Appendix G
Supporting Deliverables

100021357

Appendix G - Index

Attachment 1
Health and Safety Plan – Northern Impoundment

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Draft Provided with Preliminary 30% Remedial Design - Northern Impoundment

San Jacinto River Waste Pits Site
Harris County, Texas

International Paper Company
McGinnes Industrial Maintenance Corporation

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11187072 | Report No 13

Table of Contents

Tabel of Contents

Table Index

Attachment Index

1. Introduction

This Health and Safety Plan (HASP) for the Northern Impoundment of the San Jacinto River Waste Pits Superfund Site in Harris County, Texas (Site) was prepared by GHD Services Inc. (GHD), on behalf of the International Paper Company (IPC) and McGinnes Industrial Maintenance Corporation (MIMC; collectively referred to as the Respondents). References in this HASP to the "work site" are to the Northern Impoundment and references to "Implementing Parties" are to the entities implementing the remedial action (RA) for the Northern Impoundment.

This HASP was developed to outline potential activities to be performed to protect work site personnel and area residents from physical, chemical, and all other hazards posed by the RA for the Northern Impoundment. As specified in the Statement of Work (SOW), this HASP was prepared in accordance with the Environmental Protection Agency (EPA) Emergency Responder Health and Safety and Occupational Safety and Health Administration (OSHA) requirements under 29 Code of Federal Regulations (CFR) 1910 and 1926.

1.1 Purpose

The purpose of this work site specific HASP is to provide specific guidelines and establish procedures for the protection of personnel performing the activities described in Section 2. The HASP is a living document, in that it must continually evolve as work site conditions and knowledge of work activities develop.

The HASP, as applicable to the Northern Impoundment RA (referred to as the "project"), includes the following measures:

- Communicate the contents of this HASP to work site personnel.
- Eliminate unsafe conditions. Efforts must be initiated to identify conditions that can contribute to an incident and to remove exposure to these conditions.
- Utilize the STAR (Stop, Think, Act, and Review) process before beginning any activity/task/job, after an incident, and/or during any unusual circumstances. Stop the activities to think about the task, analyze the task hazards and determine methods to reduce risk, and review the results with affected personnel.
- Revise or develop Job Safety Analysis (JSA) forms for activities. Supervisors and affected personnel are responsible for JSA development. A blank JSA form has been included in Attachment 2 of this HASP.
- Complete behavioral based safety (BBS) observations via the use of the Safe Task Evaluation Process (STEP).
- Reduce unsafe acts by using the BBS tools (STEPs, JSAs, STAR, etc.). Personnel shall make a conscious effort to work safely. A high degree of safety awareness must be maintained so that safety factors become an integral part of the task. Supervisory personnel shall ensure that personnel committing unsafe acts are held accountable via counseling, mentoring, and, if necessary, reprimand.

- Inspect frequently. Regular documented safety inspections of the work area, materials, and equipment by qualified persons ensure early detection of unsafe conditions. HSE deficiencies shall be corrected as soon as possible or project activities shall be suspended. Documentation of daily inspections and corrective actions should be kept with the project files.

1.2 Stop Work Authority

All employees are empowered and expected to stop the work of co-workers, subcontractors, Implementing Parties' 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 condition/acts and/or Stop Work Authority (SWA) shall be documented using the Unsafe Condition/Acts and SWA form located in Attachment 1.

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

1.3 Personnel Requirements

All personnel conducting activities at the work site must conduct their activities in compliance with all applicable HSE legislation at both state and federal levels to include, but not limited to, the Texas Labor Code, Title 5, Subtitle A, OSHA 29 CFR 1910, 29 CFR 1926, and associated policies and procedures. **Project personnel must also be familiar with the procedures and requirements of this HASP**. In the event of conflicting safety procedures/requirements, personnel must implement those safety practices affording the highest level of safety and protection.

1.4 Short Service Employees

Employees and subcontractors identified as Short Service Employees (SSE) (6 months or less) shall not be permitted to work without another non SSE employee present.

1.5 Project Management and Safety Responsibilities

Project Manager

The Project Manager (PM) shall be responsible for the overall implementation of the HASP, and for ensuring that all HSE responsibilities are carried out in conjunction with the project. This shall include, but is not limited to, review and approval of the HASP, ensuring that STEP forms are completed properly, qualifying and directing subcontractors relative to HSE performance, coordinating all HSE submittals, and consultation with the person identified as the Site Supervisor (SS) regarding appropriate changes to the HASP. The PM will also ensure that the appropriate resources are provided to support the project with respect to all operations.

Site Supervisor

The SS is the person who, under the supervision of the PM, shall be responsible for the communication of work site requirements to work site project personnel and subcontractors, and is responsible for carrying out the HSE responsibilities by ensuring that the following occurs:

1. A daily Tailgate Safety meeting is conducted that communicates the work site specific hazards for the operations that day and what proactive measure will minimize the hazards. Each meeting must be documented on the Tailgate Safety Meeting Form to include all topics covered and the signatures of those in attendance.
2. All necessary clean-up and maintenance of safety equipment is conducted by project personnel.
3. Emergency phone numbers and services, including hospital and clinic locations, are verified.
4. Site personnel are implementing the STAR process before initiating activities.
5. JSA forms are developed and revised accordingly.
6. Forms attached to the HASP are completed, filed, and submitted correctly, including forms related to daily tailgate meetings and completion of daily inspection checklists.
7. A pre-entry briefing is conducted and documented, and serves to familiarize on-site personnel with the procedures, requirements, and provisions of the HASP.

Other duties include overall implementation of the HASP and ensuring that all HSE responsibilities are carried out in conjunction with the project. This shall include, but is not limited to, review and approval of the HASP, communication of work site requirements to subcontractor personnel, and consultation with the Implementing Parties/work site representative(s) regarding appropriate changes to the HASP.

The SS is also responsible for enforcing safe work practices for work site employees. The SS watches for ill effects on any crew member, especially those symptoms caused by cold/heat stress or chemical exposure. The SS oversees the safety of visitors who enter the work site. The SS maintains communication with the Implementing Parties/work site representative(s).

Other specific duties of the SS include:

- Ordering the immediate shutdown and/or stop work of activities in the case of a medical emergency, unsafe condition, or unsafe practice
- Providing the safety equipment, personal protective equipment (PPE), and other items necessary for employees
- Enforcing the use of required safety equipment, PPE, and other items necessary for employee or community safety
- Conducting work site inspections as a part of quality assurance for HSE
- Reporting HSE concerns to work site and/or project management, as necessary

Regional Safety & Health Manager

The Regional Safety & Health Manager (RSHM) is a full-time employee who is trained as a HSE professional, and serves in a consulting role to the PM and SS regarding potential HSE issues.

Employee Safety Responsibility

Employees are responsible for their own safety as well as the safety of those around them. Employees and subcontractors shall use any equipment provided in a safe and responsible manner, as directed by their supervisor.

Employees are directed to take the following actions when appropriate:

- Suspend any operations that may cause an imminent health hazard to employees, subcontractors, or others.
- Utilize the STAR process before initiating work.
- Assist in the development and revision of JSA forms that are appropriate to their current scope of work.
- Prepare, submit, and review behavior based safety observations using the STEP form. The STEP form is to be used in conjunction with the appropriate JSA to identify positive aspects of task performance as well as to identify any deficiencies associated with the observed task.
- Inspect tools and other equipment before each use or as manufacturer and/or OSHA dictates.
- Correct work site hazards when possible without endangering life or health.
- Report HSE concerns to the SS, PM, or RSHM.

Subcontractors

Subcontractors are responsible for the implementation of their own HASP and agree to comply with its contents. 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, non-compliance with HSE policies and procedures may subject the subcontractor to disciplinary action up to and including termination of their contract. Subcontractors will be required to attend an initial work site orientation and subsequent safety meetings.

Equipment Operators

All equipment operators are responsible for the safe operation of heavy equipment. Operators are responsible for inspecting their equipment on a daily basis 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. Documentation of daily inspections is required.

Authorized Visitors

Authorized visitors shall be provided with all known information with respect to Site operations and hazards as applicable to the purpose of their visit and should be accompanied with personnel familiar with the work site's layout and procedures.

1.6 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 work site personnel to chemicals above exposure limits, such as the introduction of a new JSA, Journey Management Plan, or PPE that does not involve a change in respiratory protection. Amendments must be documented on the work site HASP Amendment Form located in Attachment 1, in addition to notifications to key personnel.

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

1.7 Training Requirements

All personnel conducting work at the work site shall have completed the appropriate HSE training as applicable to their job tasks/duties. The required training is referenced throughout the HASP and identified on each JSA form.

1.7.1 Site-Specific Training

An initial work 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
- Work site hazards and controls
- Work site specific hazardous procedures
- 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 work site until they have completed the work site specific training session. Personnel successfully completing the training session shall sign the HASP Training Acknowledgement Form, which is presented in Attachment 1.

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

1.7.2 Post-COVID-19 Health and Safety Recommendations and Guidance

COVID-19 will require that special procedures be adopted at the work site, but in light of how applicable requirements are evolving, those requirements will be addressed in a revised version of this document submitted as the RD progresses.

1.7.3 Safety Meeting/HASP Review

"Tailgate" safety meetings will take place each day prior to beginning the day's work. All work site personnel will attend these safety meetings conducted by the SS. The safety meetings will cover specific HSE issues, including the appropriate JSAs, work site activities, changes in work site conditions, and a review of topics covered in the work 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 are two formats available. For meetings attended by more than four people, please use the Tailgate Safety Meeting Form Large Group daily format, which requires one page for each Tailgate safety meeting conducted. If there are four or fewer people, please use the Tailgate Safety Meeting Form-Small Group multiple day format, which provides room to document three tailgate safety meetings on one page. The two Tailgate Safety Meeting Forms (Large Group and Small Group) are located in Attachment 1.

2. Site Operations

2.1 Scope of Work

This HASP covers the specific work site activities that will be conducted by personnel and their subcontractors. These activities are as follows:

- Mobilization of personnel, materials, and equipment to and from the work site
- Site reconnaissance activities
- Over-water activities
- Heavy equipment spotting
- Surveying activities
- Equipment fueling
- Lifting and rigging activities
- Decontamination of personnel and equipment
- Boat and barge operation
- Driving

If work 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.

3. Hazard Evaluation

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

Specific activity JSA forms (located in Attachment 2) have been developed to address the hazards associated with the work site operations outlined in Section 2. New JSAs will be developed on an as necessary basis if a JSA for that specific task is not available in the HASP. Additionally, current JSAs will be modified and customized in the field to ensure that the task-specific requirements are addressed each time the task is performed.

3.1 Chemical Hazards

The chemical hazards associated with conducting work site operations include the potential exposure to on-site contaminants encountered during field activities such as soil sampling, sediment sampling, groundwater sampling, products used in decontamination of equipment, and support products such as fuel. The potential routes of exposure from these products during normal use may occur through inhalation of vapors and dusts, or direct contact or absorption with the materials. The chemical hazards of concern that may be encountered during the tasks identified in the project's scope of work are listed in Table 1, which include: dioxins and furans**.** A listing of the contaminants of concern is found in Table 1, which includes exposure limits, signs and symptoms of exposure, chemical properties, and physical characteristics.

3.1.1 Chemical Hazard Controls

Exposure to potential on-site contaminants/chemicals shall be controlled by:

- Monitoring air concentrations with appropriate equipment in the breathing zone
- Revising JSAs to list chemical hazards and associated hazard controls on a task specific basis
- Employing dust control measures such as wetting the immediate area
- Using PPE/respiratory protection, as appropriate, in areas known to have concentrations above the specified action level for each contaminant.

3.1.2 Skin Contact and Absorption Contaminants

Skin contact with chemicals may be controlled by use of the proper PPE and good housekeeping procedures. The proper PPE (e.g., Tyvek®, gloves) as described in Section 4 shall be worn for all activities where contact with potentially harmful media or materials is anticipated. Utilize manufacturer data on permeation and degradation to minimize skin contact potential (see Section 4.2.1 for additional information).

3.1.3 Hazard Communication/WHMIS

Personnel required to handle or use hazardous materials as part of their job duties will be trained and educated in accordance with the Workplace Hazardous Materials Information System (WHMIS) standard as applicable. The training shall include instruction on the safe use and handling procedures of hazardous materials, how to read and access SDSs, and proper labeling requirements.

3.1.4 Flammable and 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 work 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°F (37.8°C). Combustible liquids have flash points above 100°F (37.8°C) and below 200°F (93.3°C).

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 SDS 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 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 and a 5-gallon container).

3.2 Physical Hazards

Physical hazards that may be present during project work include: potential for close proximity to heavy equipment, noise, overhead or underground utilities, vehicle traffic, material handling, heavy lifting, electrical or stored energy, excavations, use of hand and power tools, use of all terrain vehicles, use of utility task vehicles, slip/trip/hit/fall injuries, heat/cold stress, working on or near water, boating, working at night or with illumination difficulties, biological hazards, other potential adverse weather conditions, working alone, and aggressive or menacing behavior. In addition, personnel must be aware that the protective equipment worn may limit dexterity and visibility and may increase the difficulty of performing some tasks.

3.2.1 Heavy Equipment Safety

Heavy Equipment

The following practices shall be adhered to by personnel operating heavy equipment (such as backhoes) and personnel working in the vicinity of heavy equipment:

- Heavy equipment is to be inspected when equipment is initially mobilized, delivered to the work site, or after it is repaired and returned to service, to ensure that it meets all manufacturer and OSHA specifications (e.g., fire extinguishers, backup alarms, etc.). Documentation of these inspections are to be filed with the project files.
- Heavy equipment is to be inspected on a daily basis. Documentation of this daily pre-operational inspection is to be filed with the project files.
- Heavy equipment is only to be operated by authorized, competent operators.
- Seat belts are to be provided on heavy equipment that is not designed for stand-up operation.
- Equipment/vehicles whose payload is loaded by crane, excavator, loader, etc. will have a cab shield and/or canopy to protect the operator.
- Personnel will not be raised/lowered in buckets.
- Personnel will not ride on fender steps or any place outside the cab.
- Before leaving the equipment controls, ensure that the equipment is in its safe resting position. For a backhoe, apply the parking brake, put the front loader bucket down on the ground level, and ensure that the rear excavator bucket is locked in the travel position. Bulldozers and scraper blades, loader buckets, dump bodies, and similar equipment will be fully lowered or blocked when not in use.

- Before raising any booms, buckets, etc., a check is to be made for overhead obstructions.
- Employees involved in the operation shall not wear any loose fitting clothing, as it has the potential to be caught in moving machinery.
- Personnel shall wear high visibility safety vests, steel toed shoes, safety glasses, hearing protection, and hard hats during heavy equipment operations.
- When moving heavy equipment or when working within 10 feet of a stationary object or in tight quarters, a spotter will be used.

3.2.2 Noise

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

When it is difficult to hear a coworker at normal conversation distance, the noise level is approaching or exceeding 85 dBA, and hearing protection is necessary. All work site personnel who may be exposed to high noise levels will participate in a Hearing Conservation Program.

3.2.3 Utility Clearances

Elevated superstructures (e.g., drill rigs, backhoes, scaffolding, ladders, cranes) shall remain a distance of 10 feet away from utility lines (<50 kV) and 20 feet away from power lines (>50 kV). Underground utilities, if present, shall be clearly marked and identified prior to commencement of work. Local/state/provincial regulations and Implementing Parties' requirements with regards to utility locating requirements (e.g., One-Call) shall be followed.

Personnel involved in intrusive work shall:

- Confirm proposed intrusive work and heavy truck routes are not in the area of subsurface utilities. This meeting is to be documented.
- Review and adhere to Subsurface Utility Clearance Protocol. Use prudent digging techniques inside 18 inches of the outside edge of an underground facility. This distance will vary based on state law, facility/Implementing Parties' requirements, etc. Refer to the *Texas Utilities Code, Title 5, Chapter 251*, *and TAC Title 16, Chapter 18* for additional guidance.
- **Utilize the Underground Utilities Checklist included in Attachment 1. This is to be completed prior to initiating excavation activities.**
- Be able to determine the minimum distance from marked utilities, identify the work that can be conducted with the assistance of the locator line service, coordinate document/drawing review, and inspect the work 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. Hand dig test holes (or use an equivalent means) in a careful and prudent manner to determine the precise location of underground facility lines. If the location of the lines is still undeterminable after hand digging/probing/soft digging, contact the Site Supervisor, the Project

Coordinator, and Implementing Parties for additional direction and assistance prior to initiating intrusive operations.

- If you must expose a line, state law requires contractors to protect and support the underground facility line while working at the work site.

3.2.4 Vehicle Traffic and Control

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

- A high visibility safety vest meeting American National Standards Institute (ANSI) Class II garment requirements is to be worn at all times.
- Employees will work using the “buddy system”.
- Cones and other visible markers will be used to demarcate a safe work zone around the active work zone(s).
- Appropriate signage will be posted as necessary, to inform roadway/parking lot users of any additional control measures necessary.

The motor vehicle safety program includes the following critical components that must be followed at all times:

- Driving restrictions around electronic device usage
- Defensive driving training requirements
- Operating standards
- Driver qualifications
- Proper vehicle selection
- Vehicle inspection/maintenance

Drivers are to make a 360-degree (360°) walk around of the vehicle immediately before placing vehicle into motion to determine if there are any hazards or possible obstructions in the proposed path of travel. Drivers are to clear the area of people and objects before placing the vehicle in motion. A check will also be performed to ensure overhead and side clearances are adequate.

The journey planning process is a simple risk assessment to ensure that all identified hazards are understood and managed and that unnecessary trips or those presenting an unreasonable or uncertain risk are not taken. Journey Management Plans (JMPs) will be developed for routine travel and work site access. JMP documentation and forms are provided in Attachment 4.

Additionally, **when working on an active roadway or along the shoulder or side of the road is necessary**, project personnel must follow the requirements presented in the Manual on Uniform Traffic Control Devices (MUTCD), which is found at: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/pdf_index.htm. This will include the implementation of a Temporary Traffic Control Plan (TTCP) and discussion with the local municipality as to the party

responsible who will implement the TTCP. A TTCP has four components: the Advanced Warning Area, the Transition Area, the Activity Area, and the Termination Area.

3.2.5 Material Handling and Storage

Material handling and storage practices to be conducted at the work site include manual lifting of materials and possibly the use of hoisting and rigging equipment. As a rule, use mechanical means for lifting heavy loads whenever possible.

