of Work Tasks

The duration of activities involving the usage of PPE will be established by the SS or SHO based upon ambient temperature and weather conditions, the capacity of personnel to work in the designated level of PPE and limitations of the protective equipment (i.e., ensemble permeation rates, life expectancy of the APR cartridges, etc.) As a minimum, rest breaks will be observed at the following intervals:

i. 15 minutes midway between shift start-up and lunch
ii. One-half to one hour for lunch
iii. 15 minutes in the afternoon, between lunch and shift end

All rest breaks will be taken in the clean area (Support Zone [SZ]) after full decontamination and PPE removal. Additional rest breaks will be observed based upon the heat stress monitoring guidelines presented in Section 4.2.

Site Control

Authorization to Enter

All personnel working in Exclusion Zones (EZs) must have completed hazardous waste operations initial training as defined under OSHA Regulation 29 CFR 1926.65; have completed their training or refresher training within the past 12 months, and have been certified by a physician as fit for hazardous waste operations in order to enter a site area designated as an EZ or Contaminant Reduction Zone (CRZ).

Personnel without such training or medical certification may enter the designated Support Zone (SZ) only. The SS or SHO will maintain a list of authorized persons; only personnel on the authorized list will be allowed within the EZ or CRZ.

Site Orientation and Hazard Briefing

No person will be allowed in the general work area during project operations without first being given a Site orientation and hazard briefing. This orientation will be presented by the SS or SHO, and will consist of a review of this HASP. This review must cover the chemical, physical, and biological hazards, protective equipment, safe work procedures, and emergency procedures for the project. A Training Acknowledgement Form is provided in Appendix A for documentation purposes. In addition to this meeting, Daily Safety Meetings will be held each day before work begins. All individuals on the Site, including visitors, must document their attendance to the initial briefing as well attending the Daily Safety Meetings. Appendix A also presents the forms that will be used for documenting the Daily Safety Meeting.

Certification Documents

The PM, SS and SHO are responsible for ensuring that all personnel working at the Site meet the training and medical surveillance requirements. Subcontractor personnel must provide their training and medical documentation to the SHO prior to the start of fieldwork.

Entry Requirements

In addition to the authorization, hazard briefing and certification requirements listed above, no person will be allowed to enter the Site unless he or she is wearing the minimum support zone PPE as described in Section 4.0. Personnel entering the EZ or CRZ must wear the required PPE for those locations.

Emergency Entry and Exit

Individuals who must enter the Site on an emergency basis will be briefed of the hazards by the SS or SHO. All hazardous activities will cease in the event of an emergency and any sources of emissions will be controlled, if possible.

People exiting the Site because of an emergency will gather in a safe area for a head count. The SS or SHO is responsible for ensuring that all people who entered the work area have exited in the event of an emergency.

Contamination Control Zones

Contamination control zones are maintained to prevent the spread of contamination and to prevent unauthorized people from entering hazardous areas.

Exclusion Zone (EZ)

The EZ consists of the specific work area, or may be the entire area of suspected contamination. All personnel entering the EZ must use the required PPE, and must have the appropriate training and medical clearance for hazardous waste work. The EZ is the defined area where there is a possible respiratory and/or contact health hazard. Cones, caution tape, or other appropriate means will identify the location of each EZ.

Contamination Reduction Zone (CRZ)

The CRZ or transition area will be established, if necessary, to perform decontamination of personnel and equipment. All personnel entering or leaving the EZ will pass through this area to prevent any cross-contamination. Tools, equipment, and machinery will be decontaminated in a specific location. The decontamination of all personnel will be performed on-Site adjacent to the EZ. Personal protective outer garments and respiratory protection will be removed in the CRZ and prepared for cleaning or disposal. This zone is the only appropriate corridor between the EZ and the SZ.

Support Zone (SZ)

The SZ is a clean area outside the CRZ located to prevent personnel from exposure to hazardous substances. Eating and drinking will be permitted in the support area only after proper decontamination. Smoking may be permitted in the SZ, subject to Site requirements.

Buddy System

All project personnel must use the buddy system. Visual contact must be maintained between crew members at all times, and crew members must observe each other for signs of chemical exposure, heat, or cold stress. Indications of adverse effects include, but are not limited to:

- Changes in complexion and skin coloration
- Changes in coordination
- Excessive salivation and pupillary response
- Changes in speech pattern.

Project personnel must also be aware of potential exposure to possible safety hazards, unsafe acts, or noncompliance with safety procedures. Individuals must inform their partners or fellow team members of non-visible effects of exposure to toxic materials. The symptoms of such exposure may include:

- Headaches
- Dizziness
- Nausea
- Blurred vision
- Cramps
- Irritation of eyes, skin, or respiratory tract.

If protective equipment or noise levels impair communications, prearranged hand signals must be used for communication. Personnel must stay within line of sight of another team member.

Site Monitoring

Air Monitoring

Personal Air Monitoring Program

The PM, SS and SHO shall also implement a personnel air-monitoring program for those project personnel who have the highest risk of potential for exposure to chemicals present on Site. This monitoring will be done in compliance with 1926.65(h). Samples will be collected during startup of those project activities where personnel face potential exposure. The PM, SS and/or SHO will determine the number and frequency of sampling events. Appropriate NIOSH methodology will be followed and all samples are to be sent to an American Industrial Hygiene Association (AIHA) accredited laboratory. Results for all personnel air sampling will be posted for all project personnel to review.

Personnel Training

General

Required project personnel as discussed in Section 1.0 must have completed hazardous waste operations-related training, as required by the OSHA Standard 29 CFR 1926.65. Field personnel also receive a minimum of 3 days of actual field experience under the direct supervision of a trained, experienced supervisor. Personnel who completed their training more than 12 months prior to the start of the project must have, if required, completed an 8-hour refresher course within the past 12 months. The SS must also have completed an additional 8 hours of training that is required by OSHA for supervisors.

Basic 40-Hour Course

The following is a list of the topics typically covered in a 40-hour training course:

- General safety procedures
- Physical hazards (fall protection, noise, and heat stress, cold stress)
- Names and job descriptions of key personnel responsible for Site health and safety
- Safety, health, and other hazards typically present at hazardous waste sites
- Use, application, and limitations of PPE
- Work practices by which individuals can minimize risks from hazards
- Safe use of engineering controls and equipment on site
- Medical surveillance requirements
- Recognition of symptoms and signs, which might indicate overexposure to hazards
- Worker right-to-know (Hazard Communication OSHA 1926.59/1910.1200)
- Routes of exposure to contaminants
- Engineering controls and safe work practices
- Components of a Site HASP
- Decontamination practices for personnel and equipment
- Confined space entry procedures
- General emergency response procedures

Supervisor Course

Management and supervisors receive an additional 8 hours of training which typically includes:

- General Site safety and health procedures
- Emergency procedures

- PPE programs
- Air monitoring techniques

Medical Surveillance Program

Medical Examination

All required personnel who will enter a Site EZ or CRZ must have successfully completed a pre-placement and/or annual physical examination prior to entering one of these work zones. This medical surveillance program must comply with OSHA 29 CFR 1926.65(f).

Pre-Placement Medical Examination

All on-Site project personnel who will enter an EZ or CRZ must have completed a comprehensive medical examination within the past 12 months that meets the requirements of applicable OSHA Regulations. The annual medical examination typically includes the following elements:

- Medical and occupational history questionnaire
- Physical examination
- Complete blood count, with differential
- Liver enzyme profile
- Chest X-ray, once every 3 years, for non-asbestos workers
- Pulmonary function test
- Audiogram
- Electrocardiogram for persons older than 45 years of age, or if indicated during the physical examination
- Drug and alcohol screening, as required by job assignment
- Visual acuity
- Follow-up examinations, at the discretion of the examining physician or the corporate medical director

The examining physician provides the individual and employer with a report summarizing the findings confirming the worker's fitness for work and ability to wear a respirator. Documentation of medical clearance will be available for project personnel during all project work.

Subcontractors will certify that all of their personnel have successfully completed a physical examination by a qualified physician. The physical examination must meet the requirements of 29 CFR 1926.65 and 29 CFR 1910.134 as described above. Subcontractors will supply copies of the medical examination certificate for each of their on-Site workers.

Other Medical Examination

In addition to pre-employment, annual, and exit physicals, personnel may be examined:

- At any individual's request after known or suspected exposure to toxic or hazardous materials
- At the discretion of the client, SS, SHO, or occupational physician in anticipation of, or after known or suspected exposure to toxic or hazardous materials
- At the discretion of the occupational physician

Periodic Exam

Following the placement examination, all personnel must undergo a periodic examination, similar in scope to the placement examination. For individuals potentially exposed over 30 days per year, the frequency of periodic examinations will be annual. For personnel potentially exposed less than 30 days per year, the frequency for periodic examinations may be 24 months or as determined by the physician.

Medical Restriction

When the examining physician identifies a need to restrict work activity, the individual's supervisor must communicate the restriction to the individual, the individual's supervisor, and the SHO. The terms of the restriction will be discussed with the individual and his/her supervisor. Every attempt should be made to keep the individual working, while not violating the terms of the medical restriction.

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The Power of Commitment

Tailgate Safety Meeting Form
Large Group Format - Single Day

Date:		Time:		Project No.:	
Presenter:		Project Name:			

Safety topics/items discussed:

Emergency preparedness:

First Aid Provider(s):		Muster Point:	
		Method of Communication:	
AED Responder:		Fire Extinguisher Location:	
First Aid Kit Location:		Eye Wash Location:	

Site personnel in attendance:

Print Name:	Signature:	Company:

Tailgate Safety Meeting Form
Small Group Format - Multiple Days

Date:		Time:		Project No.:	
Presenter:		Project Name:			

Safety topics/items discussed:

Emergency preparedness:

First Aid Provider(s):		Muster Point:	
		Method of Communication:	
AED Responder:		Fire Extinguisher Location:	
First Aid Kit Location:		Eye Wash Location:	

Print Name	Signature	Company

Date:		Time:		Project No.:	
Presenter:		Project Name:			

Safety topics/items discussed:

Emergency preparedness:

First Aid Provider(s):		Muster Point:	
		Emergency Communication:	
AED Responder:		Fire Extinguisher Location:	
First Aid Kit Location:		Eye Wash Location:	

Print Name	Signature	Company

Management of Change Form
(QSF-006)

Form initiated by: _____ Date initiated: _____

Initiator's role/responsibility: _____ Project number: _____

Affected location(s): _____

Client's management of change documentation attached, if required or applicable: ☐ Yes ☐ N/A

Type of change:

- ☐ Field operations/SOPs
- ☐ Equipment
- ☐ Safety
- ☐ Project management/resources

Duration of change:

- ☐ Permanent
- ☐ Temporary (specify how long change will be in place): _____
- ☐ Emergency

Describe the change:

Describe the procedure/task(s) required to complete the change:

Who needs to know about the change and how will you communicate this to them?

Is additional training for GHD people required as a result of this change? ☐ Yes ☐ No

If yes, please describe training needs and those who require it:

Coordination with Business School Learning Centre underway: ☐ Yes ☐ No

Identify any associated risks/hazards/impacts as a result of this change:

Does the change need to be approved by a client? ☐ Yes ☐ No

If Yes, state client's name: _____

Client role/responsibility: _____

Date authorized by client: _____
(mm/dd/yyyy)

Change approved by project manager: _____
(please print)

_____ _____
(signature) (approval date – mm/dd/yyyy)

Summary:

Item	Completion date	Confirmed by
1. Task(s) to execute change have been completed		
2. Those who need to know have been notified		
3. Additional training has been completed		
4. Risk(s) have been mitigated		
5. Change has been approved by all required parties		

Notes:

Scope: GHD may use the Management of Change Form (QSF-006) to identify and record project additions, revisions, changes, or updates regarding field operations, field SOPs, equipment, safety, resources, or project management.

Detail: The level of detail to a documented project change is ultimately determined by the project manager and/or any client expectations.

File location: Correspondence folder of the project file.

This completed form is a quality record

Underground Utilities Checklist

(QSF-019)

Pre-Drilling/Excavation Checklist and Utility Clearance Log

Project number:	**Project name:**
Date:	**Project location:**
Public utility locator:	**Public utility locator phone number:**
Date of public utility locator request:	**Public locator call reference number:**
Private utility locator (If applicable):	**Private utility locator phone number:**

Utilities (indicate that location/utility presence was checked)

Borehole/ Excavation location	Date (mm/dd/yyyy)	Telephone	Water	Storm sewer	Sanitary sewer	Process sewer	Gas	Electrical	Cable	Overhead utilities	Other	Comments/Warnings
Utility owner												

Instructions: This checklist is to be completed by GHD personnel prior to initiation of field activities as a safety measure, to ensure that all underground utility lines, other underground structures, and above-ground power lines are clearly marked in the area selected for boring or excavation.

Notes: _____

Client: _____ **Client representative:** _____ **Phone number:** _____

Client or property owner acknowledgement of utility clearance: _____ **(Client, property owner, or authorized agent signature)**

Subcontractor acknowledgement of utility clearance: _____ **(Subcontractor or subcontractor representative signature)**

GHD field representative name: _____ **Signature:** _____

GHD project manager's review/confirmation of locate completion: _____

In the event that client or property owner acknowledgement cannot be obtained, all boreholes shall be hydro vacuumed and the costs passed on to the client. Attach any clearance documentation from utility owner/operator to this document.

Underground Utilities Checklist for GHD Personnel

Pre-Drilling/Excavation Checklist and Utility Clearance Log

Drilling or excavation work may not proceed if any of the questions answered below are answered "No." Implement stop work authority and contact the GHD project manager to discuss and resolve any concerns or issues. Document the reason for a "No" answer in the comments section below.

Yes	No	N/A	Pre-Mobilization
☐	☐	☐	1. Has a utility locator request been completed within the last 30 days (verify time limit with state or provincial law)? If no, stop work and comment below.
☐	☐	☐	2. Is a scaled site plan, map or drawing showing the proposed borehole locations attached to this form?
☐	☐	☐	3. Does each borehole and excavation location allow for clear entry and exit, adequate workspace, and a clear path for raising the mast (or boom) and operating the drill rig and all support equipment? Ensure that the minimum OSHA/state/provincial utility clearance requirements between the mast or boom and the power line(s) are met. For instance, OSHA requires a minimum approach distance of 10 feet for systems below 50 kV and an increase of 4" for every 10 kV over 50 kV. Confirm if additional permits are required if the boom or mast will be working 5 meters (15 feet) or less from the electrical lines.
☐	☐	☐	4. Are all of the proposed borehole and excavation locations at least 1.0 meters (3 feet) from any subsurface or above-ground utilities shown on client's building plans? Check here ☐ if plans not provided by client (therefore not applicable to this job.
☐	☐	☐	5. Are all of the proposed borehole and excavation locations at least 1.0 meters (3 feet) from any subsurface or above-ground utilities shown on public right-of-way street improvement or other public property plan or site map?
☐	☐	☐	6. Has the site representative, familiar with the site, indicated no knowledge of any subsurface or above-ground utilities within 3 metres (10 feet) of the proposed borehole and excavation locations? (Review locations with site representative)
☐	☐	☐	7. Are all of the proposed borehole and excavation locations at least 1.0 meters (3 feet) from any subsurface utilities identified during a geophysical survey? Check here ☐ if no geophysical survey has been completed (therefore not applicable to this job).
☐	☐	☐	8. Have all utility locating service providers, notified by the public line locator, marked out their facilities in the vicinity of the borehole and excavation locations or otherwise notified us that they do not have any facilities near the proposed locations? (Attached confirmation and utility locate sheets from public locator)
☐	☐	☐	9. Are all proposed borehole and excavation locations at least 1.5 meters (5 feet) from a visual line connecting two similar looking manhole covers?
☐	☐	☐	10. Are all proposed borehole and excavation locations at least 1.5 meters (5 feet) from a visual line perpendicular to the street from the water, gas, and electrical meters?
☐	☐	☐	11. Are all proposed boring and excavation locations clear of pavement joints, curbs, crash posts, or other engineered structures?
☐	☐	☐	12. Does the ground surface/pavement lack signs of previous excavation (e.g., no pavement subsidence, no differences in pavement texture or relief, no pavement patching)?
			Pre-Drilling and Excavation
☐	☐	☐	13. Has it been verified that the proposed drilling or excavation work will not affect any work currently in progress?
☐	☐	☐	14. Has the drill rig or heavy equipment been inspected prior to use and documented? (See Drill Rig Inspection Checklist or Mobile Equipment Safety Inspection Checklist)
			15. Have barricades been erected to prevent unauthorized access, where applicable?
☐	☐	☐	16. Have all known live electrical or product lines within 3 meters (10 feet) of the dig path been visually verified? If no, comment below.
			17. For boreholes that have not been cleared or are within 3 meters of a utility:
☐	☐	☐	a. Before drilling have you cleared a hole to 2.4 meters (8 feet) below grade using an air-knife, or equivalent, before drilling and is the diameter of this hole greater than the final outside diameter of the boring? If not required comment below.
☐	☐	☐	b. Does the soil you encountered in the hand-dug hole appear to be native material (i.e., free of clean gravel, clean sand, aggregate base [gravelly sand ~ 10% fines] or other non-native looking material)? If not required comment below.

Have the above concerns been discussed with the GHD project manager?	☐ Yes	☐ No	☐ Not Applicable
Has the start of subsurface work been communicated to the GHD project manager?	☐ Yes	☐ No	☐ Not Applicable
Have the above concerns been discussed with the client?	☐ Yes	☐ No	☐ Not Applicable
Has the scope of work been approved by the client?	☐ Yes	☐ No	☐ Not Applicable

Comments: _____

_____

_____

_____

_____

GHD field representative name: _____ **Date:** _____

Site Health and Safety Plan Amendment Form

This document is to be completed for ANY changes that occur within the Site Health and Safety Plan (HASP). This document is to be sent to the Regional Safety & Health Manager (RSHM) for review, verification and sign off of the HASP.

Amendment #	
Site Name/Project ID	
Date	
Client Contact (same/change)	
Reason for Amendment (SOW change, JSA addition, Chemical, etc.)	
Alternate or Additional Safeguard Procedures	
Required changes in PPE	
Additional Comments:	

Project Manager Notified	☐
RSHM Notified	☐
Client PM Notified (if necessary)	☐

Site HSE Officer (sign above)	Date

The Project Manager is ultimately responsible for the accuracy of the information on this amendment and ensuring any changes to the original HASP is discussed with all affected site personnel prior to commencing work

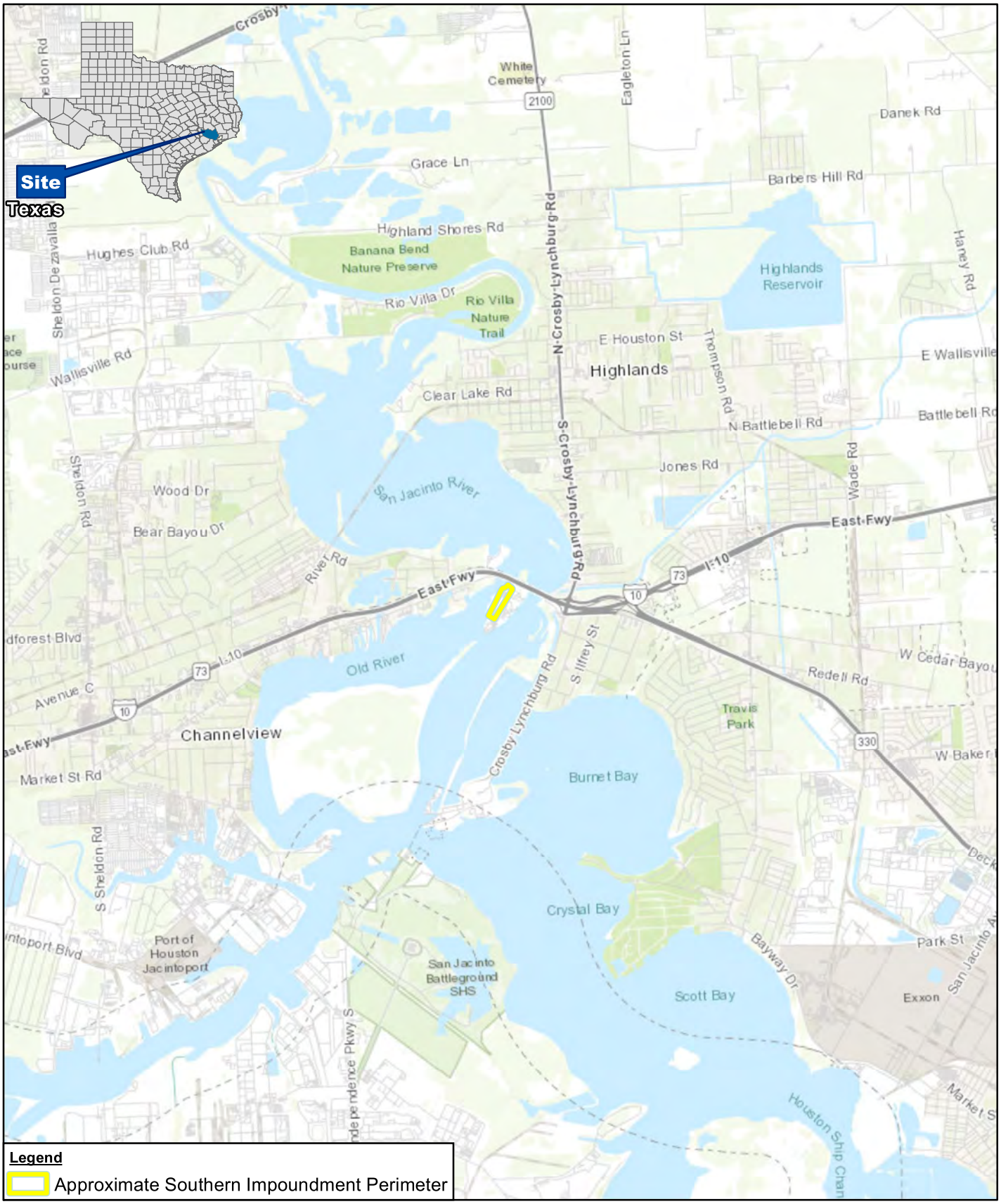
This original form must be placed in the project file and a copy needs to be attached to the Site Health and Safety Plan (HASP).

HASP Acknowledgment Sheet

Project Name:_____ Project Number: _____

This is to certify that I have received a pre-entry briefing regarding this HASP, and I understand its contents. My failure to follow and comply with the requirements contained in this plan may result in disciplinary action and/or termination.

Print Name	Signature	Date



Source: ESRI World Topographic Maps.

0 0.5 1
Miles

Coordinate System:
NAD 1983 UTM Zone 14N

SAN JACINTO RIVER WASTE PITS
SUPERFUND SITE
SOUTHERN IMPOUNDMENT
HARRIS COUNTY, TEXAS
REQUEST FOR PROPOSAL
VICINITY MAP

11215131
Mar 8, 2022

FIGURE 1

GIS File: I:\GIS\GIS\Projects\11200000s\11215131\Layouts\REPORT006\11215131-00(REPORT_006)GIS-BR001.mxd

Musgrove Property
Glendale Boat Works/
New Lost River Property
Musgrove Property
Market Street Property
Southwest Shipyards
Property

Northeast Excavation Area
North Central Excavation Area
South Central Excavation Area

FIGURE 4
SEASON 1 SITE WORKS

FIGURE 5
SEASON 2 SITE WORKS

Route to I-10 West
Route to I-10 East
Southern Impoundme
River Rd
E Lake Sandy St
Park Dr
Meadowbrook Dr
Fairmont Dr
Brookshire St
I-10
East Fwy
Moreland Dr
E Lake Sandy Dr
Monmouth Dr
Lincoln St
Market St Rd
Market
Riverside St
River Haven D

Job Safety Analysis (JSA)

Insert Name : Environmental-Asbestos-Containing Material (ACM) Sampling (Type 1 Operations)

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 18:06:57	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Bulk sampling kit, safety glasses, APR with HEPA filters, appropriate length step ladder, five floor cones, five point harness, sling, and lanyard				
Task-specific Training:	Fall Protection, Asbestos Awareness, HazCom, PPE, Decon				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☑ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☑ Full Face Mask	☐ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☐ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☑ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☑ P100		☑ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☑ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Discuss STAR	Site personnel not aware of STAR	• Project team discusses importance of STAR procedures • Employees made aware of SWA • Ensure employees requiring a respirator are clean shaven	Site Supervisor
2	Tailgate meeting	• Site hazards • Asbestos exposure • Fall • Head injury • Noise	• Project team discusses hazards related to this type of survey • Respiratory hazards while sampling asbestos and appropriate PPE • Fall protection when sampling using a ladder or lift • Loose, hidden obstructions or objects above ceiling tiles • Hazards associated with the building (e.g., when conducting a survey in a building with laboratories, you risk exposure to unknown chemicals if you touch bench tops, fume hoods, refrigerators, etc.)	Site Personnel
3	Inspection of occupied areas	• Slip/trip/fall hazards • Injury to pedestrians	• Use fall protection measures while using ladders or lifts • Maintain awareness of possible trip hazards (e.g., wet floors, wiring) • Use extreme caution when entering an abandoned building • Establish a 6 to 8 foot perimeter around base of ladder and use floor cones to demarcate a safe work zone	Site Personnel
4	Inspection of unoccupied areas/setup	• Asbestos exposure • Eye injury • Fall hazard • Head injury • Excessive noise • Dangerous atmosphere • Mobile equipment hazards	• Before beginning work, visible dust must be removed by wiping with a damp cloth or by vacuuming with a special HEPA filtered vacuum • At a minimum, wear half face air purifying respirator (APR) with HEPA cartridges while entering ceiling spaces or crawl spaces as asbestos containing debris or asbestos containing building materials in poor condition may cause a respiratory hazard • Wear safety glasses to protect eyes from foreign objects (e.g., dust, debris, wires suspending ceiling tiles) • Wear appropriate hard hat to prevent head injures when working at heights • Wear a Tyvek suit if conditions warrant • Use fall protection measures while using ladders or lifts when above 6 feet • Mechanical rooms may require additional PPE (i.e., earplugs, eye protection, and hardhat) • Do not enter a confined space or suspected confined space without confined space control measures because atmospheres immediately dangerous to life or health may be present • Eating, drinking, smoking, and chewing gum are prohibited • Never use compressed air to clean asbestos dust off surfaces • Use a drop sheet of 6 mil polyethylene below the work area to help control dust	Site Personnel

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
5	Collection of bulk asbestos samples	• Asbestos exposure • Eye injury • Fall hazard • Head injury • Excessive noise • Dangerous atmosphere • Mobile equipment hazards	• Minimize respiratory exposure to asbestos while sampling by wearing, at a minimum, an APR mask with HEPA filters • A half face APR with HEPA is adequate for bulk sampling • Wear a Tyvek suit if conditions warrant • Wear safety glasses to protect eyes from foreign objects (e.g., dust, debris, wires suspending ceiling tiles) • Safety glasses should be worn to prevent foreign objects (e.g., building materials, broken knife blades, chisel pieces, paint chips) from entering the eyes during sampling • To protect hands, use care while manipulating sampling tools (e.g., chisel, hammer, knife) • Do not unnecessarily disturb suspected ACM as this can contaminate the ambient air • Use only hand tools such as nibblers, rasps, files, shears, knives, hand drills, or hand saws • Prior to disturbing the material, wet the work (water plus wetting agent—see HASP)	Site Personnel
6	Roof inspection	• Slip/trip/fall hazards • Biological hazards	• Do not go within 6 feet of a roof's edge unless there is a guardrail or other adequate fall protection measures in place • Maintain awareness of trip hazards • Avoid biological hazards left by birds and insects	Site Personnel

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Environmental-Soil Sampling

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 18:06:58	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Air monitoring equipment, PPE Additional PPE: Tyvek if Level C initiated; gloves dependent on the task and chemical contamination present or suspected present				
Task-specific Training:	GHD Field Method Training on Soil Sampling Procedures				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☑ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Discuss STAR and SWA	• Site personnel not aware of STAR and SWA	• Project team (GHD) discusses importance of and documentation procedures for SWA during pre job safety meeting • Use SWA to stop any work that is unsafe	Site Personnel
2	Inspect and calibrate sampling and monitoring equipment	• Lost time from improperly functioning equipment • Incorrect sampling procedures/ collection due to malfunctioning equipment	• Ensure all equipment is functioning properly • Complete Quality Control documents	Sampling Technician
3	Prepare to collect soil samples	• Lifting hazards • Back injury • Manual material handling • Pinch points • Cuts • Punctures • Sample misidentification	• Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one handed carrying if possible; maintain awareness of footing • No bending or twisting while under load • Refer to the HASP for additional lifting information • Avoid placing hands/fingers in pinch point locations • Use proper tools when opening container packaging • Do not use fixed open blade knives when opening boxes or containers • Ensure the sample id label matches sample location with site plan/GHD site supervisor/subcontractor	Sampling Technician
4	Opening the sample sleeve (if applicable)	• Cuts due to sharp edges of sample sleeve • Contaminant exposure	• Use sleeve cutter for opening the sample sleeves • Keep hands clear of the sleeve when cutting • Wear nitrile gloves • Maintain awareness of sharp edges of sample sleeve	Sampling Technician
5	Sample collection	• Contaminant exposure • Cuts from container breakage • Sample misidentification	• Wear nitrile gloves and replace between soil samples • Inspect glass bottles for breaks/cracks • Do not attempt to use any suspect containers • Close glass sample containers carefully to avoid breakage • Check sample labels for accuracy prior to placing in cooler	Sampling Technician
6	Headspace screening of samples	• Contaminant exposure • Incorrect headspace readings	• Wear nitrile gloves • Ensure proper calibration of equipment	Sampling Technician
7	Sample selection	• Bottle breakage • Contaminant exposure • Pinch points • Lost time due to incorrect sample selection	• Wear nitrile gloves when handling sample containers • Confirm selected samples are correct based on work plan selection criteria, PID readings, and soil boring logs • Avoid placing hands/fingers in pinch point locations (e.g., between cooler and lid)	Sampling Technician

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
8	Packing samples in cooler(s)	• Bottle breakage • Contaminant exposure • Cuts • Pinch points • Lifting hazards • Back injury • Manual material handling • Lost time due to incorrect sample packaging or hold time exceedances	• Wear nitrile gloves when handling sample containers • Pack glass containers in bubble wrap • Check COC against sample labels and SSOW for accuracy before shipping • Avoid placing hands/fingers in pinch point locations (e.g., between cooler and lid) • Use proper lifting techniques as discussed in step 3 • If possible use a dolly or cart if cooler is heavy or has to be moved over a long distance • Ensure equipment and supplies are loaded correctly and do not shift during transport	Sampling Technician
9	Investigation derived waste (IDW) management	• Contaminant exposure • Lifting hazards • Back injury • Manual material handling • Pinch points • Slips/trips/fall hazards • Mislabeled waste	• Wear nitrile gloves when handling IDW • Use proper lifting techniques as discussed in step 3 • Avoid placing hands/fingers in pinch point locations • Maintain awareness of walking surfaces • Label IDW with generator, a contact number, identification of contents, and site location • Specify IDW as either hazardous or non hazardous material	Sampling Technician

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Environmental-Soil Sampling From Excavator Bucket

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 18:06:58	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Air monitoring equipment, PPE, Excavation equipment Additional PPE: Tyvek if Level C initiated; gloves dependent on the task and chemical contamination present or suspected present				
Task-specific Training:	GHD Field Method Training on Soil Sampling Procedures; Mobile Equipment or Heavy Equipment Safety;				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☑ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☑ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☑ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Discuss STAR and SWA.	• Site personnel not aware of STAR and SWA	• Project team (GHD) discusses importance of and documentation procedures for SWA during pre job safety meeting • Use SWA to stop any work that is unsafe	Site Personnel
2	Inspect and calibrate sampling and monitoring equipment.	• Lost time from improperly functioning equipment • Incorrect sampling procedures/collection due to malfunctioning equipment	• Ensure all equipment is functioning properly • Complete Quality Control documents	Sampling Technician
3	Prepare to collect soil samples: Technician will choose the location of the sample and communicate sample location to the operator.	• Back strain • Pinch points • Cuts • Punctures • Sample misidentification	• Use proper lifting techniques and buddy system if needed • Avoid placing hands/fingers in pinch point locations • Use proper tools when opening container packaging • Do not use fixed open blade knives when opening boxes or containers • Ensure the sample id label matches sample location with site plan/GHD site supervisor/subcontractor • Setup a safe area for technician to obtain sample from bucket	Sampling Technician
4	Obtaining the soil sample from the excavation via remote means – use the hydraulic excavator: Operator will place bucket on ground in a safe location after obtaining the sample from the agreed location.	• Excavation collapse • Contaminant exposure • Heavy equipment operation	• Stay clear of the edge of the excavation; demarcate areas that were undermined • Wear nitrile gloves and follow air monitoring program as per HASP • Follow JSAs specific for excavation and heavy equipment activities; maintain excavation safety • Be aware of swing radius of heavy equipment	Sampling Technician
5	Sample collection from excavator bucket: Operator will place heavy equipment in a zero energy state via lockout (interlocks) and placing bucket on ground. If not equipped with interlocks or equivalent safety devices then operator will shut off engine with bucket on ground. Technician will collect soil sample from the bucket once heavy equipment is in a zero energy state and leave the area.	• Contaminant exposure • Cuts from container breakage • Sample misidentification • Struck by/crushing injuries	• Wear nitrile gloves and replace between soil samples • Inspect glass bottles for breaks/cracks • Do not attempt to use any suspect containers • Communicate to all present not to distract the excavator operator • Establish eye/hand contact with excavator operator and approach when safe • Have operator activate hydraulic system kill switch if equipped and maintain two thumbs up visible to technician • If excavator is not equipped with a hydraulic system kill switch, then the operator must leave the cab prior to sample collection • Do not stand in front of or behind the bucket; stand to either side to collect sample • Close glass sample containers carefully to avoid breakage • Signal operator with thumps up when clear of swing radius • Check sample labels for accuracy prior to placing in cooler	Sampling Technician
6	Headspace screening of samples	• Contaminant exposure • Incorrect headspace readings	• Wear nitrile gloves • Ensure proper calibration of equipment	Sampling Technician

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
7	Sample selection	• Bottle breakage • Contaminant exposure • Pinch points • Lost time due to incorrect sample selection	• Wear nitrile gloves when handling sample containers • Confirm selected samples are correct based on work plan selection criteria, PID readings, and soil boring logs • Avoid placing hands/fingers in pinch point locations (e.g., between cooler and lid)	Sampling Technician
8	Packing samples in cooler(s)	• Bottle breakage • Contaminant exposure • Cuts • Pinch points • Back strain • Lost time due to incorrect sample packaging or hold time exceedances	• Wear nitrile gloves when handling sample containers • Pack glass containers in bubble wrap • Check COC against sample labels and SSOW for accuracy before shipping • Avoid placing hands/fingers in pinch point locations (e.g., between cooler and lid) • Use proper lifting techniques and buddy system if needed • Ensure equipment and supplies are loaded correctly and do not shift during transport	Sampling Technician
9	Investigation derived waste (IDW) management	• Contaminant exposure • Heavy lifting • Pinch points • Slips/trips/fall hazards • Mislabeled waste	• Wear nitrile gloves when handling IDW • Use proper lifting techniques to transport/dispose of IDW into drums and use buddy system if needed • Avoid placing hands/fingers in pinch point locations • Maintain awareness of walking surfaces • Label IDW with generator, a contact number, identification of contents, and site location • Specify IDW as either hazardous or non hazardous material	Sampling Technician

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Environmental-Surface Water Sampling

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 18:06:59	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Horiba, personal flotation device (PFD); 5-point harness; Use Ndex nitrile gloves, steel toe rubber boots, sunscreen, insect repellant, rubber boots.				
Task-specific Training:	Surface Water Sampling Procedures, PPE, WHMIS, Back Safety, Ability to swim,				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☑ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☑ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☑ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☐)Industrial Grade Safety Boot	☐ Other*	☑ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☑ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☑ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Establish work zone at surface water monitoring location	• On-site traffic patterns • Back strain • Biological hazards • Slips/trips/fall hazards • Drowning • Severe weather	• Maintain awareness of on-site traffic patterns and walking paths (i.e., uneven terrain) • Wear PFD when water is deeper than 1 meter • Use buddy system • Beware of slippery banks and uneven terrain • Beware of ticks, snakes, spiders, rodents, and mosquitoes • Use of insect repellant, if necessary • Beware of poison ivy and other poisonous plants • Check weather report at the beginning of the work day to know if severe storms or weather is likely. If severe weather occurs, stop working; sit inside vehicle until storm passes. Wait 30 minutes after seeing the last lightning bolt or hearing the last thunder clap before continuing work.	Field Personnel

2	Collect surface water grab sample	• Chemical exposure
		• Cuts from container breaking
		• Slips/trips/fall hazards
		• Drowning
		• Cold stress/heat stress
			• Wear proper PPE
			• Inspect bottles for signs of breakage/damage
			• If water is too deep to enter safely, use sampling pole to collect samples
			• Beware of slippery creek bank
			• Use buddy system and extra care when entering the water to collect samples:
			  ○ Enter at a safe point
			  ○ Beware of cold water conditions
			  ○ Develop and communicate plan for removal from water in the event of a slip/trip/fall
			• Use of sunscreen and insect repellant if necessary
			• Follow cold/heat stress procedures in the HASP
				Field Personnel

3	Pack samples in container (i.e., cooler)	• Bottle breakage • Chemical exposure • Back strain	• Wear appropriate PPE (Ndex nitrile gloves) • Use proper lifting techniques and buddy lifts (if necessary) – do not lift >50 lbs alone	Field Personnel
4	Manage any investigative derived waste (IDW)	• Chemical exposure • Pinch points • Slips/trips/fall hazards • Heavy lifting	• Wear appropriate PPE (Ndex gloves) and work gloves • Avoid pinch points; use proper PPE • Inspect for proper housekeeping; clean up work area • Use proper lifting techniques • Appropriately dispose of generated waste (i.e., used PPE, decon wastes)	Field Personnel

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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Construction-Building Demolition Oversight

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 18:06:59	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	PPE (as noted below), clipboard, pen/paper, camera, flashlight, lifeline harness Additional PPE: Assess possible inhalation hazards prior to work and determine appropriate level of respiratory protection if deemed necessary.				
Task-specific Training:	40-Hour Training, Fall Protection, CRA Annual Safety Training, Construction Hazards, Remember Charlie Video, HAZCOM/WHMIS, Lockout, Heavy/Mobile Equipment Safety, PPE, Excavation Safety				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Review STAR and SWA	• Personnel not aware of STAR and SWA	• Reminder of importance/documentation of procedures for SWA; use SWA to stop any unsafe or illegal work practices • Discuss inspection activities with construction site supervisor and appropriate subcontractors • Sign in with general contractor • Review contractor's site specific HASP/orientation	All personnel
2A	Oversight and inspection activities	• Slip/trip/fall hazards	• Walk area first, especially when view of ground surface is covered • Keep area free of excess materials and debris • Remove all travel path hazards by keeping materials/objects organized and out of walkways • Note and communicate areas of slick or uneven ground	Site supervisor
2B		• Injury from heat/cold stress or inclement weather	• Take breaks as needed by monitoring the daily heat index, as outlined in the HASP • Consume adequate food/beverages; personnel should consume at least 8 ounces (250 mL) of cool water or electrolyte replacement drinks every 20 30 minutes • Observe work rest schedule to manage heat/cold stresses • When warranted, stay alert for rain, lightning and high wind hazards; perform work in such hazards as outlined in the HASP	Site supervisor
2C		• Noise	• Hearing protection required when working within 20 feet (6 m) of operating equipment or units, if levels are suspected to be >85 dBA, or for personal comfort	Site supervisor
2D		• Lifting heavy objects	• Determine that object is within weight limit of 50 pounds (23 kg) • Check for contact hazards such as other boxes/objects in the vicinity as well as other people/equipment in the area • Check there is ample room to squat, lift, turn, or maneuver without twisting the back or other muscle joints • Check travel path for, and remove slip hazards such as tools, puddles, and debris	Site supervisor
2E		• Falling/flying objects	• Demarcate demolition area, ensuring a safe distance from work to avoid any accidental injury from airborne debris/dust as well as demolition equipment • Wear appropriate PPE as laid out in HASP • Do not allow distractions; if attention is to be diverted from work (phone call/conversation/etc.) move away from work zone • Do not enter structure once integrity has been compromised; collapse can result in serious injury and/or death	Site supervisor

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
2F		• Particulate inhalation	• Prior to demolition works, assess building to determine if possible hazards exist from airborne particulate matter such as asbestos containing materials (ACM), fiberglass, silica, or known Contaminants of Concern (COCs) from site history • Determine and don appropriate PPE (including respiratory protection) as required • Avoid airborne particulate whenever possible; PPE is your last line of defense	Site supervisor
2G	Oversight and inspection activities (continued)	• Exposure to vehicular traffic and mobile equipment	• Wear appropriate PPE and adhere to protective measures presented in the contractors' Temporary Traffic Control Plan • Maintain eye contact with equipment operators and do not walk into their path unless the operator motions for you to move • Stay outside of swing radius of the excavator	Site supervisor
3	Clean-up and disposal of debris	• Exposure to hazardous materials	• Ensure that all materials are assessed prior to demolition to determine presence of possibly hazardous materials such as ACM, fiberglass, silica or known COCs from site history • Ensure that proper protocols are followed for disposing of waste as per governmental procedures; If no procedure(s) are available, follow best practices • Ensure proper PPE (including respiratory protection) as applicable is worn until all hazardous materials (including particulate matter) has been removed and exposure to the area is deemed safe	Site supervisor

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Site Personnel Participating in JSA Review:
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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Environmental-Decontamination of Sampling Equipment and Personnel (PPE Level D)

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 18:06:59	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Alconox/Liquinox, brushes				
Task-specific Training:	Decontamination/Site Control; Quality Control/Sampling Plan				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☑ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☐ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☑ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☑ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☑)Industrial Grade Safety Boot	☐ Other*	☑ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Decontamination of sampling equipment (including pumps, bailers, tubing, etc.)	• Contaminant exposure • Pinch points • Slip/trip/hit/fall hazards • Lifting hazards • Back injury • Manual material handling	• Set up decon station to capture any spills to avoid cross contamination and manage wastes • Wear appropriate PPE • Scrub equipment clean then rinse and verify it is clean and free of contamination • Avoid putting hands in or near pinch points • Maintain good housekeeping and be aware of surroundings • Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical means, such as a dolly, cart, or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Refer to the HASP for additional lifting techniques	Sampling Personnel
2	Decontamination of personnel	• Contaminant exposure • Slip/trip/hit/fall hazards	• Refer to the HASP for specific procedures but in general start with most contaminated article and remove until inner gloves are the last item left • Dispose of used PPE in accordance with site requirements • Wash hands and face before eating, drinking, or using tobacco products • Take care when removing PPE (boots, gloves, etc.); sit down to remove/change boots as necessary	Sampling personnel
3	Management of waste derived from decontamination activities	• Contaminant exposure • Lifting hazards • Back injury • Manual material handling	• Containerize decon waste (e.g., water, used PPE) as required • Properly dispose of decon fluids (e.g., sediments) • Refer to step 1 and the HASP for additional lifting information	Sampling personnel