General Storage Practices

The basic safety requirement for storage areas is that the storage of materials and supplies shall not create a hazard. Additional general storage area practices include the following:

- Bags, containers, bundles, etc. stored in tiers shall be stacked, blocked, interlocked, and limited in height so that they are stable and secure against sliding or collapse.
- All stacked materials, cargo, etc. shall be examined for sharp edges, protrusions, signs of damage, or other factors likely to cause injury to persons handling these objects. Defects should be corrected as they are detected.
- Storage areas shall be kept free from accumulation of materials that constitute hazards from tripping, fire, explosion, or pest harborage.
- Storage areas shall have provisions to minimize manual lifting and carrying. Aisles and passageways shall provide for the movement of mechanical lifting and conveyance devices.
- Stored materials shall not block or obstruct access to emergency exits, fire extinguishers, alarm boxes, first aid equipment, lights, electrical control panels, or other control boxes.
- “NO SMOKING” signs shall be conspicuously posted, as needed, in areas where combustible or flammable materials are stored and handled.

Cylindrical materials such as pipes and poles shall be stored in racks or stacked on the ground and blocked.

Special Precautions for Hazardous or Incompatible Materials Storage

Generally, materials are considered hazardous if they are ignitable, corrosive, reactive, or toxic. Manufacturers and suppliers of these materials must provide the recipient with SDSs, which describe their hazardous characteristics and give instructions for their safe handling and storage.

Many hazardous materials are incompatible, which means they form mixtures that may have hazardous characteristics not described on the individual SDSs. The following special precautions shall be followed regarding the storage of hazardous materials:

- Based on the information available on the SDSs, incompatible materials shall be kept in separate storage areas
- Warning signs shall be conspicuously posted, as needed, in areas where hazardous materials are stored

3.2.6 Working Over or Near Water

The procedures outlined in this section are to be implemented by all 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 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 Fall Protection Standard Operating Procedure [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 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 lifesaving skiff may be necessary. However, the SS in conjunction with the RSHM will evaluate current work site conditions to determine if a skiff is required.

3.2.7 Boating Safety

Boating Safety

Safety precautions must be taken when project activities include working in or from a boat. It is a Texas requirement for operators of small boats or vessels to complete the Texas Parks and Wildlife Division (TPWD) Boater Education Course. This course can be taken online, and must be completed prior to operating a boat or vessel over 15 horsepower.

The following summarizes key guidelines for the safe operation of boats:

1. An approved Type I, II, III, or V personal flotation device (PFD) must be available onboard for each person on the boat. A PFD shall be worn when working in the smaller boats used for collecting samples from bodies of water.

2. Vessels longer than 16 feet in length shall also have an approved Type IV throwable ring buoy or buoyant cushion onboard.
3. No vessel shall be operated in a reckless or negligent manner. Examples of reckless or negligent operation include:
    - Excessive speed in regulated or congested areas
    - Operating in a manner that may cause an accident
    - Operating in a swimming area with bathers present
    - Operating while under the influence of alcohol
    - Operation of a personal watercraft that endangers life or property
4. Every vessel shall display the lights and shapes required by the navigation rules.
5. Accidents should be reported immediately to a law enforcement agency.
6. It is a good idea for all vessels with a motor to have an approved, fully charged fire extinguisher onboard.

Operator's Responsibilities

1. Make sure the boat is in top operating condition and that there are no tripping hazards. The boat should be free of fire hazards and have clean bilges.
2. Ensure that safety equipment required by law is on board, equipment is maintained in good condition, and you know how to properly use these devices.
3. File a float plan with a co-worker who is ashore.
4. Have a complete knowledge of the operation and handling characteristics of your boat.
5. Know your position and know where you are going.
6. Maintain a safe speed at all times to avoid collision.
7. Keep an eye out for changing weather conditions and act accordingly.
8. Know and practice Navigational Rules.
9. Know and obey federal and state regulations and waterway markers.
10. Maintain a clear, unobstructed view forward at all times. Scan the water back and forth; avoid tunnel vision. Most boating collisions are caused by inattention.

Overloading

Never overload your boat with passengers and cargo beyond its safe carrying capacity. Too many people and/or gear will cause the boat to become unstable. Always balance the load so that the boat maintains proper trim. Here are some things to remember when loading your boat:

1. Distribute the load evenly fore and aft from side to side.
2. Keep the load low.

3. Keep passengers seated (do not stand up in a small boat).

4. Fasten gear to prevent shifting.

5. Do not exceed the “U.S. Coast Guard Maximum Capacities” information label (commonly called the Capacity Plate). This plate displays three important items: a) the maximum weight of persons on board in pounds; b) the maximum carrying weight of the vessel in pounds; and c) the maximum horsepower recommended for the boat.

6. If there is no capacity plate, use the following chart as a guide to determine the maximum number of persons you can safely carry in calm weather. The chart is applicable only to mono-hull boats less than 20 feet in length. A mono-hull is a boat that makes a single “footprint” in the water when loaded to its rated capacity. For example, a catamaran, trimaran, or a pontoon boat is not a mono-hull boat.

Maximum Persons	1	2	2	3	4	5	6	7
Boat Length (feet)	6	8	10	12	14	16	18	20

Alternatively, you can use the following formula to determine the safe loading capacity when a capacity plate is not available.

Formulas For Safe Loading			
Horsepower Capacity:		**Person Capacity:**	
For small, flat-bottom boats:		Average weight per person is 150 lbs.	
Multiply boat length (feet) times transom width (feet)			
If answer is:	Maximum HP is:		
35 or less	3	(Boat length X Boat width) 15	= Number of People
36-39	5		
40-42	7.5		
43-45	10		
46-52	15		
Note: For flat-bottom, hard chine boats, with an answer of 52 or less, reduce one increment (e.g., 5 to 3).		Boat length and width are measured in feet. Round fractions down to next lower number.	

Always check the capacity plate to make sure you are not overloading or over-powering the vessel. A motor larger than recommended will make the stern too heavy and can cause the boat to flip. The transom will ride too low in the water and you could be swamped by your own wake or a passing boat’s wake. Your boat will not sit properly in the water and will be difficult to handle.

Too many people (and/or gear) will also cause the boat to become unstable. Always balance the load so that your vessel maintains proper trim. Too much weight to one side or the other will cause the boat to list and increase the chance of taking on water. Too much weight in the bow causes the vessel to plow through the water and too much weight in the stern will create a large wake. All of these situations make the vessel difficult to handle and susceptible to swamping.

Anchoring

Anchoring is done for two principal reasons to stop and stay in one location and to keep you from running aground in bad weather, as a result of engine failure. Anchoring can be a simple task if you follow these guidelines:

1. Make sure you have the proper type of anchor (Danforth/plow/mushroom).
2. A 3- to 6-foot length of galvanized chain should be attached to the anchor. The chain will stand up to the abrasion of sand, rock, or mud on the bottom much better than a fiber line.
3. A suitable length of nylon anchor line should be attached to the end of the chain (this combination is called the “Rode”). The nylon will stretch under heavy strain cushioning the impact of the waves or wind on the boat and the anchor.
4. Determine depth of water and type of bottom (preferably sand or mud).
5. Calculate the amount of anchor line you will need. As a general rule, use five to seven times as much anchor line as the depth of water plus the distance from the water to where the anchor will attach to the bow. For example, if the water depth is 8 feet and it is 2 feet from the top of water to your bow cleat, you would multiply 10 feet x 5 to 7 to get the amount of anchor line to put out.
6. Secure the anchor line to the bow cleat at the point you want it to stop.
7. Bring the bow of the vessel into the wind or current.
8. When you get to the spot at which you want to anchor, place the engine in neutral.
9. When the boat comes to a stop, slowly lower the anchor. Do not throw the anchor over, as it will tend to entangle the anchor line.
10. When all anchor line has been let out, back down on the anchor with engine in idle reverse to help set the anchor.
11. When anchor is firmly set, use reference points (landmarks) in relation to the boat to make sure you are not drifting. Check these points frequently.

Restrictions

Do not anchor in the traveled portion of any river or channel so as to prevent, impede, or interfere with safe passage of any other boat through the same area.

Do not anchor by the Stern

Anchoring a small boat by the stern has caused many to capsize and sink. The transom is usually squared off and has less freeboard than the bow. In a current, the force of the water can pull the stern under. The boat is also vulnerable to swamping by wave action. The weight of a motor, fuel tank, or other gear in the stern increases the risk.

Fueling Precautions

Most fires and explosions happen during or after fueling of the boat. To prevent an accident, follow these rules:

1. Portable tanks should be refueled ashore.
2. Close all hatches and other openings before fueling.
3. Extinguish all smoking materials.

4. Turn off engines, all electrical equipment, radios, stoves and other appliances.
5. Remove all passengers.
6. Keep the fill nozzle in contact with the tank and wipe up any spilled fuel.
7. Open all ports, hatches, and doors to ventilate.
8. Run the blower for at least 4 minutes.
9. Check the bilges for fuel vapors before starting the engine.
10. Do the “sniff test.” Sniff around to make sure there is no odor of gasoline anywhere in the boat.

Fuel Management

Practice the “One Third Rule” by using:

1. One third of the fuel going out
2. One third to get back
3. One third in reserve

Weather

You should never leave the dock without first checking the local weather forecast. You can get the weather information from the TV, radio, local newspaper, online, or from one of the weather channels on a very high frequency (VHF) radio.

At certain times of the year, weather can change rapidly and you should continually keep a “weather eye” out. While you are out in a boat, here are a few signs that indicate an approaching weather change.

1. Weather changes generally come from the west. Scan the sky, especially to the west.
2. Watch for cloud build-up, especially rapid vertically rising clouds.
3. Sudden drop in temperature.
4. Sudden change in wind direction and/or speed.
5. If you have a barometer on your boat, check it every 2 to 3 hours. A rising barometer indicates fair weather and rise in wind velocity; a falling barometer indicates stormy or rainy weather.

What To Do in Severe Weather

1. Reduce speed, but keep just enough power to maintain headway.
2. Put on your PFD.
3. Turn on running lights.
4. Head for nearest shore that is safe to approach, if possible.
5. Head the bow of the boat into the waves at about a 45-degree angle.

6. Keep bilges free of water.
7. Seat passengers on the bottom of the boat near the centerline.
8. If the engine fails, trail a sea anchor on a line from the bow to keep the boat headed into the waves. A bucket will work as a sea anchor in an emergency.
9. Anchor the boat, if necessary.

3.2.8 Hoisting and Rigging

Wire ropes, chains, ropes, and other rigging equipment will be inspected prior to each use and as necessary during use to assure their safety. Defective rigging equipment will be immediately removed from service.

Rigging will not be used unless the weight of the load falls within the rigging's safe work operating range. This must be verified by the authorized rigger prior to any "pick" or lifting operation.

Only personnel trained in safe rigging procedures will be authorized to engage in rigging procedures. Additionally, the rigger must understand and use recognized crane signals.

Job or shop hooks and links and other makeshift fasteners **shall not** be used. When U bolts are used for eye splices, the U bolt will be applied so the "U" section is in contact with the dead end of the rope.

Wire ropes, chains, ropes, and other rigging equipment shall be stored where they will remain clean, dry, and protected from the weather and corrosive fumes.

The proper length of rope or chain slings will be used to avoid wide angle lifts and dangerous slack. Knotted ropes or lengths of ropes reduced by bolts, knots, or other keepers will not be used.

3.2.9 Cranes and Hoists

The use of cranes may take place during project activities, and carries many associated hazards. Potential contact with overhead electrical lines and potential crushing of workers who may wander into the swing path radius of the crane are just two. If cranes are brought to the work site for use, personnel will ensure that the following safety practices are enforced:

- Crane operator will provide a copy of the crane's annual inspection report to the SS prior to initiating operations.
- Operators of cranes and hoists will make visual and operational inspections of the equipment prior to use. Any discrepancies that would jeopardize the safe operation of the equipment will be corrected prior to use. These inspections are to be documented via a daily inspection checklist or equivalent.
- The posted capacity of the crane will be adhered to and overloading of the equipment will not be allowed.
- The accessible swing radius of the crane will be demarcated and/or barricaded to prevent employees from entering the area.

- The crane's load and boom will be kept a minimum of 10 feet away from utility lines and 20 feet from power lines. **Any deviation must be approved by the PM in conjunction with the RSHM.**
- A competent person will investigate the soil for stability and determine the necessary amount of "cribbing" to be placed under the outrigger pads or if crane mats are necessary.
- No personnel will be permitted to work under a suspended load.
- Except for emergency communications, the operator will only recognize signs and signals from one designated signal person. This signal person will serve as the crane operator's eyes in areas that the crane operator cannot see. This person will be familiar with crane signals, operation of the crane, and safe methods of securing and handling a load.

3.2.10 Manual Lifting

Proper lifting takes the hazard out of moving heavy objects. Below are some items that should be considered prior to a lift.

- Establish that you can lift the load safely; if the load is in excess of 50 pounds, you are required to ask for assistance
- Use a mechanical lifting device if available
- Inspect route to be traveled, confirming sufficient clearance
- Look for any obstructions or spills
- Inspect the object to determine how it should be grasped
- 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 the following proper lifting techniques:

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

The body must be positioned so that the weight of the body is centered over the feet. This provides a more powerful line of thrust and also ensures better balance. Start the lift with a thrust of the rear foot. Do not twist.

3.2.11 Hand and Power Tools

Hand Tools

- Hand tools must meet the manufacturer's safety standards
- Hand tools must not be altered in any way
- At a minimum, eye protection must be used when working with hand tools
- Wrenches (including adjustable, pipe, end, and socket wrenches) must not be used when jaws are sprung to the point that slippage occurs
- Impact tools (such as drift pins, wedges, and chisels) must be kept free of mushroom heads
- Wooden handles must be free of splinters or cracks and secured tightly to the tool
- Any damaged or defective tools must be 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 must not be used in areas subject to fire or explosion hazards, unless they are approved for that purpose
- Portable electric tools must be connected to a Ground Fault Circuit Interrupter (GFCI) when working in wet areas
- Proper eye protection must be used when working with power tools
- Personnel must be trained in the proper use of each specific tool
- Any damaged or defective power tools must be immediately tagged and removed from service.

3.2.12 Electrical Hazards

Only qualified individuals will be allowed to perform work on electrical circuits or perform electrical work on equipment. No employee shall be permitted to work on any part of an electrical power circuit unless the person is protected against electric shock by de-energizing the circuit and grounding it, or ensuring that it has been locked and tagged out:

- All electrical wiring and equipment shall be a type listed by Underwriters Laboratories (UL) or Factory Mutual (FM) for the specific application.
- All installations shall comply with the National Electric Code (NEC) and the National Electric Safety Code (NESC).

- All electrical circuits shall be grounded according to NEC and NESC Code. GFCIs shall be used in the absence of properly grounded circuitry or when portable tools must be used around wet areas.
- Generators and like equipment will be grounded in accordance with NEC, unless exempted by NEC 250-6.
- All live wiring or equipment shall be guarded to protect all persons or objects from harm.

3.2.13 Control of Hazardous Energy

Hazardous energy sources may be encountered during the servicing and maintenance of machines and equipment, in which the unexpected energization or startup 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 using a lockout/tagout device shall follow the program requirements and written procedures for that operation.

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.

3.2.14 Excavations

All 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 the SOP 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. In addition, 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. 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 at the work site and arrange for air quality assessment and mitigation, if necessary.

Atmospheric testing and monitoring shall be performed in 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 manmade event that may increase the load on the walls of the excavation, or otherwise affect their stability

The inspections shall be documented using the Underground Utilities Checklist included in Attachment 1.

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.

3.2.15 Compressed Gas Cylinders

Compressed gases present several hazards. The cylinder must be properly labeled, identifying the hazardous properties of the gas, such as toxicity, flammability, or the presence of an oxidizer, and a SDS must be supplied by the manufacturer. In addition to the gas hazards, compressed gas cylinders pose other hazards simply because they contain gas under pressure.

Regardless of the properties of the gas, any gas under pressure can explode if the cylinder is improperly stored or handled. Improperly releasing the gas from a compressed gas cylinder is extremely dangerous. A sudden release of the gas can cause a cylinder to become a missile like projectile, destroying everything in its path. Cylinders have been known to penetrate concrete block walls. To prevent such a dangerous situation, there are several general procedures to follow for the safe storage and handling of a compressed gas cylinder:

- Store cylinders in an area specifically designated for that purpose. This area must protect the cylinders from being struck by another object. The area must be well ventilated, away from sources of heat, and at least 20 feet away from highly combustible materials. Oxidizers must be stored at least 20 feet away from flammable gases.
- Cylinders must not be dropped or allowed to fall. Chain and rack them in an upright position during use and storage. When transporting cylinders, they must be secured from falling.
- When moving a cylinder, even for a short distance, all the valves must be closed, the regulator removed, and the valve cap installed. Never use the valve cap to lift a cylinder. If you are using a crane or some other lifting device to move a cylinder, use a cradle or boat designed for that purpose. Never use a sling or a magnet to move a cylinder.
- Never permit cylinders to contact live electrical equipment or grounding cables.
- Cylinders must be protected from the sun’s direct rays, especially in high temperature climates. Cylinders must also be protected from 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 to ensure that there are no leaks. When you are ready to use 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.

3.2.16 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 the SOP for fall protection. 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 as follows: Other personnel on-site will assist in retrieving fallen person. There will be no lone work when/if work at heights takes place. Local Emergency Medical Services (EMS) will also be used a resource for fall rescue. 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 work 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

3.2.17 Portable Ladders

Employees who use ladders on work sites must be familiar with safe ladder usage.

- Activities conducted at elevated heights of 6 feet or more, or falls that are likely to result in death or serious harm, must employ suitable fall hazard control measures.
- Use the 4-to-1 ratio. Place the ladder so its feet are 1 foot away from what it leans against for every 4 feet in height to the point where the ladder rests. Example: If the top of a 16-foot ladder leans against a wall, its feet should be placed 4 feet from the wall. The “fireman’s method” is a convenient way of checking the angle of the ladder. Place your toes against the base of the ladder; fully extend both arms toward the side rail and parallel to the ground. When standing erect you should be able to hold the ladder’s side rails.
- Do not use a ladder in a horizontal position as a runway or a scaffold.
- Do not place a ladder in front of a door that opens toward it unless the door is locked, blocked, or guarded by someone.
- Place a portable ladder so that both side rails have a secure footing. Provide solid 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.
- On wet or oily pavement, a smooth floor, or an icy or metal surface, the ladder footing must be lashed, blocked, or otherwise secured.
- Do not lean a ladder against unsafe backing, such as loose boxes or barrels.
- When using a ladder for access to high places, securely lash or otherwise fasten the ladder to prevent it from slipping.
- To gain access to a roof or elevated platform, extend the ladder at least three rungs (3 feet) above the point of support.