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3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : O_M-Derived Waste Drum Moving and Handling

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 18:07:00	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Empty drums, spill kit, dolly, ratchet set, or box end wrench for loosening and tightening drum band, bung cap tool Additional PPE: Leather work gloves must be worn				
Task-specific Training:	40 Hour HAZWOPER or 8 Hour Refresher, HAZComm, PPE, Hand and Power Tools				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Walk the path to and from the drum storage area	• Slip/trip/fall hazards	• Review HASP and client requirements and implement • Use the STAR process to identify and correct any obvious hazards • Remove trip hazards in the area around the drums before moving hazards	Project personnel on site
2	Set up staging area	• Slip/trip/fall hazards • Traffic hazards • Spills	• Remove trip hazards in the area around the drums before moving hazards • Select and demarcate area if necessary to prevent un-authorized personnel and vehicle entry • Ensure emergency spill materials are readily available	Project personnel on site
3	Inspect all equipment and hand tools before use	• Hand injuries • Back Injuries • Lacerations	• Inspect dolly to ensure that it is operating properly (wheels turning freely, proper air pressure in wheels, no cracks in welds, sharp edges or burrs) • Select and inspect ratchet and socket or box end wrench • Do not use adjustable wrench or screw driver to loosen or tighten band • Ensure bung caps on drums are in place and secure if provided	Project personnel on site
4	Remove drum lid	• Contaminant exposure • Pinch points • Hand injury	• Select and inspect ratchet and socket or box end wrench • Do not use adjustable wrench or screw driver to loosen or tighten band • Wear appropriate gloves as identified in PPE section	Project personnel on site
5	Fill with derived waste material (i.e., soil cuttings, waste absorbent material, PPE Tyvek suits, etc.)	• Contaminant exposure • Pinch points • Hand injury • Lifting hazards	• Reduce risk of contaminant exposure by wearing proper PPE when handling waste materials (i.e., safety glasses, leather gloves, Tyvek suit, respirator, and appropriate gloves as identified in PPE section) • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • If an object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Fill drums ONLY to 75% capacity with soil and 85% capacity with water. DO NOT fill drums to full capacity.	Project personnel on site
6	Properly seal the drum prior to moving	• Contaminant exposure • Pinch points • Hand injury	• Select and inspect ratchet and socket or box end wrench • Do not use adjustable wrench or screw driver to loosen or tighten band • Wear appropriate gloves as identified in PPE section • Ensure band is placed and secured properly to prevent lid from opening	CRA Project personnel on site

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
7	Attach drums to dolly and move filled containers to designated staging area.	• Pinch points • Hand injury • Slip/trip/fall hazards • Lifting hazards • Manual material handling • Back injury	• Ensure that drums are sealed properly before maneuvering • Reduce travel distance when there is a need to carry/lift materials • Ensure that drum is properly fastened to dolly prior to moving • Make sure grip is adequate; wear leather/cotton gloves • Use moving/lifting device (drum dolly) to move 55 gallon drums; if an object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one handed carrying if possible; maintain awareness of footing • Should the drums be excessively heavy, personnel may need to consider alternative lifting/moving device • Place drum in drum storage/staging area in careful, controlled manner • Keep hands and feet out of pinch points and crush points	Project personnel on site
8	Managing waste drums (55 gallon drums)	• Mislabeling waste	• Label waste appropriately (generator, contact number, identification of contents, and site location); specify type of contents; arrange for disposal	Project personnel on site

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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Motor Vehicle - Driving

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 18:07:00	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Vehicle, valid driver's license, 360-degree topper; seatbelt				
Task-specific Training:	Defensive Driving				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☐ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☐ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☐ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☐ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☐)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Discuss STAR and SWA	Site personnel not aware of STAR and SWA	• Project team (GHD) discusses importance of and documentation procedures for SWA during pre-job safety meeting • Discuss route, concerns, and alternate routes with passenger and drivers of other vehicles • Use SWA to stop any work that is unsafe • Ensure proper vehicle selected for travel (use a truck if going to construction site or area with rough conditions that would damage a small vehicle?)	Driver and passenger
2	Check weather	• Unexpected storm • Fog; rain; snow; lightning/thunder • Heat/cold stress	• Check local weather forecast • Discuss weather issues and precautions to take while driving and on site during the pre-job safety meeting • If weather conditions (e.g., fog, rain, snow, etc.) impair the ability/vision of the driver, exit at nearest safe location and assess the situation • While on site, at first sign of lightning/thunder utilize SWA and assess weather conditions • In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection (e.g., canopy, fan, glove warmers)	Driver or Passenger

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
3	Complete GHD Daily Operator Vehicle Checklist	• Damaged vehicle lights, tires, windows, mirrors, horn • Inadequate vehicle documents and/or safety items	• Check for fluid leaks under vehicle • Test operation of headlights, front/rear turn signals, backup lights, brake lights, and emergency flashers • Visually check the pressure/wear of tires • Ensure the vehicle has a properly inflated spare tire and associated tools to install • Assure windshield and window glass is clean and free from obstructions • Assure all fluids are topped off (e.g., windshield wiper fluid) and scheduled routine maintenance has occurred (e.g., oil changes). • Test the windshield wipers and horn • Verify vehicle registration, insurance card, and inspection sticker is present and valid • If the vehicle contains a first aid kit, fire extinguisher, and road hazard kit, verify that all items with expiration dates are current and that fire extinguisher has had documented monthly check • Do not use vehicle if any safety device is found not functioning	Driver or Passenger
4	Check and adjust seat, steering wheel, headrest, and mirrors	• Back/body strain • Blind spot • Impaired vision	• Adjust seat, headrest, and steering wheel height so body is fully supported/comfortable and pedals are within easy reach • Ensure mirrors are properly adjusted	Driver or Passenger
5	Fasten seat belt(s) and ensure passengers' seat belts are fastened	• Serious injury, ejection, or death from collision and/or traffic citation	Verify driver and passenger(s) seat belts are in good condition and properly latched	Driver or Passenger

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
6	Ensure vehicle doors are locked	• Serious injury, ejection, or death from collision • Unwanted intrusion • Lost equipment	Manually lock all doors to vehicle prior to starting the vehicle	Driver
7	Start engine and check gauges and warning lights	• Vehicle breakdown	Verify sufficient fuel and other hazard lamps (e.g., battery, oil, and temperature) are not lit	Driver
8	Driving – Use defensive driving techniques and stay alert	• Arriving late • Collision • Blind spots of other vehicles • Injury or death to occupants or other parties	• Acknowledge and comply with all traffic regulations, laws, and ordinances • Do not use two-way communicating devices or perform other distracting activities while vehicle is in motion • Constantly scan intersections, move eyes, check mirrors, and assess traffic lights (fresh vs. stale) • Recognize other vehicle's blind spots and minimize time spent within these zones • Maintain safety cushion around vehicle (front, sides, and rear) and 4-second following distance (add an extra second for each hazardous condition, triple following distance in poor weather conditions) • Signal well in advance before changing lanes or turning • Utilize all driving defensive techniques	Driver
9	Arrive at site	• Pedestrian injury • Collision	• Maintain awareness of pedestrian/vehicular traffic when entering site and traveling to work zone	Driver

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
10	Park vehicle – assign a spotter if necessary (when in doubt use a spotter)	• Pedestrian injury • Collision • Property damage • Equipment theft	• Maintain awareness of pedestrian/vehicular traffic • Park vehicle in pull-through parking space or facing the exit • Parking in a parking space that is not a designated parking space will require the placement of the 360-degree topper on the hood of the vehicle • Use a spotter when backing up a vehicle • If no spotter available when backing up a vehicle, complete a 360-degree walk around vehicle. Ensure there are no hidden obstacles (e.g. pot holes, rocks, stumps, broken tree branches hidden by vegetation/foliage, etc.) that could be struck – look up and down. Stop, park and exit vehicle to check rear clearance as necessary when backing up to ensure travel pathway remains clear • Use caution and mirrors/spotter when backing vehicle • Set parking brake • Never leave field equipment in a vehicle unprotected • Never miss use and and always care for all field equipment • Never leave expensive equipment in your vehicle overnight • Always take expensive equipment with you into your hotel room/ house • Never miss use and always care for all field equipment	Driver
11	Demobilization – conduct a vehicle walk around inspection paying particular attention to path(s) of travel	• Collision • Injury or death to occupants or other parties	• Perform perimeter vehicle check • Maintain awareness of pedestrian/vehicular traffic when exiting site • Utilize defensive driving techniques • Complete post-departure checklist and report vehicle problems to company vehicle maintenance manager or rental car agency	Driver or Passenger

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
12	Report maintenance or mechanical problems upon returning vehicle	• Conditions worsen leading to mechanical failure resulting in collision and injury	• Report vehicle problems immediately to company representative or rental car agency • Schedule and/or perform repairs as soon as possible	Driver

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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Construction-Excavation Oversight

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 18:07:01	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Excavator; shoring with tabulated data sheet(s); ladder; air monitoring equipment (PID and 4-gas); Excavation Safety Checklist Additional PPE: Class II vest; leather gloves; Noise Reduction Rating (NRR) 20 hearing protection				
Task-specific Training:	40-Hour and 8-Hour HAZWOPER; PPE; Mobile Equipment Operations; Excavation Safety Training; Excavation Competent Person; Confined Space Entry				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
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☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
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Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Perform the STAR process; discuss SWA; verify Permit to Excavate and Utility Clearance Form is completed (overhead and underground); verify excavation layout	• Underground utility strike • Overhead utilities	• QSF 019 and Permit to Excavate Forms completed and signed off • Utility Locate Ticket number on file within 10 days of excavation startup? • Mark work area and safe distances for overhead lines; use spotter as necessary	CRA Construction Oversight Person
2	Set up necessary work area and traffic controls	• Fall in • Caught between • struck by • Lifting hazards • Manual material handling • Back injury	• Demarcate site and work areas to ensure that personnel and truck/equipment traffic is maintained safely and smoothly • Stockpile and laydown area are set up properly • Perform a pre start meeting, inform subcontractor of safe lifting practices • Reduce travel distance when there is a need to carry/lift materials • Make sure grip is adequate; wear leather/cotton gloves when setting up barricades • Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one handed carrying if possible; maintain awareness of footing	CRA Construction Oversight Person
3	Hand digging and potholing activities (where/if necessary based on utility locates)	Underground utility strike	• Use preventive techniques • Maintain proper utility clearances with heavy equipment and use hand digging/potholing when necessary • Refer to step 2 and the HASP for additional lifting information	CRA Construction Oversight Person
4	Heavy equipment operations to excavate and handle soils and waste materials	• Caught between and struck by hazards • Underground/overhead utilities	• Stay out of swing radius • Use spotters to verify clear route of travel and work area • Maintain eye contact with operator and/or signal operator • Keep soil 2 feet from edges • Inspect heavy equipment and document inspection • Ensure the above utility clearances and safe work protocols are followed	CRA Construction Oversight Person
5	Excavating activities	• Soil cave in • Noise hazard • Struck by/against hazards • Potential contact with chemical waste material, organic vapors, and particulate	• Keep proper distances from edge of excavation • Limit equipment operations in trench area • Keep work area free of trip hazards • Perform necessary soil classification • Use hearing protection as necessary • Wear designated PPE and conduct air monitoring	CRA Construction Oversight Person

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
6	Excavation entry activities (if required)	• Soil cave in • Struck by/against hazards • Hazardous atmospheres • Slip/trip/fall hazards • Emergency egress	• Keep proper distances from edge of excavation • Limit equipment operations in trench area • Keep work area free of trip hazards • Perform necessary soil classification • Use daily inspection form to document/meet competent person inspection requirements • Inspect trench after any change in conditions (e.g., rain, equipment vibrations) • Provide fall protection measures • Utilize shoring equipment properly – ensure that tabulated data sheet is on site • Use 4 gas monitor and PID to screen excavation air prior to and during entry • Ladder safety and proper slope of ladder • Use harness and lifeline when entering trenches over 5 feet deep	CRA Construction Oversight Person

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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Environmental-Drum Sampling for Non Hazardous Material

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 18:07:01	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:					
Task-specific Training:	Hand Tools; Air Monitoring; RCRA/DOT Awareness Training				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Discuss STAR and SWA	• Site personnel not aware of stop work authority	• Project team (GHD) discuss importance of and document procedures for SWA during pre job safety meeting • Use SWA to stop any work that does not comply with the GHD or Client policies	
2	Tailgate Safety Meeting/Safe Performance Self Assessment (SPSA)	• Not identifying all hazards • Property damage • Injury	• Discuss work to be performed and associated hazards • Open communication among team members; have all team members sign safety meeting form • Discuss any new or unknown hazards; Include discussion on SWA, hospital route, evacuation procedures, emergency contact(s), etc. • Identify personnel responsible for respective JSA critical actions for job steps	
3	Opening drums	• Cuts • Hand injury • Pinch point	• Wear leather/cotton gloves and use proper tool (e.g., box end wrench or socket wrench) • Avoid placing hands/fingers in pinch point locations	
4	Sample collection	• Contaminant exposure • Cuts from container breakage • Sample misidentification	• Wear nitrile gloves while collecting soil sample • Inspect container for breaks/cracks • Do not attempt to use any suspect containers • Close containers carefully to avoid breakage • Check sample labels for accuracy prior to placing in cooler	
5	Sample packing	Bottle breakage Contaminant exposure Cuts Pinch points Lifting hazards • Back injury • Manual material handling • Lost time due to incorrect sample packaging or hold time exceedances	• Wear nitrile gloves when handling sample containers • Pack glass containers in bubble wrap • Check COC against sample labels and SSOW for accuracy before shipping • Avoid placing hands/fingers in pinch point locations (e.g., between cooler and lid) • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back • If the object is in excess of 50 pounds (23 kg) then assistance (mechanical such as a cart, dolly or a buddy lift) will be required • Make sure grip is adequate; use gloves to enhance grip when necessary • Reduce distance needed to travel when handling materials • Ensure equipment and supplies are loaded correctly and do not shift during transport	
6	Closing drums	• Cuts • Hand injury • Pinch point	• Wear leather/cotton gloves and use proper tool (e.g., box end wrench or socket wrench) • Avoid placing hands/fingers in pinch point locations	

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2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Remediation-Derived Waste Drum Moving and Handling

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 18:07:01	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Empty drums, spill kit, dolly, ratchet set, or box end wrench for loosening and tightening drum band, bung cap tool				
Task-specific Training:	40 Hour HAZWOPER or 8 Hour Refresher, HAZComm, PPE, Hand and Power Tools				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☐ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☑ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Walk the path to and from the drum storage area	• Slip/trip/fall hazards	• Review HASP and client requirements and implement • Use the STAR process to identify and correct any obvious hazards • Remove trip hazards in the area around the drums before moving hazards	
2	Set up staging area	• Slip/trip/fall hazards • Traffic hazards • Spills	• Remove trip hazards in the area around the drums before moving hazards • Select and demarcate area if necessary to prevent un-authorized personnel and vehicle entry • Ensure emergency spill materials are readily available	
3	Inspect all equipment and hand tools before use	• Hand injuries • Back Injuries • Lacerations	• Inspect dolly to ensure that it is operating properly (wheels turning freely, proper air pressure in wheels, no cracks in welds, sharp edges or burrs) • Select and inspect ratchet and socket or box end wrench • Do not use adjustable wrench or screw driver to loosen or tighten band • Ensure bung caps on drums are in place and secure if provided	
4	Remove drum lid	• Contaminant exposure • Pinch points • Hand injury	• Select and inspect ratchet and socket or box end wrench • Do not use adjustable wrench or screw driver to loosen or tighten band • Wear appropriate gloves as identified in PPE section	
5	Fill drum to appropriate level with derived waste material (i.e., soil cuttings, waste absorbent material, PPE Tyvek suits, etc.)	• Contaminant exposure • Pinch points • Hand injury • Lifting hazards	• Reduce risk of contaminant exposure by wearing proper PPE when handling waste materials (i.e., safety glasses, leather gloves, Tyvek suit, respirator, and appropriate gloves as identified in PPE section) • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • If an object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Fill drums ONLY to 75% capacity with soil and 85% capacity with water. DO NOT fill drums to full capacity.	
6	Properly seal the drum prior to moving	• Contaminant exposure • Pinch points • Hand injury	• Select and inspect ratchet and socket or box end wrench • Do not use adjustable wrench or screw driver to loosen or tighten band • Wear appropriate gloves as identified in PPE section • Ensure band is placed and secured properly to prevent lid from opening	

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
7	Attach drums to dolly and move filled containers to designated staging area.	• Pinch points • Hand injury • Slip/trip/fall hazards • Lifting hazards • Manual material handling • Back injury	• Ensure that drums are sealed properly before maneuvering • Reduce travel distance when there is a need to carry/lift materials • Ensure that drum is properly fastened to dolly prior to moving • Make sure grip is adequate; wear leather gloves • Use moving/lifting device (drum dolly/forklift) to move 55 gallon drums; if an object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or buddy lift) is required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one handed carrying if possible; maintain awareness of footing • Place drum in drum storage/staging area in careful, controlled manner • If available, place drums on pallet for easier loading and unloading • Keep hands and feet out of pinch points and crush points	
8	Managing waste drums (55 gallon drums)	• Mislabeling waste	• Label waste appropriately (generator, contact number, identification of contents, and site location); specify type of contents; arrange for disposal	

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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Surveying-Land Surveying

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 18:07:02	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Flag or paddle Additional PPE: Class II vest; leather gloves to mob/demob equipment				
Task-specific Training:	Flagger Safety; Traffic Control Devices; Personal Protective Equipment				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)
1	Mob equipment to surveying area with GHD vehicle	• Lifting hazards • Manual material handling • Back injury • Pinch points • Moving or flying projectiles inside vehicle while transporting equipment • Slip/trip/fall hazards • Biological hazards	• Reduce travel distance when there is a need to carry/lift materials • Make sure grip is adequate; wear leather/cotton gloves • Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one handed carrying if possible; maintain awareness of footing • Review JSA and HASP • Practice STAR • Properly secure all equipment inside the vehicle	Survey Team
2	Note traffic flow	• Struck by oncoming traffic • Slip/trip/fall • Biological hazards • Threatening dogs	• Stage the GHD vehicle to aid in the protection of the survey crew if they need to set up a Temporary Traffic Control Zone (TTCZ) • Review JSA and HASP • Practice STAR	Survey Team
3	Develop the Temporary Traffic Control Plan (TTCP) and set up the Temporary Traffic Control Zone (TTCZ)	• Struck by oncoming traffic • Slip/trip/fall • Biological hazards • Threatening dogs • Lifting hazards • Manual material handling • Back injury • Heat/cold stress	• Review the requirements of the TTCP ahead of time • Make sure that all temporary traffic control equipment (signs/cones/etc.) is available • Carefully set up TTCZ using the buddy system • Refer to step 1 and HASP for additional lifting methods/information • Position truck with flashers on for added protection • Follow hot/cold stress procedures presented in the HASP • Review JSA and HASP • Practice STAR	Survey Team
4	General use of tools	• Struck by oncoming traffic • Slip/trip/fall hazards • Biological hazards • Threatening dogs • Potential injuries from misuse of tools or use of tools in disrepair	• Wear ANSI Class II reflective safety vest, safety toed boots, and hard hat • Do not use old or faded PPE • Inspect tools • Repair/replace tools as necessary • Review JSA and HASP • Practice STAR	Survey Team
5	Conduct survey activities	• Struck by oncoming traffic • Slip/trip/fall hazards • Biological hazards • Threatening dogs	• Surveyor will enter roadway after clearance from flag person • Surveyor will maintain contact with flag person during survey • Make sure that proper PPE is being worn • Review JSA and HASP • Practice STAR	Survey Team
6	Exit roadway	• Struck by oncoming traffic • Slip/trip/fall hazards • Biological hazards • Threatening dogs	• Surveyor should exit roadway first, followed by flag person nearest oncoming traffic (spotter) • Review JSA and HASP • Practice STAR	Survey Team

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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Mobilization-Demobilization

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 18:07:02	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	#360 degree topper				
Task-specific Training:	#				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☐ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☐ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☐ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)
1	Discuss STAR and SWA	• Site personnel not aware of STAR and SWA	• Project team (GHD) discusses importance of and documentation procedures for SWA during pre job safety meeting • Use SWA to stop any work that is unsafe	
2	Check weather	• Unexpected storm • Fog, rain, snow; lightening/thunder • Heat/cold stress	• Check local weather forecast • If adverse weather conditions are likely, prepare a contingency plan for lodging, etc. with project manager • Discuss weather issues and precautions to take while driving and on site during the pre job safety meeting • If weather conditions (e.g., fog, rain, snow, etc.) impair the ability/vision of the driver, exit at nearest safe location and assess the situation • While on site, at first sign of lightening/thunder utilize SWA and assess weather conditions • In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection (e.g., canopy, fan, glove warmers)	
3	Load equipment into vehicle	• Lifting hazards • Manual material handling • Back injury • Cuts • Pinch points • Hand/foot injury • Forgotten or damaged equipment	• Reduce travel distance when there is a need to carry/lift materials • Make sure grip is adequate; wear leather/cotton gloves • Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Maintain neutral back posture - Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and make sure to shift with the feet rather than twisting at the back • Maintain neutral wrist posture when lifting, carrying, pushing or pulling. The wrist is the strongest and most stable when it is straight. • Avoid one handed carrying if possible; maintain awareness of footing • Avoid placing hands/fingers in pinch point locations • Wear safety toed boots • Verify requested equipment against warehouse form • Load equipment in an organized manner to prevent shifting during transport or use cargo netting	

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)
4	Complete GHD Daily Operator Vehicle Checklist	• Damaged vehicle lights, tires, windows, mirrors, horn • Inadequate vehicle documents and/or safety items	• Check for fluid leaks under vehicle • Test operation of headlights, front/rear turn signals, backup lights, brake lights, and emergency flashers • Visually check the pressure/wear of tires • Ensure the vehicle has a spare tire • Assure windshield and window glass is clean and free from obstructions • Test the windshield wipers and horn • Verify vehicle registration, insurance card, and inspection sticker is present and valid • Ensure the vehicle contains a first aid kit, fire extinguisher, and road hazard kit • Check immediate vehicle perimeter and initial path of travel for obstructions	
5	Check and adjust seat, steering wheel, headrest, and mirrors	• Back/body strain • Blind spot • Impaired vision	• Adjust seat, headrest, and steering wheel height so body is fully supported/comfortable and pedals are within easy reach • Ensure mirrors are properly adjusted	
6	Fasten seat belt(s) and ensure passenger(s) seat belts are fastened	• Serious injury, ejection, or death from collision and/or traffic citation	• Verify driver and passenger(s) seat belts are in good condition and properly latched	
7	Ensure vehicle doors are locked	• Serious injury, ejection, or death from collision • Unwanted intrusion • Lost equipment	• Manually lock all doors to vehicle	
8	Start engine and check gauges and warning lights	• Vehicle breakdown	• Verify sufficient fuel and other hazard lamps (e.g., battery, oil, and temperature) are not lit	
9	Mobilize to site	• Arriving late • Collision • Injury or death to occupants or other parties	• Do not use cell phones or perform other distracting activities while vehicle is in motion • Constantly scan intersections, move eyes, check mirrors, and assess traffic lights (fresh vs. stale) • Maintain safety cushion around vehicle (front, sides, and rear) and 4 second following distance • Utilize all driving defensive techniques	
10	Arrive at site	• Pedestrian injury • Collision	• Maintain awareness of pedestrian/vehicular traffic when entering site and traveling to work zone	

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)
11	Park vehicle	• Pedestrian injury • Collision • Property damage	• Maintain awareness of pedestrian/vehicular traffic • Park vehicle in pull through parking space or facing the exit • Parking in a parking space that is not a designated parking space will require the placement of the 360 degree topper on the hood of the vehicle • Use caution and mirrors/spotter when backing vehicle • Set parking brake	
12	Demobilization	• Collision • Injury or death to occupants or other parties	• Check immediate vehicle perimeter and initial path of travel for obstructions • Maintain awareness of pedestrian/vehicular traffic when exiting site • Utilize defensive driving techniques	

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3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Environmental-Plugging and Abandoning

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 18:07:02	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Safety cones/barricades; Geoprobe Additional PPE: Cease operations and re evaluate the scope of work or upgrade to Level C (full face respirator with OV carts, Tyvek, nitrile inner and outer gloves, safety rated rubber boots or overboots) if sustained background readings are 1 ppm or greater				
Task-specific Training:	HAZCOM, PPE, Heavy/Mobile Equipment Safety, Remember Charlie				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Discuss STAR and SWA	• Site personnel not aware of STAR and SWA	• Project team (GHD) discusses importance of and documentation procedures for SWA during pre job safety meeting • Use SWA to stop any work that is unsafe	
2	Tailgate safety meeting	• Not identifying all hazard	• Discuss work to be performed and associated hazards • Open communication among team members • Have all team members sign safety meeting form • Include discussion on SWA, hospital route, evacuation procedures, emergency contact(s), etc. • Identify personnel responsible for respective JSA critical actions for job steps	
3	Conduct site walk, identify unsafe conditions, and inspect well locations	• Traffic • Slip/trip/fall hazards • Biological and overhead hazards • Maintain awareness of on site traffic and walking surfaces • When inspecting well locations, be aware of biological hazards (e.g., ants, poison ivy, wasps) and overhead hazards (e.g., overhead utilities)	• Discuss work to be performed and associated hazards • Open communication among team members • Have all team members sign safety meeting form • Include discussion on SWA, hospital route, evacuation procedures, emergency contact(s), etc. • Identify personnel responsible for respective JSA critical actions for job steps	
4	Inspection of equipment	• Pinch points • Injury; property damage • Lost time due to damaged equipment/parts	• Discuss pinch points on equipment (e.g., Geoprobe, etc.) • Familiarize all personnel with location/operation of fire extinguisher(s) and kill switch on Geoprobe • Visually inspect equipment/parts for damage	
5	Setup of staging area and work zone	• Traffic • Slip/trip/fall hazards • Pinch points • Lifting hazards • Back injury • Manual material handling • Heat stress • Unstable ground conditions	• Maintain awareness of on site traffic and walking surfaces • Utilize barricades/cones/caution tape to define staging area and to direct traffic • Wear leather/cotton gloves when setting up barricades • Identify heavy loads (>50 lbs/23kg) or loads with shapes or weight distribution that makes them unwieldy • Use at least two people to lift and carry loads greater than 50 lbs • Bend and lift with legs and arms not back • Determine path of travel prior to lifting any object • Ensure all personnel have proper clothing, hydration, and heat/cold protection (e.g., canopy) • Inspect soil for loose, soft or unstable conditions under rig jacks or outriggers	

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)
6	Subcontractor oversight of removing well casing from ground surface	• Equipment failure • Hand injury • Lifting hazards • Back injury • Manual material handling • Slip/trip/fall hazards	• Perform periodic inspections of Geoprobe • Perform a pre-start meeting and inform the subcontractor of safe lifting practices (move objects with cart or dolly when possible) • Refer to step 5 and the HASP for additional lifting information • Ensure operators are wearing leather gloves and using proper body positioning • Practice good housekeeping techniques by keeping work zone free of tripping hazards • Maintain awareness of open borehole	
7	Subcontractor oversight of breaking and removing of concrete from monitor well pad	• Traffic • Slip/trip/fall hazards • Flying debris, property damage • Hearing loss • Cuts/scrapes • Lifting hazards • Back injury • Manual material handling	• Stay within designated work zones and maintain awareness of on site traffic and walking surfaces, use rig as shield • Keep workers/vehicles out of line of fire • Ensure all on site personnel are wearing hearing protection (ear plugs) when in the vicinity of the drill rig • Ensure subcontractors wear leather gloves while handling concrete and watch for rebar and sharp corners of concrete • Refer to step 5 and the HASP for additional lifting information	
8	Subcontractor oversight of surface completion	• Lifting hazards • Back injury • Manual material handling • Eye injury • Skin exposure to concrete • Particulate inhalation • Slip/trip/fall hazards	• Ensure subcontractors are using proper lifting techniques and equipment to mix concrete • Do not allow individual subcontractors to lift greater than 50 lbs • Subcontractors must wear nitrile gloves, dust mask, and safety glasses with side shields • Practice good housekeeping techniques by keeping work zone free of tripping hazards • Verify surface completions with concrete at grade to prevent a future tripping hazard • Leave barricades over former well locations until concrete is safe to drive on • Refer to step 5 and the HASP for additional lifting information	
9	Site cleanup and demobilization (see also job step 2)	• Slip/trip/fall hazards • Vapors and airborne particulates • Lowering mast	• Pick up tools, materials, equipment, and debris to prevent tripping hazards • Wear appropriate PPE including safety glasses, face shield (splash hazard), dust masks (if necessary), and pants • Stay upwind of vapors • Keep hands and other body parts clear of mast while lowering to avoid pinch points • Wear leather work gloves	

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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Environmental- Monitoring Well Sampling

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 18:07:03	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:					
Task-specific Training:					

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☑ Chemical Protective (ie.Nitrile)	☐ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☐ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☐ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☐ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☐)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	**Signature**			
Nathaniel (wells) Richard				

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)
1	Coordinate site access	• Delays or added work	• Notify Station Manager of schedule • Notify other required personnel if applicable (city, regulators, private property owners, etc.)	
2	Mobilize with proper equipment/ supplies for sampling	• Delay or improper/unsafe performance of work due to improper equipment on site • Cross contamination of wells	• Review work plan to determine equipment/supply needs • Make sure all sampling/gauging equipment is decontaminated • Bring ice for sample storage • Review THE HASP and gather necessary PPE	
3	Notify other personnel on site	• Unknown traffic or other work hazards • Lack of communication between all interested parties	• Meet with station attendant or other site personnel and explain planned activities	
4	Determine sampling order	• Cross contamination of samples and wells due to incomplete decontamination of sampling equipment	• Review prior analytical results and set sampling order from lowest to highest concentration wells	
5	Perform STAR and tailgate safety meeting upon arrival at site	• Consider worst case scenario (including weather conditions)	• Review HASP with co workers • Highlight aspects identified by HASP and, if necessary, add to HASP • Get signature of all co workers on HASP	
6	Set up exclusion zone(s)	• Injury or exposure to public or other on site personnel • Slip/trip/fall hazards	• Implement exclusion zone setup instructions of THE HASP (barricades, caution tape, cones, etc.) • Set up work area free of trip hazards	
7	Gauge water levels and product thickness (where applicable) in wells	• Back strain • Inhalation or dermal exposure to chemical hazards	• Don any additional PPE and initiate air quality monitoring in accordance with the HASP • Maintain safe distance from well head • Bend at knees, not waist	

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
8	Purge well(s) and collect purge water	• Cross contamination • Lifting hazards • Back injury • Manual material handling • Inhalation or dermal exposure to chemicals • Slip/trip/fall hazards • Spilling contaminated water	• Decontaminate purging equipment between each sampling location • Reduce travel distance when there is a need to carry/lift materials • Make sure grip is adequate; wear leather/cotton gloves • Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one handed carrying if possible; maintain awareness of footing • Use PPE and monitoring in accordance with the HASP • Keep work area clear of tripping or slipping hazards • Store purge water in appropriate containers	
9	Collect samples in accordance with sampling plan	• Cross contamination • Lifting hazards • Back injury • anual material handling • Inhalation or dermal exposure to chemical hazards • Slip/trip/fall hazards • Improper labeling or storage • Injury due to acid burn (unsealed or leaking sample bottle) • Injury from broken sample bottle (cuts or acid burn)	• Use PPE in accordance with the HASP • Use PPE whenever handling or labeling samples • Decontaminate sampling equipment between each well (unless disposable) • Refer to step 9 and the HASP for additional lifting methods • Label samples in accordance with sampling plan • Keep samples stored in proper containers, at correct temperature, and away from work area • Wear nitrile gloves when handling bottles • Handle bottles carefully	
10	Dispose or store purge water onsite	• Lifting hazards • Back injury • Manual material handling • Exposure to chemicals • If disposing through on site treatment system, damage or injury from improper use of equipment • Improper storage or disposal	• Use proper equipment to transport water (pumps, drum dollies, etc.) • Refer to step 9 and the HASP for additional lifting methods • Where PPE in accordance with the HASP • Review any necessary instructions for use of on site treatment systems • Label storage containers properly and locate in isolated area away from traffic and other site functions • Coordinate off site disposal (where applicable)	
11	Clean site/demobilize	• Traffic • Nuisance or safety hazard left on site • Back strain	• Use buddy system as necessary to remove traffic control • Leave site clean of refuse and debris • Notify station personnel of departure, and note any purge water left on site • Exercise caution when lifting coolers out of the trunk of a car; use the buddy system if justified	

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
12	Package and deliver samples to lab	• Bottle breakage • Improper temperature • Exceeding hold times • Improper completion of Chain of Custody (COC)	• Pack samples in ice, use bubble wrap/bags for sample bottles • Use standard COC forms and labels • Submit samples to lab as soon as possible (no more than 3 days, but check sampling plan for any special requirements such as rush turnaround or special hold time restrictions)	

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Presenter Signature: _____ Date/Time: _____

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Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Environmental-Oversight of Monitoring Well Installation and/or Soil Boring

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 18:07:03	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Air monitoring equipment; safety cones/fencing/barricades (not needed in vacant, fenced areas)				
Task-specific Training:					

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)
1	Markout underground utilities	• Property damage • Explosion • Electrocution • Injury • Death	• Call public underground utility agency (One Call) at least 5 or more days prior to work activities • Review State Law pertaining to underground pipe line safety and have private utility mark out performed • Expose lines if warranted (i.e., hand dig, test pit, or daylight)	Project Manager and Site Supervisor
2	Conduct site walk,identify unsafe conditions and determine sample point locations	• Traffic hazard • Slip/trip/fall hazards • Biological hazard • Overhead/underground hazards • Property damage	• Maintain awareness of on site traffic and walking surfaces • When selecting soil boring locations, be aware of biological hazards (e.g., ants, poison ivy, wasps) and overhead/underground hazards (e.g., overhead utilities, concrete scarring, station canopy) • Use a walking stick, probe, or other such device to check for soil integrity/softness	Site Personnel
3	Equipment inspection	• Pinch points • Property damage • Lost time due to damaged equipment/parts	• Discuss pinch points on equipment (e.g., drill rig, air knife, pressure washer, etc.) • Familiarize all personnel with location/operation of fire extinguisher(s) and kill switch on drill rig • Visually inspect equipment/parts for damage and document inspections	Site Personnel
4	Set up work zone for drilling	• Traffic hazard • Slip/trip/fall hazards • Property damage • Overhead hazards • Environmental impact • Unstable ground conditions • Property damage	• Maintain awareness of on site traffic, work zones, walking surfaces, overhead hazards (e.g., canopy and low hanging overhead lines) • Utilize barricades/cones/caution tape to define work zone and direct traffic • Wear leather/cotton when setting up barricades • Be aware of any potential sensitive receptors and verify all personnel are aware of the location of spill kit • Inspect soil for loose, soft or unstable conditions under rig jacks or outriggers • Place mats or plywood in areas where drill rig will make ruts or depressions (i.e., under tracks or outriggers)	Site Personnel

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)
5	Set up staging area	• Traffic hazard • Slip/trip/fall hazards • Lifting hazards • Back injury • Manual material handling • Pinch points • Heat/cold stress	• Maintain awareness of on site traffic and walking surfaces • Utilize barricades/cones/caution tape to define work zone and direct traffic • Reduce distance needed to travel when carrying materials and or equipment • Wear leather/cotton gloves when setting up barricades • Size up the load, If the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required. • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one handed carrying if possible; maintain awareness of footing • Avoid placing hands/fingers in pinch point locations • In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection (e.g., canopy, fan, glove warmers)	Site Personnel
6	Contractor oversight/ management of hole clearance/drilling activities	• Traffic hazard • Slip/trip/fall hazards • Lifting hazards • Back injury • Manual material handling • Damage to underground utilities • Contaminant exposure • Heat/cold stress • Injury to personnel and public • Cross contamination • Equipment failure	• Maintain awareness of on site traffic and practice good housekeeping • Perform a prestart meeting, inform subcontractor of safe lifting practices • Refer to step 5 and the HASP for additional lifting information • Ensure subcontractors don proper PPE (e.g., face shield, leather/cotton gloves, hearing protection). No loose clothing. • Complete and sign off utility clearance. If non native material (e.g., pea gravel, sand, fill material) or underground utilities are observed, utilize SWA and assess situation. • Monitor breathing zone and refer to HASP for action levels • Monitor all personnel for signs and symptoms of heat/cold stress and refer to HASP for recommendations • Be aware of unsafe hoisting and material handling practices • Be aware of proper augering and auger handling techniques. Visually monitor performance and functioning of drill rig for signs of failure. Monitor safe drill movement/positional setup. • Decontaminate sampling equipment after collecting a sample and decontaminate drilling equipment after each borehole • Watch where you step, look for debris which may be covered by brush or rubble	Site Personnel

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
7	Construct well	• Lifting hazards • Back injury • Manual material handling • Cross contamination • Non approved construction • Slip, trip, and fall hazards • Eye injury • Cuts	• Use proper lifting techniques as discussed in Step 5 and HASP • Prior to going into the borehole, inspect casing and other materials to ensure they are free of jagged/sharp edges • Confirm construction with project manager • Ensure presence or other authorization by any required inspectors for well installation/grouting • Keep pathways and work area clean of debris and possible tripping hazards • Use PPE and monitoring in accordance with the JSA • Use safe cutting tools (no fixed open blade knives)	
8	Site/boring security, clean site, demobilize	• Traffic hazard • Slip/trip/fall hazards • Lifting hazards • Back safety • Manual material handling	• Use buddy system as necessary to remove traffic control • Do not work with your back to traffic • Wear leather/cotton gloves when moving barricades • Maintain awareness of on site traffic and walking surfaces • Maintain proper lifting techniques as described in Step 5 and HASP. • Ensure good house keeping methods are practiced. Work area is kept clean of debris. • Leave site clean of refuse and debris • Clearly mark/barricade any borings that need later topping off or curing • Notify property personnel of departure • Secure boring location if open overnight	

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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Construction Oversight

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 18:07:04	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Modified Class D Personal Protective Equipment, Field notebook, Pen/Pencil, Paper, Camera, Hand Sanitizer				
Task-specific Training:	Introduction to the CRA SMART Program, CRA Annual Safety Training, HAZCOM/WHMIS, HAZWOPER				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☑ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☑ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Review STAR and SWA	• Personnel not aware of STAR and SWA • Traffic hazards, unfamiliar locations	• Reminder of importance of and documentation procedures for SWA; use SWA to stop any unsafe or illegal work practices • Discuss inspection activities with construction site supervisor and appropriate subcontractors • Sign in with general contractor • Review CRA's and contractors site-specific HASP/orientation • Take time to map quest/plot route to and from site. Drive defensively, allow plenty of time for unforeseen traffic conditions	Inspector

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
2	Traversing the site, accessing work area(s) (ladder/scaffold/stairs/climbing)	● Fall hazard (working from heights, floor openings, conveyor pit, etc.) ● Slip/trip hazards ● Falling debris and materials ● Heavy equipment (cranes, dozers, excavator, etc.) ● Heat/Cold stress	● Spot check to identify hazards, establish pathways which is most free of slip and trip hazards, beware of trip hazards, keep work areas free of clutter, communicate hazards to on site personnel, ● Ensure appropriate railings/guarding/delineations are in place around any temporarily open pits or that a spotter is in attendance. ● Inspect ladder before use to ensure safe working condition ● Test ladder for stability and ensure it is tied off in safe manner ● Maintain three points of contact ● Ensure scaffold has been cleared for use before climbing. (planks inspected, etc.) ● Never climb scaffolding structure - always use the integral scaffold ladder or external ladder ● Follow the most stringent fall protection requirements (proper protection systems) if no systems are in place, use your SWA ● Be aware of your surroundings at all times; know where the heavy equipment is at all times while walking the site ● Stay clear of heavy equipment swing radius (cranes) ● Make eye contact with heavy equipment operators ● Look for and obey all commands from flagmen ● Look for loose debris which may be resting on ceiling tiles or framing ● Stairs may have temporary railings; keep to the wall side of the steps ● Stairs may have tarps draped to keep the heat on a particular floor; listen for people on the other side before entering ● If worker is performing a task in the stair take another stair; do not try to walk around ● Always yield right of way to workers carrying materials ● Do not cross barrier tape ● Take frequent water breaks to stay hydrated. Adhere to CRAs H&S guidelines on heat/cold stress	Inspection

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
3	Inspection activities (electrical, mechanical equipment, dead spaces with limited exiting)	● Entrapment ● Potential for exposure to different types of energy sources ● Working from heights ● Slip/trip/fall hazards, (see step 2)	● Never enter a dead space without someone present and waiting at the exit ● Inform site superintendent of your plans and get approval to enter a dead space ● Carry a flashlight and obtain a radio ● Adhere to CRA's policies and guidelines for confined space entry ● Some rooms may have one way locks on the doors; check to ensure that the handle on the inside is unlocked prior to entering ● Assess the risk versus benefit: 1. Is there any other way to observe what you need to observe? 2. Observe from location out of the way of workers? 3. Is it possible to take a picture instead? 4. Can worker use your camera to take a photo for you? ● Do not open panel boards or switchboards ● Do not touch wiring either with hands or other items such as pens or sticks ● Be aware of hanging wiring; report any hanging wire to electrician, electrical superintendent, and site superintendent ● Adhere to CRA's LOTO program ● Ask contractor where you should stand during testing of equipment ● Be aware of low hanging piping and plan your walking path accordingly ● Don't walk when looking at the ceiling for installation deficiencies; walk to the point you need to observe and stop ● Do not touch piping to check if it is hot ● Do not lean on or place anything on equipment such as notepads, etc. ● Spot check to identify hazards, establish pathways which is most free of slip and trip hazards, beware of trip hazards, keep work areas free of clutter, communicate hazards to on site personnel	Inspector

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
4	General activities	● Distractions ● Slip/trip/fall hazards (see step 2) ● Entanglement	● Do not answer or make calls from your cell phone; let your cell phone take a message ● When talking to a contractor or other worker; stop walking; find a place to talk where you do not interfere with ongoing construction activities ● Spot check to identify hazards, establish pathways which is most free of slip and trip hazards, beware of trip hazards, keep work areas free of clutter, communicate hazards to on site personnel Wear appropriate clothing (no loose fitting clothing, tuck in draw strings, shoes/boots tied appropriately, sleeved shirts, long pants, etc.) ● Carry flashlight in your hand, not hanging from your hip ● Carry your camera in a pocket under sweater/coat/jacket; remove any strap from camera ● Never put your hand into a void or wall space ● Do not wear a “hoody” under your hard hat as it may obstruct your peripheral vision ● Do not carry a cell phone on your hip in a holster; place it in your shirt pocket and remove any strap from cell phone	Inspectors

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2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Environmental-Site Recon and Walkthrough

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 18:07:05	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Basic PPE, hand/power tools based on site condition, site inspection checklist or notebook, JSA forms, pens, flashlight. Additional PPE: Insect repellant. Coveralls may be necessary based on type of brush/plants/insects in work area(s) being inspected. Leather gloves if overgrown vegetation or rundown buildings.				
Task-specific Training:	SMART Safety training (STAR), JSA development, Poison Plant Identification				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☑ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☑)Industrial Grade Safety Boot	☐ Other*	☑ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☑ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Discuss STAR and SWA	• Site personnel not aware of STAR and SWA	• Project team discusses importance of and documentation procedures for SWA during pre-job safety meeting • Use SWA to stop any work that is unsafe	All persons on project team
2	Check weather	• Unexpected storm, fog; rain; snow; lightening, thunder • Heat/cold stress, including frostbite and sunburn	• Check local weather forecast • Discuss weather issues and precautions to take while driving and on site during the pre job safety meeting • If weather conditions (e.g., fog, rain, snow) impair the ability/vision of the driver, exit at nearest safe location and assess the situation • While on site, at first sign of lightning/thunder utilize SWA and assess weather conditions • In extreme temperatures, ensure all personnel have proper clothing, which includes either a helmet liner or hat/mask that will cover exposed skin on one's face and ears, hydration, and heat/cold protection (e.g., canopy, fan, glove warmers) • Implement the "Buddy System." The site supervisor shall also keep close tabs on all project personnel working in extreme temperatures.	Assessor
3	Sign in	• Site Manager and Operator not aware of GHD staff presence in facility or on grounds	• Sign in at front desk • Ask to speak to Site Manager or alternate designate	
4	Don necessary GHD and client required PPE	• Contact with recyclable material or equipment	• Wear all required PPE (hard hat, vest, boots, and glasses) at all times while in the facility	
5	Unload equipment from vehicle	• Lifting hazards • Back injury • Manual material handling • Cuts • Pinch points • Hand/foot injury • Forgotten equipment • Damaged equipment	• Reduce travel distance when there is a need to carry/lift materials • Make sure grip is adequate; wear leather/cotton gloves • Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one handed carrying if possible; maintain awareness of footing • Wear leather/cotton gloves and avoid placing hands/fingers in pinch point locations • Wear steel toed boots • Verify requested equipment against warehouse form • Load equipment in an organized manner to prevent shifting during transport or use cargo netting	Assessor

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
6	Complete site inspection and walkover of the property and work areas – Note any hazards that will impact site personnel and/or their operations	• Slip/trip/fall hazards • Insects/reptiles • Pedestrian injury • Poison plants	• Check in with site personnel and sign appropriate visitor or safety log (may require watching safety video [i.e., plant]) • Check with site contact to determine safely accessible areas and areas where PPE are required • Wear PPE as directed by site personnel or dependent upon your evaluation of conditions • If building(s) looks dilapidated or in poor condition, do not enter • Watch for vehicles or other mobile equipment moving around • Make sure areas are well lit and you are accompanied by a site representative (if applicable) • Watch where you step on pavement (potholes, dips, or obstructions) and in vegetated/wooded areas (dips, holes, branches, vines, etc.) • Do not take photographs while walking • Do not talk on cell phone while walking • If in vegetated or wooded areas, watch for beehives, wear insect repellent (if area and season dictate) as needed, be mindful of gopher holes/tunnels, small animal dens, snakes, stray dogs/cats, transient/homeless individuals, poison ivy/oak/sumac, etc.	Assessor
7	Sign out	• Site Manager and Operator not aware that GHD staff have left facility	• Sign out at front desk • Ask to speak to Site Manager or alternate designate	
8	Demobilization	• Collision • Injury or death to vehicle occupants or other parties	• Perform perimeter vehicle check • Maintain awareness of pedestrian/vehicular traffic when exiting the site • Utilize defensive driving techniques • Complete post departure checklist and report vehicle problems to company vehicle maintenance manager or rental car agency	Assessor

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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Vacuum Truck Operation Oversight

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 18:07:06	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Vacuum Truck. High visibility vest, fit for purpose hand protection, hard hat, safety glasses, steel toes with chem or oil resistant soles, and long sleeved clothing.				
Task-specific Training:	CRA SMART (BBS) training; 40-hour HAZWOPER, 8-hour Refresher, Hazard Communication. Supervisor shall be trained in CPR, First Aid, and have Supervisor Training.				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☑ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☑ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☑ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Obtain necessary permits, agreements and bonds; coordinate inspections and subcontractors, and notify stakeholders	• Fines, law suits, delays, or added work	• Coordinate with project manager to ensure all approvals are obtained (well, encroachment, access agreements, traffic control plans, etc.) and owner, tenant, subcontractors, and agencies are notified of start date.	Project Manager
2	Mobilize with proper equipment/supplies	• Delay or improper performance of work due to improper equipment on site	• Make sure subcontractors are aware of their responsibilities for safety, labor, equipment and supplies. • Provide subcontractor with minimum checklist (they can use their own if more protective) and ensure equipment has been checked and meets expected standards before it mobilizes to the site. • Review the HASP and permit conditions and gather necessary PPE.	Site Supervisor
3	Meet with Property Manager (or designee) on start date before commencing work	• Unknown traffic or other work hazards • Lack of communication between all interested parties	• Explain planned activities • Confirm locations to be cleared and tentative schedule • Locate emergency product shut-off switch for facilities with potential hydrocarbon exposures; communicate that location to all personnel	Site Supervisor
4	Perform STAR and tailgate safety meeting upon arrival at site	• Consider worst-case scenario (including weather conditions) • Loud conditions (hearing protection and communications with crew)	• Review the HASP with coworkers • Highlight aspects identified by SPSA and, if necessary, add to HASP and modify JSAs • Have all coworkers sign the HASP • Discuss crew communication in high noise environments; have communication means on hand (air horn, whistle, etc.) • Ensure that all site workers have donned PPE and it is in good condition • Confirm all necessary subcontractor certifications and keep copies on site	Site Supervisor
5	Verify necessary traffic control	• Accident during placement or as a result of improper traffic control equipment placement	• Use buddy system for placing traffic control • Reference traffic control plan section of the HASP (may include specific requirements based on encroachment permit)	Site Supervisor
6	Verify exclusion zone(s) and establish work areas/heavy equipment pathways	• On-site vehicular accident with heavy equipment • Injury or exposure to public or other on-site personnel • Slip/trip/fall hazards	• Use orange fencing, delineators with flags at least 4 feet tall, and caution tape • Implement exclusion zone setup instructions of the HASP • Set up clear walking paths between workstations	Site Supervisor

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
7	Verify set up of vacuum truck	• Damage caused by vac rig while accessing setup locations • Overhead or underground utilities	• Make sure subcontractor ensures clear pathway to location to be cleared • Provide as-needed hand signals and guidance to driver to place rig • Visually inspect vehicle (fire extinguisher on board, no oil or other fluid leaks, pressurized hoses secured with whip-checks or adequate substitute, water tank not leaking, etc.) • Confirm local utility locations • Visually verify bonding and grounding have been performed • Verify that all gauges work, determine when relief valves were last serviced, that all drains/valves open and close as needed, and document and perform function check of emergency shutdown switch • Post person at one of the emergency shutdown switches to shut down operation if unplanned events happen with the rig or that could impact the project.	Site Supervisor
8	Observe operation of vacuum truck	• Eye injury from flying debris • Exposure to chemical hazards • Hearing damage • Catastrophic equipment failure • Damage to adjacent structures and vehicles • Personal or property damage due to accidental activation of vac rig • Back strain	• Don any additional PPE and make sure all people not associated with work at hand are a safe distance from equipment and far enough away that they are safe from flying debris • Ensure that the stinger is safely secured when not in use by shutting off or blocking pressure supply to prevent accidental activation • Use proper lifting techniques and tools	Site Supervisor
9	Verify the removal of all traffic control devices and inspect site for cleanliness	• Traffic • Nuisance or safety hazard left on site • Possible spills	• Use buddy system as necessary to remove traffic control • Leave site clean of refuse and debris • Clearly mark/barricade any holes that need later topping off or curing • Notify station personnel of departure • Map locations and note any cuttings/purge water left on site	Site Supervisor

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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Construction-Loading Soil with Excavator

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Date Issued/Revised:	10/12/2022 19:36:07	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Additional PPE: Modified Level D (MLD) PPE, Photo ionization detector (PID)				
Task-specific Training:					

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
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Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Inspect work area	• Slip/trip/fall hazards • Biological hazards	• Clear any hazards that are clearable • Mark major obstructions with orange tape • Exercise caution • Pay close attention to the ground surface • Inspect immediate surroundings • Walk cautiously	
2	Inspect work area	• Slip/trip/fall hazards • Biological hazards	• Clear any hazards that are clearable • Mark major obstructions with orange tape • Exercise caution • Pay close attention to the ground surface • Inspect immediate surroundings • Walk cautiously	
3	Establish communication	• Know response for emergencies and accidents	• Hand and horn signals established • Emergency signal established	
4	Begin excavation	• Equipment damage • People/hazards in swing radius slides • Cave ins	• All operators must be trained, skilled, and experienced • Operator must look around area and be aware of surroundings at all times • Use proper sloping/shoring techniques • Keep excavator on even or undisturbed surfaces	
5	Excavator loads soil into truck	• Truck running into excavator • Tipping over	• Operators have stopping signal (two honks) • Awareness of surroundings • Do not overload truck or bucket to avoid spillage • Spread the soil in the truck bed to avoid having one side heavier than the other • Trucks need to remain on level ground	

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Heavy Equipment Operation - Hydraulic Track Excavator

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 19:36:07	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Hydraulic excavator (appropriately sized); fire extinguisher				
Task-specific Training:	Heavy Equipment Operation; HASP; OQ training				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Discuss STAR and SWA	• Failing to identify hazardous conditions resulting in losses or near losses	• Determine the hazards of performing the task and survey the work area • Consider weather conditions such as fog that could reduce visibility • Always consider the worst-case scenario • Analyze the hazards determined • Decide on a plan of action to eliminate or reduce the hazards and act on it • For every hour of continuous operation, the operator shall exit the equipment and refocus on the task at hand (i.e., walk around the equipment, kick the tires, obtain a drink of water, etc.)	All personnel
2	Inspect equipment	• Equipment malfunction or damage • Hydraulic fluid, fuel, oil leaks/spills • Loss of steering, loss of brakes, etc. • Accidents • Decreased visibility • Fire • Slip/trip/fall hazards • Unexpected operation of equipment • Swing radius signage missing	• Follow CRA Equipment Inspection Form/Tag Out if malfunction found • Grease moving parts • Check all fluids; ensure that fluids are not too low or too full • Walk around equipment and look for leaking fluids • Ensure that tracks are acceptable (no unacceptable wear and no objects present) • Ensure that windows and mirrors are clean; adjust mirrors! • Remove trash or other debris from cab • Ensure that back up alarm and horn are operational • Correct any problems immediately and inform supervisor • If equipment appears as though it has been tampered with or vandalized, do not start it • Ensure that fire extinguisher is in place and functioning • Inspect the fire extinguisher monthly • Use three point mount/dismount at all times • Be cautious of where you step and be aware of your surroundings • Ensure that ignition key is in your pocket, equipment is in neutral and parking brake is engaged • Use interlock safety mechanism any time equipment is not conducting a productive and/or controlled activity	All personnel
3	Entering equipment	• Reduced visibility • Uncomfortable seating - back strain • Debris on floor becoming stuck under pedals • Unexpected movement of excavator	• Adjust seat and mirrors so that you are able to see where traveling • Adjust controls and seat to your comfort and safety • Ensure that all materials inside cab are secured • Be cautious of where you step and be aware of your surroundings • Ensure steps are clear of water, mud, and other debris • Ensure parking brake is engaged and gear is in neutral • Use interlock safety mechanism any time equipment is not conducting a productive and/or controlled activity	All personnel

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)
4	Configure controls and seating	• Ergonomics - unnecessary physical stress, back injury • Incapable of reaching controls • Visual blocks	• Upon sitting, adjust seat fully to accommodate reach and comfort zone • Fasten seat belt • Make certain all controls are set in neutral positions • Adjust mirrors	All personnel
5	Starting and warming up	• Unanticipated rolling or movement • Engine fire • Mechanical/electrical faults	• Review operator's manual if new to this particular machine • Start engine and check controls to ensure all are in working condition • Allow a minimum of 2 minutes to warm up	All personnel
6	Moving equipment work area	• Other equipment, personnel, or objects in the work area • Uneven terrain	• Perform STAR; be aware of surroundings • Know the daily task and other people and equipment in the area • Make eye contact with other operators and site personnel in the immediate vicinity • Inspect pathway prior to moving equipment to ensure clear pathway	All personnel
7	Performing tasks	• Other equipment (collision) • Slopes, ground conditions causing possible injuries to personnel and equipment • Buried obstacles • Underground and overhead utilities • Dust	• Perform STAR • Know where utilities are located - know where your bucket is in relation to any underground utilities at all times • Be aware of the scope of work to be performed • Use a spotter • Know the paths of other equipment or persons entering and leaving your work area • Communicate with supervisors and other operators throughout the day with any questions • Stop work immediately and contact a supervisor if you are uncertain of your task, experience equipment failure, or personal injury or near loss • Wear dust mask if conditions warrant	All personnel
8	Stopping at end of day	• Slip/trip/fall hazards • Overnight parking of equipment	• Be cautious of where you step and be aware of your surroundings • Park in designated area • Set brake/control locks • Idle for 2 minutes if engine is hot • Lower bucket to ground - zero energy state • Turn equipment off and remove keys • Use three-point dismount • Secure inside instruments (i.e., fire extinguisher)	All personnel

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Construction-Heavy Equipment Operation-Bulldozer

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 19:36:52	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Bulldozer; Fire Extinguisher				
Task-specific Training:	Heavy Equipment Operation				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)
1	Discuss STAR and SWA	• Failing to identify hazardous conditions resulting in losses or near losses	• Determine the hazards of performing the task and survey the work area • Consider weather conditions such as fog that could reduce visibility • Always consider the worst case scenario • Analyze the hazards determined • Decide a plan of action to eliminate or reduce the hazards and act on it • For every hour of continuous operation the operator shall exit the equipment and refocus on the task at hand. This micro break shall consist of (i.e., walk around the equipment, kick the tires, obtain a drink of water, etc.).	Site Supervisor on all
2	Inspect equipment	• Equipment malfunction or damage • Hydraulic fluid, fuel, oil leaks/spills • Loss of steering, loss of brakes, etc.; accidents, decreased visibility • Fire • Slip/trip/fall hazards • Unexpected operation of equipment	• Follow CRA Equipment Inspection Form/Tag Out if malfunction found • Grease moving parts • Check all fluids • Ensure that fluids are not too low or too full • Walk around equipment and look for leaking fluids • Ensure that dozer tracks are acceptable (no unacceptable wear and no objects present) • Ensure that windows and mirrors are clean • Remove trash or other debris from cab • Ensure that back up alarm and horn are operational • Correct any problems immediately and inform supervisor • If equipment appears as though it has been tampered with or vandalized, do not start it • Ensure that fire extinguisher is in place and functioning • Inspect the fire extinguisher monthly • Use three point mount/dismount at all times • Be cautious of where you step and be aware of your surroundings • Ensure that ignition key is in your pocket, equipment is in neutral and parking brake is engaged	Site Supervisor and Operator
3	Entering equipment	• Reduced visibility, uncomfortable seating - back strain • Debris on floor getting stuck under pedals • Unexpected movement of truck • Unexpected movement of truck	• Adjust seat and mirrors so that you are able to see where traveling • Adjust controls and seat to your comfort and safety • Ensure that all materials inside dozer cab are secured • Be cautious of where you step and be aware of your surroundings • Ensure steps are clear of water, mud, and other debris • Ensure parking brake is engaged and gear is in neutral	Site Supervisor and Operator
4	Configure controls and seating	• Ergonomics/unnecessary physical stress • Incapable of reaching controls • Visual blocks	• Upon sitting, adjust seat fully to accommodate reach and comfort zone • Fasten seat belt • Make certain all controls are set in neutral positions • Adjust mirrors	Site Supervisor and Operator

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
5	Starting and warming up	• Unanticipated rolling or movement, engine fire, or mechanical/electrical faults	• Review operator's manual if new to this particular machine • Start engine and check controls to ensure all are in working conditions • Allow a minimum of 2 minutes to warm up	Site Supervisor and Operator
6	Moving equipment work area	• Other equipment, personnel, or objects in work area • Uneven terrain	• Perform STAR • Know the daily task and other people and equipment in the area • Make eye contact with other operators and site personnel in the immediate vicinity • Inspect pathway prior to moving equipment to ensure clear pathway	Site Supervisor and Operator
7	Performing tasks	• Other equipment (collision) • Slopes, ground conditions possible injuries to personnel and equipment, buried obstacles, underground and overhead utilities • Dust	• Perform STAR • Know where utilities are located • Be aware of the scope of work to be performed • Know the paths of other equipment or persons entering and leaving your work area • Communicate with supervisors and other operators throughout the day with any questions • Stop work immediately and contact a supervisor if you are uncertain of your task, experience equipment failure, or personal injury or near loss • Wear dust mask of conditions warrant	Site Supervisor and Operator
8	Stopping at end of day	• Slip/trip/fall hazards • Overnight parking of equipment	• Be cautious of where you step and be aware of your surroundings • Park in designated area • Set brake/control locks • Idle for 2 minutes if engine is hot • Lower blade to ground • Turn equipment off • Use three point dismount • Secure inside instruments (i.e., fire extinguisher)	Site Supervisor and Operator

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3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Construction-Heavy Equipment Operation-[Articulated] Dump Truck

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 19:38:16	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Articulated dump truck; inspection checklist; driver's logbook; commercial driver's license; fire extinguisher				
Task-specific Training:	Heavy Equipment Operation; Spotter Safety; Towing/Trailering				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)
1	Discuss STAR and SWA		• Determine the hazards of performing the task and survey the work area • Consider weather conditions such as fog that could reduce visibility • Always consider the worst case scenario • Analyze the hazards determined • Decide a plan of action to eliminate or reduce the hazards and act on it • For every hour of continuous operation the operator shall exit the equipment and refocus on the task at hand. This micro break shall consist of (i.e., walk around the equipment, kick the tires, obtain a drink of water, etc.).	Site Supervisor on all
2	Equipment inspection/ maintenance	• Slip/trip/fall hazards • Faulty equipment • Pinch points/hot surfaces	• Inspect travel path for weather related hazards (i.e., wet, puddles, mud, obstacles) • Use three points of contact • Do not jump off of equipment • Must pass equipment inspection checklist prior to operation • Wear leather gloves • Identify and avoid pinch points	Site Supervisor and Operator
3	Traveling around work area	• Overturning • Steep grade collision • Personnel struck by truck	• Control speed • Use proper gear for situation and use turn signals • Monitor truck operation and braking abilities during operation • Evaluate road for slippery conditions • Follow established traffic patterns and instructions • Be cautious of other personnel on site	Site Supervisor and Operator

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
4	Loading truck	• Overturning • Collision/personnel struck by truck • Contact with utilities • Falling material from side of truck or swing of excavator • Falling from truck/trailer	• Evaluate surface behind truck • Use spotter when backing • position truck so that cab is away from the trackhoe bucket • Stop truck completely prior to starting loading operations • Be cautious of trackhoe operator signals (two honks to stop) for starting and completing loading ops • Do not exit until signaled by operator or spotter • spotter required within 100 feet of overhead utilities • Maintain at least 10 feet from overhead lines and increase distance for high voltage • Utilities (subsurface, power poles, etc) shall be identified, marked, and protected again contact with heavy equipment • Load from the rear of truck and do not swing bucket over cab • Spotter stays clear of truck while loading and pulling away from area • If spotter/driver mounts truck to check load level, etc., always maintain three points of contact with truck/trailer	Site Supervisor and Operator
5	Transport of soils	• Contact with heavy equipment • Overturning • Contact with utilities	• Haul truck operators must slow down when approaching the excavation area • Haul trucks shall follow the approved haul routes as determined by the supervisor and confirmed in the daily TGSM • Maximum speed on site is 15 mph • Excavator operator must ensure that the load on truck is evenly distributed prior to haul truck leaving area • Load must be covered with a tarp per DOTD specifications • Dirt must not be tracked into roadway	Site Supervisor and Operator
6	Dumping load	• Overturning • Collision, personnel struck by truck • Contact with utilities	• Raise truck bed with truck completely stopped and parking brake in place • Lower bed fully before moving vehicle • Use caution when dumping loads of wet material as it may stick to the truck bed causing an imbalance of load	Site Supervisor and Operator

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2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Construction-Heavy Equipment Operation-Water Truck

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 19:38:56	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Vehicle, valid driver's license Additional PPE: Fire Extinguisher, Wear sunglasses if necessary; use seatbelt				
Task-specific Training:	Motor Vehicle Safety; Heavy Equipment Use; Owner's Manual and Pump Operation Instruction Sheet				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)
1	Discuss STAR and SWA	• Personnel not aware of STAR and SWA • Situational hazards	• Understand scope of work; areas to be watered • Use SWA to stop any work that is unsafe • Have proper training on water truck and pump	Driver
2	Inspect equipment: Document daily inspection and submit paperwork to Site Supervisor/Safety and Health Officer, Ensure that ignition key is in your pocket, equipment is in neutral, and parking brake is engaged	• Equipment malfunction or damage • Hydraulic fluid, fuel, oil leaks/spills • Loss of steering, loss of brakes, etc.; accidents, decreased visibility • Fire • Slip/trip/fall hazards • Unexpected operation of equipment • Debris on floor getting stuck under pedals	• Follow CRA Equipment Inspection Form/Tagout if malfunction found; daily documentation required • Grease moving parts • Check all fluids • Ensure that fluids are not too low or too full • Walk around equipment and look for leaking fluids • Ensure that tires are acceptable (no unacceptable wear and no objects present) • Ensure that windows and mirrors are clean; adjust mirrors • Remove trash or other debris from cab • Ensure that back up alarm and horn are operational • Correct any problems immediately and inform supervisor • If equipment appears as though it has been tampered with or vandalized, do not start it • Ensure that fire extinguisher is in place and functioning • Inspect the fire extinguisher monthly • Use three point mount/dismount at all times • Be cautious of where you step and be aware of your surroundings • Use brakes and place in neutral whenever equipment is not conducting a productive and/or controlled activity	Driver
3	Entering equipment/ configure controls/seating: Use three points of contact and clean steps if necessary, Adjust seat and mirrors so that you are able to see where traveling	• Reduced visibility • Uncomfortable seating back strain • Unexpected movement of machine • Ergonomics/unnecessary physical stress/back injury • Incapable of reaching controls • Visual blocks	• Adjust controls to your comfort and safety • Ensure that all materials inside cab are secured • Be cautious of where you step and be aware of your surroundings • Ensure steps are clear of water, mud, and other debris • Upon sitting, adjust seat fully to accommodate reach and comfort zone • Fasten seat belt • Make certain all controls are set in neutral positions	Driver
4	Starting and warming up:Review operator's manual if new to this particular machine, Review pump operation instructions	• Unanticipated rolling or movement, engine fire, or mechanical/electrical faults	• Ensure that equipment is in good working order • Start engine and check controls to ensure all are in working conditions • Allow a minimum of 2 minutes to warm up • Do not leave equipment unattended while warming up	Driver

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)
5	Moving equipment to work area or fill area:Review braking distances as indicated in manufacturer's specifications, Make eye contact with other operators and site personnel in the immediate vicinity, Verify a clear path for travel, No cell phone use while operating vehicle	• Other equipment, personnel, or objects in work area • Uneven terrain	• Perform STAR – be aware of surroundings • Know the daily task and other people and equipment in the area • Maintain communication between workers on foot and in equipment • Inspect pathway prior to moving equipment to ensure clear pathway • Evaluate surface know manufacturer's limitations as to maximum % grade or slope allowed for safe equipment operations • Maximum water truck speed is 15 mph	Driver
6	Filling water tank	• Pinch points • Rolling vehicle • Ergonomics/unnecessary physical stress/back injury • Uneven terrain • Equipment damage	• Use leather gloves when turning valves and connecting/ disconnecting hoses • Place vehicle in neutral and set parking brake • Be cautious of where you step and be aware of your surroundings • Understand tank and pump operation instructions • Use proper lifting and bending techniques	Driver
7	Watering site roads and work areas: Know where utilities are located, Communicate with supervisors and other operators throughout the day with any questions, No cell phone use while operating vehicle	• Other equipment (collision) • Slopes, ground conditions possible injuries to personnel and equipment, buried obstacles, underground and overhead utilities • Fire or explosion • Stuck by equipment or material • Overturning • Equipment damage	• Perform STAR • Be aware of the scope of work to be performed • Use a spotter as necessary • Know the paths of other equipment or persons entering and leaving your work area • Stop work immediately and contact a supervisor if you are uncertain of your task, experience equipment failure, or personal injury or near loss • Use and be aware of personal H2S monitor • Ground personnel should be outside the operational area of the equipment while equipment is in operation • Do not operate pump over 15,000 rpm – approximately 8 mph • Max imum water truck speed is 15 mph	Driver
8	Stopping at end of day or at times during the day: Set brake; place in "R", Turn equipment off; remove keys, Use three point dismount	• Slip/trip/fall hazards • Temporary/overnight parking of equipment	• Be cautious of where you step and be aware of your surroundings • Park in safe area • Idle for 2 minutes if engine is hot • Zero energy state • Secure inside instruments (i.e., fire extinguisher) • Lock cab if applicable	Driver

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Construction-Heavy Equipment Operation-Loader

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 19:40:02	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Loader Additional PPE: Fire Extinguisher				
Task-specific Training:	Heavy Equipment Operation				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Review JSA General Site Activities	• Failing to identify hazardous conditions resulting in losses or near losses	• Conduct STAR • Assess the risks • Determine the hazards of performing the task and survey the work area • Consider weather conditions such as fog that could reduce visibility • Always consider the worst case scenario • Analyze the hazards determined • Decide a plan of action to eliminate or reduce the hazards and act on it	Site Supervisor on all
2	Inspect equipment	• Equipment malfunction or damage • Hydraulic fluid, fuel, oil leaks/spills • Loss of steering, loss of brakes, etc.; accidents, decreased visibility • Fire • Slip/trip/fall hazards • Unexpected operation of equipment	• Follow CRA equipment inspection form/tag out if malfunction found • Grease moving parts • Check all fluids • Ensure that fluids are not too low or too full • Walk around equipment and look for leaking fluids • Ensure that loader tracks are acceptable (no unacceptable wear and no objects present) • Ensure that windows and mirrors are clean • Remove trash or other debris from cab • Ensure that back up alarm and horn are operational • Correct any problems immediately and inform supervisor • If equipment appears as though it has been tampered with or vandalized, do not start it • Ensure that fire extinguisher is in place and functioning • Inspect the fire extinguisher monthly • Use three point mount/dismount at all times • Be cautious of where you step and be aware of your surroundings • Ensure that ignition key is in your pocket, equipment is in neutral and parking brake is engaged	Site Supervisor and Operator
3	Entering equipment	• Reduced visibility, uncomfortable seating back strain • Debris on floor getting stuck under pedals • Unexpected movement of truck	• Adjust seat and mirrors so that you are able to see where traveling • Adjust controls and seat to your comfort and safety • Ensure that all materials inside dozer cab are secured • Be cautious of where you step and be aware of your surroundings • Ensure steps are clear of water, mud, and other debris • Ensure parking brake is engaged and gear is in neutral	Site Supervisor and Operator
4	Configure controls and seating	• Ergonomics/unnecessary physical stress • Incapable of reaching controls • Visual blocks	• Upon sitting, adjust seat fully to accommodate reach and comfort zone • Fasten seat belt • Make certain all controls are set in neutral positions • Adjust mirrors	Site Supervisor and Operator

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
5	Starting and warming up	• Unanticipated rolling or movement, engine fire, or mechanical/electrical faults	• Review operator's manual if new to this particular machine • Start engine and check controls to ensure all are in working conditions • Allow a minimum of 2 minutes to warm up	Site Supervisor and Operator
6	Moving equipment work area	• Other equipment, personnel, or objects in work area • Uneven terrain	• Conducts SPSA • Know the daily task and other people and equipment in the area • Make eye contact with other operators and site personnel in the immediate vicinity • Inspect pathway prior to moving equipment to ensure clear pathway	Site Supervisor and Operator
7	Performing tasks	• Other equipment (collision) • Slopes, ground conditions possible injuries to personnel and equipment, buried obstacles, underground and overhead utilities • Dust	• Perform SPSA • Know where utilities are located. Be aware of the scope of work to be performed • Know the paths of other equipment or persons entering and leaving your work area • Communicate with supervisors and other operators throughout the day with any questions • Stop work immediately and contact a supervisor if you are uncertain of your task, experience equipment failure, or personal injury or near loss • Wear dust mask if conditions warrant • For every hour of continuous operation the operator shall exit the equipment and refocus on the task at hand. This micro break shall consist of (i.e., walk around the equipment, kick the tires, obtain a drink of water, etc.).	Site Supervisor and Operator
8	Stopping at end of day	• Slip/trip/fall hazards • Overnight parking of equipment	• Be cautious of where you step and be aware of your surroundings • Park in designated area • Set brake/control locks • Idle for 2 minutes if engine is hot • Lower blade to ground • Turn equipment off • Use three point dismount • Secure inside instruments (i.e., fire extinguisher)	Site Supervisor and Operator

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Clearing-Skid Steer Operation

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 19:40:51	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Skid steer; first aid kit; fire extinguisher				
Task-specific Training:					

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☑ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Perform STAR process; refer to the equipment manufacturer's operating manual before using any machinery	• Slip/trip/fall hazards • Situational risks • Short service employees	• Verify personnel training is sufficient for scheduled task(s) • Is Job Instruction (hands on) Training necessary? • For every hour of continuous operation the operator shall exit the equipment and refocus on the task at hand. This micro break shall consist of a walk around the equipment, kick the tires, obtain a drink of water, etc.	All Personnel
2	Complete brief stretching/warm up	• Soft tissue related injury	• Complete 5-6 minute warm up routine to prepare for the day's work	All Personnel
3	Prepare daily inspection report while inspecting machine	• Equipment problems • PPE failure	• Don all necessary PPE • Trained on inspection procedures	Skid Steer Operator
4	Transporting the equipment to the work area	• Backing into or running over objects	• Walk around the equipment or use a spotter when necessary	Skid Steer Operator
5	Hooking up to the necessary attachment(s)	• Cuts • Pinched fingers/limbs	• Don all necessary PPE • Use a spotter to help hook up the attachment(s) • Shut down equipment when hooking up hydraulic hoses	Skid Steer Operator and Laborer
6	Operating equipment after making sure area is cleared of all unnecessary personnel	• Flying debris from cutting • Running over stumps/wire/other unknowns	• Don all necessary PPE • Keep attachments as close to the ground as possible • Use a spotter when needed • Keep ground personnel 300 feet or more from chipping/shearing operations	Skid Steer Operator and Laborer
7	Shut down and exiting of equipment	• Slip/trip/fall hazards • Situational risks	• Keep all attachments on the ground when the machine is not running • Maintain three points of contact when entering or exiting	Skid Steer Operator

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2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Construction-Concrete Breaking-Excavator with Hydraulic Hammer

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 19:41:31	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Excavator and hydraulic hammer				
Task-specific Training:	Mobile/heavy equipment training, HASP, hydraulic hammer operation and limitations				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)
1	Use the STAR Process and discuss SWA – modify JSA as necessary A) Inspect work area B) Determine the hazards of performing the task and survey the work area	• Slip/trip/fall hazards • Situational risks • Failing to identify hazardous conditions resulting in losses or near losses • Utility clearance • Miscommunications	• Verify personnel's training is sufficient for the scheduled task(s) • Is job instruction training (hands on) training necessary? • Consider weather conditions • Always consider the worst case scenario • Analyze the hazards determined • Discuss task and determine best plan of action towards safety and property • Confirm utilities within the work area(s) • For every hour of continuous operation the operator shall exit the equipment and refocus on the task at hand. This micro break shall consist of (i.e., walk around the equipment, kick the tires, obtain a drink of water, etc.).	PM, Supervisor, Operator
2	2 Inspect equipment A) Mobile equipment checklist B) Preventive maintenance C) Housekeeping procedures	• Equipment failure/malfunction • Property damage • Release of stored energy • Slip/trip/fall hazards • Pinch points • Visibility • Poor housekeeping	• Inspect equipment using daily equipment checklist • Report all damaged, missing, or broken components to your site supervisor immediately • Follow manufacturer's recommended daily inspections. • Wear appropriate hand protection; identify pinch point areas and keep hands and fingers clear • Make sure equipment is in "Zero" energy mode and off during the inspection • Clean windshield and side windows as necessary • Keep cab of machine clean and free of all debris especially around the foot controls and levers	Operator, Supervisor
3	Entering and exiting the equipment	• Slips and Falls • Muddy Conditions • Worn/dirty/muddy soles on boots	• Mount/dismount equipment using three points of contact • Use manufacturer designed steps and handrails • Keep steps and work boots free of debris (i.e., mud, clay) • Keep work boots in good condition; replace as necessary to prevent slips and loss of traction	Operator
4	Moving equipment A) Start the machine B) Review travel path prior to moving C) Tracking, travel, and swing	• Ground personnel • Inclement weather • Dust • Poor visibility • Property damage • Overhead utilities • Distractions	• Pre plan your route; use the STAR process and consult with your supervisor • Wear the appropriate PPE • Always look up when mobilizing to the work area • Be aware of your surroundings and ground personnel; use SWA if unsafe acts or conditions exist • Do not operate during electrical storms; SWA in effect • No eating, drinking, or cell phone use while operating machinery • Keep lines of communication open via hand signals, two way radios or both.	Operator

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
5	Breaking concrete A)Block B)Foundations C)Platforms	• Flying debris • Ground personnel • Equipment damage • Uneven surfaces • Noisy environment • Sprains • Utilities	• Wear hearing protection • Keep all personnel out of the “line of fire” and set up safe zone around work area – use SWA if personnel enter “line of fire” • Set up controlled/demarcated work zone in high traffic areas • Position machinery on solid, even surfaces; use the STAR process and discuss with your supervisor • Understand the equipment’s limitations • Watch for sharp objects protruding out from the concrete (i.e., rebar, steel, etc.) Never walk into the pile. Clear and area if necessary. • Watch for any known utilities	Operator
6	End of task A) Breaks B) Fueling C) Parking – set equipment to a “zero energy state”	• Slip/trip hazards • Spills • Obstructions • Equipment damage • Vandalism • Unauthorized personnel	• Be aware of your surrounding conditions (footing, weather conditions, etc.) • Restore equipment to “Zero” energy mode • Use three points of contact when dismounting equipment • Refer to JSA on “Fueling of Equipment” • Remove key from equipment, close all windows and lock the cab • Secure the work zone • Stage equipment appropriately • Park on solid, level surface	Operator

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Construction-Heavy Equipment Operation-Compactor With Blade

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 19:42:08	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Compactor - appropriately sized and equipped				
Task-specific Training:	Heavy Equipment Operation; Operator Qualification Training; Site specific Health and Safety Plan				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☑ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Discuss STAR and SWA	• Failing to identify hazardous conditions resulting in losses or near losses	• Determine the hazards of performing the task and survey the work area • Ensure that equipment selection is suitable for job requirements • Consider weather conditions such as fog that could reduce visibility • Always consider the worst case scenario • Consider slopes and grades the equipment is working on • Analyze the determined hazards • Decide a plan of action to eliminate or reduce the hazards and act on it	Site Supervisor and Operator
2	Inspect equipment	• Equipment malfunction or damage • Hydraulic fluid, fuel, oil leaks/spills • Loss of steering, loss of brakes, or decreased visibility causing accidents • Fire hazard • Slip/trip/fall hazards • Unexpected operation of equipment • Equipment safety warnings or signage missing	• Complete CRA Equipment Inspection Form and tag out equipment if malfunction found • Grease moving parts • Check all fluids • Ensure fluids are not too low or too full • Walk around equipment and check for leaking fluids • Ensure that tires are acceptable (no unacceptable wear and no foreign objects present) • Ensure as appropriate that windows and mirrors are clean; adjust mirrors if present • Remove trash or other debris from cab • Ensure backup alarm and horn are operational • Correct any problems immediately and inform supervisor • If equipment appears to have been tampered with or vandalized, do not start it • Ensure fire extinguisher is in place and functioning • Ensure equipment operations manual is present in cab; inform supervisor if manual is missing or damaged • Review equipment operation manual if not familiar with equipment • Inspect fire extinguisher monthly • Use three point mount/dismount at all times • Be cautious of where you step and be aware of your surroundings • Ensure that ignition key is in your pocket, equipment is in neutral, and parking brake is engaged • Use interlock safety mechanism whenever equipment is not conducting a productive and/or controlled activity	Operator

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)
3	Entering equipment	• Slip/trip/fall hazards • Reduced visibility • Uncomfortable seating causing back strain • Debris on floor getting stuck under pedals • Unexpected movement of equipment	• Always use three points of contact • Adjust seat and mirrors so that you are able to see where traveling • Adjust controls and seat for your comfort and safety • Ensure that all materials inside cab are secured • Be cautious of where you step and be aware of your surroundings • Ensure steps are clear of water, mud, and other debris • Ensure parking brake is engaged and gear is in neutral when unit is not moving • Use interlock safety mechanism whenever equipment is not conducting a productive and/or controlled activity	Operator
4	Configure controls and seating	• Poor ergonomics causing unnecessary physical stress or back injury • Difficulty reaching controls • Visual blocks	• Upon sitting, adjust seat fully to accommodate reach and comfort zone • Fasten seat belt • Make certain all controls are set in neutral position • Adjust mirrors	Operator
5	Starting and warming up	• Unanticipated rolling or movement of equipment • Engine fire or mechanical/electrical faults	• Review operator's manual for this particular machine • Start engine and check controls to ensure all are in working conditions • Allow a minimum of 2 minutes to warm up	Operator
6	Moving equipment to work area	• Other equipment, personnel, or objects in work area • Uneven terrain and slopes	• Perform STAR – be aware of your surroundings • Wear seat belt, remain seated keep limbs inside equipment, shut engine off • Know the daily tasks reviewed at Tailgate Meetings and be aware of other people and equipment in the area • Make eye contact with other operators and site personnel in the immediate vicinity • Inspect pathway prior to moving equipment to ensure clear pathway • If working on slopes be aware of equipment limitations and the proper procedures for working on slopes or uneven terrain as identified in the operator's manual	Operator

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
7	Performing tasks	• Collision with other equipment • Possible injury to personnel or damage to equipment due to ground conditions (e.g., slopes, buried obstacles, underground and overhead utilities) • Rollover • Debris being kicked by and/or caught by blade or roller	• Perform STAR • Know where utilities are located – know where your equipment is in relation to underground utilities at all times • Be aware of the scope of work to be performed • Know the paths of other equipment or persons entering and leaving your work area • Communicate with supervisors and other operators throughout the day with any questions • Stop work immediately and contact a supervisor if you are uncertain of your task or experience equipment failure or personal injury or near loss • Spot branches, limbs, pipes, etc. 3 feet or greater in length • Beware of debris becoming caught in equipment wheels • Do not back compactor with blades lowered as this could force debris onto roller	Operator
8	Stopping at end of day	• Slip/trip/fall hazards • Overnight parking of equipment	• Be cautious of where you step and be aware of your surroundings • Park in designated area • Set brake/control locks • Idle for 2 minutes if engine is hot • Turn equipment off; remove keys • Use three points of contact to dismount	Operator

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : P66-Utility Task Vehicle (UTV)

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 19:42:57	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Kawasaki Mule, Gator and/or Bobcat; Fire Extinguisher mounted on unit. Based upon the specific task activities, the following type(s) of gloves will be worn in accordance with the Glove Selection Guideline (P66 Contractor Safety Requirements – Personal Protective Equipment): Use hearing protection as necessary based on site conditions. FRC clothing (coverall, pants, long sleeve shirt)				
Task-specific Training:	Utility Task Vehicle -specific training; Operator's Manual including general operation, safety, and inspection procedures				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☑ Coveralls
☐ Type 2 (Side Impact)	☐ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☑ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☑ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☑ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☑ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☑ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Pre-Operation Inspection-Safety Checks - Daily	• Equipment failure (brakes/ accelerator sticking, fuel leaks) • Property damage • Low fluid levels • Poor steering • Rough idle • Vandalism • Pinch points • Undercarriage-branches	• Complete mobile equipment checklist, daily Inspection Form • Make notes on inspection form to include manufacturer's specific recommended procedures. • **Wear ANSI Cut & Puncture Level 3 Impact gloves.** • Know and understand actions to take during equipment failure events (stuck throttle, braking issues, tire blowout, etc.) • Report to site supervisor immediately and tag vehicle out of service if any deficiencies' are found. • Keep all guards and shields in place • Check all fluid levels including fuel tank-Unit takes diesel fuel. • Ensure Fire Extinguisher is fully charged, pinned and tagged.	Operator
2	Standard (safe) operations	• Noise • Roll-over injuries • Entrapment/pinned • Collision • Crush Feet & Hands • Speeding • Rough terrain • Heavy equipment • Contact/collision with other mobile heavy equipment or personnel • Muddy conditions • Tree stumps, roots • Debris-glass, hoses, tires • Poor visibility	• Wear hearing protection as deemed necessary • Operate equipment in accordance with manufacturer's specifications • **Wear ANSI Cut & Abrasion Level 2 gloves.** • Scan ahead of travel route to ensure ground conditions are suitable for safe operation. • Only qualified operators may operate equipment • Keep both hands on steering wheel and feet inside the cab • Obey site specific speed limits (5-10mph) • Seat belts to be worn at all times. • Never operate diagonally on slopes. Approach slopes 90 degree (straight on) • Never leave UTV running and unattended. Place in Neutral, turn off and set brake. • Never cross a body of water unless depth is less than 12". Cross water slowly and place in 4 wheel drive. • Ensure marker flags are in proper position • Ensure warning lights are functioning • Keep gas and brake pedal free of mud build-up. Keep bottom of boots clean each time when getting in the driver's position.	Operator
3	Loading & Transporting supplies/equipment	• Property Damage • Spills • Protruding objects • Strike by or projectile • Pinch points	• Follow manufacture recommended load capacity. Refer to owner's manual. • **Wear ANSI Cut & Abrasion Impact Level 3 Impact gloves** • Uniformly load supplies /equipment for proper weight distribution. • Keep supplies within the boundary of the UTV box. • Do not overload!! If weight sages the back of UTV and tires bulge, It's unsafe • Secure load with ratchet straps.	Operator and helper

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
4	Fueling	• Fire/explosion • Static electricity	• **Wear ANSI Cut & Abrasion Level 2 gloves under chemical or Nitrile gloves.** • Fuel in a well ventilated area or stationary fueling area. • Never fuel while engine is running. Allow engine to cool down for 15 minutes. • Wipe spilled fuel immediately and wait for fumes to disperse before starting engine • Ensure proper bonding and grounding is performed before dispensing fuel.	Operator
5	End of Use	• Leaks • Property loss • Dead Battery • Debris stuck underneath (undercarriage)	• **Wear ANSI Cut & Abrasion light duty Level 2 gloves** • Stage equipment in secure, level area. • Conduct housekeeping. Put tools/equipment up in storage • Turn off machine and remove key and set the brake. • Check for leaks by conducting a 360 walk around. • Clean or remove any trapped debris from undercarriage	Operator

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Presenter Signature: _____ Date/Time: _____

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Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Operating Geoprobe Rig with Macro Core System

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 19:50:32	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Geoprobe drill rig; Gloves will dependent on the task and chemical contamination present or suspected present				
Task-specific Training:	Operation of Geoprobe Drill Rig With Macro Core System				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☐ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☑ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Discuss STAR and SWA	Site personnel not using the STAR process and SWA	• Project team (GHD) discusses importance of and documentation procedures for SWA during pre-job safety meeting Use SWA to stop any work that is unsafe	
2	Raise mast, slide extension ¾ ways out, lower foot on ground surface	• Slip/trip/fall hazards • Overhead utilities • Underground utilities • Pinch and crush points - hands, feet, and fingers • Unstable ground conditions	• Use the STAR process • Be aware of footing at all times • Verify that all utilities have been cleared • Machine has all pinch and crush points marked in reflective tape • Wear appropriate PPE • Inspect soil for loose, soft, and unstable conditions under rig jacks or outriggers	
3	Place drive cap on macro core tube, position under hammer, and lower hammer until anvil meet drive cap	• Back strain • Pinch point • Loud percussion • Shift or kick out of macro core tube	• Use proper lifting techniques • Maintain awareness of pinch and crush points at all times • Adjust hammer side to side or forward and backward to keep macro core plumb • Wear appropriate PPE	
4	Don't raise foot off the ground while advancing macro core tube	• Pinch and crush points - hands, feet, and fingers • Kick out of macro core tube	• Maintain awareness of pinch and crush points at all times • Maintain awareness of macro core tube	
6	Lower hammer all the way down	• Slip/trip/fall hazards • Pinch and crush points - hands, feet, and fingers	• Be aware of footing at all times • Machine has all pinch and crush points marked in reflective tape	

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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Operating Geoprobe with Augers

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 19:50:33	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Geoprobe drill rig; Gloves are dependent on the task and chemical contamination suspected or present				
Task-specific Training:	Spinning augers with Geoprobe				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☐ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☐ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☑ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	• Discuss STAR and SWA	Site personnel not using the STAR process and SWA	· Project team (GHD) discusses importance of and documentation procedures for SWA during pre-job safety meeting Use SWA to stop any work that is unsafe	
2	• Raise mask, slide extension ¾ ways out, lower foot on ground surface, lower out riggers to level machine • Raise hammer assembly to fold out auger head and secure with a bolt or pin.	· Slip/trip/fall hazards · Overhead wires · Underground utility · Pinch and crush points - hands, feet, fingers Unstable ground conditions	· Use STAR process · Be aware of footing at all times · Verify that all utilities have been cleared · Machine has all pinch and crush points marked in reflective tape · Wear appropriate PPE Inspect soil for loose, soft or unstable conditions under rig jacks or outriggers	
3	• Place HSA drive cap in auger head and secure with pin • Place wooden auger plug into cutting head • Lift auger with cutting head and bolt to HSA drive cap • Apply down pressure with hammer assembly • Keep auger plum • Clear soils as needed	· Back strain · Pinch points · Pulled in by rotation of auger · Shift or kick out of auger Shovel hitting auger during rotation	· Use proper lifting techniques · Use two people when lifting augers · Maintain awareness of pinch and crush points at all times · No loose clothing or jewelry · Adjust side to side or forward and backward to keep auger plumb · Keep shovel clear of auger while auger is in rotation Wear proper PPE	

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
4	• Don’t raise foot off the ground while advancing auger • Repeat step 3 as you add more flights	· Pinch and crush points - hands, feet, and fingers Kick out of auger	· Maintain awareness of pinch and crush points at all times Maintain awareness of auger	
5	• Pulling augers, remove HSA from auger and then remove from auger head • Fold auger head back and secure with bolt or pin • Lower hammer assembly to place, auger pulling system on hammer and flights • Raise hammer assembly to pull augers from ground, and fork lower auger at ground surface • Unbolt the auger connection • Lift auger and place on ground repeat until all flights are removed from ground	· Back strain · Pinch and crush points - hands, feet, and fingers Contaminant exposure	· Use proper lifting techniques · Use two people when lifting augers · Maintain awareness of pinch and crush points at all times Wear proper PPE	
6	• Lower hammer all the way down • Raise foot from ground surface, slide extension in • Lower mask, raise out riggers	· Slip/trip/fall hazards Pinch and crush points - hands, feet, and fingers	· Be aware of footing at all times Machine has all pinch and crush points marked in reflective tape	

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2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Electrical-Install Electrical Equipment

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 19:59:13	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Portable Ladders, Rollers/Dollys, Hydraulic Jacks, Fall Protection System, PLC Cabinets, Panels, Switcgear				
Task-specific Training:					

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☑ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Complete JSA for task.	• Missed information. • Missed hazards.	• Discuss hazards and control with all workers involved. • Document all changes and additions.	
2	Review JSA and obtain necessary permits.	• Missed steps. • Misunderstanding. • Workers not informed of hazards.	• Ensure all workers/supervision involved with task attend the pre-task meeting. • Review JSA and emergency procedures. • All involved in task to sign attendance sheet. • Date and time to be recorded.	
3	Inspect tools and equipment to be used for task.	• Defective tools. • Defective equipment. • Electrical Shock.	• Care to be taken when inspecting tools and equipment prior to each use. • Wear appropriate PPE. • DO NOT use defective tools or equipment.	
4	Complete JSA at work area as a work group.	• Other trades in work area. • Slips/trips/falls. • Miscommunication. • Missed hazards.	• Inform other trades of intended scope of work. • Watch footing. • Document all hazards identified and document control measures. • Discuss task as a group and sign JSA. • Add any new identified hazards during discussion of JSA.	
5	Set up work area.	• Pinch points. • Lifting. • Falling objects and debris. • Other workers in the same area. • Wear correct PPE.	• Work in pairs (buddy system). • Tape off area and identify hazards to other trades. • Double eye protection where needed. • Communication.	
6	Remove wood filler for feeders for equipment.	• Pinch points. • Sharp edges. • Falling objects/debris. • Power tools. • Limited lighting. • Holes in the floor.	• Watch hand placement. • Wear correct PPE (i.e. work gloves/dust mask) as required. • Awareness of surroundings while working. • Only trained/competent persons to operate power tools. • Temporary lighting where necessary. • Stretch/Micro Breaks. • Fall arrest equipment. • Flag off the area below and on the main level. • Drill out one hole at time and move switchgear to cover to prevent leaving open holes in the floor.	