Ascending or Descending of Ladders

- Maintain three points of contact at all times when going up or down. If material must be handled, 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.

3.2.18 Slip/Trip/Hit/Fall

Slip/trip/hit/fall injuries are the most frequent of all injuries to workers, but can be minimized by the following prudent practices:

- Spot check the work area to identify hazards
- Establish and utilize a pathway free of slip and trip hazards
- Beware of trip hazards such as wet floors, slippery floors, and uneven surfaces or terrain
- Carry only loads you can see over
- Keep work areas clean and free of clutter, especially in storage rooms and walkways
- Communicate hazards to on-site personnel
- Secure all loose clothing and ties, and remove jewelry while around machinery
- Report and/or remove hazards
- Keep a safe buffer zone between workers using equipment and tools

3.2.19 Heat Stress

Recognition and Symptoms

Temperature stress is one of the most common illnesses faced by project personnel when working in elevated temperatures and/or humidity. Acclimatization and frequent rest periods must be established for conducting activities where temperature stress may occur. Below are listed signs and symptoms of heat stress. Personnel should follow appropriate guidelines if any personnel exhibit these symptoms:

- *Heat Rash:* Redness of skin. Frequent rest and change of clothing.
- *Heat Cramps:* Painful muscle spasms in hands, feet, and/or abdomen. Administer lightly salted water by mouth, unless there are medical restrictions.
- *Heat Exhaustion:* Clammy, moist, pale skin, along with dizziness, nausea, rapid pulse, fainting. Remove to cooler area and administer fluids.
- *Heat Stroke:* Hot dry skin; red, spotted, or bluish; high body temperature of 104°F; mental confusion; loss of consciousness; convulsions or coma. Immediately cool victim by immersion in cool water. Wrap with wet sheet and sponge with cool liquid while fanning; treat for shock. **Do not delay treatment. Cool body while awaiting ambulance.**

Work Practices

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

- Heat stress monitoring

- Acclimatization
- Work/rest regimes (schedule of breaks) - mandatory breaks scheduled in summer months or during high risk activities for heat stress
- Heat stress safety PPE (cool vests, bandanas, etc.)
- Liquids that replace electrolytes, water, and salty foods available during rest
- Use of buddy system

Acclimatization

The level of heat stress at which excessive heat strain will result depends on the heat tolerance capabilities of the worker. Each worker has an upper limit for heat stress, beyond which the resulting heat strain can cause the worker to become a heat casualty. In most workers, appropriate repeated exposure to elevated heat stress causes a series of physiologic adaptations called acclimatization, whereby the body becomes more efficient in coping with the heat stress. Work/rest regimes should be planned as a component of project preparation and discussed during the daily tailgate safety meetings.

Worker Information and Training

All new and current employees who work in areas where there is a reasonable likelihood of heat injury or illness should be kept informed through continuing education programs (e.g., hazards, effects, preventative measures, drug/alcohol interaction).

3.2.20 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. Ultraviolet (UV) rays from the sun can cause skin damage or sunburn, but can also result in vision problems, allergic reactions, and other skin concerns. Two types of UV rays are emitted from the sun: UVA and UVB rays.

UVB rays cause sunburn, skin cancer, and premature aging of the skin. UVB rays stimulate tanning but are also linked to other problems such as impaired vision, skin rashes, and some allergic and other reactions to certain drugs. Extra care should be taken if activities are to be conducted on or near water. Sunlight reflected off the surface of the water is intensified resulting in accelerated effects. The following steps should be taken to protect against overexposure to sunlight:

- ***Always Use Sunscreen:*** Apply a broad spectrum sunscreen with Sun Protection Factor (SPF) of at least 15 or higher liberally on exposed skin. Reapply every 2 hours or more. Even waterproof sunscreen can come off when you towel off or sweat.
- ***Cover Up:*** Wearing tightly woven, loose fitting, and full length clothing is a good way to protect your skin from UV rays.
- ***Wear a Hat:*** A hat with a wide brim offers good sun protection to your eyes, ears, face, and the back of your neck - areas particularly prone to overexposure to the sun.

- ***Wear Sunglasses That Block 99 to 100 Percent of UV Radiation:*** Sunglasses that provide 99 to 100 percent UVA and UVB protection will greatly reduce sun exposure that can lead to cataracts and other eye damage. Check the label when buying sunglasses.
- ***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.
- ***Limit Time in the Midday Sun:*** The sun's rays are strongest between 10 a.m. and 4 p.m. Whenever possible, limit exposure to the sun during these hours.

3.2.21 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. Fatal exposures to cold have been reported in employees failing to escape from low environmental air temperatures or from immersion in low temperature water. Hypothermia, a condition in which the body's deep core temperature falls significantly below 98.6°F (37°C), can be life threatening. A drop in core temperature to 95°F (35°C) or lower must be prevented.

Air temperature is not sufficient to determine the cold hazard of the work environment. The wind chill must be considered as it contributes to the effective temperature and insulating capabilities of clothing. The equivalent chill temperature should be used when estimating the combined cooling effect of wind and low air temperatures on exposed skin or when determining clothing insulation requirements to maintain the body's core temperature.

The body's physiologic defense against cold includes constriction of the blood vessels, inhibition of the sweat glands to prevent loss of heat via evaporation, glucose production, and involuntary shivering to produce heat by rapid muscle contraction.

The frequency of incidents increases with cold temperature exposures as the body's nerve impulses slow down, individuals react sluggishly, and numb extremities make for increased clumsiness. Additional safety hazards include ice, snow blindness, reflections from snow, and possible skin burns from contact with cold metal.

Pain in the extremities may be the first early warning of danger to cold stress. During exposure to cold, maximum severe shivering develops when the body temperature has fallen to 95°F (35°C). This must be taken as a sign of danger to the employees on-site, and cold exposures should be immediately terminated for any employee when severe shivering becomes evident. Useful physical or mental work is limited when severe shivering occurs.

Predisposing Factors for Cold Stress

Certain predisposing factors make an individual more susceptible to cold stress. The project team members are responsible for informing the SS to monitor an individual, if necessary, or use other means of preventing/reducing the individual's likelihood of experiencing a cold related illness or disorder.

- Predisposing factors that will increase an individual's susceptibility to cold stress are listed below:

- *Dehydration:* The use of diuretics and/or alcohol, or diarrhea can cause dehydration. Dehydration reduces blood circulation to the extremities.
- *Fatigue during Physical Activity:* Exhaustion reduces the body's ability to constrict blood vessels. This results in the blood circulation occurring closer to the surface of the skin and the rapid loss of body heat.
- *Age:* Some older and very young individuals may have an impaired ability to sense cold.
- *Poor Circulation:* Vasoconstriction of peripheral vessels reduces blood flow to the skin surface.
- *Heavy Work Load:* Heavy workloads generate metabolic heat and make an individual perspire even in extremely cold environments. If perspiration is absorbed by the individual's clothing and is in contact with the skin, cooling of the body will occur.
- *Use of PPE:* PPE usage that traps sweat inside the PPE may increase an individual's susceptibility to cold stress.
- *Lack of Acclimatization:* Acclimatization, the gradual introduction of workers into a cold environment, allows the body to physiologically adjust to cold working conditions.
- *History of Cold Injury:* Previous injury from cold exposures may result in increased cold sensitivity.

Prevention of Cold Stress

A variety of measures can be implemented to prevent or reduce the likelihood of employees developing cold related ailments and disorders. These include acclimatization, fluid and electrolyte replenishment, eating a well balanced diet, wearing warm clothing, the provision of shelter from the cold, thermal insulation of metal surfaces, adjusting work schedules, and employee education.

- *Acclimatization:* Acclimatization is the gradual introduction of workers into the cold environment to allow their bodies to physiologically adjust to cold working conditions. However, the physiological changes are usually minor and require repeated uncomfortably cold exposures to induce them.
- *Fluid and Electrolyte Replenishment:* Cold, dry air can cause employees to lose significant amounts of water through the skin and lungs. Dehydration affects the flow of blood to the extremities and increases the risk of cold injury. Warm, sweet, caffeine free, non-alcoholic drinks and soup are good sources to replenish body fluids.
- *Eating a Well Balanced Diet:* Restricted diets including low salt diets can deprive the body of elements needed to withstand cold stress. Eat high energy foods throughout the day.
- *Warm Clothing:* Maintaining air space between the body and outer layers of clothing is beneficial in order to retain body heat. However, the insulating effect provided by such air spaces is lost when the skin or clothing is wet.
- *Work/Rest Regimes:* Schedule work during the warmest part of the day, if possible. Rotate personnel and adjust the work/rest schedule to enable employees to recover from the effects of cold stress.

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.

3.2.22 Adverse Weather Conditions

The SS shall decide on the continuation or discontinuation of work based on current and pending weather conditions. Electrical storms, heavy rains, hurricanes, tornado warnings, and sustained strong winds (approximately 40 mph) are examples of conditions that would call for the discontinuation of work and evacuation of the work site.

In addition, no work with elevated super structures (e.g., drilling, crane operations) will be permitted during any type of electrical storm, or during wind events that have wind speeds exceeding 40 mph.

3.2.23 Special Work Conditions/Situations

Contractors may be asked to conduct work that requires special precautions/considerations due to the following factors:

• Remote work locations.	Mandatory: No working alone, Journey Management Plan, call in procedure to include use of satellite phone if no cell or direct line access.
• Work site is in an area known for high crime or violence activity.	Mandatory: No working alone, police or security escort.
• Entry into abandoned buildings.	Mandatory: No working alone, call in procedure.
• Project work involving single employees (lone worker).	Mandatory: Call in procedure.

If these situations are possible, please consult with the RSHM to develop a plan.

3.2.24 Aggressive or Menacing Behavior

If confronted by an individual whose behavior becomes aggressive or menacing, staff should 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 911. 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. 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. Staff members 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 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, facial piercings, scars, hair color, and weapon, if any.

File an Incident Report with your immediate supervisor who will forward the report accordingly.

3.3 Biological Hazards

On-site employees conduct numerous project activities that may encounter biological hazards, including bloodborne pathogens, insects, spiders, scorpions, rodents, snakes, and large predators. This section identifies precautions to be taken if these hazards are encountered.

3.3.1 Vegetation Overgrowth

Overgrown weeds, bushes, trees, grass, and other vegetation are fire and safety hazards. A number of hidden hazards may not be immediately recognized due to the overgrowth of vegetation in areas where field activities may occur, including discarded junk, litter, and debris. Construction materials such as boards, nails, concrete, and other debris may be hidden beneath tall grass, weeds, and bushes. Other hazards may include steep slopes, potholes, trenches, soft spots, dips, etc., all dangerously concealed from the view of the individual walking or operating motorized equipment in the area. Additionally, biological hazards such as snakes, ticks, chiggers, and mosquitoes may be present, as they breed in overgrowth conditions.

Here are some simple actions you can take:

- Assess the work area and determine if the area requires vegetation clearance. Consider that overgrowth extending above the lowest level of motorized equipment (i.e., bumper or fender) or 6 inches above your ankle has hidden hazards that you will not be able to readily identify.
- Determine if the area is safe to walk or whether you need motorized equipment. Consider the limitations of the equipment.
- Identify slip, trip, and fall hazards and remove from the general work area. Remember to give adequate clearance so that the items being removed do not pose future hazards.
- Adequately protect yourself against the hazards by wearing boots that protect the ankles, wearing long pants, and using insecticides.
- Consider the limitations of manual or mechanical equipment for the clearance of overgrowth, particularly the safety hazards when using sling blades, machetes, weed eaters, bush hogs, or other brush removing equipment.

Before taking any action, determine whether there any ecological issues that would affect or prevent the removal of overgrowth in protected areas such as wetlands, wildlife habitats, or sanctuaries for endangered and/or protected species.

3.3.2 Poisonous Plants

Common poison ivy grows as a small plant, a vine, and a shrub. Poison ivy occurs in every state. The leaves always consist of three glossy leaflets.

Poison sumac grows as a woody shrub or small tree 5 to 25 feet tall. It usually contains nine leaves, with eight paired leaves and one on top, and is common in swampy areas. The plants are potent sensitizers and can cause a mild to severe allergic reaction, referred to as “contact dermatitis.”

Dermatitis, in Rhus-sensitive persons, may result from contact with the milky sap found in the roots, stems, leaves, and fruit, and may be carried by contacted animals, equipment, or apparel.

The best form of prevention is to avoid contact. Wearing long sleeves, gloves, and disposable clothing, such as Tyvek, is recommended in high risk areas to avoid exposure from contaminated apparel. Barrier creams and cleaners are also recommended.

3.3.3 Insects

Ticks

Ticks are blood feeding external parasites of mammals, birds, and reptiles throughout the world. Some human diseases of current interest in the United States caused by tick-borne pathogens include Lyme disease, ehrlichiosis, babesiosis, Rocky Mountain spotted fever, tularemia, and tick-borne relapsing fever. Lyme disease is caused by a bacterial parasite called spirochete and is spread by infected ticks that live in and near wooded areas, tall grass, and brush. The ticks that cause the disease in the Northeast and Midwest are often no bigger than a poppy seed or a comma in newsprint. The peak months for human infection are June through October. Many other tick-borne diseases, such as Rocky Mountain spotted fever, can be carried by a variety of ticks. The prevention and treatment of these diseases are similar to those of Lyme disease.

Prevention

Preventative measures include wearing light colored clothing, keeping clothing buttoned, tucking pant legs in socks, and keeping shirttails tucked in. Periodic checks for ticks should be made during the day, and especially at night. Hair should also be checked by parting it and combing through it to make sure that no ticks have attached to the scalp. Also, check clothing when it is first removed, before ticks have a chance to crawl off. A shower or bath should be taken as soon as possible after leaving the work site for the day.

The most common repellent recommended for ticks is N, N-dimethyl-m-toluamide, or DEET. It is important to follow the manufacturer's instructions found on the container with all insecticides, especially those containing DEET.

In general, DEET insect repellent should only be applied to clothing, not directly on the skin. Do not apply to sunburns, cuts, or abrasions. Use soap and water to remove DEET once indoors. However, the DEET user is required to read the insect repellant label and/or SDS for safe use requirements. If ticks are not responding to DEET or other safety methods, then the PM and RSHM are to be notified and additional safety controls may be utilized.

Removal

The best way to remove a tick is removal by tweezers. If tweezers are not available, cover your fingers (tissue paper) while grasping the tick. It is important to grasp the tick as close as possible to the site of attachment and use a firm steady pull to remove it. When removing the tick, be certain to remove all the mouth parts from your skin so as not to cause irritation or infection. Wash hands immediately after with soap and water, and apply antiseptic to the area where tick was removed. Get medical attention if necessary.

Symptoms of Lyme Disease

The first symptoms of Lyme disease usually appear from 2 days to a few weeks after a person is bitten by an infected tick. Symptoms usually consist of a ring like red rash on the skin where the tick attached, and often red on the outside and clear in the center. The rash may be warm, itchy, tender, and/or “doughy” and appears in only 60 to 80 percent of infected persons. An infected person also has flu-like symptoms of fever, fatigue, chills, headaches, a stiff neck, and muscle aches and pains (especially knees). Rashes may be found some distance away from the original rash. Symptoms often disappear after a few weeks.

Bees, Wasps, and Yellow Jackets

Stinging insects are members of the order Hymenoptera of the class Insecta. There are two major subgroups: Apidae (honeybees and bumblebees) and vespids (wasps, yellow jackets, and hornets). Apidae are docile and usually do not sting unless provoked. The stinger of the honeybee has multiple barbs, which usually detach after a sting. Vespids have few barbs and can inflict multiple stings.

Types of stinging insects that might be encountered at this work site may include:

- Carpenter bees
- Bumblebees
- Mud dauber wasps
- Africanized killer bees
- Cicada killer wasps
- Giant hornets
- Honeybees
- Paper wasps
- Yellow jackets

Symptoms

If you are stung, three types of reactions are possible: a normal, a toxic, or an allergic reaction.

- *Normal Reaction:* Only lasts a few hours and consists of pain, redness, swelling, itching, and warmth near the sting area
- *Toxic Reaction:* Will last for several days, results from multiple stings, and may cause cramps, headaches, fever, and drowsiness
- *Allergic Reaction:* Can cause hives, itching, swelling, tightness in the chest area, and a possibility of breathing difficulties, dizziness, unconsciousness, and cardiac arrest.

The stingers of many Hymenoptera may remain in the skin and should be removed as quickly as possible without concern for the method of removal. An ice cube placed over the sting will reduce pain; aspirin may also be useful. Persons with known hypersensitivity to such stings should carry a kit containing epinephrine in a prefilled syringe. Antihistamines may help decrease hives and angioedema. Persons who have severe symptoms of anaphylaxis, have positive venom skin test results, and are at risk for subsequent stings should receive immunotherapy regardless of age or time since anaphylaxis.

Precautions

The following precautions can help you avoid stings. Try to wear light colored clothing and shy away from dark or floral prints. Avoid wearing perfumes, hairsprays, colognes, and scented deodorants while working outside. If eating outside, keep all food and drinks covered; sweet foods and strong scents attract stinging insects as well. Never swat or swing at the insect; it is best to wait for it to

leave, softly blow it away, or gently brush it aside. Seek medical attention when the reaction to a sting includes swelling, itching, dizziness, or shortness of breath.

If physical control measures are not effective, use a pesticide that will have a minimal impact on both you and the environment.

Fire Ants

Fire ants are reddish brown in color and range from 1/8 inch to 3/8 inch in length. When a fire ant stings an individual, the individual is rarely only stung once. Most fire ant stings result in a raised welt with a white pustule. If stung by a fire ant, continue to observe the welt and try to prevent secondary infection by keeping the welt intact. However, some individuals may have an allergic reaction to a fire ant sting and require immediate medical attention. Pesticides and even hot water can be used to kill fire ant colonies. Fire ants are normally seen in the southern states.

Mosquitoes

Mosquitoes are common pests that can be found in any state and any work environment where warm, humid conditions exist. Mosquitoes can pass along diseases such as West Nile virus and malaria. Several different methods can be used to control adult mosquito populations: repellants such as DEET, mosquito traps, foggers, and vegetation and water management.