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
7	Move the electrical equipment.	• Pinch points. • Heavy material. • Lots of workers in the area. • Low lighting. • Miscommunication. • Use of Hydraulic Jacks.	• Watch hand placement/Body Awareness. • Stay out of the line of fire. • Wear correct PPE including gloves. • Use team lifting techniques. • Use lifting devices. • Awareness of surroundings while working. • Only competent persons to operate hydraulic jacks and inspect prior to use. • Temporary lighting where necessary. • Stretch/Micro Breaks. • Strong communication. • Only required personnel in immediate area.	
8	Clean work area.	• Heavy lifting. • Slips/trips/falls. • Potash build-up on floors and equipment. • Garbage/Housekeeping.	Use buddy system when lifting heavy loads. Ensure all tools and equipment are packed and stored correctly. Dispose of excess material appropriately.	
9	Close out JSA.	• Miscommunication. • Hazards left out.	• Ensure all workers involved or affected by the task are informed of its completion, including supervision. • Remove all barricade tape and signage. • Ensure housekeeping is complete. • Ensure any openings in floors or handrails are guarded with appropriate barriers and signage. • Ensure all hazards have been removed.	

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Electrical-Lockout and Tagging Electrical Systems

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 19:59:14	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Padlock & Tag, Lockout/Tagout Request Form				
Task-specific Training:					

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☐ Class II (standard)	☑ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)
1	Complete JSA.	• Missed hazards. • Miscommunication.	• Discuss hazards and abatement measures with workers. • Documents all changes and additions.	
2	Review JSA with all workers involved with or affected by task.	• Missed steps. • Misunderstanding. • Workers not informed of hazards & abatement measures.	• Ensure all workers involved with task attend meeting. • Review JSA with workers. • Ensure workers understand task and safe work procedure. • If a permit is required, review permit with workers to ensure workers understand the terms and conditions of the permit and their specific responsibilities.	
3	Determine the required isolation to render the work safe.	• Missed steps. • Review safe work procedure for task.	• Make sure all components of the system to be worked on are identified. • Ensure isolation point/points are identified.	
4	Review procedure with client to ensure isolation is adequate	• All sources of energy not identified. • Wrong information.	• Check drawings or equipment numbers. • Discuss with client to ensure isolation complete. • Competent personnel to complete review.	
5	Make sure lockout does not affect other crafts or ensure they are aware of the need for and time of the lockout.	• Other workers needing access to the work area/power to complete their tasks.	• Communication. • Old meeting to review work plan with other crafts.	
6	Submit a completed Lockout/Tagout request to the electrical authority.	• Missing or wrong information.	• Ensure form is complete & accurate.	
7	Lockout authority issues appropriate locking device to task supervisor.	• Not enough locks.	• Ensure you have enough locking devices and locks to lockout all sources of energy. • Ensure locking device is working properly.	
8	Turn off energy sources. Task supervisor to lockout electrical box; complete with tag and appropriate information.	• All energy sources not turned off or locked out. • Lockout attached improperly.	• Turn off power. • Check to make sure energy source cannot be reactivated.	
9	All workers involved with the task must then attach their locks; complete with tag and appropriate information.	• Worker without lock on locking device.	• Review lockout procedure with workers. • Be sure all workers involved install a padlock and tag before work commences.	
10	Commence work		• Use safe work practices.	
11	Workers to remove locks from lockout after task is complete (first on, last off).	• Locks left on after task.	• Make sure tagging authority has information as to where and how you can be contacted. • If lock has to be removed by someone other than the worker, refer to Lock Removal form.	

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3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Construction-Trash Pump Setup and Operation

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 20:31:21	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Trash pump; fittings; hose sections; safety fuel can and funnel Additional PPE: Goggles as necessary; abrasion/cut resistant gloves (leather or equivalent); chemical resistant gloves needed				
Task-specific Training:	Review the manufacturer's recommendations for each specific pump; hand tools				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☑ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Use the STAR Process; refer to the specific pump's equipment manufacturer's operating manual before using the equipment. Note the design of the pump and the configuration of the attachment points, as these may present unique hazards.	• Slip/trip/fall hazards • Situational risks	• Verify personnel's training is sufficient for the scheduled task(s) • Is job instruction training (hands on) training necessary? • Employees should remove finger rings, necklaces, or jewelry, which may be hazardous in equipment operation	All Affected Personnel
2	Equipment safety checklist	• Faulty hose connections • Damaged hoses and fittings	• Replace worn or damaged hoses and fittings • Replace hose connections with operational connections • Perform an overall inspection of the equipment for defects or signs of damage	All Affected Personnel
3	Pump and hose setup	• Slip/trip/fall hazards • Uneven terrain • Wet, icy, and muddy conditions • Lifting hazards • Manual material handling • Back injury • Struck by and line of fire • Pinch points	• Be aware of your surrounding conditions (footing, weather conditions, etc.) • Reduce distance traveled when carrying materials • Make sure grip is adequate; use gloves to enhance grip when necessary • Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one handed carrying if possible; maintain awareness of footing • Grab the equipment only at designated handles or, if none are available, at locations where the hands and fingers will not get caught in the equipment or smashed • Test the weight of the equipment before lifting • Straighten out hoses before connection and keep them out of high traffic areas • Be aware of "stored energy" hazards presented by hoses	All Affected Personnel
4	Equipment fueling/refueling	• Fires • Explosions • Chemical hazard	• Turn off equipment before fueling • No smoking while fueling • Do not use cell phones while fueling • Store fuel in proper safety containers only • Always use a funnel when transferring fuel from can to tank on pump • If transferring fuel from large vessels into portable cans, use proper grounding or bonding techniques • Do not fuel the equipment when it is hot • Wear gloves and wash hands after fueling	All Affected Personnel

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
5	Starting the pump	• Back strain • Slippery conditions	• Make sure the starting cord is free pulling; test the cord before pulling • Maintain straight posture when pulling the recoil starter cord • Do not over exert when pulling the cord • Be aware of your surrounding conditions • Make sure slip/trip/fall hazards were properly identified and corrected	Assigned Laborer
6	Pump operation	• Splash hazards • Hot surfaces • Noise	• Remove worn or damaged hoses until they can be repaired or replaced • Keep hands away from the exhaust or hot components of the equipment • Be aware of any unguarded moving parts on the equipment • Wear required PPE (hearing protection, Tyvek, etc.)	Assigned Laborer

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3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

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Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Construction-Use of Portable Grinders

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 20:32:38	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Handheld angle grinder Additional PPE: Tight fitting leather gloves Involving hot work (generating heat or sparks); use appropriate clothing or coveralls.				
Task-specific Training:	Health and Safety Plan, Operation of Hand Tools Training				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☐ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Review JSA, SWA, and perform STAR process	• Personal injuries • Property damage	• Perform STAR by first assessing the risks that could be associated with this task • Analyze how to reduce these risks or eliminate them • Before beginning the task, act to ensure that you have done everything possible to make this task safe • Remember to use SWA at any time	
2	Inspect and secure work area	• Slip/trip/fall hazards • Fire or explosion • Personal Injury • Property damage • Biological hazards • Weather • Heat stress\cold stress	• Ensure work area is clear or debris and terrain affords safe footing • Ensure all combustibles are removed from area • Be aware of sparks, wet/saturate area by water to prevent fires • Inspect and place fire extinguishers within proximity of work area • Be aware of where you place hands and feet before you move • Be aware of changing weather conditions; use SWA as appropriate for lightning, fog, and heavy rain • Dress appropriately • Continually replenish fluids • Take breaks as necessary – warm up or cool down as needed • Refer to HASP regarding signs, symptoms, and first aid for heat stress and cold stress • Keep work area clear of unnecessary personnel • Place fire extinguishers • Personnel in work area must have proper PPE – use the STAR process to determine hazards to others in work area • Verify that work area has no unforeseen/unseen hazards • Demarcate work area as necessary using caution tape, etc. • Wet area with water to prevent fires • Clear area of dry brush, grasses, and any other combustibles • Clean up miscellaneous debris, unused tools/equipment and trash	

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)

3	Set up	• Slips trips falls
		• Personal injury
		• Property damage
		• Lifting hazards
		• Cuts
		• Pinch points
		• Electrical hazard
			• Verify that the area has no unseen hazards
			• Reduce travel distance when carrying materials
			• Make sure grip is adequate; use gloves to enhance grip when necessary
			• Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required
			• Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position
			• Keep fingers away from pinch point locations
			• Wear safety toed, shanked boots
			• Be aware of footing and inspect travel areas prior to lifting and carrying loads
			• Never carry tool by the cord
			• Inspect grinder and disc or wheels, ensure:
			  ○ All guards are in place
			  ○ Cords are properly insulated, use GFCI
			  ○ Wheel is not cracked
			• Clean up miscellaneous debris	

4	Prepare work area	• Slip/trip/fall hazards • Personal injury • Property damage • Lifting hazards • Cuts • Pinch points • Spill • Moving equipment	• Verify that the area has no unseen hazards • Clean work area as noted above • Crib item so that it will not fall during/after grinding • Ensure the disc is correct for the material involved • Is capable of safely operating at the specified grinder speed and is of the correct size for the grinder being used • ALWAYS unplug a grinder when performing checks or changing the disc	
5	Perform task	• Flying debris • Inhalation of hazardous particles (see note) • Rolling or moving • Personal Injury through kick back, or work piece moving • Property damage • Fire or explosion • Cuts • Pinch points • Equipment damage	• Wear required PPE – safety glasses, face shield, gloves • Always grind away from you • Use secure two hand grip • Take breaks as necessary to prevent fatigue and soreness • Ensure work piece remains secure during grinding activities • Ensure guard is in place • Never use a grinder one handed, always have the auxiliary handle in place • Ensure the work piece is rigidly supported at all times; never hold work piece • Be sure clothing cannot become entangled in grinder • Apply grinder to work piece only when it has reached operating speed • Be aware of other workers in the vicinity	

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2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Construction-Heavy Equipment Fueling

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 20:33:58	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Pickup truck with fuel tank or stationary fuel tank, fire extinguisher, Chemical resistant gloves				
Task-specific Training:					

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☑ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☐ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☑ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	If appropriate, meet with owner's representative to determine if there is a designated fueling area	• Fueling in hazardous or environmentally sensitive area	• Perform fueling in designated or appropriate area	All Personnel
2	Proceed to fueling area and make safety preparations	• Traffic hazard • Slip/trip/fall hazards • Short service employees • Potential for fire during refueling	• Be aware of site traffic hazards • Perform STAR process • Refer to equipment manufacturer's operating manual before using any machinery • Verify personnel training is sufficient for scheduled task(s); is job instruction (hands on) training necessary? • Have two 20 pound fire extinguishers within 25 feet of the fueling area positioned upwind of fueling area • No cell phone use allowed on site • No cell phone use allowed in fueling area • No smoking allowed • No fueling allowed during storm events • No fueling allowed in areas of dense brush or vegetation; there must be 25 foot diameter area of bare ground around fuel pump • Wear appropriate PPE	All Personnel
3	Dispense fuel	• Property damage and personal injury from fire • Fire potential from static/contact spark • Personal injury due to skin/eye contact with fuel due to splash/ spills of fuel • Environmental damage from spill	• Switch off equipment • Remove cap • Grounding – hook up ground to equipment from task • Insert nozzle securely in fuel tank • Do not use fuel cap as a wedge to keep nozzle open • Turn on fuel pump • Stay upwind when fueling equipment • Be aware of your surroundings • Do not rush • Remain in attendance of nozzle at all times during fueling • Avoid overfilling • Release pressure from fuel hose into fuel tank before removing nozzle to prevent drips and spills • Turn off pump • Securely return nozzle to proper location	All Personnel
4	Leave fueling area	Slip/trip/fall hazards Traffic hazard	Pick up tools, equipment, and trash Be aware of site traffic hazards	All Personnel

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Environmental-Small Equipment and Container Fueling

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 20:33:58	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Fuel Container, Leather or Cotton Palm Gloves				
Task-specific Training:					

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☑ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)
1	If appropriate, meet with owner's representative to determine if there is a designated fueling area	• Fueling in hazardous or environmentally sensitive area	Perform fueling in designated or appropriate area	All Personnel
2	Proceed to fueling area and make safety preparations	• Traffic hazard • Slip/trip/fall hazards • Short service employees	• Be aware of site traffic hazards • Perform STAR process • Refer to equipment manufacturer's operating manual before using any machinery • Verify personnel training is sufficient for scheduled task(s); is job instruction (hands on) training necessary? • Have two 20 pound fire extinguishers within 25 feet of the fueling area • No cell phone use allowed on site • No cell phone use allowed in fueling area • No smoking allowed • No fueling allowed during storm events • Wear appropriate PPE	All Personnel
3	Dispense fuel	• Property damage and personal injury from fire • Fire potential from static/contact spark • Personal injury due to skin/eye contact with fuel due to splash/ spills of fuel • Environmental damage from spill	• Switch off equipment • Remove cap • Insert nozzle securely in fuel tank • Do not use fuel cap as a wedge to keep nozzle open • Turn on fuel pump • Stay upwind when fueling equipment • Be aware of your surroundings • Do not rush • Remain in attendance of nozzle at all times during fueling • Avoid overfilling • Release pressure from fuel hose into fuel tank before removing nozzle to prevent drips and spills • Turn off pump • Securely return nozzle to proper location	All Personnel
4	Leave fueling area	• Slip/trip/fall hazards • Traffic hazard	• Pick up tools, equipment, and trash • Be aware of site traffic hazards	

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2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

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Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Chevron-Jackhammering (Hand-Held)

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/12/2022 20:44:46	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Jackhammer (electric or pneumatic), dumpster bin, Hot Work Permit				
Task-specific Training:	40 Hr. HAZWOPER, 8 Hr. Refresher, GHD SMART BBS Training, CEMC Permit To Work, Heavy equipment operation training				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☑ Type 1 (Top Impact)	☑ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☑ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☑ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☑ Long Pants
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Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Discuss STAR, Stop Work Authority (SWA), Permit to Work process and documents, and Hazard Recognition	**1.A –** Site personnel not aware of STAR and SWA **1.B –** Personnel unclear on role assignments regarding implementation of corrective measures **1.C –** Corrective measures incomplete or incorrectly performed	**1.A.1 -** Project team to discuss importance of documentation procedures for SWA **1.A.2 -** Use SWA to stop any unsafe work **1.B.1 -** Prior to start of work, the person responsible for each corrective measure is assigned and listed on the JSA **1.B.2 -** All personnel sign JSA and list their names in related Person Responsible column **1.C.1 -** Prior to start of work the responsible person (as assigned) verifies each corrective measure has been completed by listing their name in the appropriate box on the JSA **1.C.2 -** Supervisor verifies and signs that each control has been implemented by responsible person **1.C.3 -** Confirm that all applicable permits have been properly completed and signed by appropriate parties	
2	Obtain all necessary documentation and notify stakeholders	**2.A –** Organizational Factors-Fines and lawsuits **2.B –** Organizational Factors-Work delays	**2.A.1 -** Coordinate with project manager to ensure all approvals are obtained (well, encroachment, access agreements, traffic control plans, etc.) **2.B.1 -** Notify all relevant people prior to the start date (owner, tenant, subcontractors, and agencies)	
3	Mark area for proposed jackhammering locations with white spray paint	**3.A –** Motion-Traffic hazards **3.B –** Motion/Electrical-Overhead obstructions and underground line	**3.A.1 -** Review jackhammering location prior to arriving on site **3.B.1 -** Use buddy system and/or traffic controls if working in high traffic areas **3.B.2 -** Acknowledge overhead obstructions and power lines that are in the proximity of the area to be jackhammered	

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
4	Contact USA for line location clearance	**4.A –** Electric/Pressure - Hitting an underground line (electrocution, explosion, product release, property damage and interruption of services)	**4.A.1 -** Contact USA at a minimum of 2 days prior to drilling/digging **4.A.2 -** Acquire list of utilities that will be contacted for marking **4.A.3 -** Visit site prior to the day of jackhammering to ensure all utilities have been marked **4.A.4 -** Contact companies that have yet to mark utilities **4.A.5 -** If necessary, coordinate with a private line locator **4.A.6 -** Do not jackhammer until all utilities are accounted for	
5	Mobilize with proper equipment/supplies	**5.A –** Organizational Factors-Improper work performance	**5.A.1 -** Contact subcontractors to make sure they are aware of their responsibilities to include safety, labor, equipment, supplies and PPE **5.A.2 -** Review the HASP and permit conditions	
6	Meet with Property Manager (or designee) on start date prior to commencing work	**6.A –** Organizational Factors-Lack of communication between all interested parties	**6.A.1 -** Discuss planned activities and locations of work and schedule **6.A.2 -** Confirm locations will be clear of unaccounted traffic (deliveries) **6.A.3 -** Locate emergency shut-off switch	
7	Visually clear proposed jackhammering locations	**7.A –** Electrical/Pressure-Underground and overhead utilities/obstructions	**7.A.1 -** Complete Pre-Mobilization section of Borehole **7.A.2 -** Clearance Review form and adjust locations to be cleared as necessary **7.A.3 -** Identify any two points of evidence that might indicate the presence of a line **7.A.4 -** Look for visible signs of trenching	

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
8	Set up any necessary traffic control	**8.A –** Motion-Struck by a vehicle **8.B –** Organizational Factors-Improper traffic control placement	**8.A.1 -** Use buddy system for placing traffic control **8.A.2 -** Never work with you back to traffic **8.A.3 -** Wear brightly colored traffic vest at all times **8.B.1 -** Follow traffic control plan **8.B.2 -** Check the effectiveness of the placement after set up	
9	Jackhammer concrete at selected locations	**9.A –** Electric-Electrical shock **9.B –** Motion- Trip hazard **8.C –** Sound-Hearing Damage **9.D –** Motion- Lifting hazard **9.E –** Pressure- Compressed Air	**9.A.1 -** Inspect electrical cords prior to use (if using an electric jackhammer) **9.A.2 -** Properly ground the equipment through the use of a GFI **9.B.1 -** Maintain good housekeeping with cords and hoses **9.C.1 -** Ear plugs are to be worn whenever employees are within 10 feet of the jackhammer during use **9.D.1 -** Use proper lifting technique which include getting help when possible, bending at the knees, straddling the load, lifting with the strength of the legs and keeping the back in a neutral position **9.D.2 -** Never twist when you lift **9.E.1** - Watch hoses when connecting/disconnecting air lines	
10	Store/remove concrete (if any) properly	**10.A –** Chemical-Exposure to public **10.B –** Motion- Traffic hazards	**10.A.1 -** Have proper storage containment and labeling available on site **10.B.1 -** Place materials in isolated location away from traffic and other site functions	

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
11	Clean site/demobilize	**11.A –** Motion-Traffic hazards	**11.A.1 -** Use buddy system as necessary to remove traffic control **11.A.2 -** Do not work with your back to traffic **11.A.3 -** Wear traffic vest	
		11.B – Motion- Lifting hazard	**11.B.1 -** Use proper lifting techniques as discussed in step 9.E	

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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Environmental-Short Duration Two Lane Traffic Control (Non Freeway)

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/13/2022 18:21:16	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Vehicle, road signs (TC-21, TC-22, TC-2a/TC-2b, TC-4, RB-91 and/or TC-12 [see Figure TL-19 attached]), TC-51b traffic cones				
Task-specific Training:	Traffic Control, PPE, Back Safety, WHMIS				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)
1	Review STAR and SWA	• Personnel not aware of STAR and SWA • Inclement weather • Poor visibility • Equipment failure	• Discuss importance of and documentation procedures for SWA; use SWA to stop unsafe or illegal work practices • Discuss inspection activities with supervisor/employees • Review site specific Health and Safety Plan (HASP), JSA, and Temporary Traffic Control Plan (TTCP) • Ensure all traffic control persons are given adequate oral and written instructions for the task • Check weather report for poor conditions • Schedule inspections during hours of good natural light • Try to plan activities during hours of lower traffic volume • If work is to take place in low light or evening hours, wear additional retro reflective silver stripes encircling each arm and leg, or equivalent visibility enhancing stripes • Inspect all equipment for damage	Safety Supervisor/Field Technician
2	Securing work zone/setup/tear down	• Vehicular traffic struck by hazards • Pedestrian or cyclists hazards • Slip/trip/fall hazards • Lifting hazards • Back injury • Manual material handling	• Park vehicle on side of road approximately 5 m behind sampling location (this distance should increase with slippery/wet/low light conditions) • Engage park brake, hazard lights, and beacon • Prior to commencing work, check the area for potential hazards (walking surfaces, dogs, construction) • Check mirrors and look over shoulder before exiting the vehicle; open the door slowly to avoid potential collision with passing vehicle/pedestrians • Only walk to the driver's side when entering/exiting and to and from the front of the vehicle • Watch footing for uneven or wet/slippery surfaces and protruding hazards • Don appropriate PPE (high visibility garment meeting CSA standards, safety rated boots) • Wear leather/cotton gloves to increase grip when necessary • Size up the load; if the object is too large or is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one handed carrying if possible; maintain awareness of footing • Avoid placing hands/fingers in pinch point locations • Refer to HASP for additional lifting information • Place ten cones, approximately 4 m apart (this distance may increase with slippery, wet, or low light conditions), from work zone out 10 to 15 m in a tapered fashion for approaching traffic (see attached Table A and TL 19 from Manual Book 7)	Field Technician

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
			• Place a TC 2a or TC 2b 5 m from the work zone from the oncoming lane (see TL 19) • Place a T 4 at the end of the work zone (see TL 19) • Place a RB 91 5 m out from the TC 4 or TC 12 if used (see TL 19) • Place a TC 2a or TC 2b 5 m out from the RB 91 (see TL 19) • Place a pedestrian direction sign such as a TC 40 an or barricades maintaining a minimum sidewalk or path width of 1.2 m • Clearly define pedestrian pathway; the pedestrian barricade should consist of rails or a fence and the top of the barricade should be located approximately 1 m above the surface on which it is installed • Cyclist who are directed to use the pedestrian path through the work zone by a “Cyclists Use Pedestrian Path” sign are to be advised to dismount and walk their bicycle, and notify by a “Cyclists Dismount and Walk” sign • When a Traffic Control Person (O. Reg. 213/91 Section 67) is directing traffic, a TC 21 must be used at all times and placed 20 m out form the work zone • The traffic control person will use the TC 22 sign to direct traffic • If a TC 12 is used, no person shall direct traffic • Maintain heightened awareness of proximity to moving traffic or pedestrians • Cease operations if unsafe conditions are present that have not been addressed or cannot be corrected	

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2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Construction-Office Trailer Installation and Inspection

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/13/2022 18:22:48	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Portable stairways, hand tools, electrical				
Task-specific Training:					

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☑ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Perform STAR process: Review the trailer vendor's equipment rental terms and conditions	• Situational risks • Short service employees	• Verify personnel training is sufficient for scheduled task(s) • Is Job Instruction (hands on) Training necessary?	All Personnel
2	Placement of office trailer - Pre determine best placement option(s) prior to placing	• Uneven terrain • Too close to/too far from work zone	• Perform pre-installation site walkaround and determine in advance best location for trailer • Consult with Project Manager/Site Supervisor	Site Supervisor
3	Installation of portable stairways	• Uneven terrain • Slipped/loose leg bolts • Slip/trip/fall hazards	• Set stairs on level ground or support with flat surface (such as plywood) • Ensure that toe boards and railings are present and not damaged • Ensure that trailer vendor adjusts stair height and tightens all leg bolts • Anchor stair legs with steel pins	Site Supervisor
4	Exterior inspection	• Rolling of trailer • Failure of support legs • Biological hazards/insect infestations • Electrical fire • Vandalism	• Make sure wheels are chocked or somehow prevented from rolling • Ensure that trailer vendor adjusts carriage supports properly • Inspect underside and corners for wasp/hornet/bird/rat nests • Check any external wiring and hookups; make sure they are insulated • Check for corrosion, wear, burn spots, or damage • Inspect windows/screens for damage/tampering • Make sure underside is clear of debris/materials and items are not leaning against carriage supports	Site Supervisor
5	Interior inspection – Document trailer condition after inspections are completed	• Biological hazards/insect infestations • Broken window glass • Poor ventilation/odors	• Check for ants/wasps/hornets • Inspect windows/screens for damage/tampering • Identify source(s) of odors, if possible; notify vendor as soon as possible	Site Supervisor
6	Turn on electricity – Note: Electrical connections to trailer from power source are to be made by a qualified electrician	• Faulty wiring/short fuses • Electrical fire • No heating/ventilation/air conditioning or working improperly	• Check fuse box for corrosion, wear, burn spots, or damage • Check lights (inside and outside) and contacts • Check and clean HVAC coils, condenser unit, contacts monthly	Site Supervisor

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3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

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Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Construction – Hoisting with a Hydraulic Tracked Excavator

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/13/2022 18:36:20	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:					
Task-specific Training:	Competent in the operation of a tracked excavator as gained by operational experience and equipment knowledge. Spotter qualified by knowledge and experience to assist.				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☐ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☐ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)
1	Discuss STAR and Stop Work Authority and planned activity	• Failing to identify hazardous conditions resulting in losses or near losses, or death • Always consider the worst case scenario • Changing site conditions and/or weather • Miscommunication • Malfunctions	• Determine the hazards of performing the task and survey the work area • Modify the JSA accordingly • Discuss the task and expectations of the task to all personnel • Have all applicable personnel sign off on this JSA prior to starting work • Project team (CRA) discusses importance of and documentation procedures for SWA during pre job safety meeting • All CRA project personnel are required to use their SWA to stop any work that is unsafe • Analyze the hazards determined • Decide a plan of action to eliminate or reduce the hazards and act on it	Site superintendent,all site staff
2	Inspect equipment and lift area	• Load to heavy • Uneven or soft ground conditions • Congested areas • Restricted visibility • Overhead wires or restrictions • Other equipment working in the area	• Consult manufacturer's specifications for the equipment being used, remember equipment modifications may lower lift capacities allow for unknowns, if in doubt suspend lift and reconsider task. • Reposition equipment if possible, use flotation mats, • Use qualified spotters, situated if safe areas to oversee lift. • Remove equipment or materials as possible from lift area, consider repositioning lift if items cannot be moved • NEVER hoist over workers. Clear area for duration of lift • Stop other activates in the immediate area that may be distracting or require entry into the lift area	Site superintendent,all site staff
3	Load may shift or slip	• Irregular load may not have proper lifting lugs • Use of improper lifting slings • Strong winds • Unstable soils cause excavator to shift or tip	• Perform STAR, ensure lifting is as per manufacturers recommendation • Ensure load is balanced and load center of gravity is low • Verify proper slings and of the correct size and rating for the load being lifted • Do not lift in high winds or if lightening is observed in the area. • Prepare and discuss a plan of action with staff what the operator will do and where load will be placed in the event it needs to be lowered quickly • Check soils conditions and level of area to ensure the soil will sustain the load prior to attempting lift	Site superintendent,all site staff

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
4	Moving excavator with load suspended	• Irregular load may not have proper lifting lugs • Use of improper lifting slings • Strong winds • Unstable soils cause excavator to shift or tip	• Perform STAR, ensure travel area is clear and staff are aware the direction of movement • Travel with load suspended as low as possible • Ensure spotters/ site staff are not in travel or swing area at any time during the move • Check soils conditions and level of area to ensure the soil will sustain the load prior to attempting lift • Never leave controls unattended with a load suspended	Site superintendent,all site staff
5	Completion of lift	• Load shifting or binding as it is lowered into place • Hands or feet pinched by load or straps, slings as load is unfastened • Sudden movement of load or excavator while load is unfastened	• Perform STAR, ensure eye and clear communication between operator and worker before entering area to unfasten load • Ensure hydraulics are locked out and operator cannot shift the excavator or load • Slacken slings and wait to ensure load does not move prior to unfastening • Sore slings and chains properly until next required lift	Site superintendent,all site staff

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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

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Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Construction-Air Compressor Use

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/13/2022 18:36:21	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Air Compressor, hoses, whipchecks and clips.				
Task-specific Training:	Hand and Power Tool Use, Equipment Fueling, General CRA Policies. Minimum Level D PPE.				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☐ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☑ Level 2 - Light Duty with Protection	☑ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☑ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Discuss STAR and SWA	• Site personnel not aware of STAR and SWA	• Project team (CRA) discusses importance of and documentation procedures for SWA during pre-job safety meeting • Use SWA to stop any work that is unsafe • Stop-Think-Assess-Review, CRA's ongoing safety evaluation process for all staff is reviewed	Supervisor
2	Assess location for potential hazards	• Slip/trip/fall hazard • Traffic on roadway	• Evaluate/revise planned route for placement of work truck and compressor at job site • Use proper traffic control measures and signs to divert traffic away from the work area	Supervisor and Operator
3	Equipment check for safe use of machine	• Improperly maintained equipment/fluid check (fuel, oil, coolant) • Back or muscle strain • Pinch points • Hand/foot injury • Damaged equipment • Trip hazard	• When checking fluids use proper PPE and assistance if necessary when opening compressor compartment doors • Refer to the Equipment Fueling JSA if re-fueling is required • Ensure compressor stays hooked to truck hitch or secure the machine with wheel chocks to eliminate the potential of machine movement during use • Place compressor in such a location to not restrict movement around machine and not to block traffic – using cones if necessary	Operator

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
4	Securing compressor hose to compressor for use/stringing out air hose	Back or muscle strain Trip hazard Injury/damaged equipment Unroll air hoses to ensure there is an adequate amount of materials Use known route of walking for hose placement Secure air hoses to compressor, jackhammer and other hoses Use of Chicago fitting clips and whipchecks	• Proper lifting methods • Proper PPE • Use known footpath when placing hose on ground • Ensure all hose connections are secure with approved methods for safe operations • Use of air fitting clips and whipchecks to reduce the possibility of the air hoses coming apart from each other	Operator
5	Use of compressor to perform work	• Back and muscle strain • Loud noise operation • Highly compressed air • Equipment failure	• Slowly bring the air compressor up to your desired pressure, checking connects for integrity • Use of hearing protection mandatory • Use of gloves mandatory • Buddy system to monitor air equipment – one worker using hammer and another to watch the compressor and hoses for any potential issues, placing himself in a position to stop air flow immediately if the need arises • Ensure all site workers are trained in the safe use of compressor, understanding how to shut off air flow immediately if the need arises • Ensure there is adequate room for use of air compressor • Never use compressed air to blow off clothing • Keep air hose in a good position to eliminate the possibility of being entangled with operator's feet • Perform an equipment inspection of all components prior to supplying air to hoses and end use tool	Operator

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
6	Equipment shut down	• Hazardous energy • Personal injury • Property Damage	• Shut compressor off; use the air dump valve to slowly bleed off compressed air stored in the hose(s) • When the zero energy state is confirmed, disconnect tools and hoses and stow a required	Operator

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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Construction-Air Monitoring

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/13/2022 18:36:21	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Select (four gas or five gas monitors, colorometric detector tube, PID}				
Task-specific Training:	Training and understanding of specific model of meter being used				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☐ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☑ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)
1	Prepare to enter work area	• Low oxygen levels • Flammable or explosive conditions • Organic vapors	• Consult the site specific HASP to identify known and suspected chemicals or concern • Ensure the gas meter selected is correct for the items identified • Ensure meter has been properly calibrated and documented • Ensure the meter is fully charged or the correct style and type of replacement battery is available • Document readings at appropriate intervals • Enter area to perform work only when you are certain conditions are safe • If uncertain or untrained on the specific meter being used or if you have concerns over meter functioning correctly or you receive readings of concern, exercise SWA, relocate to a safe area, and contact your site supervisor or regional safety supervisor • Reference Table 2 of the HASP for Action Levels	Site Supervisor
2	Continued monitoring of work area	• Low oxygen levels • Flammable or explosive conditions • Organic vapors	• While performing work tasks keep meter with you and record readings at predetermined times • If job conditions change or meter alarms exercise SWA, move to a safe location, notify the site supervisor, and re evaluate the task • Re-enter only when certain safe conditions exist	Site Supervisor
3	Completion of work or end of work day	• Low oxygen levels • Flammable or explosive conditions • Organic vapors	• Document readings and time • If work complete return meter to stores • If work is continuing clean, inspect, and recharge meter • Store meter in a safe place in clean dry conditions	Site supervisor
4	Continued meter use	• Low oxygen levels • Flammable or explosive conditions • Organic vapors	• Ensure meter is charged or replacement batteries are available • Perform daily checks and meter calibrations required for the specific meter being used • Record checks and calibrations • If meter is good, proceed with use as above • If meter does not perform or is suspect, do not use, inform site supervisor, and do not enter work area until a working meter is available	Site Personnel

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3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Construction-All-Terrain Utility Vehicle Use

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/13/2022 18:36:21	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Gator, 4-wheeler, Helmet				
Task-specific Training:	Utility vehicle-specific training; Operator's Manual including general operation, safety, and inspection procedures				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☐ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)
1	Routine operation – pre use procedures	• Equipment failure (brakes/ accelerator sticking, fuel leaks)	• Complete ATV Pre Use Daily Inspection Form • Modify CRA Inspection Form to include manufacturer's specific recommended procedures • Do not use equipment if not safe • Follow manufacturer's recommendations during equipment failure/emergency situations • Know and understand actions to take during equipment failure events (stuck throttle, braking issues, tire blowout, etc.) • Report to site supervisor immediately and tag vehicle out of service if any problems are present	Operator/ Project Manager/ Site Supervisor
2	Routine operation	• Noise • Roll over injuries • Entrapment/pinned • Collision	• Wear hearing protection as necessary • Operate equipment in accordance with manufacturer's specifications • Set up traffic control plan(s) for site to indicate safe travel areas for site vehicle/equipment traffic • Survey area to determine if ground conditions are suitable for safe operation • Only qualified operators may use equipment • Operate at safe speeds • For every hour of continuous operation the operator shall exit the equipment and refocus on the task at hand. This micro break shall consist of (i.e., walk around the equipment, kick the tires, obtain a drink of water, etc.).	Operator/ Project Manager/ Site Supervisor
3	Routine operation	• Unexpected ATV movement	• Leave in neutral and set park brake when not in use	Operator
4	Routine operation	• Contact/collision with other mobile or heavy equipment	• Ensure marker flags are in proper position • Ensure warning lights are functioning • Use headlights while operating • Operate at safe speeds and in pre determined traffic routes	Operator
5	Fueling	• Fire/explosion	• Fuel in a well ventilated area • Never fuel while engine is running • Wipe spilled fuel immediately and wait for fumes to disperse before starting engine	Operator

Job steps(1)	Task activity	Potential hazard(s)(2)	Corrective measure(s)(3)	Person responsible (Print first and last names)
6	Troubleshooting/maintenance checks	• Overexertion • Pinch points • Entanglement • Burns/scalding	• If pull starting is required, pull once slowly followed immediately with a fast pull. • Stop engine and remove key before performing pre use checks or troubleshooting • Keep all guards and shields in place • Keep hands, hair, and clothing away from moving parts • Wear appropriate gloves when reaching near hot areas • Do not open radiator cap on liquid cooled engines when engine is hot • Only qualified individual is authorized to perform maintenance or repairs	Operator/Qualified Person

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Name/Company	Sign	Date

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Presenter Signature: _____ Date/Time: _____

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Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Travel Preparations

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/13/2022 19:20:31	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	Vehicle, road hazard kit				
Task-specific Training:	Motor Vehicle Safety Training				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☐ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☐ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☐ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☐ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☐)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Discuss STAR	• Site personnel not aware of STAR and SWA	• Project team (CRA) discusses importance of and documentation procedures for SWA during pre job safety meeting • Use SWA to stop any work that is unsafe	Vehicle Operator
2	Check weather	• Unexpected storm • Fog; rain; snow; lightening/thunder • Heat/cold stress	• Check local and destination weather forecast • Discuss weather issues and precautions to take while driving to the destination • If weather conditions (e.g., fog, rain, snow) impair the ability/vision of the driver, exit at the nearest safe location and assess the situation • In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection	Vehicle Operator
3	Loading equipment into vehicle	• Back strain • Cuts • Pinch points • Hand/foot injury	• Reduce travel distance when there is a need to carry/lift materials • Make sure grip is adequate • Avoid one handed carrying if possible; maintain awareness of footing • Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Verify requested equipment against warehouse form • Load equipment in an organized manner to prevent shifting while traveling	Vehicle Operator
4	Complete a Pre Departure Vehicle Checklist	• Damaged vehicle lights, tires, windows, mirrors, horn • Possible mechanical breakdown • Inadequate vehicle documents and/or safety items	• Check for fluid leaks under vehicle • Check the headlights, front/rear turn signals, backup lights, brake lights, and emergency flashers • Visually check the pressure/wear of tires • Ensure the vehicle has a spare tire • Assure windshield and window glass is clean and free from obstructions, inside and out • Check the windshield wipers and horn • Verify vehicle registration, insurance card, and inspection sticker is present and valid • Ensure the vehicle contains a first aid kit, fire extinguisher, and road hazard kit	Vehicle Operator

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
5	Pre Departure preparations	• Back/body strain • Blind spot • Impaired vision • Unwanted intrusion • Serious injury, ejection, or death from collision	• Adjust seat, headrest, and steering wheel height so body is fully supported/comfortable and pedals are within easy reach • Ensure mirrors are properly adjusted • Verify driver and passenger(s) seat belts are in good condition and properly latched • Verify sufficient fuel and other hazard lamps (e.g., battery, oil, and temperature) are not lit • Ensure all vehicle doors are locked	Vehicle Operator/ Passenger
6	Over the road travel	• Arriving late • Collision • Injury or death to occupants or other parties	• Do not use cell phones or perform other distracting activities while vehicle is in motion • Constantly scan intersections, move eyes, check mirrors, and assess traffic lights (fresh vs. stale) • Maintain safety cushion around vehicle (front, sides, and rear) and 4 second following distance • Utilize all driving defensive techniques	Vehicle Operator
7	Arrive at destination	• Pedestrian injury • Collision • Property damage	• Maintain awareness of pedestrian/vehicular traffic • Park vehicle in pull through parking space or facing the exit • Use caution and mirrors/spotter when backing vehicle	Vehicle Operator
8	Return trip	• Collision • Injury or death to occupants or other parties	• Review/implement Job Steps 1 through 7 • Complete post departure checklist and report any vehicle problems to company vehicle maintenance manager or rental car agency	Vehicle Operator

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GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name : Chevron-Remediation System Operations and Maintenance

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

Date Issued/Revised:	10/13/2022 19:31:41	**Client:**	International Paper		
Project Number:	11215131	**Created By:**	cra\cmattair	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:					
Key Equipment:	AcuVac MDP System				
Task-specific Training:	40-Hour HAZWOPER, 8-Hour Refresher, H_2S Training				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☐ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
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Foot Protection	☑ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Nathaniel (wells) Richard				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Discuss STAR, Stop Work Authority (SWA), Permit to Work process and documents, and Hazard Recognition	**1.A –** Site personnel not aware of STAR and SWA **1.B –** Personnel unclear on role assignments regarding implementation of corrective measures **1.C –** Corrective measures incomplete or incorrectly performed	**1.A.1 -** Project team to discuss importance of documentation procedures for SWA **1.A.2 -** Use SWA to stop any unsafe work **1.B.1 -** Prior to start of work, the person responsible for each corrective measure is assigned and listed on the JSA **1.B.2 -** All personnel sign JSA and list their names in related Person Responsible column **1.C.1 -** Prior to start of work the responsible person (as assigned) verifies each corrective measure has been completed by listing their name in the appropriate box on the JSA **1.C.2 -** Supervisor verifies and signs that each control has been implemented by responsible person **1.C.3 -** Confirm that all applicable permits have been properly completed and signed by appropriate parties	
2	Mobilize with proper equipment/supplies for MDP Event	**2.A –** Motion- Vehicle incident **2.B –** Motion- Lifting hazards **2.C –** Organizational Factors- Delay or improper performance of work due to improper equipment on site	**2.A.1 -** Follow safe driving procedures as shown in Driving HASP **2.B.1 -** Employ safe lifting procedures as shown in lifting HASP **2.C.1 -** Make sure subcontractors are aware of their responsibilities for labor, equipment, and supplies **2.C.2 -** Review HASP and permit conditions and gather necessary PPE	
3	Walk the site and look for any driving hazards. All vehicles should be stationary at this point.	**3.A –** Motion- Trip hazards **3.B –** Motion- Tire punctures from falling into the vault	**3.A.1 -** Watch for uneven ground, obstacles protruding from the ground and open vaults **3.B.1 -** Make sure cones and other barriers are placed to prevent cars driving into open vaults	

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
4	Locate the AcuVac equipment near the Extraction Well	**4.A –** Motion- Struck by vehicle during placement **4.B –** Motion- Vehicle incedent as a result of improper traffic control equipment placement	**4.A.1 -** Move one vehicle at a time **4.A.2 -** Wear traffic vest **4.B.1 -** Use a single spotter for any backing **4.B.2 -** Maintain eye contact with driver **4.B.3 -** Maintain eye contact with spotter	
5	Set up necessary traffic control and exclusion zone(s)	**5.A –** Motion- Struck by vehicle during placement **5.B –** Motion- Vehicle incident as a result of improper traffic control equipment placement	**5.A.1 -** Use observer if needed to place barriers safely **5.A.2 -** Implement exclusion zone setup instructions of HASP **5.A.3 -** Wear traffic vest, use cones at each location **5.B.1 -** Set up workstation with clear walking paths to all testing locations **5.B.2 -** Maintain eye contact with drivers	
6	Unload equipment	**6.A –** Motion- Trip hazards when maneuvering equipment **6.B –** Motion- Lifting hazard	**6.A.1 -** Place equipment away from high traffic areas **6.A.2 -** Store hoses and electrical cords neatly and protect with traffic control equipment (cones, barricades, tape, etc) **6.B.1 -** Use proper lifting techniques **6.B.2 -** Use proper body positioning	
7	Setup Equipment - Connect the vacuum hoses to the AcuVac System; Check continuity of vacuum hose (<10 ohm); Connect the water discharge line from the well to the Total Flow Meter and then to the standby collection tank/tank truck; Check continuity of water discharge hose (<10 ohm); Place a bucket or absorbent pads below the hose connections to catch any residual fluids from dropping on the ground	**7.A –** Motion- Trip hazards **7.B –** Electrical- Electrical hazard **7.C –** Motion- Lifting hazard	**7.A.1 -** Place equipment away from high traffic areas **7.B.1 -** Use GFCI on generators or other electrical equipment and inspect cords **7.B.2 -** Use proper grounding equipment for generator **7.C.1 -** Use proper lifting techniques **7.C.2 -** Use proper body positioning	

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
8	Gauge water levels and product thickness (where applicable)	**8.A –** Chemical- Inhalation or dermal exposure to chemical hazards; contaminated Probe	**8.A.1 -** Decontaminate equipment between each measurement |**8.A.2 -** Don necessary PPE and initiate air quality monitoring in accordance with the HASP	
9	Commence MDP Event	**9.A –** Temperature- Explosion or fire **9.B –** Motion- Trip hazards **9.C –** Chemical- Unauthorized release of contaminants; exposure to contaminants (inhalation, dermal contact) **9.D –** Sound- Noise **9.E –** Electrical- Electrical hydraulic, vacuum **9.F –** Temperature- Hot surfaces on DPE System	**9.A.1 -** Follow equipment-specific operation instructions **9.A.2 -** Monitor influent vapor, H2S and oxygen concentrations if applicable **9.B.1 -** Keep work area tidy and free of loose equipment **9.C.1 -** Monitor treatment system and collect data to ensure discharge is within permit parameters and capacity of any storage containers (concentrations and flow rates) **9.D.1 -** Wear PPE in accordance with HASP (including ear protection as necessary) **9.E.1 -** Avoid standing in wet areas when working with electrical equipment **9.E.2 -** Use GFIC and inspect cords **9.F.1 -** Avoid touching catalytic converters	
10	Collect vapor samples in accordance with sampling plan	**10.A –** Chemical- Exposure to contaminants **10.B –** Motion- Repetitivemotionstress	**10.A.1 -** Perform air monitoring **10.A.2 -** Wear proper PPE **10.B.1 -** Use proper body positioning and lifting procedures	

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
11	Store waste water in accordance with site-specific requirements	**11.A –** Motion- Back strain **11.B –** Motion- Traffic hazard **11.C –** Biological- Leaks	**10.A.1 -** Use proper lifting techniques **10.B.1 -** Place materials in isolated location away from traffic and other site functions **10.C.1 -** Monitor all connection of the water discharge line for leaks	
12	Clean site/demobilize	**12.A –** Motion- Traffic hazard **12.B –** Motion- Lifting hazards **12.C –** Organizational Factors- Safety hazards left on site	**12.A.1 -** Leave cones in place until all materials have been removed **12.A.2 -** Use observer if needed to remove barriers safely **12.A.3 -** Maintain eye contact with drivers **12.B.1 -** Use proper lifting techniques **12.C.1 -** Leave site clean of refuse and debris **12.C.2 -** Notify station personnel of departure and location of any stored waste	

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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

SAFETY DATA SHEET

Version 5.5
Revision Date 03/31/2016
Print Date 11/14/2016

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Alconox® detergent
Product Number	:	242985
Brand	:	Aldrich
Product Use	:	For laboratory research purposes.
Supplier	:	Sigma-Aldrich Canada Co. 2149 Winston Park Drive OAKVILLE ON L6H 6J8 CANADA
Telephone	:	+1 9058299500
Fax	:	+1 9058299292
Emergency Phone # (For both supplier and manufacturer)	:	+1-703-527-3887 (CHEMTREC)
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956

Manufacturer	:	Sigma-Aldrich Corporation 3050 Spruce St. St. Louis, Missouri 63103 USA

2. HAZARDS IDENTIFICATION

Emergency Overview

WHMIS Classification

D1B	Toxic Material Causing Immediate and Serious Toxic Effects	Toxic by ingestion
D2B	Toxic Material Causing Other Toxic Effects	Moderate skin irritant Severe eye irritant

GHS Classification

Acute toxicity, Oral (Category 4)
Skin corrosion/irritation (Category 2)
Serious eye damage/eye irritation (Category 1)
Acute aquatic toxicity (Category 2)

GHS Label elements, including precautionary statements

Pictogram

Signal word: Danger

Hazard statement(s)

H302	Harmful if swallowed.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H401	Toxic to aquatic life.

Precautionary statement(s)

P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P302 + P352	IF ON SKIN: Wash with plenty of water.

P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P362 + P364	Take off contaminated clothing and wash it before reuse.
P501	Dispose of contents/ container to an approved waste disposal plant.

HMIS Classification

Health hazard: 2
Flammability: 0
Physical hazards: 0

Potential Health Effects

Inhalation May be harmful if inhaled. Causes respiratory tract irritation.
Skin May be harmful if absorbed through skin. Causes skin irritation.
Eyes Causes eye irritation.
Ingestion Toxic if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS-No.	EC-No.	Index-No.	Concentration
Tetrasodium pyrophosphate			
7722-88-5	231-767-1	-	>= 10 - <= 30 %
Sodium dodecylbenzenesulfonate			
25155-30-0	246-680-4	-	>= 10 - <= 30 %
Sodium carbonate			
497-19-8	207-838-8	011-005-00-2	>= 7 - <= 13 %
Pentasodium triphosphate			
7758-29-4	231-838-7	-	>= 10 - <= 30 %

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

Hazardous combustion products

Explosion data - sensitivity to mechanical impact
No data available

Explosion data - sensitivity to static discharge
No data available

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis
Tetrasodium pyrophosphate	7722-88-5	TWA	5.000000 mg/m3	Canada. British Columbia OEL
		TWAEV	5.000000 mg/m3	Canada. Ontario OELs
		TWA	5.000000 mg/m3	Canada. Alberta, Occupational Health and Safety Code (table 2: OEL)
Remarks	Occupational exposure limit is based on irritation effects and its adjustment to compensate for unusual work schedules is not required			
		TWAEV	5.000000 mg/m3	Québec. Regulation respecting occupational health and safety, Schedule 1, Part 1: Permissible exposure values for airborne contaminants
		TWA	5.000000 mg/m3	Ontario Table of Occupational Exposure Limits made under the Occupational Health and Safety Act.
		TWA	5 mg/m3	Ontario Table of Occupational Exposure Limits made under the Occupational Health and Safety Act.

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm

Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Eye protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Specific engineering controls
Use mechanical exhaust or laboratory fumehood to avoid exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	granular, powder
Colour	white

Safety data

pH	9.5 at 10 g/l
Melting point/freezing point	No data available
Boiling point	No data available
Flash point	No data available
Ignition temperature	No data available
Auto-ignition temperature	No data available
Lower explosion limit	No data available
Upper explosion limit	No data available
Vapour pressure	No data available
Density	No data available
Water solubility	soluble
Partition coefficient: n-octanol/water	No data available
Relative vapour density	No data available
Odour	odourless
Odour Threshold	No data available
Evaporation rate	No data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
No data available

Conditions to avoid
No data available

Materials to avoid
No data available

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Sulphur oxides, Oxides of phosphorus, Sodium oxides
Other decomposition products - No data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
No data available

Inhalation LC50
No data available

Dermal LD50
No data available

Other information on acute toxicity
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
Eyes: No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

No data available

Teratogenicity

No data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
No data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
No data available

Aspiration hazard
No data available

Potential health effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Ingestion	Toxic if swallowed.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects
No data available

Additional Information
RTECS: Not available

12. ECOLOGICAL INFORMATION

Toxicity

No data available

Persistence and degradability
No data available

Bioaccumulative potential
No data available

Mobility in soil
No data available

PBT and vPvB assessment
No data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

WHMIS Classification

D1B	Toxic Material Causing Immediate and Serious Toxic Effects	Toxic by ingestion

D2B	Toxic Material Causing Other Toxic Effects	Moderate skin irritant Severe eye irritant

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

16. OTHER INFORMATION

Text of H-code(s) and R-phrase(s) mentioned in Section 3

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

DIESEL FUEL

000003000395

Version 6.3 | Revision Date 2022/02/01 | Print Date 2022/02/01

SECTION 1. IDENTIFICATION

Product name	:	DIESEL FUEL
Synonyms	:	Seasonal Diesel, #2 Diesel, #1 Diesel, #2 Heating Oil, #1 Heating Oil, OSX, D50, Arctic Diesel, Farm Diesel, Marine Diesel, Low Sulphur Diesel, LSD, Ultra Low Sulphur Diesel, ULSD, Mining Diesel, Naval Distillate, Dyed Diesel, Marked Diesel, Coloured Diesel, Furnace special, Biodiesel blend, B1, B2, B5, Renewable Diesel blend (RX where X is 2- 50, X is representative of volume %), Diesel Low Cloud (LC), Marine Gas Oil, Marine Gas Oil Dyed
Product code	:	103213, 100679, 100654, 100653, 100105, 100992, 100637, 100634, 100631, 100638, 100641, 100635, 100632, 100684, 100683, 100657, 100656, 100655, 100687, 100686, 100685, 100681, 100661, 100659, 100667, 100666, 100665, 100682, 100671, 100669, 100664, 100662, 100680, 100781, 100964, 103204, 103180, 103179, 103193, 103178, 103136, 103135, 103134, 103133, 103132, 103131, 101799, 102907, 102762, 102763, 102755, 102302, 102744, 101801, 100678, 100677, 101802, 100107, 100668, 100658, 100911, 100663, 100652, 100460, 100065, 101796, 101793, 101795, 101792, 101794, 101791, 100768, 100643, 100642, 100103, 101798, 101800, 101797, 101788, 101789, 101787, 102531, 100734, 100733, 100640, 100997, 100995, 100732, 100731, 100994
Manufacturer or supplier's details		Petro-Canada P.O. Box 2844, 150 - 6th Avenue South-West Calgary Alberta T2P 3E3 Canada, Telephone: 1-866-786-2671
Emergency telephone number		CHEMTREC: 1-800-424-9300 (toll free) or +1 703-527-3887; Suncor Energy: +1 403-296-3000

Recommended use of the chemical and restrictions on use

Recommended use	:	Diesel fuels are distillate fuels suitable for use in high and medium speed internal combustion engines of the compression ignition type. Mining diesels, marine diesels, MDO and naval distillates may have a higher flash point requirement.
Prepared by	:	Product Safety

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance	Bright oily liquid.
Colour	Clear to yellow (This product may be dyed red for taxation purposes)

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Odour	Mild petroleum oil like.

GHS Classification

Flammable liquids	:	Category 3
Acute toxicity (Inhalation)	:	Category 4
Skin irritation	:	Category 2
Carcinogenicity	:	Category 2
Specific target organ toxicity - single exposure	:	Category 3 (Central nervous system)
Specific target organ toxicity - repeated exposure	:	Category 2 (Liver, thymus, Bone)
Aspiration hazard	:	Category 1

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : Flammable liquid and vapour.
May be fatal if swallowed and enters airways.
Causes skin irritation.
Harmful if inhaled.
May cause drowsiness or dizziness.
Suspected of causing cancer.
May cause damage to organs (Liver, thymus, Bone) through prolonged or repeated exposure.

Precautionary statements : **Prevention:**
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Keep container tightly closed.
Ground and bond container and receiving equipment.
Use explosion-proof electrical/ ventilating/ lighting equipment.
Use non-sparking tools.
Take action to prevent static discharges.
Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
Wash skin thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:

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IF SWALLOWED: Immediately call a POISON CENTER/doctor.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
IF exposed or concerned: Get medical advice/ attention.
Do NOT induce vomiting.
If skin irritation occurs: Get medical advice/ attention.
Take off contaminated clothing and wash it before reuse.
In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
Storage:
Store in a well-ventilated place. Keep container tightly closed.
Store in a well-ventilated place. Keep cool.
Store locked up.
Disposal:
Dispose of contents/ container to an approved waste disposal plant.

Potential Health Effects

Primary Routes of Entry : Eye contact
Ingestion
Inhalation
Skin contact

Aggravated Medical Condition : None known.

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

Chemical name	CAS-No.	Concentration
Kerosine (petroleum), hydrodesulfurized; Kerosine — unspecified	64742-81-0	48 - 100 %
Kerosine (petroleum); Straight run kerosine	8008-20-6	
Fuels, diesel; Gasoil — unspecified	68334-30-5	
Alkanes, C10-20-branched and linear	928771-01-1	0 - 50 %
Fatty acids, C16-18 and C18-unsatd., Me esters	67762-38-3	0 - 20 %

All above concentrations are in percent by weight.

SECTION 4. FIRST AID MEASURES

If inhaled : Move to fresh air.
Artificial respiration and/or oxygen may be necessary.
Seek medical advice.

In case of skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing

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		and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Wash clothing before reuse. Seek medical advice.
In case of eye contact	:	Remove contact lenses. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.
If swallowed	:	Rinse mouth with water. DO NOT induce vomiting unless directed to do so by a physician or poison control center. Never give anything by mouth to an unconscious person. Seek medical advice.
Most important symptoms and effects, both acute and delayed	:	Harmful if inhaled. Respiratory, skin and eye irritation; nausea; cancer.
Notes to physician	:	Treat symptomatically. For specialist advice physicians should contact the Poisons Information Service.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Dry chemical Carbon dioxide (CO2) Water fog. Foam
Unsuitable extinguishing media	:	Do NOT use water jet.
Specific hazards during firefighting	:	Cool closed containers exposed to fire with water spray.
Hazardous combustion products	:	Carbon oxides (CO, CO2), nitrogen oxides (NOx), sulphur oxides (SOx), smoke and irritating vapours as products of incomplete combustion.
Further information	:	Prevent fire extinguishing water from contaminating surface water or the ground water system.
Special protective equipment for firefighters	:	Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	For personal protection see section 8. Ensure adequate ventilation. Evacuate personnel to safe areas. Material can create slippery conditions.
Environmental precautions	:	If the product contaminates rivers and lakes or drains inform respective authorities.
Methods and materials for containment and cleaning up	:	Prevent further leakage or spillage if safe to do so. Remove all sources of ignition. Soak up with inert absorbent material. Non-sparking tools should be used. Ensure adequate ventilation.

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Contact the proper local authorities.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling : For personal protection see section 8.
Smoking, eating and drinking should be prohibited in the application area.
Use only with adequate ventilation.
In case of insufficient ventilation, wear suitable respiratory equipment.
Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity.
Avoid contact with skin, eyes and clothing.
Do not ingest.
Keep away from heat and sources of ignition.
Keep container closed when not in use.

Conditions for safe storage : Store in original container.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Keep in a dry, cool and well-ventilated place.
Keep in properly labelled containers.
To maintain product quality, do not store in heat or direct sunlight.
Ensure the storage containers are grounded/bonded.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Kerosine (petroleum), hydrodesulfurized; Kerosine — unspecified	64742-81-0	TWA	200 mg/m3 (As total hydrocarbon vapour)	ACGIH
		TWA	200 mg/m3 (total hydrocarbon vapor)	CA AB OEL
		TWA	525 mg/m3	CA ON OEL
		TWA	200 mg/m3 (As total hydrocarbon vapour)	ACGIH
		TWA	200 mg/m3 (total hydrocarbon vapor)	ACGIH
Kerosine (petroleum); Straight run kerosine	8008-20-6	TWA	200 mg/m3 (total hydrocarbon vapor)	CA BC OEL
		TWA	200 mg/m3 (total hydrocarbon vapor)	CA AB OEL
		TWA	200 mg/m3 (total hydrocarbon	ACGIH

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			vapor)	
Fuels, diesel; Gasoil — unspecified	68334-30-5	TWA	100 mg/m3 (total hydrocarbons)	CA AB OEL
		TWA (Vapour and inhalable aerosols)	100 mg/m3 (total hydrocarbons)	CA BC OEL
		TWA (Inhalable fraction and vapor)	100 mg/m3 (total hydrocarbons)	ACGIH

Engineering measures : Adequate ventilation to ensure that Occupational Exposure Limits are not exceeded.
Use only in well-ventilated areas.
Ensure that eyewash station and safety shower are proximal to the work-station location.

Personal protective equipment

Respiratory protection : Concentration in air determines protection needed.
Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines.
Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Filter type : organic vapour cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.

Hand protection

Material : neoprene, nitrile, polyvinyl alcohol (PVA), Viton(R). Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns. It should be realized that eventually any material regardless of their imperviousness, will get permeated by chemicals. Therefore, protective gloves should be regularly checked for wear and tear. At the first signs of hardening and cracks, they should be changed.

Remarks : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Eye protection : Wear face-shield and protective suit for abnormal processing problems.

Skin and body protection : Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place.

Protective measures : Wash contaminated clothing before re-use.

Hygiene measures : Remove and wash contaminated clothing and gloves, including the inside, before re-use.

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Wash face, hands and any exposed skin thoroughly after handling.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Bright oily liquid.
Colour	:	Clear to yellow (This product may be dyed red for taxation purposes)
Odour	:	Mild petroleum oil like.
Odour Threshold	:	No data available
pH	:	No data available
Melting point	:	No data available
Boiling point/boiling range	:	150 - 371 °C (302 - 700 °F)
Decomposition temperature		No data available
Flash point	:	> 40 °C (104 °F) Method: closed cup
Auto-Ignition Temperature	:	204 °C (399 °F)
Evaporation rate	:	No data available
Flammability	:	Flammable in presence of open flames, sparks and heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. This product can accumulate static charge and ignite.
Upper explosion limit	:	6 %(V)
Lower explosion limit	:	0.7 %(V)
Vapour pressure	:	7.5 mmHg (20 °C / 68 °F)
Relative vapour density	:	4.5
Relative density	:	0.8 - 0.88
Solubility(ies)		
Water solubility	:	insoluble
Partition coefficient: n-octanol/water	:	No data available
Viscosity		
Viscosity, kinematic	:	1.3 - 4.1 cSt (40 °C / 104 °F)

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SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Stable at normal ambient temperature and pressure.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Hazardous polymerisation does not occur.
Conditions to avoid	:	Extremes of temperature and direct sunlight.
Incompatible materials	:	Reactive with oxidising agents and acids.
Hazardous decomposition products	:	May release COx, NOx, SOx, smoke and irritating vapours when heated to decomposition.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure
Eye contact
Ingestion
Inhalation
Skin contact

Acute toxicity

Product:

Acute oral toxicity	:	Remarks: Based on available data, the classification criteria are not met.
Acute inhalation toxicity	:	Acute toxicity estimate: 1.5 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: Calculation method Assessment: The component/mixture is moderately toxic after short term inhalation. Remarks: Harmful if inhaled.
Acute dermal toxicity	:	Assessment: The substance or mixture has no acute dermal toxicity

Components:

Kerosine (petroleum), hydrodesulfurized; Kerosine — unspecified:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg,
Acute inhalation toxicity	:	LC50 (Rat): > 5.2 mg/l Exposure time: 4 hrs Test atmosphere: dust/mist
Acute dermal toxicity	:	LD50 (Rabbit): > 2,000 mg/kg,

Kerosine (petroleum); Straight run kerosine:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg,
Acute inhalation toxicity	:	LC50 (Rat): > 5 mg/l Exposure time: 4 h Test atmosphere: dust/mist
Acute dermal toxicity	:	LD50 (Rabbit): > 2,000 mg/kg,

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Fuels, diesel; Gasoil — unspecified:

Acute oral toxicity	:	LD50 (Rat): 7,500 mg/kg,
Acute inhalation toxicity	:	LC50 (Rat): 4.1 mg/l Exposure time: 4 h Test atmosphere: vapour
Acute dermal toxicity	:	LD50 (Mouse): 24,500 mg/kg,

Skin corrosion/irritation

Product:

Remarks: Causes skin irritation.

Serious eye damage/eye irritation

Product:

Remarks: Based on available data, the classification criteria are not met.

Respiratory or skin sensitisation

Product:

Remarks: Based on available data, the classification criteria are not met.

Germ cell mutagenicity

Product:

Germ cell mutagenicity-Assessment	Based on available data, the classification criteria are not met.

Carcinogenicity

Product:

Carcinogenicity - Assessment	Suspected of causing cancer.

Reproductive toxicity

Product:

Reproductive toxicity - Assessment	Based on available data, the classification criteria are not met.

STOT - single exposure

Product:

Target Organs: Central nervous system
Remarks: May cause drowsiness or dizziness.

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STOT - repeated exposure

Product:

Target Organs: Liver, thymus, Bone
Remarks: May cause damage to organs through prolonged or repeated exposure.

No data available

Aspiration toxicity

Product:

May be fatal if swallowed and enters airways.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:

Toxicity to fish	:	Remarks: No data available
Toxicity to daphnia and other aquatic invertebrates	:	Remarks: No data available
Toxicity to algae	:	Remarks: No data available
Toxicity to bacteria	:	Remarks: No data available

Persistence and degradability

Product:

Biodegradability	:	Remarks: No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	The product should not be allowed to enter drains, water courses or the soil. Offer surplus and non-recyclable solutions to a licensed disposal company. Waste must be classified and labelled prior to recycling or disposal. Send to a licensed waste management company.

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		Dispose of as hazardous waste in compliance with local and national regulations. Dispose of product residue in accordance with the instructions of the person responsible for waste disposal.
Contaminated packaging	:	Contact local or business unit authorities for guidance on disposal of product.

SECTION 14. TRANSPORT INFORMATION

International Regulations

IATA-DGR

UN/ID No.	:	UN 1202
Proper shipping name	:	Diesel fuel
Class	:	3
Packing group	:	III
Labels	:	Class 3 - Flammable Liquid
Packing instruction (cargo aircraft)	:	366

IMDG-Code

UN number	:	UN 1202
Proper shipping name	:	DIESEL FUEL
Class	:	3
Packing group	:	III
Labels	:	3
EmS Code	:	F-E, S-E
Marine pollutant	:	yes

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

National Regulations

TDG

UN number	:	UN 1202
Proper shipping name	:	DIESEL FUEL
Class	:	3
Packing group	:	III
Labels	:	3
ERG Code	:	128
Marine pollutant	:	yes

SECTION 15. REGULATORY INFORMATION

This product has been classified according to the hazard criteria of the Hazardous Products Regulations (HPR) and the SDS contains all of the information required by the HPR.

The components of this product are reported in the following inventories:

DSL	On the inventory, or in compliance with the inventory

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SECTION 16. OTHER INFORMATION

For Copy of SDS	:	Internet: www.petro-canada.ca/msds Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228 For Product Safety Information: 1 905-804-4752
Prepared by	:	Product Safety
Revision Date	:	2022/02/01

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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Hartland Fuel Products
920 10th Avenue North
Onalaska, WI 54650
Telephone: (608) 779 6580

SAFETY DATA SHEET

SECTION 1. IDENTIFICATION

Product identifier used on the label

: **Gasoline**

Other means of identification : Octane Grades, Blendstock uses (i.e. CBOBs, RBOBs), Unleaded Gasolines, Ethanols and Gasohols

Recommended use of the chemical and restrictions on use

: Automotive and internal combustion engine fuel
Restriction on use: None known

Chemical family : Complex combination of hydrocarbons

Name, address, and telephone number of the supplier:

Hartland Fuel Products
920 10th Avenue North
Onalaska, WI, USA
54650

Name, address, and telephone number of the manufacturer:

Refer to supplier

Supplier's Telephone # : (800) 283-4427, (608) 779-6580, (Monday - Friday 8 am - 5 pm CST)

24 Hr. Emergency Tel # : (800) 633-8253 (PERS)

SECTION 2. HAZARDS IDENTIFICATION

Classification of the chemical

Clear Colored liquid. Hydrocarbon odor.

Most important hazards: Extremely flammable liquid and vapor. Vapors may cause flash fires. Aspiration hazard. Causes skin irritation. Causes serious eye irritation. May cause respiratory irritation. May cause drowsiness or dizziness. Occupational exposure to the substance or mixture may cause adverse effects. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Avoid release to the environment. See Section 12 for more environmental information.

Hazard classification
This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015).

Flammable liquids -Category 1
Aspiration Toxicity - Category 1
Skin Corrosion/Irritation - Category 2
Eye damage/irritation Category 2A
Specific target organ toxicity, single exposure - Category 3 (respiratory)
Specific target organ toxicity, single exposure - Category 3 (narcotic effects)
Specific Target organ toxicity, repeated exposure- Category 1 (blood and immune, peripheral neuropathy)
Specific Target Organ Toxicity, Repeated Exposure - Category 2 (Central Nervous system)
Germ cell mutagenicity - Category 1B
Reproductive toxicity - Category 2
Carcinogenicity - Category 1

Label elements

Hazard pictogram(s)

Signal Word

Danger

Hazard statement(s)

Extremely flammable liquid and vapor.
May be fatal if swallowed and enters airways. Causes serious eye irritation.
Causes skin irritation.
May cause respiratory irritation. May cause drowsiness or dizziness. May cause genetic defects.
May cause cancer.
Suspected of damaging fertility or the unborn child.
Causes damage to organs through prolonged or repeated exposure. (blood, immune, peripheral neuropathy and central nervous system)

Precautionary statement(s)

Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources - No smoking. Keep container tightly closed.
Ground/Bond container and receiving equipment.
Use explosion-proof electrical and ventilating equipment. Use only non-sparking tools.
Take precautionary measures against static discharge. Do not breathe mist/vapors/spray.
Use only outdoors or in a well-ventilated area.
Do not eat, drink or smoke when using this product. Wash thoroughly after handling.
Wear protective gloves/clothing and eye/face protection.

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
Do NOT induce vomiting.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
If skin irritation occurs: get medical advice/attention.
Take off contaminated clothing and wash it before reuse.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
Call a poison center/doctor if you feel unwell.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention. IF exposed or concerned: Get medical attention/advice. In case of fire: Use appropriate media to extinguish.

Store in a well-ventilated place. Keep container tightly closed.
Keep cool.
Store locked up.

Dispose of contents/container in accordance with local/regional/national/international regulations.

Other hazards

Other hazards which do not result in classification:
Exposure to component solvent Vapor concentrations in excess of the stated occupational exposure limit may result in adverse health effect, such as mucous membrane and respiratory system irritation and adverse effect on kidney, liver and central nervous system. Intentional inhalation may cause unconsciousness, asphyxiation and death. Contains benzene, which can cause blood disease, including anemia and leukemia.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical name	Common name and synonyms	CAS #	Concentration (% by weight)
Gasoline	Petrol	8006-61-9	**99.9 - 100.0**
Toluene	Methylbenzene	108-88-3	**8.0 - 11.0**
Ethyl alcohol	Ethyl alcohol Ethyl hydrate	64-17-5	**9.0 - 11.0**
Pentane	Amyl hydride	109-66-0	**8.0 - 10.0**
n-Hexane	Hexanes	110-54-3	**7.0 - 9.0**
Xylene	Dimethylbenzene; Methyltoluene; Xylol	1330-20-7	**7.0 - 8.0**
Heptane	Dipropylmethane Heptyl hydride	142-82-5	**5.0 - 8.0**
Butane	Butyl hydride	106-97-8	**4.0 - 6.0**
1,2,4-Trimethyl benzene	Pseudocumene	95-63-6	**0.0 - 3.0**
Benzene	Phenyl hydride Coal naphtha	71-43-2	**0.0 - 3.0**
Ethylbenzene	Ethylbenzol Phenylethane	100-41-4	**0.0 - 2.0**
Cyclohexane	Benzenehexahydride	110-82-7	**0.0 - 1.0**

The % concentrations for the above listed chemicals will vary from batch to batch. Concentrations listed represent the actual concentration range for each chemical.

SECTION 4. FIRST-AID MEASURES

Description of first aid measures

Ingestion : Rinse mouth. Do NOT induce vomiting. Call a physician or poison control center immediately. Seek immediate medical attention/advice. If vomiting occurs spontaneously, keep victim's head lowered (forward) to reduce the risk of aspiration.

Inhalation : Move to fresh air. If breathing is difficult, give oxygen by qualified medical personnel only. If breathing has stopped, give artificial respiration. Seek immediate medical attention/advice. Provide supportive treatment, keeping victim warm and quiet.

Skin contact : IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Wash affected areas with soap and water. If irritation persists, seek prompt medical attention. Take off contaminated clothing and shoes immediately. Launder clothing before reuse.

Eye contact : Flush eyes thoroughly with running water for at least 20 minutes, holding eyelids open to ensure complete flushing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Seek immediate medical attention/advice.

Most important symptoms and effects, both acute and delayed

: Causes eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision.
Causes skin irritation. Symptoms may include redness, edema, drying defatting and cracking of the skin.

May cause drowsiness or dizziness. Symptoms and signs include headache, dizziness, fatigue, muscular weakness, drowsiness and in extreme cases, loss of consciousness.
May cause respiratory irritation. Symptoms may include coughing, choking and wheezing.
Aspiration hazard - material may cause lung inflammation or damage if it enters lungs through vomiting or swallowing.
May cause genetic defects.
May damage fertility or the unborn child.
May cause cancer by inhalation.
Causes damage to organs through prolonged or repeated exposure.

Indication of any immediate medical attention and special treatment needed

: Treat symptomatically. Aspiration hazard. This product is a CNS depressant.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing media

Suitable extinguishing media

: Dry chemical, alcohol foam, carbon dioxide, or water spray. For large fires use alcohol type or all-purpose type foam.

Unsuitable extinguishing media

: Water may cause spattering of hot material and may spread burning. Water may be ineffective because it may not cool product below the flashpoint.

Special hazards arising from the substance or mixture / Conditions of flammability

: Extremely flammable liquid and vapor. Vapor may cause flash fire. Will be ignited by heat, sparks, flame, or other ignition sources. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Vapors may form explosive mixtures with air. Product may emit flammable vapors which when mixed with air may burn or explode. Vapors are heavier than air and may travel or be moved along the ground to an ignition source at locations distant from material handling. Prevent runoff from fire control or dilution from entering sewers, drains, drinking water supply or any natural waterway. Risk of explosion.

Flammability classification (OSHA 29 CFR 1910.106)

: Flammable liquid- Category 1

Hazardous combustion products

: Carbon dioxide and carbon monoxide. Aldehydes Aromatic hydrocarbons and other irritating fumes and smoke

Special protective equipment and precautions for firefighters

Protective equipment for fire-fighters

: As in any fire, wear self-contained breathing apparatus pressure-demand, NIOSH (approved or equivalent) and full protective gear.

Special fire-fighting procedures

: Keep containers cool until after the fire is out. Prevent runoff from fire control or dilution from entering sewers, drains, drinking water supply or any natural waterway. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

: Shut off ignition sources; no flares, smoking or flames in hazard area. Wear appropriate personal protective equipment (PPE). Wear suitable protective clothing (see Section 8). Wear chemically resistant personal protective equipment during cleanup. Only trained personnel should be permitted in area. Do not walk through spilled product as it may be on fire and not visible. Handle in accordance with good industrial hygiene and safety practice.

Environmental precautions : If necessary, dike well ahead of the spill to prevent runoff into drains, sewers, or any natural waterway or drinking supply. Do not flush into surface water or sanitary sewer system.

Methods and material for containment and cleaning up

: Small spill: contain and collect spill with non-combustible, absorbent material such as sand, vermiculite, or diatomaceous earth. Place in a container for disposal according to local regulations. Large spill: prevent entry into sewers, waterways, basements, or confined areas. Isolate any hazards and deny entry to unnecessary personnel. Dike area for later disposal or recovery. Notify appropriate federal, state, and local agencies.

Special spill response procedures

: Contact appropriate local and provincial environmental authorities for assistance and/or reporting requirements. Fire fighting foam may be useful in certain situations to reduce vapors. Use water fog to knock down vapors and contain run-off.
If a spill/release in excess of the EPA reportable quantity is made into the environment, immediately notify the national response center in the United States (phone: 1-800-424-8802).
US CERCLA Reportable quantity (RQ): See section 15.

SECTION 7. HANDLING AND STORAGE

Precautions for safe handling

: Do not breathe mist or vapor. Use with adequate ventilation. Do not get in eyes, on skin, or on clothing. Use proper bonding and grounding techniques when transferring liquid. Do not ~~cut,~~ weld, drill ~~or grin~~d on or near this container. For use as a motor fuel only. Product should never be used as a solvent due to its flammable and potentially toxic properties. Siphoning by mouth can result in lung aspiration which can be harmful or fatal. Portable containers of 12 gallons (45 liters) or less should never be filled while they are in or on a motor vehicle or marine craft. Static electric discharge can ignite fuel vapors when filling non-grounded containers or vehicles on trailers. Containers should be placed on the ground.

The nozzle spout must be kept in contact with the container before and during the entire filling operation. Use only approved containers. A buildup of static electricity can occur upon re-entry into a vehicle during fueling especially in cold or dry climate conditions. The charge is generated by the action of dissimilar fabrics (i.e., clothing and upholstery) rubbing across each other as a person enters/exits the vehicle. A flash fire can result from this discharge if sufficient flammable vapors are present.

Therefore, do not get back in your vehicle while refueling. Cellular phones and other electronic devices may have the potential to emit electrical charges (sparks). Sparks in potentially explosive atmospheres (including fueling areas such as gas stations) could cause an explosion if sufficient flammable vapors are present. Therefore, turn off cellular phones and other electronic devices when working in potentially explosive atmospheres or keep devices inside your vehicle during refueling.

Conditions for safe storage : Store in a cool, dry, well-ventilated area. Flammable liquid. Keep away from excessive heat, open flames, sparks and other possible sources of ignition. Do not store in unmarked containers or storage devices. Do not store near any incompatible materials (see Section 10). Keep containers tightly closed when not in use. Storage area should comply with NFPA 30 "Flammable and Combustible liquid Code". Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. Do not expose to heat, open flames, strong oxidizers or other sources of ignition.

Incompatible materials : Strong oxidizers (e.g. Chlorine, Peroxides, etc.). .

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits:

Chemical Name	ACGIH TLV		OSHA PEL	
	TWA	STEL	PEL	STEL
Gasoline	N/Av	N/Av	N/Av	N/Av
Toluene	N/Av	N/Av	200 ppm	300 ppm (Ceiling)
Ethyl alcohol	N/Av	1000 ppm	1000 ppm (1900 mg/m³)	N/Av
Pentane	1000 ppm	N/Av	1000 ppm (2950 mg/m³)	N/Av
n-Hexane	50 ppm (skin)	N/Av	500 ppm (1800 mg/m³)	N/Av
Xylene	100 ppm	150 ppm	100 ppm (435 mg/m³)	N/Av
Heptane	400 ppm	500 ppm	500 ppm (2000 mg/m³)	500 ppm
Butane	1000 ppm (listed under Aliphatic hydrocarbon gases: Alkane C1-4)	N/Av	800 ppm	N/Av
1,2,4-Trimethyl benzene	25 ppm (mixed isomers)	N/Av	25 ppm (trimethylbenzene isomers) (final rule limit)	N/Av
Benzene	0.5 ppm (skin)	2.5 ppm (skin)	10 ppm	25 ppm (Ceiling)
Ethylbenzene	20 ppm	N/Av	100 ppm (435 mg/m³)	N/Av
Cyclohexane	300 ppm	N/Av	300 ppm ; 1050 mg/m³	N/Av

Exposure controls

Ventilation and engineering measures : Provide adequate ventilation. General mechanical ventilation and local exhaust is required for use with this product. However, if operating conditions create high airborne concentrations of this material, special ventilation may be needed. Use explosion-proof electrical and ventilating equipment.

Respiratory protection : A NIOSH approved air-purifying respirator with the appropriate chemical cartridges or a positive-pressure, air-supplied respirator may be used to reduce exposure. A respiratory protection program that meets CSA/OSHA/MSHA Z94.4-02 requirements must be followed whenever workplace conditions warrant use of a respirator.

Skin protection : Wear protective gloves/clothing. Wear appropriate protective clothing to prevent skin contact, such as coveralls or long sleeved shirt, long pants, and shoes and socks. Advice should be sought from glove suppliers.

Eye / face protection : Safety glasses with side shields should be used with this product. If splashing is anticipated, splash goggles and a face shield are recommended.

Other protective equipment : Emergency showers and eyewash facilities should be nearby. Depending on conditions of use, safety shoes and additional protective clothing may also be necessary.

General hygiene considerations : Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Clear, colored liquid.
Odor : Hydrocarbon odor
Odor threshold : Not available.

pH : Not available.
Melting Point/Freezing point : Not available.

Initial boiling point and boiling range
: 24-210°C
Flash point : -43 °C
Flashpoint (Method) : Not reported

Evaporation rate (BuAe = 1) : N/Av

Flammability (solid, gas) : N/Ap
Lower flammable limit (% by vol.)
: 1.4 %
Upper flammable limit (% by vol.)
: 7.6 %
Oxidizing properties : N/Av

Explosive properties : N/Av
Vapor pressure : 5.5-15 psi
Vapor density : N/Av

Relative density / Specific gravity
: 0.70-0.76
Solubility in water : Appreciable.

Other solubility(ies) : N/Av
Partition coefficient: n-octanol/water or Coefficient of water/oil distribution
: N/Av
Auto-ignition temperature : N/Av

Decomposition temperature : N/Av
Viscosity : N/Av
Volatiles (% by weight) : 100 WT%

Volatile organic Compounds (VOC's)
: N/Av
Absolute pressure of container

: N/Av
Flame projection length : N/Av
Other physical/chemical comments
: None reported by the manufacturer.

SECTION 10. STABILITY AND REACTIVITY

Reactivity : Avoid excessive heat, sparks and open flame. Avoid contact with incompatible materials.

Chemical stability : The material is stable at 70°F (21°C), 760 mmHg pressure. .

Possibility of hazardous reactions : Hazardous polymerization will not occur.

Conditions to avoid : Open flames, sparks, high heat and close proximity to incompatible substances.

Incompatible materials : Strong oxidizing agents. Contact with nitric and sulfuric acid will form nitrocresols that can decompose violently.

Hazardous decomposition products : Smoke. Carbon dioxide and carbon monoxide.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure:

Routes of entry inhalation : YES

Routes of entry skin & eye : YES

Routes of entry Ingestion : YES

Routes of exposure skin absorption : YES

Potential Health Effects:

Signs and symptoms of short-term (acute) exposure

Sign and symptoms Inhalation : May cause anesthetic effects. Symptoms include intoxication, dizziness, nausea, headache. May cause respiratory irritation. May cause damage to organs through prolonged or repeated exposure by inhalation.