3.3.4 Poisonous Spiders

Black Widow

Black Widow spiders are not usually deadly (especially to adults) and only the female is venomous. The female spider is shiny black, usually with a reddish hourglass shape on the underside of her spherical abdomen. Her body is about 1.5 inches long, while the adult male's is approximately half that. The spider's span ranges from 1 to 3 inches. The adult males are harmless, have longer legs, and usually have yellow and red bands and spots over their back, while the young black widows are colored orange and white. The bite of a black widow is often not painful and may go unnoticed. However, the poison injected by the spider's bite can cause severe reactions in certain individuals.

Symptoms

Symptoms include abdominal pain, profuse sweating, swelling of the eyelids, pains to muscles or the soles of the feet, salivation and dry mouth (alternating), and paralysis of the diaphragm. If a person is bitten, they should seek immediate medical attention. Clean the area of the bite with soap and water. Apply a cool compress to the bite location. Keep effected limb elevated to about heart level. Ask a doctor if acetaminophen or aspirin can be taken to relieve minor symptoms. Additional information can be obtained from the Poison Center (1 (800) 222-1222). Black widows are found throughout the tropics, U.S., and Canada.

Brown Recluse

Brown recluse spiders are usually light brown in color, but in some instances they may be darker. Brown recluse spiders are highly venomous spiders, native to the United States, and found coast to coast. The brown recluse can vary in size, but some can obtain bodies of 5/8 inches in length with a

leg span of 1 1/2 inches in diameter. They can be identified by their three pairs of eyes along the head area and their fiddle shaped markings on the back. Most brown recluse bites are defensive rather than offensive. They generally only bite when they feel threatened.

Symptoms

If bitten by a brown recluse, an individual may experience open, ulcerated sores, which when left untreated may become infected and cause tissue necrosis. If an individual believes a spider has bitten them, they need to seek medical attention as soon as possible. In order to minimize the occurrence of brown recluse bites, individuals should shake their clothing and shoes thoroughly, eliminate the presence of cluttered areas, and spray the building perimeters with pesticides. Brown recluse are found throughout the U.S., Mexico, and Canada.

3.3.5 Threatening Dogs

If you are approached by a frightened or menacing dog:

- Do not attempt to run and do not turn your back.
- Stay quiet, and remember to breathe.
- Be still, with arms at sides or folded over chest with hands in fists.
- Slowly walk away sideways.
- Do not stare a dog in the eyes, as this will be interpreted as a threat.
- Avoid eye contact.
- If you have a jacket, you can wrap it around your arm to reduce harm, should the dog move to bite.

3.3.6 Rodents

Rodentia: (rats, mice, beavers, squirrels, guinea pigs, capybaras, coypu)

Rodents, or Rodentia, are the most abundant order of mammals. There are hundreds of species of rats; the most common are the black and brown rat.

The **Brown Rat** has small ears, blunt nose, and short hair. It is approximately 14 to 18 inches long (with tail). They frequently infest garbage/rubbish, slaughterhouses, domestic dwellings, warehouses, shops, and supermarkets; they also frequent any space with an easy meal and potential nesting sites.

The **Black Rat** can be identified by its tail, which is always longer than the combined length of the head and body. It is also slimmer and more agile than the Norwegian or Brown rat. Its size varies according to its environment and food supply.

The **House Mouse** has the amazing ability to adapt and now can frequently be found in human dwellings. In buildings, mice will live anywhere and they are very difficult to keep out. Mice are also omnivorous and will eat anything.

Rats and mice often become a serious problem in cold winter months when they seek food and warmth inside buildings. They may suddenly appear in large numbers when excavation work disturbs their in-ground nesting locations or their food source is changed.

There are six major problems caused by rats and mice:

1. They eat food and contaminate it with urine and excrement.
2. They gnaw into materials such as paper, books, wood, or upholstery, which they use as nest material. They also gnaw plastic, cinder blocks, soft metals such as lead and aluminum, and wiring, which may cause a fire hazard.
3. Rats occasionally bite people and may kill small animals.
4. They, or the parasites they carry (such as fleas, mites, and worms), spread many diseases such as salmonella, trichinosis, rat bite fever, hantavirus, Weil's disease, and the bubonic plague.
5. Rats can damage ornamental plants by burrowing among the roots or feeding on new growth or twigs. They also eat some garden vegetables, such as corn and squash.
6. Rats and mice are socially unacceptable. These rodents have been a problem for centuries, chiefly because they have an incredible ability to survive and are so difficult to eliminate. In addition, they are extremely compatible with human behavior and needs.

3.3.7 Snakes

Snakes may be found in any region of the country. While many snakes encountered are not venomous, a few are, so all snakes should be given a wide berth. Of the 7,000 venomous snakebites reported each year, only about 15 prove to be fatal, so your chances of survival are extremely high. The usual snake encounter is one in which they see you before you see them, and they slither away from you quickly, startling you. If you see a snake, back away from it slowly and do not touch it. If you or someone you know are bitten, try to see and remember the color and shape of the snake, which can help with treatment of the snakebite.

Venomous snakes include the coral snake and pit vipers, such as the cottonmouth (water moccasin), copperhead, and rattlesnake. The venom of pit vipers is primarily *hematoxic* because it acts upon the victim's blood system. This venom breaks down blood cells and blood vessels and affects heart action. Bite victims experience severe burning pain, localized swelling and discoloration for the first 3 to 30 minutes, followed by nausea, vomiting, occasional diarrhea, and usually shock.

Preventing Snakebites

The best ways to prevent snakebites are to watch where you step, put your hands, or sit down. Poisonous snakes live on or near the ground and often like rocks, woodpiles, and other spots that offer both a place to sun and a place to hide. Most bites occur in and around the ankle. About 99 percent of all bites occur below the knee, except when someone accidentally picks up or falls on the snake.

Watching where you step and wearing boots in tall grass can prevent most snakebites. Snake chaps can also help protect against snakebites.

Signals that indicate a poisonous snakebite include:

- One or two distinct puncture wounds, which may or may not bleed - the exception is the coral snake, whose teeth leave a semicircular mark
- Severe pain and burning at the wound site immediately after or within 4 hours of the incident
- Swelling and discoloration at the wound site immediately after or within 4 hours of the incident

Emergency First Aid for Poisonous Snakebite

Although it is important to obtain medical aid immediately, emergency first aid can slow the spread of poison from the bite. Remain calm and avoid unnecessary movement, especially if someone is with you. The rate of venom distribution throughout your body will be slower if you are still and quiet. *Do not* use home remedies, and *do not* drink alcoholic beverages.

To care for a bite from a pit viper, such as a rattlesnake, copperhead, or cottonmouth, follow these steps:

- Call 9-1-1 or the local emergency number
- Wash the wound
- Keep the injured area still and lower than the heart; if possible, carry a person who must be taken to a medical facility or have him or her walk slowly
- Do not apply ice
- Do not cut the wound
- Do not apply suction
- Do not apply a tourniquet
- Do not use electric shock, such as from a car battery

Care for a bite from an elapid snake, such as a coral snake, is the same as for a pit viper, except that after washing the wound you should apply an elastic roller bandage by following these steps:

- Check for feeling, warmth, and color of the limb beyond where you will be placing the bandage by noting changes in skin color and temperature.
- Place the end of the bandage against the skin and use overlapping turns.
- Gently stretch the bandage as you continue wrapping. The wrap should cover a long body section, such as an arm or a calf, beginning at the point farthest from the heart. For a joint like a knee or ankle, use figure eight turns to support the joint.
- Always check the area above and below the injury site for feeling, warmth, and color, especially fingers and toes, after you have applied an elastic roller bandage. By checking before and after bandaging, you will be able to tell if any tingling or numbness is from the bandaging or the injury.

- Check the snugness of the bandaging a finger should easily, but not loosely, pass under the bandage.
- Keep the injured area still and lower than the heart. If possible, carry a person who must be taken to a medical facility or have him or her walk slowly.
- Do not apply ice.
- Do not cut the wound.
- Do not apply suction.
- Do not apply a tourniquet.
- Do not use electric shock, such as from a car battery.

3.3.8 Scorpions

Forty different types of scorpions are found in the U.S. ***All the different types are located in the southern states.***

Wind scorpions, including sun scorpions, are easily recognized by the pair of large, pincer-like chelicerae on the head in front of the mouth and by the slight, waist like constriction near the middle of the body. Unlike the broadly joined cephalothorax and abdomen of scorpions, wind scorpions have three distinct body regions - a segmented cephalothoracic area with two eyes at the front margin, a three-segmented thorax, and a ten-segmented abdomen.

Death by a scorpion sting, if it occurs, is the result of heart or respiratory failure some hours after the incident.

3.3.9 Alligators

Alligators, crocodiles, and gharials make up the group of animals known as crocodilians. Crocodilians are the world's largest reptiles. The American alligator or *Alligator mississippenisis* is the least aggressive crocodilian.

Similar to snakes, lizards, and other reptiles, alligators are cold-blooded (or ectothermic), meaning the air or water temperature around them determines their body temperature. The **American alligator** primarily ***inhabits the southeastern U.S.: Alabama, Arkansas, North and South Carolina, Florida, Georgia, Louisiana, Mississippi, Oklahoma, and Texas.*** They primarily live in freshwater swamps and marshes, but also in rivers, lakes, and smaller bodies of water. They can tolerate a reasonable degree of salinity for short periods of time as they are occasionally found in brackish water around mangrove swamps, although they lack the buccal salt secreting glands present in crocodiles. Adult males typically reach 4 to 4.5 meters (approximately 13 to 14.7 feet). Alligators are classified as a threatened species and thus enjoy the protection of state and federal law. State and federal law prohibits people from killing, harassing, molesting, or attempting to move alligators. The potential for being bitten or injured by a provoked alligator is high. Maintain a distance of at least 15 feet from any alligator. Fifteen feet is the outside range for the alligator's frightening burst of speed.

If an alligator attacks:

Run away in a straight line. Crocodiles and alligators will outrun you for about 30 feet (10 meters) or so at speeds up to 20 mph, after which they will need to rest. They will have no trouble out swimming you, however.

If an alligator has grabbed you:

- Hit it repeatedly on its relatively sensitive nose, poke it in the eyes, and scream. Alligators do not like resistance.
- Do not try to pry the jaws open
- Play dead. They stop shaking their prey when they think that it is dead, wedging the body in their pantry for later consumption. This is when you can escape.

Seek immediate medical attention if you are bitten by an alligator. Alligators harbor very infectious bacteria, and even minor bites may require special treatment.

3.3.10 Bloodborne Pathogens

Hepatitis and other communicable diseases are largely transmitted through exposure to bodily fluids containing the hepatitis virus, which could be found on refuse encountered in subsurface investigations. This could also be encountered during activities occurring at landfills, sewage treatment facilities, and sewers, and locations where topical spreading of treated waste and medical wastes (e.g., contaminated needles and syringes) occurs. Individuals performing tasks for these types of projects should consult with their physicians and be properly vaccinated. The primary method of transmission depends on the prevalence of the disease in a given area.

Hepatitis A is a liver disease caused by the hepatitis A virus. Hepatitis A can affect anyone and can occur in situations ranging from isolated cases of disease to widespread epidemics.

Hepatitis B is a serious disease caused by a virus that attacks the liver. The virus, which is called hepatitis B virus (HBV), can cause lifelong infection, cirrhosis (scarring) of the liver, liver cancer, liver failure, and death.

Hepatitis C is a liver disease caused by the hepatitis C virus (HCV), which is found in the blood of persons who have the disease. HCV is spread by contact with the blood of an infected person.

Hepatitis D is a liver disease caused by the hepatitis D virus (HDV), a defective virus that needs the hepatitis B virus to exist. HDV is found in the blood of persons infected with the virus.

Hepatitis E is a liver disease caused by the hepatitis E virus (HEV) and is transmitted in much the same way as hepatitis A virus. Hepatitis E, however, does not often occur in North America.

Prevention

Preventative measures include wearing appropriate PPE: leather work gloves, a long sleeved shirt, and safety footwear. Several vaccines have been developed for the prevention of hepatitis B and C virus infection. Vaccines rely on the use of one of the viral proteins (hepatitis B surface antigen or HBsAg). The vaccine was originally prepared from plasma obtained from patients who had long-standing hepatitis B virus infection. However, currently these are more often made using

recombinant technology, though plasma derived vaccines continue to be used; the two types of vaccines are equally effective and safe.

4. Personal Protective Equipment (PPE)

4.1 General

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

The purpose of PPE is to shield or isolate individuals from the chemical and physical hazards that may be encountered during work activities.

4.2 Types of PPE

The type of PPE required for a project will vary based on the level of protection required to protect the employee from physical, chemical, biological, and thermal hazards.

4.2.1 Types of Protective Material

Protective clothing is constructed of a variety of different materials for protection against exposure to specific chemicals. No universal protective material exists. All will decompose, be permeated, or otherwise fail to protect under certain circumstances.

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 (failure to maintain structure). It should be noted that 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 should be used in conjunction with degradation tables.

In order to obtain optimum usage from PPE, the following procedures are to be followed by all on-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 will be discarded. PPE used in areas known or suspected to exhibit elevated concentrations of chemicals will not be reused.

4.3 Levels of Protection

The level of protection must correspond to the level of hazard known or suspected in the specific work area. PPE has been selected with specific considerations to the hazards associated with work site activities. The specific PPE to be used for each activity is outlined in each JSA table located in Attachment 2.

- All PPE will be disposed of and/or decontaminated at the conclusion of each workday as described below. Decontamination procedures will follow the concept of decontaminating the most contaminated PPE first.
- All disposable equipment shall be removed before meal breaks and at the conclusion of the workday, and replaced with new equipment prior to commencing work.
- 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.

4.3.1 Reassessment of Protection Levels

Protection levels provided by PPE selection shall be upgraded or downgraded based upon a change in work 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 shall be 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 limit the effectiveness of PPE
- Chemicals other than those expected to be encountered are identified
- Change in ambient levels of chemicals

- Change in work scope, which affects the degree of contact with areas of potentially elevated chemical presence

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

5. Air Monitoring Program

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.

When air monitoring is required, the workers breathing zone(s) will be monitored and the results recorded. Additionally, 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
- Along decontamination line to check that decontamination workers are properly protected and on-site workers are not removing protective equipment in a contaminated area
- Downwind of work area to track any contaminants/emissions leaving the work 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 and Table 2 presents the action levels for the on-site Air Monitoring Program.

5.1 Exposure Monitoring

5.1.1 Multi-Gas Meters (LEL/O_2/H_2S/CO Meters)

The multi-gas meter is a combination indicator typically including 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.

Action levels for each contaminant being monitored can be found in Table 2, which includes parameters, action levels, and actions to be taken.

5.1.2 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 per work activity relates to the initial level of protection. The monitoring frequency may be decreased if the work areas and activities are unchanging, the result of the first hour of monitoring indicate contaminant concentrations are non-detect, and no differing conditions are observed.

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

5.1.3 HSE 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 in Modified Level D. The appropriate actions are to be taken at designated action levels. The initial action level(s) can be located in Table 2.

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

- Any symptoms of chemical exposure occur, as described in Table 1
- 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.

6. Site Control

The purpose of site control is to minimize potential contamination of workers and protect the public from hazards found on the work site. Site control is especially important in emergency situations.

- Site control and work area demarcation will be achieved through posting of signage and placement of barricades. All construction 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 construction areas, crane swing radius, and control traffic:
    - Temporary fence
    - High visibility tape, rope, or chains
    - Traffic cones
    - Sawhorses
    - Wood or metal guardrails

One pathway should be established for heavy equipment and one for personnel decontamination.

The majority of work site operations, as well as access to the work 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 work 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.

6.1 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 an air horn, walkie-talkie, cell phones, or hand signals.

The primary means for external communication are cell phones and radio.

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 all right; 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

6.2 Buddy System

A buddy system shall be implemented when conducting intrusive activities at the Site. This buddy shall be able to:

- Provide his or her partner with assistance
- Observe his or her partner for signs of chemical exposure or temperature stress
- Periodically check the integrity of his or her partner's protective clothing
- Notify emergency personnel if emergency help is needed

6.3 Site Security

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

A "No Trespassing Violators Will Be Prosecuted" sign is posted at the Northern Impoundment entrance. Only authorized personnel is to be allowed in this area.

Prior to any planned fieldwork, contact the security company and provide date and time of work.

First time work site visitors, at a minimum, should be accompanied by personnel familiar with the work site's layout and procedures.

6.4 Decontamination

The following are questions/items that may need to be addressed based on work site specific protocols:

- Is formal equipment and/or personal decontamination necessary? If so, what measures will be implemented to manage residual wash waters, sediments, soils, etc.? Disposal measures for used/spent PPE?
- Does a decontamination pad already exist?
- What type(s) of equipment and decontamination cleansers/reagents will be necessary?
- Will wipe sampling and/or other forms of verification be required?
- Is there a decontamination pad/facility present at the work site or will a pad need to be constructed? Location(s) of permanent and/or temporary facilities?
- Who is responsible for disposal of any wastes generated by decontamination activities?

The SS is responsible for ensuring that all personnel and pieces of equipment going off-site are properly decontaminated according to the procedures outlined below. Documentation of decontamination must be made in the field log notebook and will become part of the permanent project file.

6.4.1 Personnel and Equipment Decontamination Procedures

All PPE will be disposed of and/or decontaminated at the conclusion of each workday as described below. Decontamination procedures will follow the concept of decontaminating the most contaminated PPE first.

All disposable equipment shall be removed before meal breaks and at the conclusion of the workday, and will be 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 be initiated prior to exiting the contaminated work area and completed in the Contamination Reduction Zone.
- ***Modified Level D:*** First, remove outer protective wear. Remove gloves and properly dispose in designated waste container. Wash hands and face.
- ***Equipment:*** All equipment must be decontaminated with Alconox/Liquinox solution or discarded upon exit from the contaminated area in a well ventilated area. A temporary decontamination pad with a low volume high pressure washer will be set up on-site during project operations. All decontamination materials will be drummed for subsequent disposal.

7. Emergency Procedures

7.1 On-site Emergencies

Emergencies can range from minor to serious conditions. Various procedures for responding to work 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 work 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/Implementing Parties' emergency protocols to ensure compatibility between this document and facility/Implementing Parties' programs and expectations.

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 at the front of this HASP.

7.2 Incident, Injury, and Illness Reporting and Investigation

Any work related incident, injury, illness, exposure, or property loss must be reported the SS, and **within 1 hour** to the Project Manager and Project Coordinator. The Project Coordinator will then inform the Implementing Parties. Motor vehicle accidents must also be reported through this system. The Incident Reporting Form, located in Attachment 1, must also be filled out and provided to the SS. 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

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.