Sign and symptoms ingestion : Aspiration hazard if swallowed - can enter lungs and cause damage. May cause nausea, stomach pain and vomiting. May cause gastrointestinal irritation. May cause central nervous system effects.
In severe cases, may cause the following: tremors, convulsions, unconsciousness, coma, respiratory arrest, death.

Sign and symptoms skin : May cause skin irritation. Prolonged or repeated contact can result in de-fatting and drying of the skin which may result in skin irritation and dermatitis.

Sign and symptoms eyes : Symptoms may include stinging, tearing, redness, swelling and blurred vision. Causes serious eye irritation.

Potential Chronic Health Effects : Chronic exposure damages the brain and the central nervous system.
Contains benzene, which can cause blood disease, including anemia and leukemia.

Mutagenicity : This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015). Classification Germ cell mutagenicity - Category 1B. May cause genetic defects.

Carcinogenicity : This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015). Classification: Carcinogenicity Category 1. May cause cancer. This material is listed by IARC as Group 2B (possibly carcinogenic to humans).
This material is listed as Group 3 (evidence of animal carcinogenicity) by ACGIH.
Contains the following chemicals listed as confirmed or suspected human carcinogens by ACGIH: Benzene
Contains the following chemicals listed as confirmed animal carcinogens (A3) by ACGIH: Ethyl benzene, Gasoline, Methyl tert-butyl ether.
Contains the following chemical(s) listed as Group I (Human Carcinogens) by IARC: Benzene.
Contains the following chemical(s) listed as Group 2B (possibly carcinogenic) by IARC: Ethyl benzene.
Contains the following chemical(s) listed as Known Carcinogen by NTP: Benzene

Reproductive effects & Teratogenicity

: This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015). Classification: Reproductive Toxicity-Category 1. May damage the unborn child.

Sensitization to material : Not expected to be a skin sensitizer. Not expected to be a respiratory sensitizer.

Specific target organ effects : This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015). Classification:
Specific target organ toxicity, single exposure - Category 3 (respiratory).May cause respiratory irritation.
Specific target organ toxicity, single exposure - Category 3 (narcotic effects). May cause drowsiness or dizziness.
Specific Target organ toxicity, repeated exposure- Category 1 (central nervous system). Causes damage to organs.
Specific Target Organ Toxicity, Repeated Exposure - Category 2 (blood and immune, peripheral neuropathy). May cause damage to organs through prolonged or repeated exposure.

Medical conditions aggravated by overexposure

: Pre-existing skin and respiratory disorders. Liver and kidney injuries may occur. Central nervous system.

Synergistic materials : None known.

Toxicological data : There is no available data for the product itself, only for the ingredients. See below for individual ingredient acute toxicity data.

ATE Oral: 6130 mg/kg
ATE Dermal: 8345 mg/kg
ATE Inhalation: 38.6 mg/L

Chemical name	LC_{50}(4hr) (Inhalation, rat)	LD_{50} (Oral, rat)	LD_{50} (Dermal, rabbit)
Gasoline	300 g/m3 5 min	N/Av	N/Av
Toluene	7585 ppm (28.1 mg/L)	5580 mg/kg	12 125 mg/kg
Ethyl alcohol	> 32 380 ppm (61 mg/L) (Vapor)	7060 mg/kg	> 15 800 mg/kg
Pentane	> 6106 ppm (18 mg/L) (Vapor) (No mortality)	> 2000 mg/kg (No mortality)	> 3000 mg/kg
n-Hexane	38 500 ppm (135.7 mg/L) (Vapor)	28 670 mg/kg	> 3350 mg/kg (No mortality)
Xylene	6350 ppm (27.6 mg/L) (Vapor)	3253 mg/kg	12 180 mg/kg
Heptane	25 000 ppm (102.5 mg/L) (Vapor)	> 15 000 mg/kg	> 2000 mg/kg (No mortality)
Butane	658 mg/L/4H	N/Av	N/Av
1,2,4-Trimethyl benzene	18 mg/L (Vapor)	5000 mg/kg	> 3160 mg/kg
Benzene	13 700 ppm (43.8 mg/L) (Vapor)	930 mg/kg	> 8240 mg/kg
Ethylbenzene	4000 ppm (17.4 mg/L) (Vapor)	3500 mg/kg	15 380 mg/kg
Cyclohexane	>32.70 mg/L	12,850 mg/kg	>2000 mg/kg

Other important toxicological hazards

: Aspiration hazard - material may cause lung inflammation or damage if it enters lungs through vomiting or swallowing.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity : Toxic to aquatic life with long lasting effects. Avoid release to the environment. See data for individual ingredient ecotoxicity data.

Ecotoxicity data:

Ingredients	CAS No	Toxicity to Fish		
		LC50 / 96h	NOEC / 21 day	M Factor
Gasoline	8006-61-9	96 Hr LC50 Oncorhynchus mykiss: 56 mg/L	N/Av	N/Av
Toluene	108-88-3	5.4 mg/L (pink salmon)	1.4 - 4 mg/L	None.
Ethyl alcohol	64-17-5	> 100 mg/L (Fathead minnow)	N/Av	None.
Pentane	109-66-0	4.26 mg/L (Rainbow trout)	6.165 mg/L/28-day (QSAR)	None.
n-Hexane	110-54-3	2.5 mg/L (Fathead minnow)	2.8 mg/L/28-day (Rainbow trout)	None.
Xylene	1330-20-7	8.2 mg/L (Rainbow trout)	N/Av	None.
Heptane	142-82-5	5.738 mg/L (Rainbow trout)	1.284 mg/L/28-day (Rainbow trout)	None.
Butane	106-97-8	N/Av	N/Av	N/Av
1,2,4-Trimethyl benzene	95-63-6	7.72 mg/L (Fathead minnow)	N/Av	None.
Benzene	71-43-2	5.3 mg/L (Rainbow trout) (OECD)	0.8 mg/L/32 days NOEL (OECD)	None.
Ethylbenzene	100-41-4	4.2 mg/L (Rainbow trout)	1.13 mg/L (30 days) (QSAR)	None.
Cyclohexane	110-82-7	4.53 mg/L (Fathead minnow)	n/av	none

Ingredients	CAS No	Toxicity to Daphnia		
		EC50 / 48h	NOEC / 21 day	M Factor
Gasoline	8006-61-9	N/Av	N/Av	N/Av
Toluene	108-88-3	3.78 mg/L (Daphnia magna)	0.53 - 1 mg/L	None.
Ethyl alcohol	64-17-5	5012 mg/L (Daphnia magna)	N/Av	None.
Pentane	109-66-0	2.7 mg/L (Daphnia magna)	10.76 mg/L (QSAR)	None.
n-Hexane	110-54-3	3.9 mg/L (Daphnia magna)	4.9 mg/L (QSAR)	None.
Xylene	1330-20-7	3.2 - 9.56 mg/L (Daphnia magna)	N/Av	None.
Heptane	142-82-5	0.2 mg/L Chaetogammarus marinus (Water flea)	0.06 - 0.23 mg/L	1
Butane	106-97-8	N/Av	N/Av	N/Av
1,2,4-Trimethyl benzene	95-63-6	3.6 mg/L (Daphnia magna)	N/Av	None.
Benzene	71-43-2	10 mg/L (Daphnia magna) (OECD)	N/Av	None.
Ethylbenzene	100-41-4	1.81 mg/L (Daphnia magna)	N/Av	None.
Cyclohexane	110-82-7	n/av	n/av	none

Ingredients	CAS No	Toxicity to Algae		
		EC50 / 96h or 72h	NOEC / 96h or 72h	M Factor
Gasoline	8006-61-9	72 Hr EC50 Pseudokirchneriella subcapitata: 4700 mg/L	N/Av	N/Av
Toluene	108-88-3	N/Av	10 mg/L/72hr (Green algae)	None.
Ethyl alcohol	64-17-5	1000 mg/L/96hr (Green algae)	N/Av	None.
Pentane	109-66-0	7.5 mg/L/72hr (Green algae)	2.0 mg/L/72hr	None.
n-Hexane	110-54-3	0.89 mg/L/96hr (Green algae)	N/Av	1
Xylene	1330-20-7	3.2 - 4.9 mg/L/72hr (Green algae)	N/Av	None.
Heptane	142-82-5	4.338 mg/L/72hr (Green algae)	0.97 mg/L/72hr	None.
Butane	106-97-8	N/Av	N/Av	N/Av
1,2,4-Trimethyl benzene	95-63-6	2.356 mg/L/96hr (Green algae) (QSAR)	N/Av	None.
Benzene	71-43-2	29 mg/L/72hr (Green algae) (literature)	N/Av	None.
Ethylbenzene	100-41-4	3.6 mg/L/96hr (Green algae)	3.4 mg/L/96hr	None.
Cyclohexane	110-82-7	3.4 mg/L/72 hours (Green algea)	n/av	none

Persistence and degradability

: Expected to be inherently biodegradable. The presence of ethanol in this product may impede the biodegradation of benzene, toluene, ethylbenzene and xylene in groundwater resulting in elongated plumes of these constituents.

Bioaccumulation potential : May bioaccumulate. See the following data for ingredient information.

Components	Partition coefficient n-octanol/water (log Kow)	Bioconcentration factor (BCF)
Gasoline (CAS 8006-61-9)	2.1 - 6.0	N/Av
Benzene (CAS 71-43-2)	2.13	10 (Fish)
Butane (CAS 106-97-8)	2.89	N/Av
Ethylbenzene (CAS 100-41-4)	3.15	1.1 - 1.5
n-Hexane (CAS 110-54-3)	3.9	200
Toluene (CAS 108-88-3)	2.65	
Xylene (CAS 1330-20-7)	3.12 - 3.2	50 - 58
Cyclohexane (CAS 110-82-7)	3.44	N/Av
Heptane (CAS 142-82-5)	4.66	2000
Ethyl alcohol (CAS 64-17-5)	- 0.31	N/Av
1,2,4-Trimethyl benzene (CAS 95-63-6)	3.78	31 - 275
Pentane (CAS 109-66-0)	3.45	171 (Fathead minnow) (calcu

Mobility in soil : May partition into air, soil and water.

Other Adverse Environmental effects

: Product can cause fouling of shoreline and may be harmful to aquatic life in low concentrations.

SECTION 13. DISPOSAL CONSIDERATIONS

Handling for Disposal : See Section 7 (Handling and Storage) for further details.

Methods of Disposal : Dispose of in accordance with federal, provincial and local hazardous waste laws.

RCRA : If this product, as supplied, becomes a waste in the United States, it may meet the criteria of a hazardous waste as defined under RCRA, Title 40 CFR 261. Under the RCRA, it is the responsibility of the waste generator to determine the proper waste identification and disposal method.

SECTION 14. TRANSPORT INFORMATION

Regulatory Information	UN Number	UN proper shipping name	Transport hazard class(es)	Packing Group	Label
TDG	UN1203	GASOLINE	3	II	
TDG Additional information	Please consult the TDG guidelines for further information.				
49CFR/DOT	UN1203	GASOLINE	3	II	
49CFR/DOT Additional information	Please contact 49CFR/DOT guidelines for further information.				
ICAO/IATA	UN1203	Gasoline	3	II	
ICAO/IATA Additional information	Please consult the IATA/ICAO guidelines for further information.				
IMDG	UN1203	GASOLINE	3	II	
IMDG Additional information	Consult the IMDG regulations for exceptions.				

Special precautions for user : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources - No smoking.

Environmental hazards : This product meets the criteria for an environmentally hazardous material according to the IMDG Code. See Section 12 for more environmental information.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

: Not available.

SECTION 15 - REGULATORY INFORMATION

US Federal Information:

Components listed below are present on the following U.S. Federal chemical lists:

Ingredients	CAS #	TSCA Inventory	CERCLA Reportable Quantity(RQ) (40 CFR 117.302):	SARA TITLE III: Sec. 302, Extremely Hazardous Substance, 40 CFR 355:	SARA TITLE III: Sec. 313, 40 CFR 372, Specific Toxic Chemical	
					Toxic Chemical	de minimus Concentration
Gasoline	8006-61-9	Yes	N/Ap	N/Av	No	N/Ap
Toluene	108-88-3	Yes	1000 lb/ 454 kg	None.	No	1%
Ethyl alcohol	64-17-5	Yes	None.	None.	No	N/Ap
Pentane	109-66-0	Yes	None.	None.	No	N/Ap
n-Hexane	110-54-3	Yes	5000 lb/ 2270 kg	None.	Yes	1%
Xylene	1330-20-7	Yes	100 lbs / 45.4 kg	None.	Yes	1%
Heptane	142-82-5	Yes	None.	None.	No	N/Ap
Butane	106-97-8	Yes	N/Ap	N/Av	No	N/Ap
1,2,4-Trimethyl benzene	95-63-6	Yes	None.	None.	Yes	1%
Benzene	71-43-2	Yes	10 lb / 4.54 kg	None.	Yes	0.1%
Ethylbenzene	100-41-4	Yes	1000 lb/ 454 kg	None.	Yes	0.1%
Cyclohexane	110-82-7	Yes	1000 lb/ 454 kg	N/Av	Yes	1%

SARA TITLE III: Sec. 311 and 312, SDS Requirements, 40 CFR 370 Hazard Classes: Flammable; Skin irritation; Eye irritation; Carcinogenicity; Germ cell mutagenicity; Reproductive toxicity; Specific target organ toxicity, single exposure; Specific target organ toxicity, repeated exposure; Aspiration hazard.

Under SARA Sections 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

US State Right to Know Laws:

The following chemicals are specifically listed by individual States:

Ingredients	CAS #	California Proposition 65		State "Right to Know" Lists					
		Listed	Type of Toxicity	CA	MA	MN	NJ	PA	RI
Gasoline	8006-61-9	No	N/Ap	Yes	Yes	Yes	Yes	No	Yes
Toluene	108-88-3	Yes	Developmental	No	No	Yes	No	No	Yes
Ethyl alcohol	64-17-5	Yes	Cancer (in alcoholic beverages) Developmental (in alcoholic beverages)	Yes	Yes	Yes	Yes	Yes	Yes
Pentane	109-66-0	No	N/Ap	Yes	Yes	Yes	Yes	Yes	Yes
n-Hexane	110-54-3	No	N/Ap	No	Yes	Yes	Yes	Yes	Yes
Xylene	1330-20-7	No	N/Ap	Yes	Yes	Yes	Yes	Yes	Yes
Heptane	142-82-5	No	N/Ap	Yes	Yes	Yes	Yes	Yes	Yes
Butane	106-97-8	No	N/Ap	Yes	Yes	Yes	Yes	Yes	Yes
1,2,4-Trimethyl benzene	95-63-6	No	N/Ap	No	Yes	Yes	Yes	Yes	No
Benzene	71-43-2	Yes	Cancer; male reproductive toxicity; Developmental	Yes	Yes	Yes	Yes	Yes	Yes
Ethylbenzene	100-41-4	Yes	Cancer	Yes	Yes	Yes	Yes	Yes	Yes
Cyclohexane	110-82-7	No	N/Ap	Yes	Yes	Yes	Yes	Yes	Yes

Canadian Information:

Canadian Environmental Protection Act (CEPA) information: All ingredients listed appear on the Domestic Substances List (DSL).

International Information:

Components listed below are present on the following International Inventory list:

Ingredients	CAS #	European EINECs	Australia AICS	Philippines PICCS	Japan ENCS	Korea KECI/KECL	China IECSC	New Zealand IOC
Gasoline	8006-61-9	232-349-1	Present	Present	(9)-1694	KE-21971	Present	Not listed
Toluene	108-88-3	203-625-9	Present	Present	(3)-2	KE-33936	Present	HSR001227
Ethyl alcohol	64-17-5	200-578-6	Present	Present	(2)-202	KE-13217	Present	HSR001144
Pentane	109-66-0	203-692-4	Present	Present	(2)-5	KE-27968	Present	HSR001212
n-Hexane	110-54-3	203-777-6	Present	Present	(2)-6	KE-18626	Present	HSR001166
Xylene	1330-20-7	215-535-7	Present	Present	(3)-60; (3)-3	KE-35427	Present	HSR000983
Heptane	142-82-5	205-563-8	Present	Present	(2)-7	KE-18271	Present	HSR001164
Butane	106-97-8	203-448-7	Present	Present	(2)-4	KE-03751	Present	HSR000989
1,2,4-Trimethyl benzene	95-63-6	202-436-9	Present	Present	(3)-7; (3)-3427	KE-34410	Present	HSR001382
Benzene	71-43-2	200-753-7	Present	Present	(3)-1	KE-02150	Present	HSR001038
Ethylbenzene	100-41-4	202-849-4	Present	Present	(3)-60; (3)-28	KE-13532	Present	HSR001151
Cyclohexane	110-82-7	203-806-2	Present	Present	(3)-2233	KE-18562	Present	HSR001111

SECTION 16. OTHER INFORMATION

Legend : ACGIH: American Conference of Governmental Industrial Hygienists
CAS: Chemical Abstract Services
CSA: Canadian Standard Association
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR: Code of Federal Regulations
DOT: Department of Transportation
EPA: Environmental Protection Agency
HSDB: Hazardous Substances Data Bank
IARC: International Agency for Research on Cancer
LC: Lethal Concentration
LD: Lethal Dose
N/Ap: Not Applicable
N/Av: Not Available
NIOSH: National Institute of Occupational Safety and Health
OSHA: Occupational Safety and Health Administration
PEL: Permissible exposure limit
RCRA: Resource Conservation and Recovery Act
RTECS: Registry of Toxic Effects of Chemical Substances
SARA: Superfund Amendments and Reauthorization Act
STEL: Short Term Exposure Limit
TLV: Threshold Limit Values
TWA: Time Weighted Average
WHMIS: Workplace Hazardous Materials Identification System

References :
1. ACGIH, Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices for 2019.
2. International Agency for Research on Cancer Monographs, searched 2018.
3. Canadian Centre for Occupational Health and Safety, CCInfoWeb databases, 2018 (Chempendium, HSDB and RTECs).
4. Safety Data Sheets from manufacturer.
5. US EPA Title III List of Lists - June 2019 version.
6. California Proposition 65 List - November 23, 2018 version.
7. OECD - The Global Portal to Information on Chemical Substances - eChemPortal, 2018.

Preparation Date (mm/dd/yyyy)

: 07/17/2019

Other special considerations for handling

: Provide adequate information, instruction and training for operators.

Prepared for: Hartland Fuel Products 920 10th Avenue North Onalaska, WI 54650 Telephone: (608) 779 6580	
Prepared by: ICC The Compliance Center Inc. Telephone: (888) 442-9628 (U.S.): (888) 977-4834 (Canada) http://www.thecompliancecenter.com	

DISCLAIMER

This Safety Data Sheet was prepared by ICC The Compliance Center Inc using information provided by /obtained from Petro Energy LLC and CCOHS' Web Information Service. The information in the Safety Data Sheet is offered for your consideration and guidance when exposed to this product. ICC The Compliance Center Inc and Petro Energy LLC expressly disclaim all expressed or implied warranties and assume no responsibilities for the accuracy or completeness of the data contained herein. The data in this SDS does not apply to use with any other product or in any other process.
This Safety Data Sheet may not be changed or altered in any way without the expressed knowledge and permission of ICC The Compliance Center Inc and Petro Energy LLC.

END OF DOCUMENT

Lithium Grease

Safety Data Sheet

According To Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules And Regulations Version: LithiumAmber.001

SECTION 1: IDENTIFICATION

1.1. Product Identifier

Product Form: Mixture

Product Name: Plews Multi-Purpose Lithium Grease

Product Numbers: 11309, 11310

Synonyms: Grease, Lubricant

1.2. Intended Use of the Product

Grease

1.3. Name, Address, and Telephone of the Responsible Party

Supplier **Plews & Edelmann**

Address 1550 Franklin Grove Road
Dixon, IL 61021

Phone 1-800-545-1689

1.4. Emergency Telephone Number

Emergency Number : 1-800-424-9300, CHEMTREC

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the Substance or Mixture

Classification (GHS-US)

Not Classified

Full text of H-phrases: see section 16

2.2. Label Elements

GHS-US Labeling

Hazard Pictograms (GHS-US) : Not Classified

Signal Word (GHS-US) :

Hazard Statements (GHS-US) : None Required

Precautionary Statements (GHS-US) : P273 - Avoid release to the environment.
P501 - Dispose of contents/container in accordance with local, regional, national, and international regulations.

2.3. Other Hazards

None noted

2.4. Unknown Acute Toxicity (GHS-US)

None of the mixture consists of ingredient(s) of unknown acute toxicity.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

Not applicable

3.2. Mixture

Name	Product Identifier	% (w/w)	Classification (GHS-US)
Petroleum distillates, solvent dewaxed	(CAS No) 64742-65-0	60 – 75, 70 - 85	Not Classified
Lithium Hydroxide, Monohydrate	(CAS No) 1310-66-3	<2	H314: Skin Corr, 1B H302: Acute Toxicity, 4
Castor Oil, Hydrogenated; Mainly 12-Hydrosteric Acid, Triglycerides	(CAS No) 8001-78-3	8 - 18	Not Classified
12-Hydroxystearic Acid	(CAS No) 106-14-9	2 - 10	Not Classified
Sebacic Acid	(CAS No) 111-20-6	<3	Not Classified

*The specific chemical identity and/or exact percentage of composition have been withheld as a trade secret within the meaning of the OSHA Hazard Communication Standard [29 CFR 1910.1200].

*More than one of the ranges of concentration prescribed by Controlled Products Regulations has been used where necessary, due to varying composition.

Full text of H-phrases: see section 16

SECTION 4: FIRST AID MEASURES

4.1. Description of First Aid Measures

General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label if possible).
Inhalation: Remove to fresh air and keep at rest in a position comfortable for breathing. Obtain medical attention if breathing difficulty persists.
Skin Contact: Remove contaminated clothing. Drench affected area with water or soap and water for at least 15 minutes. Wash contaminated clothing before reuse. Obtain medical attention if irritation develops or persists.
Eye Contact: Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention.
Ingestion: Do NOT induce vomiting. Rinse mouth. Call a POISON CENTER or doctor/physician if you feel unwell.

4.2. Most Important Symptoms and Effects Both Acute and Delayed

General: No known significant effects or critical hazards.
Inhalation: Overexposure may be irritating to the respiratory system.
Skin Contact: Repeated or prolonged skin contact may cause irritation.
Eye Contact: Direct contact with the eyes is likely irritating.
Ingestion: Ingestion is likely to be harmful or have adverse effects.
Chronic Symptoms: No known significant effects or critical hazards.

4.3. Indication of Any Immediate Medical Attention and Special Treatment Needed

If you feel unwell, seek medical advice (show the label where possible).

SECTION 5: FIRE-FIGHTING MEASURES

5.1. Extinguishing Media

Suitable Extinguishing Media: Use extinguishing media appropriate for surrounding fire.
Unsuitable Extinguishing Media: Do not use a heavy water stream. Use of heavy stream of water may spread fire.

5.2. Special Hazards Arising From the Substance or Mixture

Fire Hazard: Not flammable but will support combustion.
Explosion Hazard: Product is not explosive.
Reactivity: Hazardous reactions will not occur under normal conditions.

5.3. Advice for Firefighters

Precautionary Measures Fire: Exercise caution when fighting any chemical fire. Under fire conditions, hazardous fumes will be present.
Firefighting Instructions: Use water spray or fog for cooling exposed containers.
Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.
Hazardous Combustion Products: Under fire conditions, may produce fumes, smoke, oxides of carbon and hydrocarbons.

Other Information: Refer to Section 9 for flammability properties.

Reference to Other Sections

Refer to section 9 for flammability properties.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Avoid all contact with skin, eyes, or clothing. Avoid breathing (vapor, mist, spray).

6.1.1. For Non-Emergency Personnel

Protective Equipment: Use appropriate personal protection equipment (PPE).
Emergency Procedures: Evacuate unnecessary personnel.

6.1.2. For Emergency Personnel

Protective Equipment: Equip cleanup crew with proper protection.
Emergency Procedures: Stop leak if safe to do so. Eliminate ignition sources. Ventilate area.

6.2. Environmental Precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and Material for Containment and Cleaning Up

For Containment: Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams.
Methods for Cleaning Up: Clean up spills immediately and dispose of waste safely. Spills should be contained with mechanical barriers. Transfer spilled material to a suitable container for disposal. Contact competent authorities after a spill.

6.4. Reference to Other Sections

See Heading 8. Exposure controls and personal protection. For further information refer to section 13.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Additional Hazards When Processed: Practice good housekeeping - spillage can be slippery on smooth surface either wet or dry.
Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.

7.2. Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Comply with applicable regulations.
Storage Conditions: Store in a dry, cool and well-ventilated place. Keep container closed when not in use. Keep/Store away from direct sunlight, extremely high or low temperatures and incompatible materials.
Incompatible Materials: Strong oxidizing agents.

7.3. Specific End Use(s)

Grease

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control Parameters

For substances listed in section 3 that are not listed here, there are no established Exposure limits from the manufacturer, supplier, importer, or the appropriate advisory agency including: ACGIH (TLV), NIOSH (REL), OSHA (PEL), Canadian provincial governments, or the Mexican government.

Mineral Oils		
USA ACGIH	ACGIH TWA (mg/m³)	5 mg/m³ (excluding metal working fluids, highly & severely refined-inhalable fraction)
USA ACGIH	ACGIH STEL	10 mg/m³ (excluding metal working fluids, highly & severely refined-inhalable fraction)
USA OSHA	OSHA PEL (TWA) (mg/m³)	5 mg/m³
Canada	OEL STEL (mg/m³)	10 mg/m³
Canada	OEL TWA (mg/m³)	5 mg/m³

8.2. Exposure Controls

Appropriate Engineering Controls: Ensure adequate ventilation, especially in confined areas. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Ensure all national/local regulations are observed.

Personal Protective Equipment: Protective goggles. Gloves. Insufficient ventilation: wear respiratory protection.

Materials for Protective Clothing: Chemically resistant materials and fabrics.

Hand Protection: Wear chemically resistant protective gloves.

Eye Protection: Chemical goggles or safety glasses.

Skin and Body Protection: Wear suitable protective clothing.

Respiratory Protection: Use a NIOSH-approved respirator or self-contained breathing apparatus whenever exposure may exceed established Occupational Exposure Limits.

Environmental Exposure Controls: Do not allow the product to be released into the environment.

Consumer Exposure Controls: Do not eat, drink or smoke during use.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on Basic Physical and Chemical Properties: See Product Data Sheet for Grade Specifics

Physical State	:	Semi-Solid At Room Temperature
Appearance	:	Varies by Grade
Odor	:	Slight Hydrocarbon
Odor Threshold	:	Not available
pH	:	Not available
Evaporation Rate	:	Not available
Melting Point	:	Not available
Boiling Point	:	> 250C
Flash Point	:	Typical 250 °C (COC) (482 °F)
Auto-ignition Temperature	:	>320C expected
Decomposition Temperature	:	Not available
Flammability (solid, gas)	:	Not available
Lower Flammable Limit	:	Not available
Upper Flammable Limit	:	Not available
Vapor Pressure	:	Not available
Relative Vapor Density at 20 °C	:	Not available
Relative Density	:	Not available

Specific Gravity	:	approx 0.9 g/cm
Solubility	:	Negligible
Partition Coefficient: N-Octanol/Water	:	Not available
Viscosity	:	Not available
Viscosity, Kinematic	:	Not available
Explosive Properties	:	Product is not explosive
Explosion Data – Sensitivity to Mechanical Impact	:	Not expected to present an explosion hazard due to mechanical impact
Explosion Data – Sensitivity to Static Discharge	:	Not expected to present an explosion hazard due to static discharge

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity: Hazardous reactions will not occur under normal conditions.
10.2. Chemical Stability: Stable under recommended handling and storage conditions (see section 7).
10.3. Possibility of Hazardous Reactions: Hazardous polymerization will not occur.
10.4. Conditions to Avoid: Direct sunlight, extremely high or low temperatures, heat, hot surfaces, sparks, open flames, incompatible materials, and other ignition sources.
10.5. Incompatible Materials: Strong oxidizing agents.
10.6. Hazardous Decomposition Products: Not expected to form during normal storage.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on Toxicological Effects - Product

Acute Toxicity: Not classified
LD50 and LC50 Data: Not available
Skin Corrosion/Irritation: Not classified
Eye Damage/Irritation: Not classified
Respiratory or Skin Sensitization: Not classified
Germ Cell Mutagenicity: Not classified
Teratogenicity: Not classified
Carcinogenicity: Not classified
Specific Target Organ Toxicity (Repeated Exposure): Not classified
Reproductive Toxicity: Not classified
Specific Target Organ Toxicity (Single Exposure): Not classified
Aspiration Hazard: Not classified
Symptoms/Injuries After Inhalation: Overexposure may be irritating to the respiratory system.
Symptoms/Injuries After Skin Contact: Repeated or prolonged skin contact may cause irritation.
Symptoms/Injuries After Eye Contact: Direct contact with the eyes is likely irritating.
Symptoms/Injuries After Ingestion: Ingestion is likely to be harmful or have adverse effects.
Chronic Symptoms: Not Classified

11.2. Information on Toxicological Effects - Ingredient(s)

LD50 and LC50 Data: Not classified

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Ecology - General: Not available

12.2. Persistence and Degradability

Not available

12.3. Bioaccumulative Potential

Not available

12.4. Mobility in Soil

Not available

12.5. Other Adverse Effects

Other Information: Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Sewage Disposal Recommendations: Do not empty into drains; dispose of this material and its container in a safe way. Do not empty into drains. Do not dispose of waste into sewer.
Waste Disposal Recommendations: Dispose of waste material in accordance with all local, regional, national, provincial, territorial and international regulations.

SECTION 14: TRANSPORT INFORMATION

14.1. In Accordance with DOT Not regulated for transport
14.2. In Accordance with IMDG Not regulated for transport
14.3. In Accordance with IATA Not regulated for transport
14.4. In Accordance with TDG Not regulated for transport

SECTION 15: REGULATORY INFORMATION

15.1. US Federal Regulations

SARA Section 311/312 Hazard Classes	Not classified

15.2. US State Regulations: Not regulated
15.3. Canadian Regulations: Not regulated

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

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Revision Date : 12/20/2017
Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

GHS Full Text Phrases:

H314	Causes severe skin burns and eye damage.
H302	Harmful if swallowed.
P273	Avoid release into the environment.
P501	Dispose of contents/container in accordance with local, regional, national, and international regulations.

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: **CAT HYDRAULIC OIL (HYDO) SAE 10W**
Product Description: Base Oil and Additives
Product Code: 20202050B020, 478909-00, 971670
Intended Use: Hydraulic/transmission fluid

COMPANY IDENTIFICATION

Supplier: **EXXON MOBIL CORPORATION**
22777 Springwoods Village Parkway
Spring, TX. 77389 USA

24 Hour Health Emergency	609-737-4411
Transportation Emergency Phone	800-424-9300 or 703-527-3887 CHEMTREC
Product Technical Information	800-662-4525
MSDS Internet Address	http://www.exxon.com, http://www.mobil.com

SECTION 2 HAZARDS IDENTIFICATION

This material is not hazardous according to regulatory guidelines (see (M)SDS Section 15).

Other hazard information:

HAZARD NOT OTHERWISE CLASSIFIED (HNOC): None as defined under 29 CFR 1910.1200.

PHYSICAL / CHEMICAL HAZARDS
No significant hazards.

HEALTH HAZARDS
High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

ENVIRONMENTAL HAZARDS
No significant hazards.

NFPA Hazard ID:	Health:	0	Flammability:	1	Reactivity:	0
HMIS Hazard ID:	Health:	0	Flammability:	1	Reactivity:	0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert

advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

Hazardous Substance(s) or Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	GHS Hazard Codes
ZINC DITHIOPHOSPHATE	68649-42-3	1 - 2.5%	H315, H318, H401, H411

* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

SECTION 4 FIRST AID MEASURES

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

First aid is normally not required. Seek medical attention if discomfort occurs.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO_2) to extinguish flames.

Inappropriate Extinguishing Media: Straight Streams of Water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Pressurized mists may form a flammable mixture.

Hazardous Combustion Products: Aldehydes, Oxides of carbon, Smoke, Fume, Sulfur oxides, Incomplete combustion products

FLAMMABILITY PROPERTIES

Flash Point [Method]: >200°C (392°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

PROTECTIVE MEASURES

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: respiratory protection will be necessary only in special cases, e.g., formation of mists. Half-face or full-face respirator with filter(s) for dust/organic vapor or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to hydrocarbons are recommended. Gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

SPILL MANAGEMENT

Land Spill: Stop leak if you can do it without risk. Recover by pumping or with suitable absorbent.

Water Spill: Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Static Accumulator: This material is a static accumulator.

STORAGE

The container choice, for example storage vessel, may effect static accumulation and dissipation. Do not store in open or unlabelled containers. Keep away from incompatible materials.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure limits/standards for materials that can be formed when handling this product: When mists/aerosols can occur the following are recommended: 5 mg/m³ - ACGIH TLV (inhalable fraction), 5 mg/m³ - OSHA PEL.

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

No biological limits allocated.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to

be considered for this material include:
No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:
No protection is ordinarily required under normal conditions of use.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:
No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Liquid
Color: Amber
Odor: Characteristic
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.878
Flammability (Solid, Gas): N/A
Flash Point [Method]: >200°C (392°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D
Boiling Point / Range: > 316°C (600°F) [Estimated]
Decomposition Temperature: N/D
Vapor Density (Air = 1): > 2 at 101 kPa [Estimated]

Vapor Pressure: < 0.013 kPa (0.1 mm Hg) at 20 °C [Estimated]
Evaporation Rate (n-butyl acetate = 1): N/D
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5 [Estimated]
Solubility in Water: Negligible
Viscosity: 37.7 cSt (37.7 mm2/sec) at 40 °C | 6.1 cSt (6.1 mm2/sec) at 100°C
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION
Freezing Point: N/D
Melting Point: N/A
Pour Point: -18°C (0°F)
DMSO Extract (mineral oil only), IP-346: < 3 %wt

SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: See sub-sections below.

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Excessive heat. High energy sources of ignition.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
Ingestion	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
Eye	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
Sensitization	
Respiratory Sensitization: No end point data	Not expected to be a respiratory sensitizer.

for material.	
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.
Aspiration: Data available.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
Carcinogenicity: No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
Reproductive Toxicity: No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: No end point data for material.	Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components.

OTHER INFORMATION

Contains:
Base oil severely refined: Not carcinogenic in animal studies. Representative material passes IP-346, Modified Ames test, and/or other screening tests. Dermal and inhalation studies showed minimal effects; lung non-specific infiltration of immune cells, oil deposition and minimal granuloma formation. Not sensitizing in test animals.

The following ingredients are cited on the lists below: None.

--REGULATORY LISTS SEARCHED--

1 = NTP CARC	3 = IARC 1	5 = IARC 2B
2 = NTP SUS	4 = IARC 2A	6 = OSHA CARC

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

MOBILITY

Base oil component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Base oil component -- Expected to be inherently biodegradable

BIOACCUMULATION POTENTIAL

Base oil component -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products. Protect the environment. Dispose of used oil at designated sites. Minimize skin contact. Do not mix used oils with solvents, brake fluids or coolants.

REGULATORY DISPOSAL INFORMATION

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrositivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND (DOT): Not Regulated for Land Transport

LAND (TDG): Not Regulated for Land Transport

SEA (IMDG): Not Regulated for Sea Transport according to IMDG-Code

Marine Pollutant: No

AIR (IATA): Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: This material is not considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

Listed or exempt from listing/notification on the following chemical inventories: AICS, DSL, ENCS, IECSC, KECI, PICCS, TSCA

EPCRA SECTION 302: This material contains no extremely hazardous substances.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: None.

SARA (313) TOXIC RELEASE INVENTORY:

Chemical Name	CAS Number	Typical Value
ZINC DITHIOPHOSPHATE	68649-42-3	1 - 2.5%

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
ZINC DITHIOPHOSPHATE	68649-42-3	13, 15, 17, 19

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):
H315: Causes skin irritation; Skin Corr/Irritation, Cat 2
H318: Causes serious eye damage; Serious Eye Damage/Irr, Cat 1
H401: Toxic to aquatic life; Acute Env Tox, Cat 2
H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Updates made in accordance with implementation of GHS requirements.

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MHC: 0B, 0B, 0, 0, 0, 0 PPEC: A

DGN: 2004671XUS (546411)

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Safety Data Sheet (SDS)

Date Prepared/Revised: 7/1/21 Version no.: 08 Supersedes: (7/8/19)

1.) Identification of the Mixture and of the Company

Product identifier**: Aervoe Survey Marking Paint - Aerosol**

Product name: **Survey Marking Paint**

Non-Fluorescent Colors	Fluorescent Colors	High Delivery	Metallic
201 Red	220 Red	281 Red	210 Silver
202 Yellow	222 Orange	288 Fluorescent Orange	
203 Blue	224 Green		
204 Green	226 Yellow		
205 Orange	227 Blue		
206 Black	229 Pink		
207 White	230 Red/Orange		
208 Hi Visibility Yellow			
209 Light Blue			
212 Purple			
280 Concrete Grey			

Relevant identified uses of the substance: Designed to adhere to most surfaces, includ¬ing pavement, gravel, and soil.
Uses advised against: This aerosol product is designed to spray at an angle not greater than 30° from vertical. Do not use on turf surfaces.

CAS No:	**Not Applicable (mixture)**
EC No:	**Not Applicable (mixture)**
Index No:	**Not Applicable (mixture)**
Manufacturer/Supplier:	**Aervoe Industries Incorporated**
Street address/P.O. Box:	**1100 Mark Circle**
Country ID/Postcode/Place	**Gardnerville, Nevada 89410**
Telephone number:	**1-775-782-0100**
e-mail:	**mailbox@aervoe.com**
National contact:	**Aervoe industries Incorporated**
For Product Information:	**1-800-227-0196**
Emergency telephone number:	**1-800-424-9300 (CHEMTREC – 24 hrs)**

2. Hazards identification

Classifications

Physical Hazards:
Aerosol - Category 1
Flam. Gas. 1
Liquefied Gas
Flam. Liq. 2
Flam. Liq. 3 * 210 Silver

Health Hazards:
Car 1B
Muta 1B
Asp Tox. 1
Eye Irrit. - 2
Rep. 2

Skin Irr. 2
STOT SE3
STOT RE 2
Acute Tox. 4 * 280 Concrete Grey

Environmental Hazards: Aquatic Chronic 2

Labeling

Signal Word: Danger

Hazard Statements:
H220 – Extremely flammable gas
H222 – Extremely flammable aerosol
H225 – Highly flammable liquid and vapour.
H226 – Flammable liquid and vapour.
H229 - Pressurized container: may burst if heated
H304 – May be fatal if swallowed and enters airways.
H312 – Harmful in contact with skin. *280 Concrete Gray
H315 – Causes skin irritation.
H319 – Causes serious eye irritation.
H332 – Harmful if inhaled. * 280 Concrete Gray
H336 – May cause drowsiness or dizziness.
H340 – May cause genetic defects
H350 – May cause cancer
H361 – Suspected of damaging fertility or the unborn child .
H373 – May cause damage to nervous system through prolonged or repeated exposure(Inhalation)
H411 – Toxic to aquatic life with long lasting effects.

Precautionary Statements:
P101 - If medical advice is needed, have product container or label at hand
P102 - Keep out of reach of children
P103 - Read label before use
P210 - Keep away from heat/sparks/open flames/hot surfaces - no smoking
P211 - Do not spray on an open flame or other ignition source
P251 - Pressurized container: Do not pierce or burn, even after use
P261 - Avoid breathing dust/fume/gas/mist/vapours/spray
P262 - Do not get in eyes, on skin, or on clothing
P264 - Wash … thoroughly after handling
P280 - Wear protective gloves/eye protection/face protection

P303+P361+P353 - If on skin or hair, remove/takeoff immediately all contaminated clothing. Rinse skin with water/shower.
P410+P412 - Protect from sunlight. Do not expose to temperatures exceeding 50ºC/122ºF
P501 - Dispose of contents/container in accordance with local/regional/national/international regulation

Symbols/Pictograms:

3. Composition / Information on Ingredients

Composition

Chemical	Synonyms	CAS Number	EINECS Number	Weight Percent	Hazard Category	H-Code
Hydrocarbon Propellant	LPG	68476-86-8	270-705-8	10-30%	Flam. Gas 1 Liquefied Gas	H220 H229 H222
Hexane	n-Hexane	110-54-3	203-777-6	5-10%	Flam. Liq. 2 Repr. 2 Asp. Tox. 1 STOT RE 2 * Skin Irrit. 2 STOT SE 3 Aquatic Chronic 2	H225 H361f * H304 H373 ** (nervous system) (inhalation) H315 H336 H411
Aliphatic Petroleum Distillates	Solvent Naphtha	64742-89-8	265-192-2	5-10%	Flam Liq. 2 Skin Irr. 2 Asp. Tox. 1 STOT SE 3 Aquatic Tox. 2	H224 H304 H315 H336 H411
Aliphatic Petroleum Distillates	Solvent Naphtha	64742-88-7	265-191-7	1-5%	Asp. Tox. 1	H304
Non-fluorescent colors also contain:						
Acetone	Propanone	67-64-1	200-662-2	1-5%	Flam. Liq. 2 Eye Irrit. 2 STOT SE 3	H225 H319 H336
Aliphatic Petroleum Distillates	Solvent Naphtha	8052-41-3	232-489-3	1-5%	Carc. 1B Muta. 1B Asp. Tox. 1 STOT RE 1	H304 H340 H350 H372 (Nervous)
210 silver contains:						
Hydrocarbon Propellant	LPG	68476-86-8	270-705-8	10-30%	Flam. Gas 1 Liquefied Gas	H220 H229 H222
Acetone	Propanone	67-64-1	200-662-2	30-60%	Flam. Liq. 2 Eye Irrit. 2 STOT SE 3	H225 H319 H336
Aliphatic Petroleum Distillates	Solvent Naphtha	8052-41-3	232-489-3	1-5%	Carc. 1B Muta. 1B Asp. Tox. 1 STOT RE 1	H304 H340 H350 H372 (Nervous)
n-Butyl Acetate	n-Butyl Ester	123-86-4	204-658-1	1-5%	Flam. Liq. 3 STOT SE 3	H226 H336

Aliphatic Petroleum Distillates	Solvent Naphtha	64742-89-8	265-192-2	10-30%	Flam Liq. 2 Skin Irr. 2 Asp. Tox. 1 STOT SE 3 Aquatic Tox. 2	H224 H304 H315 H336 H411
Aliphatic Petroleum Distillates	Solvent Naphtha	64742-88-7	265-191-7	7-13%	Asp. Tox. 1	H304
280 Concrete Gray contains:						
Hydrocarbon Propellant	LPG	68476-86-8	270-705-8	10-30%	Flam. Gas 1 Liquefied Gas	H220 H229 H222
Hexane	n-Hexane	110-54-3	203-777-6	5-10%	Flam. Liq. 2 Repr. 2 Asp. Tox. 1 STOT RE 2 * Skin Irrit. 2 STOT SE 3 Aquatic Chronic 2	H225 H361f * H304 H373 ** (nervous system) (inhalation) H315 H336 H411
Aliphatic Petroleum Distillates	Solvent Naphtha	64742-89-8	265-192-2	5-10%	Flam Liq. 2 Skin Irr. 2 Asp. Tox. 1 STOT SE 3 Aquatic Tox. 2	H224 H304 H315 H336 H411
Acetone	Propanone	67-64-1	200-662-2	1-5%	Flam. Liq. 2 Eye Irrit. 2 STOT SE 3	H225 H319 H336
n-Butyl Acetate	n-Butyl Ester	123-86-4	204-658-1	1-5%	Flam. Liq. 3 STOT SE 3	H226 H336
Ethyl Acetate	Ethanoate	141-78-6	205-500-4	1-5%	Flam. Liq. 2 Eye Irrit. 2 STOT SE 3	H225 H319 H336
2-Butoxyethyl Acetate	Butyl Glycol Acetate	112-07-2	203-933-3	1-5%	Acute Tox. 4 * Acute Tox. 4 *	H332 H312
2-(2-butoxyethoxy)ethanol; diethylene glycol monobutyl ether	0	112-34-5	203-961-6	1-5%	Eye Irrit. 2	H319

Other Product Information

Chemical Identity: Mixture

4.) First Aid Measures

General Advice: If symptoms persist, always call a doctor.