7.3 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 work site. The safety equipment may include, but is not limited to, the following:

- First Aid kit (size is dependent upon the number of personnel on-site):

- Contents**:** Each first aid kit shall contain, as a minimum (ANSI 308.1-2003):
- 1 Absorbent Compress (32 square inches, no side less than 4 inches)
- 16 Adhesive Bandages (1 inch x 3 inches)
- 1 Adhesive Tape (roll, 3/8 inch x 5 yards)
- 10 Individual Antiseptic (0.5 g)
- 6 Burn Treatments (Antibiotic) (each 1/32 oz.)
- 2 Pairs of Medical Exam Gloves (not to be reused)
- 4 Sterile Pads (3 inches x 3 inches)
- 1 Triangular Bandage

- 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).

7.4 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 victim 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.

7.5 Work Site Evacuation

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 cell phone established communications to evacuate

the area. In the event of an emergency, 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 work site-specific training prior to commencement of work activities, weekly thereafter, and prior to the advent of potentially threatening weather. Muster points and evacuation routes will be identified during the tailgate safety meeting.

During work over water (boating, barge drilling, excavation, etc.), the SS will determine an appropriate docking location to transfer personnel from the water to the land so they can be transported to a hospital or clinic. Two boat launches are present in the vicinity of the Northern Impoundment, where work over water will occur. The nearest boat launch is located at the San Jacinto River Fleet Facility approximately 1.5 boating miles west of the Northern Impoundment. The second is located at the Riverside Inn Marina, approximately two boating miles west of the Northern Impoundment.

7.6 Spill and Release Contingencies

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

8. 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 (work site specific training, toolbox meetings, etc.)
- Documentation of work site inspections, results of inspections, and corrective actions implemented
- Emergency reports describing any incidents or accidents

Attachment 2
Emergency Response Plan – Northern Impoundment

Attachment 2 - Emergency Response Plan - Northern Impoundment

Draft Provided with Preliminary 30% Remedial Design - Northern Impoundment

San Jacinto River Waste Pits Site
Harris County, Texas

International Paper Company
McGinnes Industrial Maintenance Corporation

GHD | 5551 Corporate Boulevard Suite 200 Baton Rouge Louisiana 70808 USA
11187072 | Report No 13

Table of Contents

Table of Contents

1. Introduction

This Emergency Response Plan (ERP) for the Northern Impoundment in Harris County, Texas (Site) was prepared by GHD Services Inc. (GHD), on behalf of the International Paper Company (IPC) and McGinnes Industrial Maintenance Corporation (MIMC; collectively referred to as the Respondents). This ERP complies with the United States Environmental Protection Agency (EPA) *Remedial Design/Remedial Action Handbook* and Occupational Safety and Health Administration (OSHA) standard for Hazardous Waste Operations and Emergency Response; Final Rule (29 Code of Federal Regulations [CFR] § 1910.120(1)(2) to plan for potential emergencies prior to the commencement of hazardous waste operations. References in this ERP to the "work site" are to the Northern Impoundment of the Site and references to "Implementing Parties" are to the entities implementing the remedial action (RA) for the Northern Impoundment.

Major incidents at the work site that may require emergency response would include: severe weather, fire, explosion, chemical reaction, truck rollovers, off-site accidents involving transport vehicles, spills or other incidents that may be immediately dangerous to human health and safety of on-site personnel, the traveling public, navigational traffic and nearby residents and/or the environment.

2. Pre-Emergency Planning

2.1 Coordination with Outside Parties

During any emergency events on-site, personnel may coordinate and communicate with the following authorities (as necessary):

- EPA Region 6
- Harris County Sheriff
- Channelview Fire Department
- Texas Commission on Environmental Quality (TCEQ)
- Texas Railroad Commission (TRRC)
- Texas Department of Transportation (TxDOT)
- United States Coast Guard (USCG)
- Port of Houston Authority (POHA)

A meeting with these authorities may be requested and conducted by the Implementing Parties prior to the commencement of RA activities at the work site, in order to facilitate a coordinated, integrated, and timely response for any emergencies that may occur during field activities which represent a potential for release of hazardous material. Topics that would be discussed/reviewed at the meeting would include the following:

- Site history/historical response actions

- Nature and extent of contamination
- Nature and duration of anticipated RA field activities
- Health and Safety Plan (HASP) contents
- ERP contents
- Transportation routes
- Emergency response support that can be provided by local emergency response authorities

A copy of the sign-in sheet for those who attend the meeting would be maintained on file at the work site.

2.2 Initial Notification Procedures

To minimize hazards to human health and safety and/or the environment, in the event of a fire, explosion, spill, or release involving a hazardous material (including oil, raw materials and by-products, or hazardous waste), it is the responsibility of on-site personnel to immediately report any such explosions, spills or releases to the person designated by the Implementing Parties as the work site supervisor (Site Supervisor or SS) The Site Supervisor will be responsible for implementing emergency procedures, if necessary, and for notification of the Project Coordinator, the Implementing Parties' Project Managers (Project Managers) and local emergency response authorities listed in Table 1.

2.3 Emergency Contacts

The emergency telephone numbers for the local emergency response authorities and other local, state, and federal authorities are presented in Table 1. The closest hospital to the work site is located approximately 9 miles east of the work site, in Baytown, Texas. The emergency telephone numbers and the emergency route to the hospital will be posted at the work site prior to commencement of activities and are included in the Site HASP.

Table 1 Emergency Information

EMERGENCY INFORMATION		
Contact	**Phone Number**	**Site Location, Hospital & Clinic Directions**
Local Police:	911	**Northern Impoundment:**
Harris County Constable	(713) 637-0014	18003 Market St. Channelview, Texas 77530
Baytown Police Department	(281) 422-8371	(29.793781, -95.063186)
Local Fire Department:	911	
Channelview Fire Department	(281) 452-5782	
Ambulance	911	

3. Emergency Recognition and Prevention

This section describes the methods and procedures to be used to recognize and prevent or minimize the adverse effects of any releases of hazardous materials that may occur at the work site.

3.1 Emergency Recognition

On-site personnel, who will be required to be trained in accordance with 29 Code of Federal Regulations (CFR) 1910.120 , will be prepared to recognize and report to the Site Supervisor any incident (e.g., fire, explosion) or releases of hazardous materials which may endanger human health and safety or the environment. Specifically, when personnel discover such an incident or release of a hazardous material, the following procedures will be followed:

- Report the incident/release to the Site Supervisor
- The Site Supervisor will determine if the incident/release represents an emergency and, if so, will immediately notify the Project Coordinator, the Project Managers, and local emergency response authorities, if necessary.

Personnel in the affected area(s) will immediately evacuate the area of release or the work site in accordance with the "Evacuation Procedures", presented in Section 6.

3.2 Release Prevention Measures

The following procedures/measures may be implemented at the work site to prevent potential releases of or minimize the impact of releases of hazardous materials:

- Operations will not be conducted when meteorological conditions, (e.g., wind speed/direction or precipitation) would result in a significant risk to human health and safety or the environment, should a release occur.
- All potential hazardous material generated during activities (i.e., impacted soils, dewatering fluids, decontamination fluid, used PPE, etc.) will be placed onto the appropriate staging pads or placed in compatible containers.
- The Site Supervisor will be accountable for hazardous materials spill/release prevention, and is responsible for properly instructing on-site personnel in the operation and maintenance of equipment to prevent the discharges of hazardous materials.
- A supply of spill/release response materials and emergency safety equipment will be stored at the work site during activities to immediately respond to releases/emergencies.
- On-site personnel will be capable of providing immediate response in order to contain and/or mitigate spills and releases.
- If necessary, a meeting will be conducted with local emergency response authorities in order to facilitate a coordinated, integrated and timely response for any emergencies that on-site personnel are unable to contain and/or control.

4. Personnel Roles

This section of the ERP describes the various personnel roles, responsibilities, lines of authority and communication procedures that will be followed by on-site personnel involved in responses to incidents or emergencies.

4.1 Site Supervisor

The Site Supervisor will be responsible for implementing on-site emergency response procedures and directing the on-site and emergency personnel. All on-site personnel and their communications will be coordinated through the Site Supervisor. Specific duties of the Site Supervisor will be as follows:

- Initially identify the source and character of the incident and the type and quantity of any release. Assess possible hazards to human health or the environment in consultation with the person designated as responsible for safety and health requirements at the work site(Safety and Health Officer) that may result directly from the problem or its control.
- If the incident may threaten human health or safety of on-site personnel, immediately determine whether evacuation of the Site is necessary in consultation with the Project Managers and EPA Remedial Project Manager (RPM).
- If the incident does not threaten human health or safety of on-site personnel or nearby residents or the environment, determine if on-site personnel can contain or control the incident or release. If not, notify local emergency response authorities identified above in Table 1.
- Direct on-site personnel to control the incident or release until, if necessary, outside emergency response help arrives. Specifically ensure that the location where the incident/release occurred and the surrounding area are evacuated and all operations in the vicinity of the incident are discontinued to ensure that fire, explosions, or spills do not spread. Direct work site personnel not involved in emergency response actions to avoid the area of the incident and leave emergency control procedures unobstructed and ensure protected personnel are on standby for emergency rescue, if necessary.
- If hazardous materials have been released or produced through control of the incident, ensure that containers of material are removed or isolated from the immediate location of the emergency.
- Per regulations developed under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) , a spill/release of one pound or more of any hazardous material for which a reportable quantity has not been established will be reported.
- Determine, in consultation with the Safety and Health Officer, when the emergency has passed and initiate an "all clear" signal to notify on-site personnel of such.
- Ensure that all emergency equipment used is decontaminated, recharged, and/or fit for its intended use before work site operations are resumed.
- Record time, date, and details of the incident, and submit both a verbal notification with 24 hours to and a written incident report to the TCEQ regional manager within 30 working days of the

release, if the release is at or above reportable quantities, per 30 Texas Administrative Code (TAC) 327.

4.2 Health and Safety Officer

This individual may be responsible for identifying and evaluating actual and potential hazards and provide oversight of emergency response actions with respect to the safety of operations being conducted. The Health and Safety Officer will report directly to the Site Supervisor. Specific duties of the Health and Safety Officer are as follows:

- Conduct an initial assessment of the spill/release to identify chemical(s) and potential physical hazard(s) of the emergency response actions.
- Perform necessary air monitoring to determine levels of exposure and necessary protective equipment for emergency personnel and evaluate the potential for off-site migration of airborne contaminants.
- Present a safety briefing to on-site personnel to inform them of the actual and potential hazards of the emergency spill/release response and required levels of personnel protective equipment.
- Identify use of any engineering controls, (e.g., ventilation, remote handling devices, etc.), to control overexposure of personnel to hazardous materials.
- Identify work zones to be established by on-site personnel.
- Investigate any injuries or illnesses as a result of accidents occurring during the emergency response.
- Observe the safety of clean-up procedures and ensure appropriate PPE requirements are being adhered to.
- Determine that it is safe for personnel to return to the affected area after emergency response action are completed.

Maintain a log of safety briefings, air monitoring, safety observations, and other important issues relevant to safety.

4.3 On-site Personnel

The Site Supervisor may be responsible for directing the on-site personnel in emergency response operations.

The on-site personnel will respond initially to all emergency incidents. Priorities of on-site personnel will be to protect human health and safety of on-site personnel and nearby residents, and then the environment. Concentration will be placed on preventing the spill/release from spreading to nearby areas. The spill/release response efforts will be carried out until, if necessary, arrival of the appropriate local emergency response authorities. Specific duties of the on-site personnel are as follows:

- Clear the area of all personnel not actually involved in responding to the spill/release, and remove any injured persons from the area such that medical treatment can be administered by qualified first aid- trained personnel. Prior to allowing treatment of injured persons by first

aid- trained personnel, decontamination of the injured persons will be performed. On-site personnel will be responsible for ensuring that the level of decontamination reflects the extent of injury and level of contamination.

- Establish appropriate work zones for emergency response as directed by the Health and Safety Officer.
- Control the incident or release at the direction of the Site Supervisor, until, if necessary, outside emergency response help arrives.

The Site Supervisor may appoint or designate, as necessary, on-site personnel to assist in the following efforts:

- Notification of local emergency response authorities.
- Site evacuation and accounting of personnel and visitors.
- Assuring that personnel not involved in the emergency response and clean-up activities are kept a safe distance from the spill/release area and do not interfere with operations.
- Maintaining on-site traffic lanes for emergency response vehicles.
- Sampling efforts to determine the extent of contamination and clean-up efforts.
- Proper containerization, labeling and staging of any recovered hazardous materials.
- Assisting in decontaminating, recharging or replacing all emergency equipment used during the emergency response.
- Assisting in returning personnel to their work areas after the "all clear" signal is given.

5. Severe Weather Preparation

The Site Supervisor may administer three different preparation phases if severe weather including a tropical depression, tropical storm, or hurricane is anticipated to make landfall in the general vicinity of the work site based on the National Hurricane Center advisories. The phases and associated procedures are defined below and should be followed to protect the work site and personnel in the event of severe weather.

Phase I Preparation

Phase I preparations will take place in the event of severe weather events, including heavy rains with potential localized flooding, or an expected tropical depression, tropical storm, or hurricane landfall in the southeast Texas vicinity, which is predicted to affect the area in the vicinity of Channelview (Channelview Area) within 96 hours.

The Site Supervisor will execute the following:

- Monitor the weather forecast for updated storm predictions
- Consider suspending all non-essential work site activities and deliveries and covering of any open excavations

- Consider timing of a complete suspension of work and for covering of any open excavations
- Secure or remove equipment that could be damaged by the storm (i.e., small totes, drums, vehicles, monitoring instruments, etc.)

Phase II Preparation

Phase II preparations will take place in the event of an expected tropical depression, tropical storm, or hurricane landfall in the southeast Texas vicinity which is predicted to affect the Channelview Area within 84 hours. The Site Supervisor will follow the procedures outlined in Phase I and, in addition, will execute the following:

- Cancel all deliveries
- Suspend all work and shutdown and move equipment off-site, as necessary
- Take all records off-site
- Backfill any open excavation using available on-site material or clean backfill.

Phase III Preparation

Phase III preparations will take place in the event of an expected tropical depression, tropical storm, or hurricane landfall in the vicinity of southeast Texas which is predicted to affect the Channelview Area within 72 hours. The Site Supervisor will follow the procedures outlined in Phases I and II and, in addition, will execute the following:

- Evacuate all personnel from the work site
- Suspend all work activities until the Site Supervisor, in coordination with the Project Coordinator, Project Managers, and EPA RPM, determines the work site is safe for reentry.

5.1 High Water Plan

This section will discuss the plans and procedures to implement in preparation for and during a high water event. The Site Supervisor will monitor applicable weather and river stage predictions to forecast a high water event. Prior to an anticipated high water event, the Site Supervisor will take the following precautions to secure the work site.

5.1.1 Onshore Response

5.1.2 Offshore Response

5.2 Reentry Procedure

The Site Supervisor, in coordination with the Project Coordinator and Project Managers, will determine the appropriate time for personnel to return to the work site. Site personnel will not access the work site until the Site Supervisor approves entry.

Federal, state, and local government agencies and law enforcement officials have agreed to recognize specific identification from critical infrastructure owners and operators, and their

contractors, subcontractors, and assignees that seek access into a closed emergency area. Once identity has been verified, access is granted at the discretion of agency or official representatives (e.g., law enforcement, National Guard). The following is a list of identification that may be required to gain access at checkpoints:

1. A valid State Driver's License and company issued photo ID
2. Transportation Worker Identification Credential (TWIC) Card
3. Marked company vehicles
4. Letter of Access (LOA) issued by the company (with verified phone number) stating that the person and vehicle is authorized

Once the local authorities have granted access, the Site Supervisor, in coordination with the Project Coordinator and the Implementing Parties, can then determine the appropriate time for personnel to return to the work site. Site personnel will not access the work site until the Site Supervisor approves entry.

5.3 Site Inspection

Once it is determined that the work site is safe to access, personnel will mobilize to the work site to complete a post-storm, hurricane or high water event site inspection. Personnel will document work site conditions with photographs and field notes. In addition, they will note any damage or impact to materials or equipment, determine approximate high water levels, and/or obtain relevant information from any local residents that may have stayed in the area during the storm, hurricane, or high water event. If necessary, site personnel will prepare a Site Inspection Report for submittal to the EPA that includes documentation of the work site conditions and photographs.

6. Evacuation Route and Procedures

Emergencies require prompt and deliberate action. In the event of a hazardous material spill/release, it will be necessary to follow an established set of procedures. Such established procedures will be followed as closely as possible; however, in specific emergency situations, the Site Supervisor may deviate from the procedures to provide a more effective plan for bringing the situation under control. The Site Supervisor is responsible for determining which situations require evacuation of the work site.

This section describes the procedures which will be employed to minimize the potential for on-site personnel and nearby residents to be exposed to hazardous conditions arising out of releases of hazardous materials. No single recommendation can be made for evacuation or safe distances due to the nature of the work. Safe distances can only be determined at the time of an emergency, based on a combination of work site and incident conditions. However, the following measures are established to serve as general guidelines. Table 1 below addresses the criteria for releases.

Table 2 Criteria for Hazardous Material Spill/Release Incidents

Release Classification	Criteria
Minor Release	• Low toxicity compound spill > 1 barrel (bbl) (42 gallons) outside secondary containment, or ≥ 5 bbl inside secondary containment, unless it impacts or potentially impacts state or marine waters • Single hand held detector with a LEL reading ≥ 50 percent • Smoke Investigation
Major Release	• High toxicity compound spill impacting or potentially impacting state or marine waters • Fire or Explosion • Hazardous materials release with off-site potential

6.1 Minor Releases Requiring Limited Evacuation

In the event of minor releases (small spills of low toxicity) of hazardous materials, personnel will evacuate the immediate area and report to the Contaminant Reduction Zone (CRZ). Low toxicity will be defined as a compound having an Animal LD_{50} greater than 50 milligrams/ kilograms (mg/kg). The signal to evacuate a limited area in the case of a minor release will be one short blast using an air horn or verbal communication. Small spills or leaks from a container will require initial evacuation of at least 35 feet in all directions to allow for clean-up and to prevent exposure.

After initial assessment of the extent of the release and potential hazards, the Site Supervisor, in consultation with the Health and Safety Officer, will determine the specific boundaries for evacuation. Appropriate steps such as caution tape, rope, traffic cones, or barricades will be used to secure the boundaries.