Inhalation First Aid: Remove victim to fresh air and provide oxygen if breathing is difficult. If not breathing, give artificial respiration, preferably mouth to mouth. Get medical attention immediately.

Skin Contact First Aid: Wash with soap and water. Remove contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse.

Eye Contact First Aid: If contact with eyes, immediately flush eyes with plenty of water for at least 15 minutes, while holding eyelids open. Get medical attention immediately.

Ingestion First Aid: If swallowed, wash out mouth with water provided the person is conscious. Do not induce vomiting. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Most Important Symptoms/Effects: Exposure may cause slight irritation to the skin, eyes, and respiratory tract. Excessive exposure may cause central nervous system effects.

5. Fire Fighting Measures

Flammable Properties:	Aerosol
Auto Ignition Temperature:	Not Available
Suitable extinguishing media:	Carbon dioxide, dry chemical, water spray.
Unsuitable extinguishing media:	None known
Special hazards arising from the substance or mixture:	None known
Hazardous combustion products:	Carbon dioxide, Carbon monoxide
Fire & Explosion Hazards:	Closed Containers may rupture due to the buildup of pressure from extreme temperatures.
Precautions for fire-fighters:	Use water spray to cool containers exposed to heat or fire to prevent pressure build up. In the event of a fire, wear full protective clothing and NIOSH- approved self-contained breathing apparatus with full face piece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

PERSONAL PRECAUTIONARY MEASURES:

1) Follow personal protective equipment recommendations found in section 8.
2) Maintain adequate ventilation.

SPILL CLEAN-UP PROCEDURES:

1.) Evacuate unprotected personnel from the area.
2.) Remove sources of ignition if safe to do so.
3.) Pickup spilled materials using non-sparking tools and place in an appropriate container for disposal.
4.) Contain spill to prevent material from entering sewage or ground water systems.
5.) Always dispose of waste materials in accordance with all EU, National and Local Regulations.

7. Handling and Storage

Handling:

Flammable Aerosol, use in a well ventilated area.
Do not use near sources of ignition.

Do not to eat, drink and smoke while working with this material.
Wash hands after use.

Conditions for safe storage, including any incompatibilities:

Store out of direct sunlight.
Storage Temperature: 32° to 120°F (0° to 49°C).
No known incompatibilities.

8. Exposure Controls / Personal Protection

Appropriate engineering controls:
Ensure adequate ventilation. A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits.
Keep away from sources of ignition.
Take precautionary measures against static discharge.

Personal Protection:
Eye & face protection devices such as safety glasses, safety goggles or face shield are recommended.

Skin protection
Wear the appropriate protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Respiratory protection:
Use only in an adequately ventilated area. For unknown vapor concentrations use a positive-pressure, pressure-demand, self-contained breathing apparatus (SCBA).

Hazardous Ingredient	CAS Number	ACGIH TLV (TWA)	ACGIH TLV (STEL)	OSHA PEL (TWA)	OSHA PEL (STEL)
Aliphatic Petroleum Distillates	64742-88-7	N/A	N/A	N/A	N/A
Aliphatic Petroleum Distillates	64742-89-8	N/A	N/A	N/A	N/A
Hydrocarbon Propellant	68476-86-8	N/A	N/A	N/A	N/A
Hexane	110-54-3	50PPM	N/A	500PPM	N/A
Acetone	67-64-1	250PPM	500PPM	1000PPM	N/A
Aliphatic Hydrocarbon	8052-41-3	100PPM	N/A	500PPM	N/A
n-Butyl Acetate	123-86-4	50PPM	150PPM	150 ppm	N/A
Aliphatic Petroleum Distillates	64742-47-8	N/A	N/A	N/A	N/A
Ethyl Acetate	141-78-6	400PPM	N/A	400PPM	N/A
2-Butoxyethyl Acetate	112-07-2	20PPM	N/A	N/A	N/A
diethylene glycol monobutyl ether	112-34-5	10PPM (IFV)	N/A	N/A	N/A

***Values are based on the 2019 Guide to Occupational Exposure Values by ACGIH**

9. Information on Basic Physical and Chemical Properties

Appearance: Color varies by product.	Odor: Hydrocarbon Odor
Odor Threshold: N/AV	pH: Not Applicable (solvent Base)
Melting Point: N/AV	Freezing Point: N/AV

Initial Boiling Point: N/AV	Boiling Point Range: N/AV
Flash Point: <0° F (-18° C)	Evaporation Rate: Faster than n-Butyl Acetate
Flammability Solid/Gas: Flammable gas	Upper LEL: 1% Lower LEL: 13%
Vapor Pressure: N/AV	Vapor Density: Heavier Than Air
Relative Density: N/AV	Solubility: Negligible
Partition Coefficient: n-octanol/ water: N/AV	Auto-ignition Temperature: N/AV
Decomposition Temperature: N/AV	Viscosity: N/AV
Explosive Properties: N/AV	Oxidizing Properties: N/AV

10. Stability & Reactivity

Possibility of hazardous reactions: Hazardous polymerization will not occur under normal conditions
Chemical stability: Stable under normal conditions
Conditions to avoid: Heat and ignition sources
Incompatible materials: Strong Oxidizing Agents
Hazardous decomposition products: Will not occur

11. Toxicological Information

Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage. Repeated overexposure can also damage kidneys, lungs, liver, heart and blood

Routes of exposure: Eyes, skin, ingestion, and/or inhalation

Acute toxicological data:	(Acetone) Acute oral LD50: 5800mg/kg(rat) (Acetone) LC50: 21000 ppm / 8 hr (rat) (Hexane) LD50: 2870 mg/kg (Rat-Oral) (2-Butoxyethyl Acetate)CD50: 2400mg/kg (Rat-Oral)
Eye irritation data:	Eye Irrit. 2
Skin irritation/sensitization/absorption data:	Skin Irrit. 2
Reproductive toxicity data:	Reproductive 2 (Fertility)
Mutagenicity data:	Muta 1B
Symptoms associated with physical contact:	N/AV
Acute/chronic effects from short/long term exposure:	STOT SE 3 (Nervous system, Inhalation) STOT RE 1/2 (Nervous system, Inhalation) Irritating to skin. Prolonged/repeated contact may cause defatting of the skin which can lead to dermatitis. Not expected to be a skin sensitizer.

Known reportable carcinogens via the following agencies:

NTP:	N/AV
IARC:	IARC3:Classification not possible from current data
OSHA:	TLV-A4

12. Ecological Information

Ecotoxicity: **No Data Available**
Persistence and degradability: **No Data Available**
Bioaccumulative potential: **No Data Available**
Mobility in soil: **No Data Available**
Results of PBT and vPvB assessment: **No Data Available**
Other adverse effects: **No Data Available**

13. Disposal Considerations

Waste Disposal: Dispose of material in accordance with EU, national and local requirements. For proper disposal of used material, an assessment must be completed to determine the proper and permissible waste management options permitted under applicable rules, regulations and/or laws governing your location.
Product / Packaging disposal: Dispose of packaging in accordance with federal, state and local requirements, regulations and/or laws governing your location.

14. Transportation Information

US DOT

UN Number	Proper Shipping Name	Hazard Class	Packing Group	Marine Pollutant	Special Provisions
UN1950	Aerosols	2.1	Not Applicable	Not Applicable	Reference 49 CFR 172.101

IMDG

UN Number	Proper Shipping Name	Hazard Class	Packing Group	Marine Pollutant	Special Provisions
UN1950	Aerosols	2.1	Not Applicable	Not Applicable	Reference IMDG code part 3

IATA:

UN Number	Proper Shipping Name	Hazard Class	Packing Group	Marine Pollutant	Special Provisions
UN1950	Aerosols, Flammable	2.1	Not Applicable	Not Applicable	Reference IATA Dangerous Goods Regulation

15. Regulatory Information

Workplace classification:
This product is considered hazardous under the OSHA Hazard Communication Standard (29 CFR 1910.1200). The Occupational Safety and Health Administration's interpretation of the product's hazard to workers.
SARA Title 3:
Section 311/312 Categorizations (40 CFR 372): This product is a hazardous chemical under 29 CFR 1910.1200, and is categorized as an immediate and delayed health, and flammability physical hazard. Superfund Amendment and Reauthorization Act (SARA) category. SARA requires reporting any spill of any hazardous substance.
TSCA status: All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.
WHMIS: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the (M)SDS contains all of the information required by the CPR.
PROP 65 (CA): WARNING: Cancer and Reproductive Harm – www.P65Warnings.ca.gov.

16. Other Information

This SDS has been completed in accordance with GHS Rev04 (2011): U.S OSHA, CMA, ANSI, Canadian WHMIS standards, and European Directives.

Date of Preparation/Revision: 7/1/21
Supersedes: (7/8/19)

To the best of our knowledge, the information contained herein is believed to be accurate. However, the above data does not imply any guarantee or warranty of any kind, expressed or implied. The final determination of the suitability of any material is the sole responsibility of the user. All materials made present un-known hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee these are the only hazards existing.

MATERIAL SAFETY DATA SHEET

Review Date: 04/17/2008

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT: **PENNZOIL™ Multi-Grade Motor Oil - All Grades**

MSDS NUMBER: 612978LU - 3
PRODUCT CODE(S): 2010, 2011, 2012, 3560, 3600, 3606, 3610, 3616, 3650, 3656, 5041969, 5041970, 5041971, 5044482, 5044491, 5047954, 5060206, 5065725, 5069624, 5070239, 5076150, 5076175, 59751, 62569, 62710

PRODUCT USE: Motor Oil

MANUFACTURER	**TELEPHONE NUMBERS**
SOPUS Products	**Spill Information:** (877) 242-7400
P.O. Box 4427	**Health Information:** (877) 504-9351
Houston, TX. 77210-4427	**MSDS Assistance Number:** (877) 276-7285

SECTION 2 PRODUCT/INGREDIENTS

INGREDIENTS	**CAS#**	**CONCENTRATION**
Multigrade Motor Oil		
Highly refined petroleum oils	Mixture	90 - 99 %weight
Proprietary additives (<1% zinc)	Mixture	1 - 3 %weight

SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
Appearance & Odor: Amber liquid. Petroleum oil odor.
Health Hazards: No known immediate health hazards.
Physical Hazards: No known physical hazards.
NFPA Rating (Health, Fire, Reactivity): 0, 1, 0
Hazard Rating: Least - 0 Slight - 1 Moderate - 2 High - 3 Extreme - 4

Route(s) of Exposure: Skin

Inhalation:
Inhalation of vapors (generated at high temperatures only) or oil mist may cause mild irritation of the nose, throat, and respiratory tract.

Eye Irritation:
Lubricating oils are generally considered no more than minimally irritating to the eyes.

Skin Contact:
Lubricating oils are generally considered no more than minimally irritating to the skin. Prolonged and repeated contact may result in defatting and drying of the skin that may cause various skin disorders such as dermatitis, folliculitis or oil acne.

Ingestion:
Lubricating oils are generally no more than slightly toxic if swallowed.

Other Health Effects:
The International Agency for Research on Cancer (IARC) has determined there is sufficient evidence for the carcinogenicity in experimental animals of used gasoline motor oils. Handling procedures and safety precautions in the MSDS should be followed to minimize exposure to the used product.

Signs and Symptoms:
Irritation as noted above.

Aggravated Medical Conditions:
Pre-existing eye, skin and respiratory disorders may be aggravated by exposure to this product.

For additional health information, refer to section 11.

SECTION 4 FIRST AID MEASURES

Inhalation:
Remove victim to fresh air and provide oxygen if breathing is difficult. Get medical attention.

Skin:
Remove contaminated clothing and shoes and wipe excess from skin. Flush skin with water, then wash with soap and water. If irritation occurs, get medical attention. Do not reuse clothing until cleaned.

Eye:
Flush with water. If irritation occurs, get medical attention.

Ingestion:
Do not induce vomiting. In general, no treatment is necessary unless large quantities of product are ingested. However, get medical attention.

Note to Physician:
In general, emesis induction is unnecessary in high viscosity, low volatility products such as oils and greases.

SECTION 5 FIRE FIGHTING MEASURES

Flash Point [Method]: >430 ºF/>221.11 ºC [Cleveland Open Cup]
Upper Flammability Limit: Not Determined
Lower Flammability Limit: Not Determined

Extinguishing Media:
This material is non-flammable. Material will float and can be re-ignited on surface of water. Use water fog, 'alcohol foam', dry chemical or carbon dioxide (CO_2) to extinguish flames. Do not use a direct stream of water.

Fire Fighting Instructions:
Do not enter confined fire space without full bunker gear (helmet with face shield, bunker coats, gloves and rubber boots), including a positive pressure, NIOSH approved, self-contained breathing apparatus.

Unusual Fire Hazards:
Material may ignite when preheated.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures:
May burn although not readily ignitable.

Wear appropriate personal protective equipment when cleaning up spills. Refer to Section 8.

Spill Management:
FOR LARGE SPILLS: Remove with vacuum truck or pump to storage/salvage vessels.

FOR SMALL SPILLS: Soak up residue with an absorbent such as clay, sand or other suitable material. Place in non-leaking container and seal tightly for proper disposal.

Reporting:
CERCLA: Product is covered by EPA's Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) petroleum exclusion. Releases to air, land, or water are not reportable under CERCLA (Superfund).

CWA: This product is an oil as defined under Section 311 of EPA's Clean Water Act (CWA). Spills into or leading to surface waters that cause a sheen must be reported to the National Response Center, 1-800-424-8802.

SECTION 7 HANDLING AND STORAGE

Precautionary Measures:
Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet. Launder contaminated clothing before reuse. Properly dispose of contaminated leather articles such as shoes or belts that cannot be decontaminated. Avoid heat, open flames, including pilot lights, and strong oxidizing agents. Use explosion-proof ventilation to prevent vapor accumulation. Ground all handling equipment to prevent sparking.

Storage:
Do not store in open or unlabeled containers. Store in a cool, dry place with adequate ventilation. Keep away from open flames and high temperatures.

Container Warnings:
Keep containers closed when not in use. Containers, even those that have been emptied, can contain explosive vapors. Do not cut, drill, grind, weld or perform similar operations on or near containers.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Chemical	Limit	TWA	STEL	Ceiling	Notation
Oil mist, mineral	ACGIH TLV	5 mg/m3	10 mg/m3		
Oil mist, mineral	OSHA PEL	5 mg/m3			

Exposure Controls

Provide adequate ventilation to control airborne concentrations below the exposure guidelines/limits.

Personal Protection

Personal protective equipment (PPE) selections vary based on potential exposure conditions such as handling practices, concentration and ventilation. Information on the selection of eye, skin and respiratory protection for use with this material is provided below.

Eye Protection:
Chemical Goggles, or Safety glasses with side shields

Skin Protection:
Use protective clothing which is chemically resistant to this material. Selection of protective clothing depends on potential exposure conditions and may include gloves, boots, suits and other items. The selection(s) should take

into account such factors as job task, type of exposure and durability requirements.

Published literature, test data and/or glove and clothing manufacturers indicate the best protection is provided by:
Neoprene, or Nitrile Rubber

Respiratory Protection:
If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, an approved respirator must be worn. Respirator selection, use and maintenance should be in accordance with the requirements of the OSHA Respiratory Protection Standard, 29 CFR 1910.134.

Types of respirator(s) to be considered in the selection process include:
For Mist: Air Purifying, R or P style NIOSH approved respirator.
For Vapors: Air Purifying, R or P style prefilter & organic cartridge, NIOSH approved respirator. Self-contained breathing apparatus for use in environments with unknown concentrations or emergency situations.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance & Odor: Amber liquid. Petroleum oil odor.
Substance Chemical Family: Lubricants
Physical State: Liquid

Flash Point	> 430 ºF [Cleveland Open Cup]	**Odor**	Petroleum oil odor.
Specific Gravity	0.874	**Viscosity**	70 cSt - 90 cSt @ 40 ºC

Odor Threshold: Not Determined
Partition Coefficient: Not Determined
pH: Not Determined

SECTION 10 REACTIVITY AND STABILITY

Stability:
Material is stable under normal conditions.

Conditions to Avoid:
Avoid heat and open flames.

Materials to Avoid:
Avoid contact with strong oxidizing agents.

Hazardous Decomposition Products:

Thermal decomposition products are highly dependent on combustion conditions. A complex mixture of airborne solids, liquids and gases will evolve when this material undergoes pyrolysis or combustion. Carbon Monoxide, Carbon Dioxide and other unidentified organic compounds may be formed upon combustion.

SECTION 11 TOXICOLOGICAL INFORMATION

Acute Toxicity

TEST	Result	OSHA Classification	Material Tested
Dermal LD50	>5.0 g/kg(Rabbit)	Non-Toxic	Based on components(s)

Oral LD50	>5.0 g/kg(Rat)	Non-Toxic	Based on components(s)

Carcinogenicity Classification

Chemical Name	NTP	IARC	ACGIH	OSHA
Multigrade Motor Oil	Not Reviewed	Not Reviewed	No	No

SECTION 12 ECOLOGICAL INFORMATION

Environmental Impact Summary:
There is no ecological data available for this product. However, this product is an oil. It is persistent and does not readily biodegrade. However, it does not bioaccumulate.

SECTION 13 DISPOSAL CONSIDERATIONS

RCRA Information:

Under RCRA, it is the responsibility of the user of the material to determine, at the time of the disposal, whether the material meets RCRA criteria for hazardous waste. This is because material uses, transformations, mixtures, processes, etc. may affect the classification. Refer to the latest EPA, state and local regulations regarding proper disposal.

SECTION 14 TRANSPORT INFORMATION

US Department of Transportation Classification
This material is not subject to DOT regulations under 49 CFR Parts 171-180.

Oil: This product is an oil under 49CFR (DOT) Part 130. If shipped by rail or highway in a tank with a capacity of 3500 gallons or more, it is subject to these requirements. Mixtures or solutions containing 10% or more of this product may also be subject to this rule.

International Air Transport Association
Not regulated under IATA rules.

International Maritime Organization Classification
Not regulated under International Maritime Organization rules.

SECTION 15 REGULATORY INFORMATION

Federal Regulatory Status

OSHA Classification:
Under normal conditions of use or in a foreseeable emergency, this product does not meet the definition of a hazardous chemical when evaluated according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

WHMIS Classification: Not a controlled substance.

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

Ozone Depleting Substances (40 CFR 82 Clean Air Act):

This material does not contain nor was it directly manufactured with any Class I or Class II ozone depleting substances.

Superfund Amendment & Reauthorization Act (SARA) Title III:
There are no components in this product on the SARA 302 list.

SARA Hazard Categories (311/312):

Immediate Health	Delayed Health	Fire	Pressure	Reactivity
NO	NO	NO	NO	NO

SARA Toxic Release Inventory (TRI) (313):
There are no components in this product on the SARA 313 list.

Toxic Substances Control Act (TSCA) Status:
All component(s) of this material is(are) listed on the EPA/TSCA Inventory of Chemical Substances.

Other Chemical Inventories:
Component(s) of this material is (are) listed on the Australian AICS, Canadian DSL, Chinese Inventory, European EINECS, Korean Inventory, Philippines PICCS,

State Regulation

This material is not regulated by California Prop 65, New Jersey Right-to-Know Chemical List or Pennsylvania Right-To-Know Chemical List. However for details on your regulation requirements you should contact the appropriate agency in your state.

SECTION 16 OTHER INFORMATION

Revision#: 3
Revision Date: 04/17/2008
Review Date: 04/17/2008
Revisions since last change (discussion): This Material Safety Data Sheet (MSDS) has been reviewed to fully comply with the guidance contained in the ANSI MSDS standard (ANSI Z400.1-2003). We encourage you to take the opportunity to read the MSDS and review the information contained therein.

SECTION 17 LABEL INFORMATION

READ AND UNDERSTAND MATERIAL SAFETY DATA SHEET BEFORE HANDLING OR DISPOSING OF PRODUCT. THIS LABEL COMPLIES WITH THE REQUIREMENTS OF THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200) FOR USE IN THE WORKPLACE. THIS LABEL IS NOT INTENDED TO BE USED WITH PACKAGING INTENDED FOR SALE TO CONSUMERS AND MAY NOT CONFORM WITH THE REQUIREMENTS OF THE CONSUMER PRODUCT SAFETY ACT OR OTHER RELATED REGULATORY REQUIREMENTS.

PRODUCT CODE(S): 2010, 2011, 2012, 3560, 3600, 3606, 3610, 3616, 3650, 3656, 5041969, 5041970, 5041971, 5044482, 5044491, 5047954, 5060206, 5065725, 5069624, 5070239, 5076150, 5076175, 59751, 62569, 62710

PENNZOIL™ Multi-Grade Motor Oil - All Grades

ATTENTION!

PROLONGED OR REPEATED SKIN CONTACT MAY CAUSE OIL ACNE OR DERMATITIS. USED GASOLINE ENGINE OIL HAS BEEN SHOWN TO CAUSE CANCER IN LABORATORY ANIMALS.

Precautionary Measures:
Avoid prolonged or repeated contact with eyes, skin and clothing. Wash thoroughly after handling.

FIRST AID

Inhalation: Remove victim to fresh air and provide oxygen if breathing is difficult. Get medical attention.
Skin Contact: Remove contaminated clothing and shoes and wipe excess from skin. Flush skin with water, then wash with soap and water. If irritation occurs, get medical attention. Do not reuse clothing until cleaned.
Eye Contact: Flush with water. If irritation occurs, get medical attention.
Ingestion: Do not induce vomiting. In general, no treatment is necessary unless large quantities of product are ingested. However, get medical attention.

FIRE

In case of fire, Use water fog, 'alcohol foam', dry chemical or carbon dioxide (CO_2) to extinguish flames. Do not use a direct stream of water. Material will float and can be re-ignited on surface of water.

SPILL OR LEAK

Dike and contain spill.
FOR LARGE SPILLS: Remove with vacuum truck or pump to storage/salvage vessels.

FOR SMALL SPILLS: Soak up residue with an absorbent such as clay, sand or other suitable material. Place in non-leaking container and seal tightly for proper disposal.

CONTAINS: Highly refined petroleum oils, Mixture; Proprietary additives (<1% zinc), Mixture

NFPA Rating (Health, Fire, Reactivity): 0, 1, 0

TRANSPORTATION

US Department of Transportation Classification
This material is not subject to DOT regulations under 49 CFR Parts 171-180.

Oil: This product is an oil under 49CFR (DOT) Part 130. If shipped by rail or highway in a tank with a capacity of 3500 gallons or more, it is subject to these requirements. Mixtures or solutions containing 10% or more of this product may also be subject to this rule.

CAUTION: Misuse of empty containers can be hazardous. Empty containers can be hazardous if used to store toxic, flammable, or reactive materials. Cutting or welding of empty containers might cause fire, explosion or toxic fumes from residues. Do not pressurize or expose to open flames or heat. Keep container closed and drum bungs in place.

Name and Address
SOPUS Products
P.O. Box 4427
Houston, TX 77210-4427

ADMINISTRATIVE INFORMATION	
MANUFACTURER ADDRESS:	SOPUS Products, P.O. Box 4427, Houston, TX. 77210-4427

THE INFORMATION CONTAINED IN THIS DATA SHEET IS BASED ON THE DATA AVAILABLE TO US AT THIS TIME, AND IS BELIEVED TO BE ACCURATE BASED UPON THAT : IT IS PROVIDED INDEPENDENTLY OF ANY SALE OF THE PRODUCT, FOR PURPOSE OF HAZARD COMMUNICATION. IT IS NOT INTENDED TO CONSTITUTE PRODUCT PERFORMANCE INFORMATION, AND NO EXPRESS OR IMPLIED WARRANTY

OF ANY KIND IS MADE WITH RESPECT TO THE PRODUCT, UNDERLYING DATA OR THE INFORMATION CONTAINED HEREIN. YOU ARE URGED TO OBTAIN DATA SHEETS FOR ALL PRODUCTS YOU BUY, PROCESS, USE OR DISTRIBUTE, AND ARE ENCOURAGED TO ADVISE THOSE WHO MAY COME IN CONTACT WITH SUCH PRODUCTS OF THE INFORMATION CONTAINED HEREIN.

TO DETERMINE THE APPLICABILITY OR EFFECT OF ANY LAW OR REGULATION WITH RESPECT TO THE PRODUCT, YOU SHOULD CONSULT WITH YOUR LEGAL ADVISOR OR THE APPROPRIATE GOVERNMENT AGENCY. WE WILL NOT PROVIDE ADVICE ON SUCH MATTERS, OR BE RESPONSIBLE FOR ANY INJURY FROM THE USE OF THE PRODUCT DESCRIBED HEREIN. THE UNDERLYING DATA, AND THE INFORMATION PROVIDED HEREIN AS A RESULT OF THAT DATA, IS THE PROPERTY OF SOPUS PRODUCTS AND IS NOT TO BE THE SUBJECT OF SALE OR EXCHANGE WITHOUT THE EXPRESS WRITTEN CONSENT OF SOPUS PRODUCTS.

44419-11418-100R-04/17/2008

Safety Data Sheet

1 - Identification

Trade Name: WD-40 MULTI-USE PRODUCT AEROSOL **Product Use: Lubricant, Penetrant, Drives Out Moisture, Removes and Protects Surfaces from Corrosion** **Restrictions on Use: None identified** **SDS Date of Preparation: August 3, 2021**	**Manufacturer: WD-40 Company** **Address: 9715 Businesspark Avenue** **San Diego, California, USA** **92131** **Telephone:** **Emergency: 1-888-324-7596** **Information: 1-888-324-7596** **Chemical Spills: 1-800-424-9300 (Chemtrec)** **1-703-527-3887 (International Calls)**

2 – Hazards Identification

GHS Classification:
Flammable Aerosol Category 1
Aspiration Toxicity Category 1
Specific Target Organ Toxicity Single Exposure Category 3 (nervous system effects)

This product is a consumer product and is labeled in accordance with local regulations for consumer chemicals. The actual container label may not include the label elements below. The labeling below applies to industrial/professional products.

Label Elements:

DANGER!
H222 Extremely Flammable Aerosol.
H229 Pressurized container: may burst if heated.
H304 May be fatal if swallowed and enters airways.
H336 May cause drowsiness or dizziness.
Prevention
P210 Keep away from heat, hot surfaces, sparks, open flames, and other ignition sources. No smoking.
P211 Do not spray on an open flame or other ignition source.
P251 Do not pierce or burn, even after use.
P261 Avoid breathing vapors or mists.
P271 Use only outdoors or in a well-ventilated area.
Response
P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or physician.
P331 Do NOT induce vomiting.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P312 Call a POISON CENTER or physician if you feel unwell.
Storage
P405 Store locked up.
P410+P412+P403 Protect from sunlight. Do not expose to temperatures exceeding 50°C/122°F. Store in a well-ventilated place.
Disposal
P501 Dispose of contents and container in accordance with local and national regulations.

3 - Composition/Information on Ingredients

Ingredient	CAS #	Weight Percent	GHS Classification
Aliphatic Hydrocarbon	64742-47-8	50-70%	Flammable Liquid Category 3 Aspiration Toxicity Category 1 Specific Target Organ Toxicity Single Exposure Category 3 (nervous system effects)
Petroleum Base Oil	Mixture	<25%	Not Hazardous
Carbon Dioxide	124-38-9	2-3%	Simple Asphyxiant Gas Under Pressure, Compressed Gas

Note: The exact percentages are a trade secret.

4 – First Aid Measures

Ingestion (Swallowed): Aspiration Hazard. DO NOT induce vomiting. Call physician or poison control center immediately.
Eye Contact: Flush thoroughly with water. Remove contact lenses if present after the first 5 minutes and continue flushing for several more minutes. Get medical attention if irritation persists.
Skin Contact: Wash with soap and water. If irritation develops and persists, get medical attention.
Inhalation (Breathing): If irritation is experienced, move to fresh air. Get medical attention if irritation or other symptoms develop and persist.
Signs and Symptoms of Exposure: Harmful or fatal if swallowed. If swallowed, may be aspirated and cause lung damage. May cause eye and respiratory irritation. Skin contact may cause drying of the skin. Inhalation may cause coughing, headache, and dizziness.
Indication of Immediate Medical Attention/Special Treatment Needed: Immediate medical attention is needed for ingestion.

5 – Fire Fighting Measures

Suitable (and unsuitable) Extinguishing Media: Use water fog, dry chemical, carbon dioxide or foam. Do not use water jet or flooding amounts of water. Burning product will float on the surface and spread fire.
Specific Hazards Arising from the Chemical: Contents under pressure. Keep away from ignition sources and open flames. Exposure of containers to extreme heat and flames can cause them to rupture often with violent force. Vapors are heavier than air and may travel along surfaces to remote ignition sources and flash back. Combustion will produce oxides of carbon and hydrocarbons.
Special Protective Equipment and Precautions for Fire-Fighters: Firefighters should always wear positive pressure self-contained breathing apparatus and full protective clothing. Cool fire-exposed containers with water. Use shielding to protect against bursting containers.

6 – Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures: Wear appropriate protective clothing (see Section 8). Eliminate all sources of ignition and ventilate area.
Methods and Materials for Containment/Cleanup: Leaking cans should be placed in a plastic bag or open pail until the pressure has dissipated. Contain and collect liquid with an inert absorbent and place in a container for disposal. Clean spill area thoroughly. Report spills to authorities as required.

7 – Handling and Storage

Precautions for Safe Handling: Avoid contact with eyes. Avoid prolonged contact with skin. Avoid breathing vapors or aerosols. Intentional misuse by deliberately concentrating vapors and inhaling can be harmful or fatal. Use only with adequate ventilation. Keep away from heat, sparks, pilot lights, hot surfaces, and open flames. Unplug electrical tools, motors and appliances before spraying or bringing the can near any source of electricity. Electricity can burn a hole in the can and cause contents to burst into flames. To avoid serious burn injury, do not let the can touch battery terminals, electrical connections on motors or appliances or any other source of electricity. Wash thoroughly with soap and water after handling. Keep containers closed when not in use. Keep out of the reach of children. Do not puncture, crush or incinerate containers, even when empty.
Conditions for Safe Storage: Store in a cool, well-ventilated area, away from incompatible materials do not store above 120°F or in direct sunlight. U.F.C (NFPA 30B) Level 3 Aerosol. Store away from oxidizers.

8 – Exposure Controls/Personal Protection

Chemical	Occupational Exposure Limits
Aliphatic Hydrocarbon	1200 mg/m3 TWA (manufacturer recommended)
Petroleum Base Oil (as mineral oil)	5 mg/m3 TWA, 10 mg/m3 STEL Mexico OEL 5 mg/m3 TWA (inhalable) ACGIH TLV
Carbon Dioxide	5000 ppm TWA, 15000 ppm STEL Mexico OEL 5000 ppm TWA, 30000 ppm STEL ACGIH TLV

The Following Controls are Recommended for Normal Consumer Use of this Product
Appropriate Engineering Controls: Use in a well-ventilated area.
Personal Protection:
Eye Protection: Avoid eye contact. Always spray away from your face.
Skin Protection: Avoid prolonged skin contact. Chemical resistant gloves recommended for operations where skin contact is likely.
Respiratory Protection: None needed for normal use with adequate ventilation.

For Bulk Processing or Workplace Use the Following Controls are Recommended
Appropriate Engineering Controls: Use adequate general and local exhaust ventilation to maintain exposure levels below that occupational exposure limits.
Personal Protection:
Eye Protection: Safety goggles recommended where eye contact is possible.
Skin Protection: Wear chemical resistant gloves.
Respiratory Protection: None required if ventilation is adequate. If the occupational exposure limits are exceeded, wear a NIOSH approved respirator. Respirator selection and use should be based on contaminant type, form, and concentration. Follow local regulations and good Industrial Hygiene practice.
Work/Hygiene Practices: Wash with soap and water after handling.

9 – Physical and Chemical Properties

Appearance:	Light green to amber liquid	Flammable Limits: (Solvent Portion)	LEL: 0.6% UEL: 8%
Odor:	Mild petroleum odor	Vapor Pressure:	95-115 PSI @ 70°F (21.1°C)
Odor Threshold:	Not established	Vapor Density:	Greater than 1 (air=1)
pH:	Not Applicable	Relative Density:	0.8 – 0.82 @ 60°F (15.6°C)
Melting/Freezing Point:	Not established	Solubilities:	Insoluble in water
Boiling Point/Range:	361 - 369°F (183 - 187°C)	Partition Coefficient; n-octanol/water:	Not established
Flash Point:	122°F (49°C) Tag Closed Cup (concentrate)	Autoignition Temperature:	Not established
Evaporation Rate:	Not established	Decomposition Temperature:	Not established
Flammability (solid, gas):	Flammable Aerosol	Viscosity:	2.79-2.96 cSt @ 100°F (37.8°C)
VOC:	65%	Pour Point:	-63°C (-81.4°F) ASTM D-97

10 – Stability and Reactivity

Reactivity: Not reactive under normal conditions
Chemical Stability: Stable
Possibility of Hazardous Reactions: May react with strong oxidizers generating heat.
Conditions to Avoid: Avoid heat, sparks, flames, and other sources of ignition. Do not puncture or incinerate containers.
Incompatible Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide and carbon dioxide.

11 – Toxicological Information

Symptoms of Overexposure:
Inhalation: High concentrations may cause nasal and respiratory irritation and central nervous system effects such as headache, dizziness, and nausea. Intentional abuse may be harmful or fatal.
Skin Contact: Prolonged and/or repeated contact may produce mild irritation and defatting with possible dermatitis.
Eye Contact: Contact may be irritating to eyes. May cause redness and tearing.

Ingestion: Swallowing is an unlikely route of exposure for an aerosol product. This product has low oral toxicity. Swallowing may cause gastrointestinal irritation, nausea, vomiting and diarrhea. This product is an aspiration hazard. If swallowed, can enter the lungs, and may cause chemical pneumonitis, severe lung damage and death.
Chronic Effects: None expected.
Carcinogen Status: None of the components are listed as a carcinogen or suspect carcinogen by IARC, NTP, ACGIH or OSHA.
Reproductive Toxicity: None of the components is considered a reproductive hazard.

Numerical Measures of Toxicity:
The oral toxicity of this product is estimated to be greater than 5,000 mg/kg and the dermal toxicity greater than 2,000 mg/kg based on an assessment of the ingredients. This product is not classified as toxic by established criteria. It is an aspiration hazard.

12 – Ecological Information

Ecotoxicity: No specific aquatic toxicity data is currently available; however, components of this product are not expected to be harmful to aquatic organisms
Persistence and Degradability: Components are readily biodegradable.
Bioaccumulative Potential: Bioaccumulation is not expected based on an assessment of the ingredients.
Mobility in Soil: No data available
Other Adverse Effects: None known

13 - Disposal Considerations

Do not puncture or incinerate containers, even empty. Dispose in accordance with federal, state, and local regulations.

14 – Transportation Information

DOT Surface Shipping Description: UN1950, Aerosols, 2.1 Ltd. Qty
(Note: Shipping Papers are not required for Limited Quantities unless transported by air or vessel – each package must be marked with the Limited Quantity Mark)
IMDG Shipping Description: UN1950, Aerosols, 2.1, LTD QTY
ICAO Shipping Description: UN1950, Aerosols, flammable, 2.1

NOTE: WD-40 Company does not test aerosol cans to assure that they meet the pressure and other requirements for transport by air. We do not recommend that our aerosol products be transported by air.

15 – Regulatory Information

EPA Toxic Substances Control Act (TSCA) Status: All of the components of this product are listed on the TSCA inventory.

Canadian Environmental Protection Act: One of the components is listed on the NDSL. All of the other ingredients are listed on the Canadian Domestic Substances List or exempt from notification.

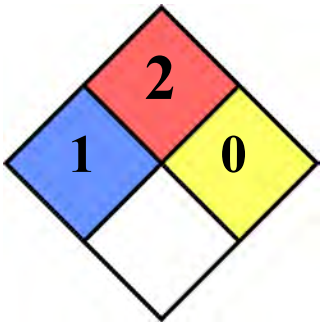
16 – Other Information

HMIS Hazard Rating:
Health – 1 (slight hazard), Fire Hazard – 4 (severe hazard), Physical Hazard – 0 (minimal hazard)

Revision Date: August 3, 2021 Supersedes: October 18, 2018

Revision Summary: Updated Section 2, 8, 9, and 15.

Prepared by: IHSC, LLC. Milford, CT, USA
Reviewed by: I. Kowalski Regulatory Affairs Department



4093100/No.0069809

SAFETY DATA SHEET

According to Regulation on Preparation of Safety Data Sheets for Hazardous Substances and Mixtures

(13.12.2014-29204 Turkish Official Gazette)

COMMON PORTLAND CEMENT

1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY

1.1.Identification of the Product

Product Name: ASTM C 91 MASONRY CEMENT TYPE M
ASTM C 150 TYPE I
ASTM C 1157 HYDRAULIC CEMENT TYPE GU
ASTM C 1157 HYDRAULIC CEMENT TYPE HE
ASTM C 150 TYPE I/II

EINECS: 266-043-4

CAS: 65997-15-1

1.2.Use of the Substance / Application Area

Cements are used in industrial installations to manufacture/formulate hydraulic binders for building and construction work, such as ready-mixed concrete, mortars, renders, grouts, plasters as well as precast concrete.

Common cements and cement containing mixtures (hydraulic binders) are used industrially, by professionals as well as by consumers in building and construction work, indoor and outdoor.

Any uses not mentioned above, are advised against.

1.3.Identification of the Company

Manufacturer's

Name: Göltaş Göller Bölgesi Çimento Sanayi Ve Ticaret A.Ş.

Address: Isparta - Afyon Karayolu Üzeri 15. Km 32320 ISPARTA

Telephone Number: 0246 237 14 51 **Fax:** -

E-mail: goltas@goltas.com.tr **Web:** https://www.goltas.com.tr/

1.4.Emergency Telephone Number

Company Information: 0246 237 14 51

Working Hours: 08:00-18:00 (Weekdays)

Call the emergency telephone number of your town and provide the information contained in this sheet. If not available, call the National Toxicology Centre.

2. HAZARDS IDENTIFICATION

2.1. Classification[1]

The product has been classified according to Regulation 11.12.2013-28848 CLP and Regulation (EC) No 1272/2008 of the European Parliament and of the Council.

Physico-chemical Hazard: Not relevant.

Health Hazard:

According to Regulation 11.12.2013-28848 CLP;

Skin Irritation 2; H315: Causes skin irritation.

Skin Sensitisation 1B; H317: May cause an allergic skin reaction.

Serious Eye Damage/Eye Irritation 1; H318: Causes serious eye damage.

STOT Single Exposure Respiratory Tract Irritation 3; H335: May cause respiratory irritation.

Environmental Hazard: Not relevant.

SAFETY DATA SHEET

According to Regulation on Preparation of Safety Data Sheets for Hazardous Substances and Mixtures

(13.12.2014-29204 Turkish Official Gazette)

COMMON PORTLAND CEMENT

2.2. Label Elements

Hazard Pictograms:

Signal Word: Danger

Hazard Statements:

H318 Causes serious eye damage.
H315 Causes skin irritation.
H317 May cause an allergic slin reaction.
H335 May cause respiratory irritation.

Precautionary Statements:

Measure

P102 Keep out of reach of children.
P264 Wash hands, forearms, exposed areas thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P272 Contaminated work clothing must not be allowed out of the workplace.
P271 Use only outdoors or in a well-ventilated area.

Response

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER or doctor/physician.
P302+P352 IF ON SKIN: Wash with plenty of soap and water.
P321 Specific treatment (see on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash it before reuse.
P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
P363 Wash contaminated clothing before reuse.
P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P312 Call a POISON CENTER or doctor/physician if you feel unwell.

Storage

P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.

Disposal

P501 Dispose of waste material in accordance with all local, regional, state, national, provincial, territorial and international regulations.

Additional Information

Skin contact with wet cement, fresh concrete or mortar may cause irritation, dermatitis or burns.
May cause damage to products made of aluminium or other non-noble metals.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

Not applicable as the product is a mixture, not a substance.

3.2. Mixtures

Portland cement is produced from portland cement clinker created by burning and sintering at high temperatures of raw material predominantly including calcium carbonate, aluminium oxide, silica, and iron oxide. Produced chemical substances form crystal structucture of the product. This crystalline structure included in Portland Cement is a combination of following chemical compounds. Ca_2SiO_4, Ca_3SiO_5, $CaAl_2O_4$, $Ca_2Al_2SiO_7$, $CaAl_4O_7$, $Ca_4Al_6SO_{16}$, $CaAl_{12}O_{19}$, $Ca_{12}Al_{14}Cl$, $Ca_3Al_2O_6$, $Ca_{12}Al_{14}F_2$, $Ca_{12}Al_{14}O$, $Ca_4Al_2Fe_2$, CaO, $Ca_6Al_4Fe_2$, $Ca_2Fe_2O_5$. Cement includes low amount of gypsum.

Composition	EC NO	CAS NO	Concentration Range % (weight)					
			ASTM C 91	ASTM C 150 TIP I	ASTM C 150 TIP I/II	ASTM C 1157 TIP GU	ASTM C 1157 TIP HE	ASTM C 91
Portland cement clinker, K	266-043-4	65997-15-1	56.6-68.0	89.0-97.1	89.0-97.1	75.5-85.4	89.6-97.1	56.6-68.0
Gypsum	-	7778-18-9	3.0-6.0	3.0-6.0	3.0-6.0	3.0-6.0	3.0-6.0	3.0-6.0
Limestone, L	215-279-6	1317-65-3	28.3-38.8	0-5.0	0-5.0	5.7-13.6	0-4.9	28.3-38.8
Puzolan, P	-	-	-	-	-	5.7-13.6	-	-

4. FIRST AID MEASURES

4.1. Description of First Aid Measures

General Notes

No personal protective equipment is needed for first aid responders. First aid workers should avoid contact with wet cement or wet cement containing mixtures.