6.2 Major Release Requiring Evacuation of the Work Site

In the event of a major hazardous material release (large spills of high toxicity), personnel will be evacuated from the work site. High toxicity will be defined as a compound having an Animal LD_{50} less than 50 mg/kg. Three short blasts using an air horn will be used to notify on-site personnel to evacuate the work site in case of major releases requiring evacuation of the work site. Site evacuation will be initiated by the Site Supervisor, in consultation with the Project Managers and EPA RPM. However, if necessary, the Site Supervisor will initiate work site evacuation, as necessary, to protect the health and safety of on-site personnel.

6.3 Work Site Evacuation Route

The evacuation route will be identified daily during tailgate safety meetings (TGSM) due to changing work site conditions, work activities, and weather factors. A secondary evacuation route will also be identified during the TGSM.

6.4 Evacuation Procedures

In the event work site evacuation is necessary, the following actions will be undertaken:

- The signal for work site evacuation will be activated (three short blasts using an air horn).

- No further entry of visitors, contractors, or trucks will be permitted. Vehicle traffic within the work site will cease to allow safe exit of personnel and movement of emergency equipment.
- **ALL** personnel, visitors, and contractors will immediately leave through the identified primary or secondary evacuation route.
- No persons will remain or re-enter the work site unless to carry out their emergency duty procedures. Those within the work site area will normally only include emergency response personnel or other emergency teams (e.g., fire department).
- Immediately upon exit, **ALL** personnel, visitors and contractors will be accounted for by the Site Supervisor or designee.
- The names of emergency response team members and/or other emergency team members involved in emergency response will be reported to the Site Supervisor.
- Re-entry into emergency areas, to find persons not accounted for will not be attempted.
- Re-entry into the work site will be made only after an "all clear" signal is given by the Site Supervisor. At his/her direction, a signal or other notification will be given for re-entry into the work site.

6.5 Places of Refuge

6.5.1 Alternate Places of Refuge

7. Emergency Site Security and Control

Implementation of security procedures will begin with the notification that an emergency has occurred. When it is necessary to evacuate personnel from the work site or an area within the work site, security measures will be implemented to safely remove personnel and to secure the area from re-entry. Emergency security is necessary to prevent the exposure of unprotected personnel to work site hazards and to avoid interference with emergency response actions. On-site personnel will immediately take steps to secure the spill/release area and establish safe boundaries (i.e., work zones). Three work zones will be established at the direction of the Health and Safety Officer. The three zones are defined as follows:

- Support Zone (SZ) - The uncontaminated area where emergency response personnel should not be exposed to hazardous conditions.
- Contaminant Reduction Zone (CRZ) - The area where decontamination takes place.
- Exclusion Zone (EZ) - The contaminated area/emergency response area.

7.1 Delineation of Work Zones

Delineation of these three zones will be based on sampling and monitoring results, pre-determined area that will be excavated and on an evaluation of potential routes and amount of contamination dispersion in the event of a release. Movement of personnel and equipment among these zones will be minimized and restricted to access control points to prevent cross contamination from

contaminated areas to clean areas. Work zones will be clearly marked by lines, placards, hazard tape, construction cones and/or signs, or enclosed by physical barriers such as fences, or ropes.

7.2 Buddy System

The use of a buddy system will be implemented where activities are performed in the EZ. The buddy will be able to:

- Provide his or her partner with assistance.
- Observe his or her partner for signs of chemical exposure or heat stress.
- Periodically check the integrity of his or her partner's protective clothing.
- Notify the Site Supervisor or others, if emergency help is needed.

The buddy system alone may not be sufficient to ensure that help will be provided in an emergency. Whenever possible, personnel in the EZ will be in line of sight contact or communications contact with the Site Supervisor or designee in the SZ.

7.3 Communication Systems

A system of communication, as described below, will be established at the hazardous material spill/release scene. The communication system will address both internal communication among on-site personnel and external communication between on-site and off-site personnel.

7.3.1 Internal Communication

Internal communication will be used to:

- Alert emergency response personnel members to emergencies.
- Pass along safety information, such as the next rest period, air change, heat stress check, etc.
- Communicate changes in the work to be accomplished.
- Maintain control of the work site.

The Site Supervisor will be responsible for determining the proper methods of communication at the work site. The Site Supervisor will also be responsible for instructing all on-site personnel on the use of the selected communication methods.

7.3.2 External Communication

An external communication system between on-site and off-site personnel will be implemented to:

- Coordinate emergency response.
- Report to management.
- Maintain contact with essential off-site personnel.
- The primary means of external communication will be by telephone.

8. Emergency First Aid and Medical Treatment

Any personnel requiring emergency medical attention will be evacuated immediately from EZs and CRZs. Personnel will not enter the area to attempt a rescue if their own lives would be threatened. The decision whether or not to decontaminate a victim prior to evacuation is based on the type and severity of the illness or injury and the nature of the contaminant. If decontamination does not interfere with essential treatment, it should be performed.

If decontamination can be performed, observe the following procedures:

- Wash external clothing and cut it away.

If decontamination cannot be performed, observe the following procedures:

- Wrap the victim in blankets or plastic to reduce contamination of other personnel and emergency vehicles.
- Alert emergency (i.e., 911) and off-site medical personnel of potential contamination and advise them to implement decontamination procedures.
- Send work site personnel familiar with the incident and chemical safety information, (e.g., SDS).
- Transport victim to the medical facility along the predefined route.

8.1 Emergency Medical Actions

If actual or suspected serious injury occurs, these steps will be followed:

- Remove the exposed or injured person(s) from immediate danger.
- First aid to be rendered at on-site personnel discretion. Decontaminate affected personnel after critical first aid is given.
- Notify Site Supervisor and Health and Safety Officer of incident.
- Obtain emergency medical services or ambulance transport to the hospital.
- Other personnel in the work area will be evacuated to a safe distance until the Site Supervisor determines that it is safe for work to resume. If there is any doubt regarding the condition of the area, work shall not commence until all hazard control issues are resolved.

8.2 First Aid

Qualified personnel may give first aid at their discretion and stabilize an individual needing assistance. Professional medical assistance will be obtained at the earliest possible opportunity.

To provide first line assistance to emergency response personnel in the case of sickness or injury, the items identified in Section 8, will be made immediately available.

8.3 Emergency Numbers

In the event of an emergency medical incident the telephone numbers provided in Table 1 shall be available to summon for assistance.

9. Emergency Alerting and Response Procedures for On-site Incidents

In the event of an emergency involving an on-site hazardous material spill or release, the following general procedures will be used for rapid and safe response and control of the situation.

9.1 Emergency Alerting Procedures

If on-site personnel discover a chemical spill or process upset resulting in a vapor or material release, they will immediately notify the Site Supervisor. When contacted, the Site Supervisor will obtain information pertaining to the following:

- The material spilled or released.
- Location of the release or spillage of hazardous material
- An estimate of quantity released and the rate at which it is being released.
- The direction in which the spill/release or vapor or smoke release is heading.
- Any injuries involved.
- Fire explosion or chemical reaction or possibility of these events.
- The area and materials involved and the intensity of the fire or explosion.

This information will help the Site Supervisor to assess the magnitude and potential seriousness of the spill or release.

9.2 Emergency Response Procedures

The initial response to any emergency will be to protect human health and safety, and then the environment. Identification, containment, treatment, and disposal assessment will be the secondary response.

If a spill/release is not contained within a dike or sump area (e.g., drum staging area or decontamination pad), an area of isolation will be established around the spill/release. The size of the area will generally depend on the size of the spill/release and the materials involved. If the spill/release is large or is highly toxic, an initial isolation of at least 100 feet in all directions will be used. Small spills or leaks of low toxicity will require evacuation of at least 35 feet in all directions to allow clean-up and repair and to prevent exposure. When any spill/release occurs, only those personnel involved in overseeing or performing emergency operations will be allowed within the EZ or CRZ (see Section 7, Emergency Site Security and Control).

If the spill/release results in the formation of a toxic vapor cloud (by reaction with surrounding materials or by outbreak of fire or due to high vapor pressures under ambient conditions), further evacuation will be enforced. An area at least 500 feet wide and 1,000 feet long will be evacuated downwind if volatile materials are spilled. This may be modified based on air monitoring performed by the Health and Safety Officer.

If the control and clean-up of a spill or release is within the capabilities of the on-site personnel, and it does not threaten human health or safety of on-site personnel or nearby residents, local emergency response authorities will not be notified, unless the release migrates beyond the perimeter of the work site. This decision will be made by the Site Supervisor in consultation with the Project Coordinator, Project Managers, and EPA RPM, if practicable.

Any release occurring from drums or other containers containing solid wastes will be placed into approved containers and will be labeled as to its contents and transferred to the on-site staging area pending treatment and/or off-site disposal.

In the event of spilled liquid, the spilled liquids will be confined to the immediate area of the spill and the liquids will be pumped, with the use of a portable hand pump, into an overpack drum or tank (or similar container). The spilled liquids will be confined by diking around the spill with native material or with an inert absorbent. Any residual liquids which cannot be pumped will be absorbed with a sufficient quantity of inert absorbent to ensure that no free liquids remain. Containers which are generated will be labeled as to contents and transferred to the on-site drum staging area pending treatment and/or off-Site disposal. If the spilled liquid consisted of non-aqueous phase liquids (NAPL) or highly toxic waste, the spilled material and visibly affected soils will be immediately excavated, placed in drums and transferred to the staging area. If the spilled liquid consisted of decontamination water, the decision to excavate the visibly affected soils will be based on whether the water was generated from a source known to exhibit contamination.

If the Site Supervisor determines that the control and clean-up of a spill or release is not within the capabilities of the on-site personnel or the spill or release may threaten human health or safety of on-site personnel or nearby residents or may potentially migrate beyond the work site perimeter, the 911 dispatcher will be immediately notified. Evacuation of all potentially affected work site areas will be initiated by the Site Supervisor. Evacuation of potentially affected nearby residents will be initiated by the proper local emergency response authorities, as soon as possible.

10. Personal Protection and Emergency Equipment

10.1 Personal Protective Equipment

Emergency response personnel entering an EZ for emergency spill/release response will, depending on the task and exposure potential, wear one of the protection levels as described in the HASP as directed by the Health and Safety Officer.

10.2 Emergency Equipment

The following emergency equipment will be available for deployment during emergencies/releases of hazardous materials if needed.

10.2.1 Air Monitoring Equipment

The following equipment list includes direct reading instrumentation that may be used in emergency situations to assess the degree of environmental hazard. This equipment will only be used by the

Safety and Health Office, Site Supervisor, or other specially trained designees. This equipment will be stored, charged and ready, for immediate use in evaluating hazardous chemical concentrations.

Equipment Name	Application
Photoionization detector (PID) with an 11.7 eV lamp.	Measures total undifferentiated organic chemical concentrations.
Real-Time Digital Particulate Monitor such as a MIE DataRAM.	Measures particulate levels.

10.2.2 Emergency Response -Cleanup Equipment

A sufficient supply of the following emergency response clean-up equipment will be inventoried and maintained at the work site for spill/release control:

- "Diatomite" or equivalent to solidify/absorb liquid spills.
- Sorbent sheets (diapers) to absorb liquid spills.
- Hand tools.
- Empty drums for containerizing recovered liquids and soils.

The bulk of the above materials will be staged in the SZ. Smaller quantities will be staged, as necessary, in each active work area in the EZ during activities.

10.2.3 Emergency Safety Equipment

The following equipment will be staged at the work site, during active RA activities, to provide for safety and first aid:

- Air horn.
- Additional PPE equipment.
- Potable water.
- OSHA approved first aid kit sized for a minimum of ten people.
- Portable emergency eyewash/shower.
- 20-pound ABC type dry chemical fire extinguishers (one per each piece of heavy equipment).

11. Response Follow Up

Following all emergency response actions and activation of this plan, the Site Supervisor will conduct a debriefing session for all key individuals involved. The response will be evaluated and response plans revised, if necessary. Corrective actions will be listed where procedures were inadequate or need improvement. Responsible persons will be listed and held accountable for follow up. The Site Supervisor will prepare an incident report, fully documenting any release of hazardous material, at or above reportable quantities, and response actions taken.

Attachment 3
Field Sampling Plan – Northern Impoundment

Attachment 3 - Field Sampling Plan - Northern Impoundment

Draft Provided with Preliminary 30% Remedial Design - Northern Impoundment

San Jacinto River Waste Pits Site
Harris County, Texas

International Paper Company
McGinnes Industrial Maintenance Corporation

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Table of Contents

1. Introduction

This Field Sampling Plan (FSP) for the Northern Impoundment of the San Jacinto River Waste Pits Superfund Site in Harris County, Texas (Site) was prepared by GHD Services Inc. (GHD), on behalf of the International Paper Company (IPC) and McGinnes Industrial Maintenance Corporation (MIMC; collectively referred to as the Respondents). This FSP was prepared in accordance with Sampling and Analysis Plan Guidance and Template, Version 4, General Projects R9QA/009.1 May 2014 United States Environmental Protection Agency (EPA). The FSP has been developed in accordance with the Preliminary 30% Remedial Design (RD) - Northern Impoundment. As such, the FSP is preliminary and will be modified and updated as the RD progresses.

2. Sampling Objectives and Rationale

The FSP defines in detail the sampling methods to be performed to obtain the data in connection with implementation of the remedial action (RA) for the Northern Impoundment. It provides the operational plan for execution of the sample design and identifies the procedures for collection of samples consistent with the sample design (EPA, 1993a). The FSP is supplemented by the Quality Assurance Project Plan (QAPP) to verify that the data will be usable for that purpose.

This section will describe the purpose of the environmental investigation and how the data will be used. It will discuss how the Northern Impoundment's history relates to the problem to be investigated, the scope of the sampling effort, and the types of analyses required. It will include all measurements to be made on an analyte-specific basis in the multiple media (soil, sediment, water, etc.) that may be sampled.

3. Sample Type, Frequency, and Locations

Environmental media samples may be collected for a variety of purposes during implementation of the Northern Impoundment RA. The type, location, and frequency of environmental media samples collected will be dependent on the intended use of the data. The determination of the appropriate number of samples to be collected will be made with a number of considerations including the number of areas of concern that will be sampled, planned statistical methods, statistical performance, and practical considerations of logistics and cost (EPA, 1989).

3.1 Soil and Sediment Sampling Rationale

This section will provide a general overview of the soil and sediment sampling during the Northern Impoundment RA, if necessary. It will present a rationale for choosing each sampling location or sampling area and the depths at which the samples are to be collected, if relevant. If decisions will be made in the field, details concerning the criteria to be used to make these decisions will be provided. A figure showing proposed sampling locations will be provided.

3.2 Contact Water Sampling Rationale

This section will provide a general overview of the contact water sampling rationale for the Northern Impoundment RA, if necessary. It will present a rationale for choosing the sampling location. If decisions will be made in the field, it will provide details concerning the criteria to be used to make these decisions. This section will list the analytes of concern at each location and provide a rationale as to why the specific chemical or group of chemicals was chosen. A figure showing proposed sampling locations will be provided.

4. Sample Equipment and Procedures

4.1 List of Equipment Needed

This section will list all the equipment to be used in the field to collect samples, including decontamination equipment, if required. It will also discuss the availability of back-up equipment and spare parts. This information may be presented in a table.

4.2 Calibration of Sampling Equipment

This section will describe the procedures by which field equipment is prepared for sampling, including calibration standards used, frequency of calibration and maintenance routines. It will also indicate where the equipment maintenance and calibration record(s) for sampling conducted under this FSP will be kept.

5. Investigation Derived Wastes

This section will describe the type(s) of investigation-derived wastes (IDW) that will be generated during any sampling event. Depending upon site-specific conditions and applicable federal, state, and local regulations, other provisions for IDW disposal may be required. Any analyses of IDW will be discussed, if required. This section will also discuss drum labeling procedures for IDW that is placed in drums. The procedures that should be followed for handling the IDW will also be discussed. The procedures will have enough flexibility to allow the sampling team to use its professional judgment as to the proper method for the disposal of each type of IDW generated at each sampling location.

Attachment 4
Quality Assurance Project Plan – Northern Impoundment

Attachment 4 - Quality Assurance Project Plan - Northern Impoundment

Draft Provided with Preliminary 30% Remedial Design - Northern Impoundment

San Jacinto River Waste Pits Site
Harris County, Texas

International Paper Company
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Table of Contents

Table of Contents

1. Introduction

This Quality Assurance Project Plan (QAPP) for the Northern Impoundment of the San Jacinto River Waste Pits Superfund Site in Harris County, Texas (Site) was prepared by GHD Services Inc. (GHD), on behalf of the International Paper Company (IPC) and McGinnes Industrial Maintenance Corporation (MIMC; collectively referred to as the Respondents). The QAPP was developed to augment the Field Sampling Plan (FSP) and to address sample analysis and data handling during implementation of the remedial action (RA) for the Northern Impoundment. The QAPP was prepared in accordance with the United States Environmental Protection Agency (EPA) Requirements for Quality Assurance Project Plans, QA/R 5, EPA/240/B 01003 (March 2001, reissued May 2006); Guidance for Quality Assurance Project Plans, QA/G 5, EPA/240/R 02/009 (December 2002); and Uniform Federal Policy for Quality Assurance Project Plans, Parts 1 3, EPA/505/B 04/900A through 900C (March 2005). The QAPP has been developed in accordance with the Preliminary 30% Remedial Design (RD) – Northern Impoundment. As such, the QAPP is preliminary and will be modified and updated as the RD progresses.

In accordance with the EPA guidance listed above, there are four main topics that must be included in a QAPP.

Those four topics are:

- Project Management - This includes project management, project objectives, and project history.
- Data Generation and Acquisition - This includes descriptions of the design and implementation of all measurement systems that will be used during the project.
- Assessment/Oversight - This includes the procedures used to ensure proper implementation of the QAPP.
- Data Validation and Usability - This includes the quality assurance (QA) activities that occur after the data collection phase is completed.

The associated tasks and responsibilities with project management, data generation and acquisition, assessment/oversight, and data validation and usability will be presented in the QAPP.

2. Project Management

2.1 Project Organization

This section will list the responsibilities of management, QA personnel, field personnel, and laboratory personnel. Additionally, any special training/certification requirements for implementation of the Northern Impoundment RA will be identified and an organization chart that identifies the lines of communication among the participants may be presented herein.

2.2 Background

This section will contain historical and background information.