Following Contact with Eyes

Do not rub eyes in order to avoid possible corneal damage by mechanical stress. Remove contact lenses if any. Incline head to injured eye, open the eyelids widely and flush eye(s) immediately by thoroughly rinsing with plenty of clean water for at least 20 minutes to remove all particles. Avoid flushing particles into uninjured eye. If possible, use isotonic water (0.9% NaCl). Contact a specialist of occupational medicine or an eye specialist.

Following Skin Contact

For dry cement, remove and rinse abundantly with water. For wet/damp cement, wash skin with plenty of water. Remove contaminated clothing, footwear, watches, etc. and clean thoroughly before re-using them. Seek medical treatment in all cases of irritation or burns.

Following Inhalation

Move the person to fresh air. Dust in throat and nasal passages should clear spontaneously. Contact a physician if irritation persists or later develops or if discomfort, coughing or other symptoms persist.

Following Ingestion

Do not induce vomiting. If the person is conscious, wash out mouth with water and give plenty of water to drink. Get immediate medical attention or contact the poison information centre.

4.2. Most Important Symptoms and Effects, Both Acute and Delayed

Eyes: Eye contact with cement (dry or wet) may cause serious and potentially irreversible injuries.

Skin: Cement may have an irritating effect on moist skin (due to sweat or humidity) after prolonged contact or may cause contact dermatitis after repeated contact.

Prolonged skin contact with wet cement or wet concrete may cause serious irritation, dermatitis or burns.[(2)]

Inhalation: Repeated inhalation of cement dust over a long period of time increases the risk of developing lung diseases.

Environment: Under normal use, cement is not hazardous to the environment.

4.3. Indication of Any Immediate Medical Attention and Special Treatment Needed

When contacting a physician, take this SDS with you.

5. FIRE-FIGHTING MEASURES

5.1. Extinguishing Media

Cements are not flammable.

5.2.Special Hazards Arising from the Product

Cements are non-combustible and non-explosive and will not facilitate or sustain the combustion of other materials.

5.3. Advice for Fire-Fighters

Cements poses no fire-related hazards. No need for special protective equipment for fire-fighters. In case of fire, common fire protective equipment should be used.

6. ACCIDENTAL RELEASE MEASURES

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

6.1.1. Personal Protective Precautions for Non-Emergency Personnel

Wear protective equipment as described under Section 8 and follow the advice for safe handling and use given under Section 7.

6.1.2. Personal Protective Precautions for Emergency Responders

Emergency procedures are not required. However, respiratory protection is needed in situations with high dust levels.

6.2. Environmental Precautions

Do not wash cement down sewage and drainage systems or into bodies of water (e.g. streams).

6.3. Methods and Material for Containment and Cleaning Up

For dry cement;

Collect the spilled material as mentioned below and use it.

Use dry cleanup methods such as vacuum clean-up or vacuum extraction (Industrial portable units equipped

with high efficiency air filters (EPA and HEPA filters, EN 1822-1:2009) which do not cause airborne dispersion. Never use compressed air.
Alternatively, wipeup the dust by mopping, wet brushing or by using water sprays or hoses and remove slurry. When wet cleaning or vacuum cleaning is not possible and only dry cleaning with brushes can be done, ensure that the workers wear the appropriate personal protective equipment and prevent dust from spreading.
Avoid inhalation of cement and contact with skin. Place spilled materials into a container. Solidify before disposal as described under Section 13.
For wet cement;
Clean up wet cement and place in a container. Allow material to dry and solidify before disposal as described under Section 13.

6.4. Reference to Other Sections

See sections 8 and 13 for more details.

7. HANDLING AND STORAGE

7.1 Precautions for Safe Handling

7.1.1. Protective Measures

Follow the recommendations as given under Section 8.
To clean up dry cement, see Subsection 6.3.

Measures to Prevent Fire

Not applicable.

Measures to Prevent Aerosol and Dust Generation

Do not sweep. Use dry cleanup methods such as vacuum clean-up or vacuum extraction, which do not cause airborne dispersion.

Measure to Protect the Environment

No particular measures.

7.1.2. Information on General Occupational Hygiene

Do not handle or store near food and beverages or smoking materials. In dusty environment, wear dust mask and protective goggles.

7.2. Conditions for Safe Storage, Including Any Incompatibilities

Bulk cement should be stored in silos that are waterproof, dry conditions, clean and protected from contamination.

Engulfment Hazard: Cement can build-up or adhere to the walls of a confined space. The cement can release, collapse or fall unexpectedly. To prevent engulfment or suffocation, do not enter a confined space, such as a silo, bin, bulk truck, or other storage container or vessel that stores or contains cement without taking the proper safety measures.

Packed products should be stored in unopened bags in cool, dry conditions and protected from excessive draught in order to avoid degradation of quality.
Bags should be stacked in a stable manner.
Do not use aluminium containers for the storage or transport of wet cement containing mixtures due to incompatibility of the materials.

7.3. Specific End Use(s)

No additional information for the specific end uses (see section 1.2).

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

8.1. Control Paramaters

8.1.1. Exposure Limits

According to national Dust Control Regulation;
Occupational exposure limits for dust

Name of Substance	Total Dust Amount TWA/ZAOD (mg/m^3)	Respirable Dust Amount TWA/ZAOD (mg/m^3)
Portland cement	**15**	**5**
Gypsum	**15**	**5**
Calcium carbonate (Limestone)	**15**	**5**

Exposure threshold limit values for rocks and minerals having speciality

Mineral	Limit Value (mg/m^3)
Portland cement	**80 mg/m^3 % SiO2+2**

8.1.2. Exposure Limits in Handling Chemical Materials

According to Regulation on Health and Safety Measures in Handling Chemical Materials, there is no exposure limit and exposure threshold limit value for water soluble Cr VI component included by cement.

8.2. Exposure Controls

8.2.1. Appropriate Engineering Controls

Measures to reduce generation of dust and to avoid dust propagating in the environment such as dedusting, exhaust ventilation and dry clean-up methods which do not cause airborne dispersion.

8.2.2 Personal Protective Precautions

Equipment and suitable protection methods that will be used in situations where personal protection needed are defined according to Personal Protective Equipment Regulation No.28695 dated 2.7.2013.

General Precautions

Do not eat, drink or smoke when working with cement to avoid contact with skin or mouth.
Before starting to work with cement, apply a barrier creme and reapply it at regular intervals.
Immediately after working with cement or cement-containing materials, workers should wash or shower or use skin moisturisers. Remove contaminated clothing, footwear, watches, etc. and clean thoroughly before re-using them.

Eye /Face Protection

Wear approved glasses or safety goggles according to EN 166 when handling dry or wet cement to prevent contact with eyes.

Skin Protection: Use watertight, wear- and alkali-resistant protective gloves (eg nitrile soaked cotton gloves with CE mark). Use boots, closed long-sleeved protective clothing as well as skin care products to protect the

not enter the boots. For the gloves, respect the maximum wearing time to avoid skin problems. In some circumstances, such as when laying concrete or screed, waterproof trousers or kneepads are necessary.

Respiratory Protection: When a person is potentially exposed to dust levels above exposure limits, use appropriate respiratory protection. The type of respiratory protection should be adapted to the dust level and conform to EN 149 standard.

Thermal Hazards: Not applicable.

8.2.3 Environmental Exposure Controls

Air: Environmental exposure control for the emission of cement particles into air has to be in accordance with the available technology and regulations for the emission of general dust particles.

Water: Do not wash cement into sewage systems or into bodies of water, to avoid high pH. Above pH 9 negative ecotoxicological impacts are possible.

Soil: No special emission control measures are necessary for the exposure to the soil.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Dry cement is finely ground powdered inorganic solid material with grey or white colour. Particle size: 5-30 µm.

Odour: Odourless.

Odour Threshold: no odour threshold, odourless.

pH: (T = 20°C in water, water-solid ratio 1:2): 11-13.5

Melting Point: > 1250 °C

Initial Boiling Point and Boiling Range: Not applicable as under normal atmospheric conditions, melting point >1250°C

Flash Point: Not applicable as is not a liquid.

Evaporation Rate: Not applicable as is not a liquid.

Flammability (Solid, Gas): Not applicable as is a solid which is non combustible and does not cause or contribute to fire through friction.

Upper/Lower Flammability or Explosive Limits: Not applicable as is not a flammable gas

Vapour Pressure: Not applicable as melting point > 1250 °C

Vapour Density: Not applicable as melting point > 1250 °C

Relative Density: 2.75-3.20; Apparent density -: 0.9-1.5 g/cm³

Solubility(ies) in Water (T = 20 °C): Slight (0.1-1.5 g/l)

Partition Coefficient: n-octanol/water: Not applicable as is inorganic substance.

Auto-Ignition Temperature: Not applicable.

Decomposition Temperature: Not applicable as no organic peroxide present.

Viscosity: Not applicable as not a liquid.

Explosive Properties: Not applicable. Not explosive or pyrotechnic. Not in itself capable of producing gas by chemical reaction at temperature and pressure and at a speed as to cause damage to the surroundings. Not capable of a self-sustaining exothermic chemical reaction.

10. STABILITY AND REACTIVITY

10.1. Reactivity

When mixed with water, cement will harden into a stable mass that is not reactive innormal environments.

10.2. Chemical Stability

Dry cement is stable as long as it is properly stored (see Section 7) and compatible with most other building materials. It should be kept dry.

Contact with incompatible materials should be avoided.

Wet cement is alkaline and incompatible with acids, with ammonium salts, with aluminium or other non-noble metals. Cement dissolves in hydrofluoric acid to produce corrosive silicon tetrafluoride gas. Cement reacts with water to form silicates and calcium hydroxide. Silicates in cement react with powerful oxidizers such as fluorine, boron trifluoride, chlorine trifluoride, managanese trifluoride, and oxygen difluoride.

10.3. Possibility of hazardous reactions

Cements do not cause hazardous reactions.

10.4. Conditions to avoid

Humid conditions during storage may cause lump formation and loss of product quality.

10.5. Incompatible materials

Acids, ammonium salts, aluminium or other non-noble metals. Uncontrolled use of aluminium powder in wet cement should be avoided as hydrogen is produced.

10.6. Hazardous decomposition products

Cements will not decompose into any hazardous products.

11. TOXICOLOGICAL INFORMATION

Cement in contact with wet skin may cause thickening, cracking or fissuring of the skin. Prolonged contact in combination with abrasion may cause severe burns. [3]

Direct contact with cement may cause corneal damage by mechanical stress, immediate or delayed irritation or inflammation. Direct contact with larger amounts of dry cement or splashes of wet cement may cause effects ranging from moderate eye irritation to chemical burns and blindness. [4,5]

Exposure to wet cement dust may develop eczema because of the irritation caused by high pH value after prolonged exposure or allergic effect of soluble Cr (VI) salts. [6,7,8]

Cement dust may irritate the throat and respiratory tract. Exposure to cement dust over occupational exposure limits may cause coughing and shortness of breath. [2]

Cement dust may aggravate existing respiratory system disease(s) such as emphysema or asthma and/or existing skin and eye conditions.

12. ECOLOGICAL INFORMATION

12.1. Toxicity

Cement is not hazardous for ecosystem. The addition of large amounts of cement to water may, however, cause a rise in pH and may, therefore, be toxic to aquatic life under certain circumstances.

12.2. Persistence and Degradability

Not relevant as cement is an inorganic material. As a result of hydration of cement, toxicity is not emerge.

12.3. Bioaccumulative Potential

12.4. Mobility in Soil

Not relevant as cement is an inorganic material. As a result of hydration of cement, toxicity is not emerge.

12.5. Results of PBT and vPvB Assessment

Not relevant as cement is an inorganic material. As a result of hydration of cement, toxicity is not emerge.

12.6. Other Adverse Effects

Not relevant.

13. DISPOSAL CONSIDERATIONS

Do not dispose of into sewage systems or surface waters.

Used packages are disposed according to the Regulation on Control of Packaging Waste.

Waste materials should be disposed according to “Regulation on the General Principles of Waste Management”.

Cement that has exceeded its shelf life:

Dispose of according to local legislation.

EWC entry: 10 13 99 (wastes not otherwise specified)

Unused residue or dry spillage:

Pick up dry unused residue or dry spillage as is. Mark the containers. Possibly reuse depending upon shelf life considerations and the requirement to avoid dust exposure. In case of disposal, harden with water and dispose according to “Product – after addition of water, hardened”

EWC entry: 10 13 06 (Other particulates and dust)

Slurries:

Allow to harden, avoid entry in sewage and drainage systems or into bodies of water (e.g. streams) and dispose of as explained below under “Product - after addition of water, hardened”.

After addition of water, hardened:

Dispose of according to the local legislation. Avoid entry into the sewage water system. Dispose of the hardened product as concrete waste. Due to the inertisation, concrete waste is not a dangerous waste.

EWC entries: 10 13 14 (waste concrete or concrete sludge)
17 01 01 (construction and demolition wastes - concrete).

Packaging:

Completely empty the packaging and process it according to local legislation.

EWC entries: 15 01 01 (waste paper and cardboard packaging).
15 01 02 (Plastic package-Big bag, Sling bag)

14. TRANSPORT INFORMATION

Cement is not classified as dangerous by Regulation on Carriage of Dangerous Goods by Road, Regulation on Carriage of Dangerous Goods by Seaway and the international regulations on the transport of dangerous goods (IMDG, IATA, ADR/RID).

14.1. UN Number: Not relevant.
14.2. UN Proper Shipping Name: Not relevant.
14.3. Transport Hazard Class(es): Not relevant.
14.4. Packing Group: Not relevant.
14.5. Environmental Hazards: Not relevant.
14.6. Special Precautions for User: Not relevant.
14.7. Transport in Bulk According to Annex II of MARPOL73/78 and the IBC Code: Not relevant.

15. REGULATORY INFORMATION

15.1. Safety, Health and Environmental Regulations/Legislation Specific for the Substance

National regulations used in the preparation of material safety data sheet and that can be related are given below.

Regulation on Classification, Packaging and Labelling of Dangerous Substances
Regulation Classification, Labelling and Packaging of Substances and Mixtures
Regulation on Carriage of Dangerous Goods by Road
Regulation on Carriage of Dangerous Goods by Seaway
Regulation on Control of Packaging Waste
Dust Control Regulation
Regulation on Health and Safety Measures in Handling Chemical Materials
Personal Protective Equipment Regulation

16. OTHER INFORMATION

Hazard Statements

Skin Irritation 2; H315: Causes skin irritation.
Skin Sensitisation 1B; H317: May cause an allergic skin reaction.
Serious Eye Damage/Eye Irritation 1; H318: Causes serious eye damage.
STOT Single Exposure Respiratory Tract Irritation 3; H335: May cause respiratory irritation.

Abbreviations

1272/2008/EC: Regulation of the European Parliament and of the Council on Classification, Labelling and Packaging of Substances and Mixtures
ADR/RID: European Agreement Concerning the International Carriage of Dangerous Goods by Road/Railway
CAS: Chemical Abstracts Service
CLP: Regulation on Classification, Labelling and Packaging of Substances and Mixtures.
EC: European Commission
EINECS: European Inventory of Existing Commercial Chemical Substances
EWC: European Waste Catalogue
IATA: International Air Transport Association
IBC Code: International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk
IMDG: International Maritime Code for Dangerous Goods
IUPAC: The International Union of Pure and Applied Chemistry
MARPOL 73/78: International Convention for the Prevention of Pollution from Ships
mg / m^3 : at 20^{0}C temperature and under 101,3 kPa (760 mm Hg) pressure miligram equivalent amount of substance in 1 m^3 of air.
PBT: Persistent, Bio-accumulative and Toxic
STOT: Specific Target Organ Toxicity
TWA/ZAOD: Time-weighed average
vPvB: Very Persistent, Very Bio-accumulative

Key Literature References and Sources of Data

SAFETY DATA SHEET

According to Regulation on Preparation of Safety Data Sheets for Hazardous Substances and Mixtures

(13.12.2014-29204 Turkish Official Gazette)

COMMON PORTLAND CEMENT

(1) ECHA European Chemicals Agency C&L Inventory Database, Available from: http://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/cl-inventory/view-notification-summary/6670

(2) *Portland Cement Dust - Hazard assessment document EH75/7,* UK Health and Safety Executive, 2006. Available from: http://www.hse.gov.uk/pubns/web/portlandcement.pdf.

(3) *Observations on the effects of skin irritation caused by cement*, Kietzman et al, Dermatosen, 47, 5, 184-189 (1999).

(4) TNO report V8815/09, Evaluation of eye irritation potential of cement clinker G in vitro using the isolated chicken eye test, April 2010.

(5) TNO report V8815/10, Evaluation of eye irritation potential of cement clinker W in vitro using the isolated chicken eye test, April 2010.

(6) *Epidemiological assessment of the occurrence of allergic dermatitis in workers in the construction industry related to the content of Cr (VI) in cement*, NIOH, Page 11, 2003.

(7) *European Commission's Scientific Committee on Toxicology, Ecotoxicology and the Environment (SCTEE) opinion of the risks to health from Cr (VI) in cement* (European Commission, 2002). http://ec.europa.eu/health/archive/ph_risk/committees/sct/documents/out158_en.pdf.

(8) *Occurrence of allergic contact dermatitis caused by chromium in cement. A review of epidemiological investigations*, Kåre Lenvik, Helge Kjuus, NIOH, Oslo, December 2011.

Training Advice

In addition to health, safety and environmental training programs for their workers, companies must ensure that workers read, understand and apply the requirements of this Safety Data Sheet.

Revision

Prepared for the first time. This Safety Data Sheet has been prepared according to Regulation on Preparation of Safety Data Sheets for Hazardous Substances and Mixtures (13.12.2014-29204 Turkish Official Gazette).

Prepared by

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Telephone Number: 444 50 57/ 1162
E-mail: elifp@tcma.org.tr
Sertificate Number: 01.150.27

Additional Information

The Material Safety Data Sheet is prepared according to the information given by manufacturer and reliable literature references available on the date preparation. Although maximum effort expended for the accuracy of the information, the accuracy of information on this document is not guarenteed . The precautions and advices given in this document may not be applicable/sufficient to all individuals and/or cases. Using the product safely and following related laws/regulations is the responsibility of the user. Also, the manufacturer is not responsible from any damage and/or injury that might be a result of not following the precautions and/or advices given in this document.

National Biomonitoring Program

Dioxins, Furans and Dioxin-Like Polychlorinated Biphenyls Factsheet

Dioxins, furans, and dioxin-like polychlorinated biphenyls (PCBs) are the abbreviated names for a family of chemicals that have similar toxicity and shared chemical characteristics. The dioxins and furans are not manufactured or produced intentionally but are created when other chemicals or products are made. These chemicals may be created during burning of forests or household trash; chlorine bleaching of pulp and paper; or manufacturing or processing of certain types of chemicals, such as pesticides. Until banned in 1979, PCBs were manufactured as insulator fluids in heat-exchangers and transformers, as hydraulic fluids, and as additives to paints, oils, and caulks. All of these chemicals remain in the environment even though they are no longer manufactured. They enter the food chain and build up in larger animals.

How People Are Exposed to Dioxins, Furans, and Dioxin-Like PCBs

People can be exposed to these chemicals by eating high-fat foods such as milk products, eggs, meat, and some fish. Workplace exposures can occur in industries that burn waste matter or that manufacture other chemical products containing these substances.

How Dioxins, Furans, and Dioxin-Like PCBs Affect People's Health

Human health effects from low environmental exposures are unclear. People who have been unintentionally exposed to large amounts of these chemicals have developed a skin condition called chloracne, liver problems, and elevated blood lipids (fats). Laboratory animal studies have shown various effects, including cancer and reproductive problems.

Levels of Dioxins, Furans and Dioxin-Like PCBs in the U.S. Population

In the *Fourth National Report on Human Exposure to Environmental Chemicals (Fourth Report)*, CDC scientists measured 26 of these chemicals in the blood serum (the clear part of blood) of at least 1,800 participants aged 12 years and older who took part in the National Health and Nutrition Examination Survey (NHANES) during 2003–2004. Prior survey periods of 1999–2000 and 2001–2002 are also included in the *Fourth Report*. By measuring these chemicals in serum, scientists can estimate the amounts of these chemicals that have entered people's bodies.

- In the *Fourth Report*, CDC researchers found low levels of these 26 chemicals in the U.S. population.
- The findings are consistent with other studies that found that the levels of most of these chemicals have decreased by more than 80% since the 1980s.

Finding a measurable amount of one or more of these chemicals in serum does not imply that the level of one or more of these chemicals causes an adverse health effect. Biomonitoring studies of these chemicals provide physicians and public health officials with reference values so that they can determine whether people have been exposed to higher levels than are found in the general population. Biomonitoring data can also help scientists plan and conduct research on exposure and health effects.

Additional Resources

Agency for Toxic Substances and Disease Registry (ATSDR)

- ToxFAQs for Chlorinated Dibenzo-*p*-Dioxins
- Public Health Statement for Chlorinated Dibenzo-*p*-Dioxins
- ToxFAQs for Chlorodibenzofurans
- Public Health Statement for Chlorodibenzofurans

Environmental Protection Agency

- Dioxins and Furans

U.S. National Library of Medicine, National Institutes of Health

- ToxTown–Dioxins
- ToxTown–Polychlorinated Biphenyls

Food and Drug Administration

- Questions and Answers About Dioxins

Page last reviewed: April 7, 2017

The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces through safety and health research

2,3,7,8 -Tetrachlorodibenzo-p-dioxin (TCDD, "dioxin")

DHHS (NIOSH) PUBLICATION NUMBER 84-104 JANUARY 1984

Current Intelligence Bulletin 40

Foreword

Current Intelligence Bulletins are reports issued by the National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control, Atlanta, Georgia, for the purpose of disseminating new scientific information about occupational hazards. A Current Intelligence Bulletin may draw attention to a hazard previously unrecognized or may report new data suggesting that a known hazard is either more or less dangerous than was previously thought.

Current Intelligence Bulletins are prepared by the staff of the Division of Standards Development and Technology Transfer, NIOSH, (Robert A. Taft Laboratories, 4676 Columbia Parkway, Cincinnati, Ohio, 45226) and are distributed to representatives of organized labor, industry, public health agencies, academic institutions, and public interest groups as well as to those federal agencies, such as the Department of Labor, which have responsibilities for protecting the health of workers. It is our intention that anyone with the need to know should have ready access to the information contained in these documents; we welcome suggestions concerning their content, style, and distribution.

Because of the recent attention given to human exposure to 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD, “dioxin”) contaminated materials and published reports on the toxicity of TCDD, NIOSH staff consider it necessary to present a review of the pertinent data and a summary of findings related to the human hazard potential of TCDD. Because of the compression in this bulletin of the voluminous literature on TCDD, it is suggested that readers wanting to know more of the details of the reported studies consult the appended references.

[signature]
J. Donald Millar, M.D., D.T.P.H. (Lond.)
Assistant Surgeon General
Director, National Institute for
Occupational Safety and Health
Centers for Disease Control

Abstract

In animals, 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD, “dioxin”) causes various systemic effects at a wide range of exposure concentrations, including tumorigenesis, immunological dysfunction, and teratogenesis. Studies of humans exposed to TCDD-contaminated materials suggest that TCDD is the cause of observed chloracne, metabolic disorders (porphyria), and other systemic problems and are suggestive of TCDD’s ability to cause cancer.

TCDD occurs as a contaminant of materials such as 2,4,5-trichlorophenol (TCP), 2,4,5-trichlorophenoxyacetic acid (2,4,5-t), and 2-(2,4,5-trichlorophenoxy)propionic acid (silvex). Occupational exposure may occur through contact with these materials during use or from the past contamination of worksites.

The National Institute for Occupational Safety and Health (NIOSH) recommends that TCDD be regarded as a potential occupational carcinogen, that occupational exposure to TCDD be controlled to the fullest extent feasible, and that decontamination measures be used for TCDD-contaminated work environments. This recommendation is based on a number of reliable studies demonstrating TCDD carcinogenicity in rats and mice.

Background

Physical and Chemical Properties of 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)

TCDD is one of a family of isomers known chemically as dibenzo-p-dioxins. The chemical and physical properties are summarized in Table I. TCDD is a colorless crystalline solid at room temperature. It is sparingly soluble in most organic solvents and essentially insoluble in water. TCDD is stable to heat, acids, and alkali and will decompose when exposed to ultraviolet light, including sunlight.[1]

TABLE I Chemical and Physical Properties of TCDD[2,3]

CAS Registry No.:	1746-01-6	
Empirical formula		$C_{12}H_4Cl_4O_2$
Percent by weight	C	44.7%
	0	9.95%
	H	l.25%
	C1	44.l%
Molecular weight		322
Vapor Pressure mm Hg at 25 °C		1.7×10^{-6}
Melting point, °C		305
Decomposition temperature, °C		>700
Solubilities, g/liter		
o-Dichlorobenzene		l.4
Chlorobenzene		O.72
Benzene		0.57
Chloroform		0.37
n-Octanol		0.05
Methanol		0.01
Acetone		0.11

Water	2×10^{-7}

Formation and Use of TCDD

TCDD forms as a stable by-product or contaminant during the production of TCP. Run-away reactions at high temperature, in which excess TCDD was produced, have occurred at TCP production sites in the United States and elsewhere.[4] Normally, TCDD persists as a contaminant in TCP in relatively small, variable amounts (0.07-6.2 mg/kg.[5] TCP has been utilized primarily as a feedstock for production of the phenoxy herbicides 2,4,5-T and silvex, resulting in the contamination of these products with TCDD. Production of 2,4,5-T and silvex ceased in the United States in 1979. However, stockpiles of both products are still being distributed and used. TCP also is used in the production of hexachlorophene, a bactericide and fungicide.

The combustion of 2,4,5-T can result in its conversion to small amounts (0.6 ppt TCDD/1 ppm 2,495-T burned) of TCDD. Also, the burning or heating of commercial and purified chlorophenates and pyrolysis of polychlorinated biphenyls (PCBs) contaminated with trichlorobenzenes have resulted in the production of TCDD.[6,7] The formation of TCDD from trace chemical reactions in fires has been postulated but has not been verified.[8,9]

Existing Regulations and Guides

No occupational exposure standard exists for TCDD. The United States Environmental Protection Agency (U.S. EPA) temporarily suspended or banned most uses of 2,4,5-T and silvex in 1979, although their use was allowed on sugarcane, orchards and for miscellaneous non-crop uses.[10] On October 18, 1983 EPA published its intent to cancel registration of pesticide products containing 2,4,5-T and silvex and to prohibit the transfer, distribution, sale or importation of any unregistered pesticide product containing 2,4,5-T or silvex or their derivatives.[11]

Nature of Occupational Exposure to TCDD

It is not possible to estimate accurately the number of U.S. workers currently at risk of exposure to TCDD. Occupational exposure to TCDD may occur during production of TCP; in decontamination of worksites from prior production or use of TCP, 2,4,5-T, or silvex; from waste materials (such as reclaimed oil) contaminated with TCDD; or from cleanup after fires in transformers containing polychlorinated aromatics.

Dust or soil particles contaminated with TCDD can remain airborne or accumulate on indoor or outdoor work surfaces and may present a potential exposure hazard. Exposure to TCDD as a vapor will normally be negligible because of its low vapor pressure. Contact with TCDD-contaminated liquids is possible through the handling of drums or tanks containing the liquid or through dispersion of the liquid.

Toxicity

Results of Studies of TCDD in Animals

Acute and Chronic Toxicity

There is wide variation in the dosage of TCDD required to cause death among animal species (oral LD_{50} 0.6-5,000 µg TCDD/kg body weight (bw)).[12,13] Progressive weight loss with death several weeks later is reported to characterize the response in experimental animals after administration of a lethal dosage of TCDD.[12,14,15] Animals given single or repeated oral dosages of TCDD of 0.1 to 25 µg/kg bw demonstrated increased liver weights and lipid accumulation, thymic atrophy, and histopathological changes in liver and thymus.[12,16-18]

TCDD is reported to be at least three times more potent than any other known compound in stimulating production of aminolevulinic acid synthetase (ALA), the rate-limiting enzyme in porphyrin and heme synthesis.[19,20] Varied effects on hematological functions have been reported in rats and mice dosed with TCDD: increased numbers of erythrocytes and leucocytes, increased hemoglobin concentration, decreased blood platelets in rats,[21,22] and decreased hemoglobin concentration in mice.[23]

Effects on Reproductive Function

TCDD administered at dosages of 0.125-3.0 ug TCDD/g bw to mice and rats induced fetotoxicity that included cleft palates and kidney anomalies,[24-26] intestinal hemorrhages and excessive tissue/organ fluid (edema), and prenatal mortality.[27,28]

Impairment of reproduction has been reported for rats ingesting 0.01 µg TCDD/kg bw/day. Significant decreased fertility, litter size, number of pups alive at birth, postnatal survival, and postnatal body weight of pups were evident in two successive generations delivered from male and female rats that ingested TCDD 90 days prior to first mating, during pregnancies, and for the durations of time between pregnancies.[29] No significant dose-related reproductive effects were observed in male mice treated with up to 2.4 µg TCDD/kg bw/day and mated with untreated female mice.[30,31]

Immunological Effects

TCDD induced immunological function alterations, expressed by decreased thymus-to-body weight ratios, in nursing newborn rats exposed through dosing of the lactating mother.[32] Other reports have shown that pre- and post-natal maternal dosing of rats and mice with TCDD caused thymic atrophy and suppression of cellular immunity in the offspring.[33] TCDD administered intraperitoneally or orally to mice induced a strong immunosuppressive effect on antibody production and cell-acquired immune responses.[34]

Mutagenic Effects

Results of mutagenicity tests are inconclusive. In two studies TCDD was mutagenic in *Salmonella typhimurium* TA 1532 without activation.[35,36] In another study, which used a more sensitive mutant strain, *Salmonella typhimurium* TA 1537, TCDD was not a mutagen.[37] There is weak evidence of chromosomal aberrations in bone marrow of rats given dosages of 0.25 to 4 µg TCDD/kg bw.[38,39]

Carcinogenic Effects

Male rats fed dosages of 0.001 µg TCDD/kg bw/week for 78 weeks and sacrificed at week 95 of the study showed a variety of neoplastic tumors (ear duct carcinoma; lymphocytic leukemia; kidney adenocarcinoma; malignant peritoneal histiocytoma; skin angiosarcoma; hard palate, tongue and nasal turbinate carcinoma).[40] Female rats that had ingested TCDD for two years at a dosage of 0.1 µg/kg bw/day developed carcinomas of the liver and squamous cell carcinomas of the lung, hard palate, nasal turbinates, or tongue.[41] Male and female rats orally dosed with 0.5 µg TCDD/kg bw/week for two years demonstrated neoplastic nodules of the liver and thyroid adenomas.[42]

Male mice fed dosages of TCDD of 0.05 or 0.5 µg/kg/week for two years developed liver cancer; female mice fed 0.2 or 2.0 µg/kg/week for the same duration developed liver cancer and thyroid follicular cell adenomas.[42] TCDD applied to the skin of female mice for two years (0.005 µg/kg bw/application; 3 days/week) resulted in a significantly higher incidence (P=0.007) of skin cancers (fibrosarcomas) when compared to untreated controls. An increase in the same tumor type, although not statistically significant (p=0.084), was also observed in the male mice that received a maximum dosage of 0.001 µg TCDD per application.[43]

Human Health Effects

The only information on the health effects in humans from exposure to TCDD is from clinical or epidemiological studies of populations who were occupationally and non-occupationally exposed to 2,4,5-T and TCP contaminated with TCDD. Because of the coincidental exposure to 2,4,5-T and TCP and to other herbicides as well as to TCDD, it is not possible to attribute the observed health effects solely to TCDD exposure. To date, no studies of humans include a quantitation of exposure to TCDD.

Chloracne and Other Systemic Effects

Chloracne is a chronic and sometimes disfiguring skin eruption caused by exposure to halogenated aromatic compounds including TCDD. Chloracne is possibly a result of systemic effects of these compounds, although it also may occur as a contact dermatitis.[44,45]

There are numerous cases of chloracne reported following accidental exposure to chlorinated aromatic chemicals which were probably contaminated with TCDD.[46-48] The most notable recent exposure occurred in Seveso, Italy in 1976.[49] In most incidences of chloracne, there are a variety of signs and symptoms (ranging from gastrointestinal disturbances to metabolic disorders) which accompany the appearance of the skin eruptions and persist for varying lengths of time.[50-54]

Reproductive Effects In Humans

Reproductive effects resulting from possible human exposure to TCDD are inconclusive. Data on male workers who applied agricultural sprays of 2,4,5-T or who produced TCDD-contaminated materials are consistent with the animal data which suggest no reproductive effects in males from TCDD exposure.[55-57] To date, no study of reproductive effects in women or in offspring of males or females with defined exposure to TCDD has been reported.

Studies of birth defects in populations that may have been exposed non-occupationally to TCDD have been conducted in Australia where a correlation was observed between 2,4,5-T use and seasonal variation in the rate of spinal cord and spine formation defects; no causal association could be drawn.[58] In a similar study in Hungary, an increased incidence of congenital malformations including spine formation defects could not be correlated with increased use of 2,4,5-T.[59] A study based on incomplete fetal tissue samples from the Seveso, Italy population found no mutagenic, teratogenic, or fetotoxic effects in 30 interrupted pregnancies and four spontaneous abortions in women believed to have been exposed to TCDD.[60] A U.S. EPA study found a positive relationship between spontaneous abortions and 2,4,5-T use in the Alsea, Oregon area.[61] The study, however, has been severely criticized because of its numerous limitations: inaccurate comparisons of the study and control areas; inaccuracies in the collection of data on spontaneous abortions; incomplete and inaccurate data on 2,4,5-T usage; and failure to recognize that the rate of spontaneous abortions was not greater than would be expected.[62]

Studies of Mortality and Carcinogenesis in Humans

Findings have been inconclusive in many mortality studies of workers with occupational exposure to TCDD-contaminated materials because of the small size of the study population and concomitant exposures to other substances

No excess mortality or tumor incidence was observed among Swedish railroad workers exposed to unknown amounts of 2,4-D, 2,4,5-T, and other herbicides but believed to have been exposed primarily to phenoxy acid herbicides for at least 45 days.[63] In a subsequent analysis of mortality in this group of workers, 45 deaths (49 expected) were observed in the total population. A significant excess of tumors also was observed among those believed to be exposed primarily to Amitrol® (3-amino-1,2,4-triazole), a suspect carcinogen, as well as to phenoxy herbicides. Two cases of stomach cancer (0.33 expected) were observed among those exposed primarily to phenoxy herbicides.[64]

Among Swedish forestry workers exposed to phenoxy herbicide preparations, supervisors, who had more extensive exposure to herbicides than the other forest workers, had a nonsignificant excess of deaths from all cancers. Mortality associated with the presence of tumors was, however, lower than expected for the total group of exposed workers.[65]

In a group of 74 workers involved in an accident during TCP production in Germany, 21 deaths occurred during the following 27 years. Seven (7) malignant neoplasms vs. 4.2 expected and a significant excess of stomach cancer (3 observed vs. 0.61 expected) were observed.[66]

Several case control studies of cancer patients have yielded data on the carcinogenicity of phenoxyacetic herbicides. Two studies were conducted in Sweden following a clinical observation of patients with soft tissue sarcoma who had previous occupational exposure to the herbicides.[67] The first study of 52 cases of soft tissue sarcoma concluded that the sarcoma cases were 5.3 times more likely than the 206 controls to have had occupational exposure to phenoxyacetic acids (primarily 2,4,5-T and 2,4-D).[68] The second study of 110 cases of soft tissue sarcomas indicated that this population was 6.8 times more likely to have had exposure to phenoxyacetic acids than the 219 controls.[69] In neither study was it possible to demonstrate the relative risk related to exposure to TCDD-contaminated 2,4,5-T because of the presence of impurities such as chlorinated dibenzodioxins and dibenzofurans which were part of the phenoxyacetic herbicides.

In other reports from Sweden, 11 of 17 patients with malignant lymphoma reported occupational exposures to phenoxyacetic acids or chlorophenols;[70] a case control study with 169 malignant lymphoma cases found a significantly higher occupational exposure to phenoxyacetic acids (primarily 2,4,5-T, and 2,4-D) associated with the sarcoma cases than did the 338 controls. Analysis by individual herbicide exposure was not possible.[71]

Two additional studies conducted in Sweden for colon cancer and nasal and nasopharyngeal cancer did not demonstrate an elevated risk for occupational exposure to phenoxyacetic acids .[72,73]

Among four small groups of U.S. production workers exposed to TCP and 2,4,5-T a total of 105 deaths were observed.[74-76] In these, three deaths were attributed to soft tissue sarcoma (43 times the number expected for this age group of U.S. white males.[77] Later, four additional cases were reported to have soft tissue sarcomas.[78-81] However, a detailed review of work

records and expert review of pathological tissue specimens have shown only two of the seven cases with both confirmed exposure to TCP or 2,4,5-T and diagnosis of soft tissue sarcoma.[82]

Summary of Toxicity in Animals and Humans

TCDD causes a variety of systemic and immunological effects in animals with wide variation among species in the dosage required to cause death. Studies using rats and mice have demonstrated that TCDD is an animal teratogen and carcinogen. Results of tests for mutagenicity are inconclusive.

Humans exposed to materials reported to be contaminated with TCDD have developed chloracne and other signs of systemic poisoning. Soft tissue sarcoma has been observed in excess among workers exposed to phenoxy herbicides. These data are inconclusive regarding TCDD toxicity in humans because the populations studied had mixed exposures making causal relationships between exposure and effect unclear. The data are, however, suggestive of an association between exposure to phenoxyacetic herbicides contaminated with TCDD and excess lymphoma and stomach cancer. Attempts to associate reproductive effects with TCDD exposure are inconclusive because of the inadequately defined populations studied and the difficulties of defining exposure.

Recommendations

There are several classifications for identifying a substance as a carcinogen. Such classifications have been developed by the U.S. National Institute of Environmental Health Sciences, National Toxicology Program,[83] the International Agency for Research on Cancer,[84] and OSHA.[85] NIOSH considers the OSHA classification the most appropriate for use in identifying carcinogens in the workplace. This classification is outlined in 29 CFR 1990.103. * Since TCDD has been shown to be carcinogenic in experimental studies with rats and mice, and studies are suggestive of an association between human exposure to TCDD-contaminated materials and carcinogenicity, NIOSH recommends that TCDD be considered as a potential occupational carcinogen and exposure to TCDD in all occupational settings should be controlled to the fullest extent feasible. While observations to date do not confirm a causal relationship between TCDD exposure and soft tissue sarcoma, they suggest a need for continued investigations.

Because of the variety of situations likely to be encountered in TCDD-contaminated worksites, it is not possible to offer in this bulletin detailed procedures for assessing exposures or decontamination. Based on NIOSH hazard evaluations of TCDD-contaminated sites, the following general guidelines are recommended until more specific procedures can be developed.[86,87]

Assessment of Exposure

Workers may be exposed to TCDD derived from a variety of sources: the production of TCP, residues from prior production or use of 2,4,5-T or silvex, waste materials contaminated by TCDD, or contamination resulting from transformer fires. The first step in assessing workplace contamination should be environmental sampling to determine the presence of TCDD contamination, keeping in mind the possible routes of exposure, with later sampling conducted to define the quantity of TCDD in the environment. The assessment may include sampling of soil and settled dust for TCDD, air sampling for TCDD-contaminated particles, and wipe sampling of surfaces.[86,87]

Decontamination and Worker Protection Programs

In general, decontamination procedures must provide an organized process in which levels of contamination are reduced. This requires containment, collection, and disposal of contaminated solutions and residues generated during the cleanup. Separate facilities should be provided for decontamination of large equipment.

Each stage of decontamination, such as gross decontamination and repetitive wash/rinse cycles, should be conducted separately, either by using different locations or by spacing in time. Personnel decontamination locations used should be physically separated to prevent cross-contact and should be arranged in order of decreasing level of contamination. Separate entry/exit routes and locations should be provided for workers when it is necessary to isolate them from different contamination areas containing incompatible waste. Entry and exit points to these areas should be well marked and controlled. Access to the decontamination area should be separate from the path between the contaminated and clean areas. Dressing stations for entry should be separate from re-dressing areas for exit.

Protective Clothing and Equipment

All workers who may be exposed to TCDD should be equipped with adequate chemical protective clothing and equipment to ensure their protection. In the selection of protective clothing, consideration should be given to the utilization of disposable apparel due to the uncertainty of decontamination of clothing.

The protective apparel should consist of both outer and inner garments. The outer garments should consist of a zippered coverall with attached hood and draw string or elastic sleeves, gloves and closure boots. If exposure is to particulate or dust, the coveralls should be made of a non-woven fabric such as spunbonded polyethylene, Tyvek®. In cases of exposure to liquids, the coveralls, gloves and boots should be made of chemically resistant materials such as disposable laminates, e.g., Saranax® coated Tyvek®, or synthetic elastomers such as butyl, nitrile or neoprene rubber. The inner garments should consist of cotton coveralls, undershirts, undershorts, gloves, and socks and should be disposed of after use. The effectiveness of the protective clothing should be evaluated under simulated use conditions, regardless of the type of clothing used. All disposable clothing should be placed in marked and approved containers and disposed of appropriately. All reusable clothing and equipment should be thoroughly cleaned and checked for residual contamination before reuse or storage.

Respiratory Protection

The use of respiratory protection requires that a respiratory protection program be instituted according to the requirements of 29 CFR 1910.134[88] and that the respirators have been approved by the Mine Safety and Health Administration (MSHA) and by NIOSH. This program should include training on proper fit testing and use and procedures for respirator maintenance, inspection, cleaning and evaluation.

For situations where TCDD contamination is low (e.g., exposure to dust contaminated with low levels of TCDD), air purifying respirators should provide sufficient protection until the extent and characterization of the exposure can be determined. Where quantities of materials highly contaminated with TCDD have been released and have contaminated an area (e.g., production accidents), all workers who may be exposed to TCDD should wear respirators that consist of a self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode. An alternate method utilizes a combination Type C supplied air respirator, with full facepiece, operated in pressure-demand mode and equipped with auxiliary positive pressure self-contained air supply.

Post-Decontamination Testing

The adequacy of the decontamination effort should be determined by conducting follow-up sampling and analysis of the contaminated areas and protective equipment. This testing should be conducted as each area is decontaminated and after the entire facility has been cleaned.

Note

*"'Potential occupational carcinogen' means any substance, or combination or mixture of substances, which causes an increased incidence of benign and/or malignant neoplasms, or a substantial decrease in the latency period between exposure and onset of neoplasms in humans or in one or more experimental mammalian species as the result of any oral, respiratory or dermal exposure, or any other exposure which results in the induction of tumors at a site other than the site of administration. This definition also includes any substance which is metabolized into one or more potential occupational carcinogens by mammals." [return to text]

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Date: _____ Project Name:_____Project Num

Project Location: _____

Project Description _____

The Project Manager is ultimately responsible for the accuracy of the information on this Reco
and Subcontractors are familiar with the site and have the required training to do the task

Employee's Name:	Confined Space Entry	Excavation Safety	Fall Protection	GHS (HazCom/WHMIS)	Lock Out Tag Out (LOTO)	Motor Vehicle Safety
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