2.3 Remedial Action Activities

This section will provide an overview of the remedial activities to be conducted as part of the RA for the Northern Impoundment.

2.3.1 Site Preparation

2.3.2 BMP Installation

2.3.3 Excavation

2.3.4 Loading, Transportation, and Disposal

2.3.5 Water Treatment and Discharge

2.3.6 BMP Removal or Abandonment

2.3.7 Site Restoration

2.4 Quality Objectives and Criteria

Data quality objectives (DQOs) are qualitative and quantitative statements derived from the outputs of each step of the DQO process. The DQO process is a series of planning steps based on the scientific method that is designed to ensure that the type, quantity, and quality of environmental data used in decision making are appropriate for the intended application. A systematic planning process will be used to develop DQOs for purposes of this work plan. That process, as described in EPA's Guidance on Systematic Planning Using the DQOs Process (EPA, 2006), is designed to ensure that environmental data are of the appropriate type and quality for the intended use, and lead to logical conclusions and defensible decisions or estimates. DQOs are developed through a seven step process that is both sequential and iterative, depending upon the complexity of the problem. The steps involve both qualitative and quantitative criteria. The overarching outcomes of the DQO process are described below.

There are seven steps in the DQO process that include:

1. Stating the problem
2. Identifying the goal of the study
3. Identifying information inputs
4. Defining the boundaries of the study
5. Developing the analytical approach
6. Specifying performance or acceptance criteria

7. Developing the plan for obtaining data

2.5 Special Training Requirements/Certifications

This section will outline the training and certification requirements for the Northern Impoundment RA.

2.6 Documentation and Records

The documents, records, and reports generated during the Northern Impoundment RA will be identified in the following subsections.

3. Data Generation and Acquisition

The design and implementation of the sampling and analytical procedures, data handling and documentation that will be used during implementation of the Northern Impoundment RA, will be described in this section.

3.1 Sampling Design

This section will set forth the rationale for the sampling program.

3.2 Measurement, Testing, and Sampling Methods

3.3 Sample Handling and Custody

This section will outline the procedures that may be used to collect potential samples.

3.3.1 Sampling Equipment Decontamination

3.3.2 Sample Packaging

3.3.3 Chain of Custody Control

This section will discuss how chain of custody is the sequence of possession of an item. An item (such as a sample or final evidence file) is considered to be in custody if the item is in actual possession of a person, the item is in the view of the person after being in his/her actual possession, or the item was in a person's physical possession but was placed in a secure area by that person. Custody procedures for field, laboratory, and final evidence files may be described in the subsections that follow.

3.3.4 Sample Shipment

3.4 Laboratory Analytical Methods

This section will list the laboratory analytical methods that will be used. This section may also state the turnaround time required for the analyses required for each sample.

3.5 Quality Control Requirements

The field and laboratory Quality Control (QC) requirements will be discussed in the following subsections. Specific QC checks and acceptance criteria may be provided.

3.5.1 Field QC Elements

3.5.2 Analytical Laboratory QC Elements

3.6 Instrument/Equipment Testing, Inspection, and Maintenance

The procedures that will be used to verify that instruments and equipment are functional and properly maintained may be described in the following subsections.

3.6.1 Field Equipment

3.6.2 Laboratory Equipment

3.7 Instrument Calibration and Frequency

3.7.1 Calibration of Field Instrumentation

3.7.2 Calibration of Laboratory Instrumentation

3.7.3 Calibration of Laboratory Equipment

3.8 Inspection/Acceptance of Materials

The procedures that will be used to ensure that supplies and consumables used in the field and laboratory will be available as needed and free of contaminants are detailed in the following subsections.

3.8.1 Field Supplies and Consumables

3.8.2 Analytical Laboratory Supplies and Consumables

3.9 Data Management

The procedures for managing data from generation to final use and storage will be stated in this section.

4. Assessment and Oversight

The following subsections will describe the procedures used to ensure proper implementation of this QAPP and the activities for assessing the effectiveness of the implementation of the Northern Impoundment RA data and associated QA/QC activities.

4.1 Assessments and Response Actions

Assessments consisting of internal and external audits may be performed during implementation for the Northern Impoundment RA. This section will describe internal technical system audits of both field and laboratory procedures that may be conducted to verify that sampling and analysis are being performed in accordance with the procedures established in the work plan and QAPP.

4.1.1 Field Audits

4.1.2 Laboratory Audits

4.1.3 Required Initial System Audit by QAO

4.1.4 Addressing Audit Deficiencies

4.2 Reports to Management

This section will describe that quality assurance information may be summarized following completion of the Northern Impoundment RA. This information may consist of the results of external performance evaluations (PEs), results of periodic data quality validation and assessment, data use limitations, and any significant QA problems identified, and corrective actions taken.

5. Data Validation and Usability

The QA activities that will be performed to ensure that the data are scientifically defensible, properly documented, of acceptable quality, and meet the project objectives will be described in the following sections.

5.1 Data Review, Verification, and Validation

All field and laboratory data will be reviewed, verified, and validated. These terms are defined as follows:

- Data review is the in-house examination to ensure that the data have been recorded, transmitted, and processed correctly
- Data verification is the process for evaluating the completeness, correctness, and conformance/compliance of a specific data set against the method, procedural, and/or contractual specifications
- Data validation is an analyte and sample specific process that extends the evaluation of data beyond method, procedure, or contractual compliance (i.e., data verification) to determine the quality of a specific data set relative to the end use.

5.1.1 Sample Collection Procedures

5.1.2 Sample Handling

5.1.3 Analytical Procedures

5.2 Validation and Verification Methods

Field data will be verified by reviewing field documentation and chain of custody records. Data from direct reading field instruments will be verified by reviewing calibration and operating records and QC data.

Verification of sample collection procedures consists of reviewing sample collection documentation for compliance with the requirements of the work plan and QAPP. If alternate sampling procedures were used, the acceptability of the procedure will be evaluated to determine the effect on the usability of the data.

5.3 Usability/Reconciliation with Data Quality Objectives

The overall usability of the data from Northern Impoundment RA will be assessed by evaluating the Precision, Accuracy, Representativeness, Comparability, Completeness, Sensitivity (PARCCS) of the data set to the measurement performance criteria of this QAPP using basic statistical analyses, as applicable. The procedures and statistical formulas to be used for these evaluations may be presented in the following subsections.

5.3.1 Reconciliation with Method Specific Acceptance or Performance Criteria

5.3.2 Reconciliation with Project Objectives

Attachment 5
Site-Wide Monitoring Plan – Northern Impoundment

Attachment 5 - Site Wide Monitoring Plan - Northern Impoundment

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San Jacinto River Waste Pits Site
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Table of Contents

Figure Index

Attachment Index

1. Introduction

1.1 Background

This Site Wide Monitoring Plan (SWMP) for the Northern Impoundment of the San Jacinto River Waste Pits Superfund Site in Harris County, Texas (Site) was prepared by GHD Services Inc. (GHD), on behalf of the International Paper Company (IPC) and McGinnes Industrial Maintenance Corporation (MIMC; collectively referred to as the Respondents). This SWMP details the elements of the work related to implementation of the Northern Impoundment remedial action (RA). The SWMP summarizes the monitoring approach during and after construction and excavation, the environmental media handling and monitoring, data collection procedures, and documentation of monitoring activities. References in this SWMP to the “work site” are to the Northern Impoundment. The SWMP has been developed in accordance with the Preliminary 30% Remedial Design (RD) - Northern Impoundment. As such, the SWMP is preliminary and will be modified and updated as the RD progresses.

1.2 Purpose

1.3 Relationship to Supporting Plans

2. Site Wide Monitoring Approach

This section identifies the approach to be implemented during construction, excavation and post-excavation monitoring, if necessary.

2.1 PDI Summary

2.2 Monitoring During Construction

The contractor will be required to prepare and submit a detailed Excavation Plan demonstrating compliance with specified requirements of the project specifications and to permit an engineer providing oversight of the RA (oversight engineer) to schedule testing and measurement activities.

2.2.1 Waste

During the RA, monitoring of waste material removal activities will include delineation of impacted and non-impacted material boundaries. This will allow for confirmation during waste material removal that impacted waste material designated for excavation has been removed. As waste material is removed, surveying will be performed to verify the extent of waste material removal (both vertical and horizontal) and to clearly mark the boundaries of waste material removal for the subsequent interval.

Other associated monitoring activities performed in relation to the waste material excavation will be addressed in the Field Sampling Plan, Quality Assurance Project Plan, Construction Quality Assurance/Quality Control Plan, and Transportation and Off-Site Disposal Plan.

2.2.2 Air

Waste material excavation and loading activities will be be performed in a controlled manner in order to eliminate or significantly reduce the potential for generation and release of dusts, particulates and noxious odors from the work site. The contractor will be required to prepare and implement a Perimeter Ambient Air Quality Monitoring Plan, or similar, and potentially cease operations when air quality data approaches or exceeds the criteria established by that plan. In the event of potential noxious odors, use of odor mitigation measures such as, but not limited to, odor-masking agents or encapsulating foams, may be employed, with work only recommencing once steps required by the plan have been implemented.

2.2.3 Storm Water

Storm water control is an essential part of the excavation program, both with regards to run-on and run-off storm water during weather-related events. For cells excavated according to Approach A, storm water will be minimized from entering any open excavation in order to reduce the volume of water requiring treatment and to prevent sloughing of the excavation faces. The contractor will also be required to take steps to contain storm water that has accumulated within the open excavation. For cells excavated according to Approach B, storm water may be directed and diverted into and contained in the open excavation.

2.2.4 Post-Construction Confirmation

Confirmation sampling methods are under evaluation.

3. Environmental Media

This section describes the regulatory framework (criteria) for documenting that the delineated waste material was appropriately removed, air monitoring was properly conducted to ensure dust and particulates were not allowed to disperse, and storm water drainage was controlled.

3.1 Soils

3.2 Dust and Particulates

3.3 Storm Water Discharge

4. Data Collection Procedures

This section describes the procedures for collecting data during the RA to fully document that the delineated waste material has been removed. Data associated with air monitoring for dust,

particulates, and odor control will be recorded for background and throughout excavation activities. Maintenance of storm water controls will be documented for the duration of the RA, as necessary.

4.1 Removal Performance Standards

4.1.1 Confirmation Procedures

4.1.1.1 Depth Control during Construction

4.1.1.2 Post Removal Surveying

4.2 Dust and Particulate Monitoring

This section will specify and discuss any dust and particulate monitoring required.

4.2.1 Sampling Instruments and Procedures

4.2.2 Sample Design and Frequency

4.2.3 Parameters and Methods

4.3 Odor Control

4.4 Storm Water

This section will specify and discuss any storm water monitoring required.

4.4.1 Permit Sampling Requirements

4.4.2 Sampling Procedures

4.4.3 Analytical Methods

4.5 Responses to Changed Conditions

5. Documentation

This section identifies the performance standards for each of the environmental media of concern. Survey records will be required to be properly maintained and provided to the oversight engineer to fully document that all of the delineated impacted material has been removed. Dust and particulate monitoring records, odor mitigation measures, as well as storm water controls maintenance records will be provided to the oversight engineer.

5.1 Removal Performance Standards

5.1.1 Post Removal Surveys

5.2 Dust and Particulate Monitoring

5.2.1 Daily Monitoring Records

5.2.2 Sample Calibration Records

5.3 Odor Monitoring and Mitigation Measures

5.4 Storm Water

5.5 Water Treatment Operation Reports

5.5.1 Water Discharge Monitoring Reports

5.6 Reports to the EPA and Texas Commission on Environmental Quality (TCEQ)

This section outlines the reports to be provided to the appropriate regulatory agencies. Throughout the Northern Impoundment RA, the oversight engineer will manage all reports provided by the contractor. The oversight engineer will ensure the validity of these records by reviewing them in timely manner and requesting any corrections be made by the contractor as determined from the reviews. As the monitoring records are confirmed for accuracy and finalized, the oversight engineer will consolidate those records for regular reporting to the appropriate agencies, potentially the EPA and TCEQ.

5.6.1 Monthly Reports

5.6.2 Annual Reports

Attachment 6
Construction Quality Assurance/Quality Control Plan – Northern Impoundment

Attachment 6 - Construction Quality Assurance/Quality Control Plan – Northern Impoundment

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Table of Contents

Table of Contents

Table of Contents

Attachment Index

1. Introduction

This Construction Quality Assurance/Quality Control Plan (CQA/QCP) for the Northern Impoundment of the San Jacinto River Waste Pits Superfund Site in Harris County, Texas (Site) was prepared by GHD Services Inc. (GHD), on behalf of the International Paper Company (IPC) and McGinnes Industrial Maintenance Corporation (MIMC; collectively referred to as the Respondents). This CQA/QCP describes the planned and systematic activities that will be used to verify that the remedial action (RA) activities satisfies the requirements contained in the Remedial Design (RD) for the Northern Impoundment. The CQA/QCP has been developed in accordance with the RD. As such, the CQA/QCP is preliminary and will be modified and updated as the RD progresses.

The CQA/QCP addresses the following major elements of the construction. References in this CQA/QCP to the “work site” are a reference to the Northern Impoundment.

- Construction Support Facilities and Site Control
- BMP Construction
- Excavation
- BMP Removal or Abandonment
- Site Restoration
- Water Treatment

The remainder of this section describes the project background, the purpose of the CQA/QCP and how this plan relates to the other supporting plans.

1.1 Background

1.2 Purpose

1.3 Relationship to Supporting Plans

2. Project Organization

The responsibility and lines of authority and communications will be described in this section. Each organization involved in construction activities related to the RA for the Northern Impoundment will be identified, followed by a description of the roles and responsibilities of the organization and the roles and responsibilities of key individuals within each organization. These individuals are to be identified either by name or title. This section will also identify the lines of authority and the flow of information within the CQA/QC Team.

This section will describe procedures for submittals and the submittal approval process. It will include the types of submittals, management of the submittal register and the process for approval by the engineer responsible for the implementation of the RA for the Northern Impoundment (oversight engineer).

This section will describe the QA/QC procedures for setup of the facilities at the work site and work site controls. The major items to be addressed are the imported materials that are brought to the work site for site preparation, storm water controls, and a survey of the work site. The material specification requirements and the requirements for verifying that the work has been performed according to the specifications will also be identified.

5. BMP Construction

This section will describe the QA/QC procedures for construction of the BMP. It will identify the inspection and verification procedures to be implemented to show that the piles and installation equipment brought to the work site conform to the specifications. It will also identify the procedures for monitoring the pile installation to confirm that the installation conforms to the drawings and the specifications.

6. Excavation

This section will describe the QA/QC procedures for excavation. This section will identify the procedures for documenting that the excavation equipment and any additives used for mixing with the excavated material conform to the specifications. It will also provide the inspection procedures for tracking the progress of the work, testing material to be transported off site for free liquids prior

to its transportation, and inspecting trucks during loading, and the procedures governing confirmation surveying.

6.1 Material Specification/Equipment Verification

6.1.1 Equipment Inspection/Verification

6.1.2 Solidification Additive

6.2 Construction Monitoring

6.2.1 Production/Depth Monitoring During Construction

6.2.2 Paint Filter Testing

6.2.3 Inspection of Trucks

6.2.4 Confirmation Surveying

7. BMP Removal/Abandonment

This section will describe the QA/QC procedures for removal or abandonment of the BMP. It will identify the inspection and verification procedures to be implemented to show that the piles and any materials are abandoned to the specifications. It will also identify the procedures for potential removal, reuse, and disposal of any materials during abandonment.

7.1 Material Specification/Equipment Verification

7.1.1 Pile Material Verification and Disposal

7.1.2 Removal/Abandonment Equipment Inspection/Verification

7.2 Construction Monitoring

7.2.1 Removal/Abandonment Procedure Verification

7.2.2 Final Depth/Survey Verification

8. Site Restoration

This section will describe the QA/QC procedures for site restoration. This section will identify the procedures for verifying and documenting that any material brought on-site or material reuse conforms to the specifications for that material. It will also describe the procedures and criteria for inspecting and testing the material during placement.

9. Water Treatment

This section will describe the procedures for verifying and documenting that the water treatment system conforms to the specifications. It will provide the procedures to verify and document that the equipment components meet specifications, the monitoring and testing procedures during installation and to document that the system is operating according to specifications.

11.1 Project Meetings

11.1.1 Pre-Construction

11.1.2 Weekly

11.1.3 Daily

11.2 Documentation

11.2.1 Daily Recordkeeping

11.2.2 Transportation and Disposal Records

11.2.3 Daily Production Reports

11.2.4 Confirmation Survey Records

11.2.5 Water Treatment Operation Reports

11.2.6 Water Discharge Reports

11.2.7 Record Drawings

11.2.8 Records Retention

11.2.9 Documentation of Field Changes

Attachment 7
Transportation and Off-Site Disposal Plan – Northern Impoundment

Attachment 7 - Transportation and Off-Site Disposal Plan – Northern Impoundment

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San Jacinto River Waste Pits Site
Harris County, Texas

International Paper Company
McGinnes Industrial Maintenance Corporation

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Table of Contents

Figure Index

Attachment Index

1. Introduction

This Transportation and off-Site Disposal Plan (TODP) for the Northern Impoundment of the San Jacinto River Waste Pits Superfund Site in Harris County, Texas (Site) was prepared by GHD Services Inc. (GHD), on behalf of the International Paper Company (IPC) and McGinnes Industrial Maintenance Corporation (MIMC; collectively referred to as the Respondents). References in this TODP to the "work site" are to the Northern Impoundment. The TODP has been developed in accordance with the Preliminary 30% Remedial Design (RD) - Northern Impoundment. As such, the TODP is preliminary and will be modified and updated as the RD progresses.

1.1 Background

This TODP details the elements of the remedial action (RA) related to the characterization, transportation and off-site disposal of removed waste material from the Northern Impoundment and other wastes generated during implementation of the RA for the Northern Impoundment. The TODP summarizes the regulatory requirements, characterization results, disposal facility profiling requirements, on-site management and loading, transportation plans, and record keeping.

1.2 Purpose

1.3 Relationship to Supporting Plans

2. Roles and Responsibilities

This section will identify the roles and responsibilities as they relate to transportation and disposal activities for the different organizations involved in the implementation of the Northern Impoundment RA and the titles of key individuals and their responsibilities.

3. Regulatory Framework

This section will describe the regulatory framework for classification and disposal of removed waste material and any other waste streams. With respect to the removed waste material, it will provide a summary of the previous waste classification from the pre-design investigations, and the rationale for the classification of those wastes as it relates to the Northern Impoundment waste material that will be generated during implementation of the Northern Impoundment RA.

This section will also provide the requirements of United States Environmental Protection Agency (EPA)'s Off-Site Rule (40 Code of Federal Regulations [CFR] 300.440) and indicate how it is being addressed and documented for each of the off-site disposal facilities that are planned for the project.

8. Document and Reporting

This section will provide the documentation requirements for the transportation and off-site disposal activities.

Attachment 8
Institutional Controls Implementation and Assurance Plan – Sand Separation Area

Attachment 8 - Institutional Controls Implementation and Assurance Plan - Sand Separation Area

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Table of Contents

1. Introduction

This Institutional Control Implementation and Assurance Plan (ICIAP) for the Sand Separation Area (SSA) of the San Jacinto River Waste Pits Superfund Site in Harris County, Texas (Site) was prepared by GHD Services Inc. (GHD), on behalf of the International Paper Company (IPC) and McGinnes Industrial Maintenance Corporation (MIMC; collectively referred to as the Respondents). This ICIAP has been developed in accordance with *Institutional Controls: A Guide to Planning, Implementing, Maintaining, and Enforcing Institutional Controls at Contaminated Sites*, OSWER 9355.0- 89, EPA/540/R- 09/001 (United States Environmental Protection Agency [EPA] 2012a), *Institutional Controls: A Guide to Preparing Institutional Controls Implementation and Assurance Plans at Contaminated Sites*, OSWER 9200.0-77, EPA/540/R-09/02 (EPA 2012b), and as applicable, Texas Commission on Environmental Quality (TCEQ) guidance. Preparation of this ICIAP will include planning discussions with the EPA, the TCEQ, and other agencies and stakeholders responsible for administering the various types of institutional controls (ICs). The ICIAP has been developed in accordance with the Preliminary 30% Remedial Design (RD) - Northern Impoundment. As such, the ICIAP is preliminary and will be modified and updated as the RD progresses.

1.1 Plan Objectives

The overall objectives of the ICIAP are to:

- Identify ICs which are necessary to meet requirements applicable to the SSA contained in the 2017 Record of Decision (ROD) and in the Statement of Work (SOW) that is part of the Administrative Settlement Agreement and Order on Consent for Remedial Design, Docket No. 06 02 18, with an effective date of April 11, 2018 (EPA, 2018a).
- Establish and document the activities and entities responsible for implementing, maintaining, enforcing, terminating, and/or modifying the ICs.

This ICIAP also addresses the following additional requirements with respect to any required ICs:

- Locations of recorded real property interests (e.g., easements, liens), if required, and resource interests in the SSA that may affect ICs (e.g., surface, mineral, and water rights), including accurate mapping and geographic information system (GIS) coordinates of such interests; and
- Legal descriptions and survey maps, as required, that are prepared according to current Texas Land Title Association (TLTA) Survey guidelines and certified by a licensed surveyor.

1.2 Plan Organization

This section will present the organizational structure of the ICIAP, listing the sections, and briefly describing the content contained in each section. This section will include a statement about the attached tables, figures, and appendices that support and supplement the content of the ICIAP.

2. Project Overview

2.1 Project Description and History

This section will include a brief description and history of the SSA, consistent with the following information from select design documents and evaluations, such as:

- Site and river history
- Existing land, waterfront, and river conditions
- Existing ecological conditions
- Historical industrial/marine activity (e.g. sand mining, dewatering operations)
- Current industrial/marine activity (e.g. barge fleeting operations)
- Contaminants of concern (COCs) and remediation goals
- Remedial action objectives for the SSA
- Summary of the selected remedy for the SSA
- Reasonably anticipated future uses within the SSA

2.2 Remedy Extent and Institutional Controls Boundary

This section will summarize the engineering controls (ECs), IC boundaries, and other features. This discussion will include:

- Location of COCs and associated IC boundaries
- Introduction of IC sub-boundaries (by property ownership and site access)
- Other relevant features

2.3 Key Stakeholders

This section will discuss property and ownership information, as well as identification of government entities and stakeholders.

This section will include discussion of the following:

- Ownership/occupancy information
- Leases, licenses, easements, and grants information
- Federal, state, and/or local government interests, if any
- Identity of other relevant stakeholders

This section will also discuss and provide property and resource mapping, legal descriptions, and survey maps as appendices as required by the SOW.

2.3.1 Property Interests

2.3.2 Resource Interests

2.4 Existing Institutional Controls (E.G., Zoning)

This section will summarize existing ICs and implementation of these ICs. Other existing regulations and guidance relevant to ICs will also be reviewed.

3. Planned Remedial Action Institutional Controls

This section will summarize the general elements for planned ICs based on the statement in the ROD that the following institutional controls may be implemented for the SSA:

- "Deed restrictions are to be applied to parcels where dioxin concentration do not allow for unrestricted use and unlimited access"
- "Notices would be attached to deeds of affected properties to alert potential future purchasers of the presence of waste and soils with dioxin concentrations exceeding EPA's protective level of 51 nanograms per kilogram (ng/kg) for residential exposures (unlimited use and unrestrictive [sic] access)"

3.1 Limits on Property Use

This section will discuss the potential mechanisms and tools to be employed to establish limits on property uses, including notices to be attached to deeds of affected properties.

3.2 Limits on Excavation and other Disturbances

This section will discuss the potential restrictions to be considered to inhibit unauthorized subterranean activity.

3.3 Legal Description and Survey Map

3.4 Notice to Deed

This section will discuss the use of deed notices or alternatives as proprietary controls. Proprietary controls are agreements that restrict use or specify controls but not property ownership.

4. Communications with Stakeholders

This section will discuss in more detail the communications and potential informational devices that may be used to communicate with stakeholders.

5. Monitoring/Enforcement

This section will address what, if any, IC monitoring will be necessary, including any administrative monitoring (e.g., land use changes, deed transfers, new tenants).

6. Reporting

This section will provide information regarding IC reporting, which will include:

- Reporting procedures
- Reporting frequency
- Events and activities to be reported
- Location and procedures for accessing records
- Entity responsible for reporting
- Stakeholder/regulatory entity contact

7. Summary

This summary may include a matrix that summarizes the ICs will be included as a table and will provide a preliminary framework of that summary with potential actions and responsible entities.

8. References

EPA. 2012a. Institutional Controls: A Guide to Planning, Implementing, Maintaining, and Enforcing Institutional Controls at Contaminated Sites, OSWER 9355.0 89, EPA/540/R 09/001.

EPA. 2012b. Institutional Controls: A Guide to Preparing Institutional Controls Implementation and Assurance Plans at Contaminated Sites, OSWER 9200.0 77, EPA/540/R 09/02.

EPA, 2017. Record of Decision, San Jacinto River Waste Pits. Harris County, Texas. EPA ID: TXN000606611. U.S. Environmental Protection Agency, Region 6. Dallas, Texas. October 2017.

Attachment 9
Monitored Natural Recovery Monitoring Plan (Operations & Maintenance Plan) – Sand Separation Area

Attachment 9 - Monitored Natural Recovery Plan - Sand Separation Area

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11187072 | Report No 13

Table of Contents

1. Introduction

This Monitored Natural Recovery (MNR) Plan for the Sand Separation Area (SSA) of the San Jacinto River Waste Pits Superfund Site in Harris County, Texas (Site) was prepared by GHD Services Inc. (GHD), on behalf of the International Paper Company (IPC) and McGinnes Industrial Maintenance Corporation (MIMC; collectively referred to as the Respondents).

1.1 Background

The Record of Decision (ROD) issued by the United States Environmental Protection Agency (EPA), Region 6 in October 2017 identified Monitored Natural Recovery (MNR) as the preferred remedial alternative for sediments in the SSA. EPA selected MNR as the preferred alternative for the SSA based on the relatively low concentrations of dioxins and furans in sediment, low potential for risk to human and ecological receptors, and evidence of net deposition of sediment. The Statement of Work (SOW) requires that an Operations and Maintenance (O&M) Plan be provided as part of the 30% Remedial Design (RD) for the Northern Impoundment. As discussed with the EPA on May 7, 2020, this MNR Plan (Plan) will take the place of the O&M Plan.

1.2 Purpose

The purpose of this Plan is to discuss the technical basis of MNR; identify the parameters to be monitored; frequency and duration of monitoring; describe the methods for data evaluation; and define the decision rule for evaluating the effectiveness of MNR.

1.3 Relationship to Supporting Plans

Supporting plans relevant to this Plan are the Emergency Response Plan (Attachment 2), Field Sampling Plan (Attachment 3), Quality Assurance Project Plan (Attachment 4), Site-Wide Monitoring Plan (Attachment 5), and Institutional Controls Implementation and Assurance Plan (Attachment 8).

2. Roles and Responsibilities

Personnel for implementation of the Plan include the following:

- Project Manager: The Project Manager will be responsible for the overall execution of the MNR monitoring program.
- MNR Lead: The MNR Lead will be responsible for ensuring the monitoring program is implemented in accordance with the Plan, review of data, senior technical review of technical memoranda and reports, and technical guidance throughout the MNR monitoring program.
- Project Scientist: The Project Scientist will be responsible for evaluation of data, preparation of technical memoranda and reports, and assisting the MNR Lead.
- Field Lead: The Field Lead will be responsible for scheduling and implementing sampling activities.

- Project Chemist: The Project Chemist will be responsible for Quality Assurance/Quality Control (QA/QC) and data validation.
- Database Manager: The Database Manager will be responsible for entering data into a database and managing the database.

3. Regulatory Framework

Currently, there are no regulations specific to monitoring MNR or establishing performance criteria for MNR. There are, however, guidance documents that provide a framework for developing MNR plans. In preparing this Plan, the following guidance documents were consulted:

- Environmental Security Technology Certification Program (ESTCP). 2009. Technical Guide. Monitored Natural Recovery at Contaminated Sediment Sites. ESTCP Project ER-0622. May 2009.
- EPA. 2002. Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites. OSWER Directive 9285.6-08. February 12, 2002.
- EPA. 2005. Contaminated Sediment Remediation Guidance for Hazardous Waste Sites. EPA-540-R-05-012. OSWER 9355.0-85. December 2005.

4. Monitored Natural Recovery

4.1 Overview

MNR occurs through physical, chemical, and biological processes that transform, immobilize, isolate, and/or remove contaminants in sediment until they no longer pose risk to human and/or ecological receptors. Reduction or management of risk is achieved through a decrease in the concentration of contaminants, reduction in bioavailability, and/or reduction in toxicity.

4.2 Physical Processes

Deposition of sediment is the primary physical process contributing to MNR. The highest potential for risk of exposure occurs in the Biologically Active Zone (BAZ), generally the upper six inches of the sediment profile, where benthic organisms are present. In addition to risk posed by direct contact in the upper six inches, dioxins and furans have the potential to bioaccumulate in fish and shellfish, which can be consumed by humans and upper trophic level ecological receptors. Deposition of uncontaminated sediment creates a new BAZ, which isolates benthic organisms and other receptors from the contaminants of concern. Deposition is expected to be the primary process for MNR for dioxins and furans in the SSA.

4.3 Chemical Processes

For dioxins and furans, adsorption is the primary chemical process of MNR. Adsorption is the partitioning of the dissolved form of a contaminant onto the surface of a solid phase (i.e., sediment particle). Adsorption reduces the bioavailability, and thus, toxicity by removing hydrophobic

contaminants from pore water, the exposure medium for benthic organisms. Adsorption is a function of the chemical properties of the contaminant and fraction of organic carbon (f_{oc}) in sediment. The contaminant-specific adsorption-desorption distribution coefficient (K_d) is the ratio of the concentration of the contaminant adsorbed to sediment to the concentration dissolved in pore water at equilibrium. For organic compounds, K_d is normalized for f_{oc} to produce the organic carbon-water partition coefficient (K_{oc}). Given the high hydrophobicity of dioxins and furans, adsorption is expected to be a contributing process of MNR for the SSA.

Persistent organic compounds, such as dioxins and furans, are stable in the environment and resistant to chemical degradation. However, some chemical transformations can potentially occur through processes such as electrophilic substitution and oxidation/reduction. Chemical transformation is not expected to be a significant contributing process to MNR for the SSA.

4.4 Biological Processes

Degradation of dioxins and furans through microbiological transformation can occur if the community of benthic organisms includes microorganisms that use dioxins and furans as a source of energy. If present, biological degradation to less toxic forms can occur as mineralization. In addition to the presence of an appropriate microbial community, factors that can influence biological degradation include oxygen availability, pH, and specific conductivity. Biological degradation is not expected to be a significant contributing process to MNR for the SSA.

5. Considerations in Developing the Monitoring Program

5.1 2019 Sampling Data

Sampling of sediment in the SSA was conducted in 2019 as part of the Second Phase Pre-Design Investigation (PDI-2). Sediment for analysis of dioxins and furans, cesium-137 (^{137}Cs), and lead-210 (^{210}Pb) was collected at nine sample locations on half-acre grids (see Figure 2-5 from the *Preliminary 30% Remedial Design - Northern Impoundment*).

Sediment for analysis of dioxins and furans was collected at depth intervals of 0-12 inches, 12-24 inches, 24-48 inches, and 48-72 inches below the sediment/surface water interface. Samples were analyzed for dioxin and furan congeners and percent solids. Toxic Equivalency (TEQ) was calculated using Toxicity Equivalency Factors (TEF) for mammalian receptors ($TEQ_{DF, M}$).

Samples for analysis of ^{137}Cs and ^{210}Pb were collected at depth intervals of 2.5 cm (0.98 in) from the sediment/surface water interface to a depth of 82.5 cm (32.5 in). Eleven intervals were sampled. ^{137}Cs was released into the environment as a result of atmospheric testing of nuclear devices beginning in 1954 with a peak in 1963. Because natural occurrence is extremely rare and its presence can be related to a specific period of time, ^{137}Cs detections are useful in dating sediments. ^{210}Pb is naturally occurring and activity of ^{210}Pb is used to estimate relative time and rates of sediment deposition.

Activity of ^{137}Cs was below detection limits, which suggests that sediment in the depth intervals sampled has been deposited since the mid-1960s. Activity of ^{210}Pb indicates that deposition is occurring in four locations within the SSA (sampling locations SJSSA01, SJSSA04, SJSSA07, and SJSSA02) at estimated deposition rates ranging from 0.77 cm/year to 3.5 cm/year, but that deposition activity is variable at four other locations sampled in the SSA (SJSSA08, SJSSA03, SJSSA06, and SJSSA09). Sample results at one location (SJSSA05) show evidence of erosion.

Data for $TEQ_{DF, M}$ indicate that, with the exception of one near shore sample location (location SJSSA06), concentrations are below 51 nanogram per kilogram (ng/kg) $TEQ_{DF, M}$ (the risk-based standard selected by the EPA in the ROD) at depth intervals at which exposure pathways are complete. Because these data demonstrate that concentrations of $TEQ_{DF, M}$ are below the EPA's risk-based level and deposition is occurring in the majority of the SSA, monitoring and possible institutional controls (ICs) will focus only on the area around SJSSA06. This area is the only location within the SSA in which levels of dioxins and furans above 51 ng/kg $TEQ_{DF, M}$ were detected in the top 24 inches in the 2019 monitoring event.

5.2 Chemical Properties of Dioxins and Furans

Of the processes of MNR discussed in Section 4, physical deposition and dispersal and chemical adsorption are expected to be the primary processes in the SSA. Chemical and biological degradation are not expected to be significant processes of MNR. Therefore, monitoring will focus on concentrations of dioxins and furans and $TEQ_{DF, M}$ in the BAZ.

5.3 Receptors at Risk

The Remedial Investigation (RI) included baseline human health and ecological risk assessments. Both risk assessments concluded that in the area of the Northern Impoundment, concentrations of dioxins and furans in sediment pose negligible risk to human and ecological receptors. Human receptors evaluated included recreational fishers, subsistence fishers, and recreational visitors. Ecological receptors evaluated included benthic invertebrate populations and communities and populations of benthic omnivorous fish, benthic insectivorous fish, benthic piscivorous fish, wading birds, diving birds, mammals, and reptiles. Because risk is negligible to all receptors, monitoring of dioxins and furans in tissue is not necessary. If concentrations of dioxins and furans in exposure depths for human and ecological receptors do not exceed the protective concentration levels (PCLs) identified in the RI and approved by the EPA, it can reasonably be expected that concentrations in tissue will also remain below protective concentrations.

5.4 Source Control

MNR will be effective only if the source of dioxins and furans in sediment of the SSA is controlled. The selected remedy for the Northern Impoundment includes excavation and off-site disposal of waste containing dioxins and furans above 30 ng/kg $TEQ_{DF, M}$ from the Northern Impoundment and MNR and ICs to prevent disturbance of sediments in the SSA. These remedial measures will insure that dioxins and furans are not re-suspended in the SSA. Therefore, MNR is expected to effectively maintain concentrations of dioxins and furans in the SSA at or below concentrations determined by the EPA to be protective of human and ecological receptors. It is acknowledged, however, that

dioxins and furans may be present in the San Jacinto River and/or adjacent upland areas from sources other than waste material in the Northern Impoundment.

5.5 Potential for Disturbance and Perturbation

Propeller wash from boat traffic in the San Jacinto River and SSA could continue to potentially disturb sediments. Hurricanes and high-energy storm events are natural events that could perturb sediment in the SSA. These anthropogenic and natural sources of disturbances and perturbation could deposit sediment contaminated with dioxins and furans from off-site sources or scour surface sediment to depths that expose deeper sediments. These types of events will be considered in evaluating data collected pursuant to this Plan. The need for ICs in the area around location SJSSA06 in the SSA to eliminate anthropogenic disturbances will be evaluated in future design documents.

6. Monitoring Program

6.1 Sampling Locations and Depth Intervals

To be determined in future design documents.

6.2 Parameters

To be determined in future design documents.

6.3 Sampling Frequency

To be determined in future design documents.

6.4 Data Evaluation

To be determined in future design documents.

6.5 Decision Rule

To be determined in future design documents.

6.6 Sampling Duration

To be determined in future design documents.

6.7 Establishment of Institutional Controls (ICs)

To be determined in future design documents.

7. Reporting

To be determined in future design documents.

Attachment 10
Operations & Maintenance Manual – Northern Impoundment

Attachment 10 - Operation and Maintenance Manual – Northern Impoundment

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11187072 | Report No 13

Per discussion with the United States Environmental Protection Agency (EPA), this plan is not anticipated to be necessary based on the Remedial Design (RD) of the selected remedy.