Mobile Cranes Program

Document Title: Phosphate Mobile Cranes Program		**Document Identifier:** <Generated by Content Server>	
Applies To: North America Phosphates		**Managed By:** Enterprise EHS PMO	
Document Owner: Director, NA Health & Safety Department		**Document Approver:** VP EHS, Enterprise Operations	
Current Version Effective Date:	8/15/2024	Formal Review Cycle Due Date:	Annual

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1. PURPOSE

To establish a policy for mobile crane operations, inspections, and training as required by OSHA, MSHA, other regulatory or consensus standards.

2. SCOPE

This procedure shall apply to all Mosaic Phosphate Business Unit employees and contractors at all Concentrates and Mining facilities. The following cranes are included in this procedure:

Lattice boom cranes	Carry decks cranes	Digger trucks
Telescopic boom cranes	Articulating cranes	Hyster Karry Krane
Boom trucks (including military wrecker type)	Loader with side mounted boom	Service trucks with mounted cranes – capacity > 2,000 lbs.

3. DEFINITIONS

3.1 ASME - Means the American Society of Mechanical Engineers.

3.2 Angle indicator, (boom) - An accessory which measures the angle of the boom to the horizontal.

3.3 Assist crane - means a crane used to assist in assembling or disassembling a crane.

3.4 Attachments - means any device that expands the range of tasks that can be done by the equipment.

3.5 Axis of rotation - The vertical axis around which the crane superstructure rotates.

3.6 Boom angle - The angle between the longitudinal centerline of the boom and the horizontal. The boom longitudinal centerline is a straight line between the boom foot pin (heel pin) centerline and boom point sheave pin centerline.

3.7 Boom angle indicator – means a device which measures the angle of the boom relative to horizontal.

3.8 Boom hoist limiting device - includes boom hoist disengaging device, boom hoist shut-off, boom hoist disconnect, boom hoist hydraulic relief, boom hoist kick-outs, automatic boom stop device, or derricking limiter. This type of device disengages boom hoist power when the boom reaches a predetermined operating angle. It also sets brakes or closes valves to prevent the boom from lowering after power is disengaged.

3.9 Competent person - One who can identify existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

3.10 Controlled load lowering - means lowering a load by means of a mechanical hoist drum device that allows a hoisted load to be lowered with maximum control using the gear train or hydraulic components of the hoist mechanism. Controlled load lowering requires the use of the hoist drive motor, rather than the load hoist brake, to lower the load.

3.11 Controlling entity- Means an employee that is a prime contractor, general contractor, construction manager or any other legal entity which has the overall responsibility for the construction of the project; it's planning, quality, and completion.

3.12 Counterweight - Is a weight used to supplement the weight of the machine in providing stability for lifting working loads.

3.13 Crossover points - means locations on a wire rope which is spooled on a drum where one layer of rope climbs up on and crosses over the previous layer. This takes place at each flange of the drum as the rope is spooled onto the drum, reaches the flange, and begins to wrap back in the opposite direction.

3.14 Dedicated channel - means a line of communication assigned by the employer who controls the communication system to only one signal person and crane/derrick or to a coordinated group of cranes/derricks/signal persons

3.15 Dedicated spotter (power lines): See High Voltage Lines and Cables Program

- **Reference:** EHSS North America – High Voltage Lines and Cables

3.16 Designated person - Selected or assigned by the employer or the employer's representative as being qualified to perform specific duties.

3.17 Drum rotation indicator - means a device on a crane or hoist which indicates in which direction and at what relative speed a particular hoist drum is turning.

3.18 Electrical contact -t occurs when a person, object, or equipment makes contact or comes in close proximity with an energized conductor or equipment that allows the passage of current.

3.19 Encroachment - is where any part of the crane, load line or load (including rigging and lifting accessories) breaches a minimum clearance distance that the EHSS North America – High Voltage Lines and Cables Program requires to be maintained from a power line.

3.20 Encroachment Precaution - practices put into place to help aid in maintaining the minimum clearance required from energized powerlines.

3.21 Fall zone - The area (including but not limited to the area directly beneath the load) in which it is reasonably foreseeable that partially or completely suspended materials could fall in the event of an accident.

3.22 F.L.H.A. - Field Level Hazard Assessment

3.23 Free fall (of the load line) - means that only the brake is used to regulate the descent of the load line (the drive mechanism is not used to drive the load down faster or retard its lowering)

3.24 Freely Suspended Load - Load hanging free with no direct external force applied except by the lifting wire rope.

3.25 Ground Gradient - The voltage decreases rapidly with increasing distance from the energized crane. (see “Step Potential”)

3.26 High Activity Work Zone – Work activity/project taking place within twelve feet of the centerline of the track that has high potential for workers, materials, or equipment to cross into the eight feet minimum clearance zone.

3.27 High Wind - Wind velocity in excess of 20 mph (32km/h).

3.28 Hoist - means a mechanical device for lifting and lowering loads by winding a line onto or off a drum.

3.29 Hoisting - is the act of raising, lowering or otherwise moving a load in the air with equipment covered by this standard. As used in this standard, “hoisting” can be done by means other than wire rope/hoist drum equipment.

3.30 Jib stop - (also referred to as a jib backstop), is the same type of device as a boom stop but is for a fixed or luffing jib.

3.31 List - means the angle of inclination about the longitudinal axis of a barge, pontoons, vessel or other means of floatation.

3.32 Load moment (or rated capacity) indicator (L.M.I) - means a system which aids the equipment operator by sensing (directly or indirectly) the overturning moment on the equipment, i.e., load multiplied by radius. It compares this lifting condition to the equipment’s rated capacity and indicates to the operator the percentage of capacity at which the equipment is working. Lights, bells, or buzzers may be incorporated as a warning of an approaching overload condition.

3.33 Load moment (or rated capacity) limiter - A system which aids the equipment operator by sensing (directly or indirectly) the overturning moment on the equipment, i.e., load multiplied by radius. It compares this lifting condition to the equipment’s rated capacity, and when the rated capacity is reached, it shuts off power to those equipment functions which can increase the severity of loading on the equipment, e.g., hoisting, telescoping out, or luffing out. Typically, those functions which decrease the severity of loading on the equipment remain operational, e.g., lowering, telescoping in, or luffing.

3.34 Load - The object(s) being hoisted and/or the weight of the object(s); both uses refer to the object(s) and the load-attaching equipment, such as, the load block, ropes, slings, shackles, and any other ancillary attachment. Load refers to the gross load.

3.35 Load ratings - Crane ratings in pounds established by the manufacturer in accordance with ASME B30.5-1.1.

3.36 Luffing jib limiting device - is similar to a boom hoist limiting device, except that it limits the movement of the luffing jib

3.37 Mobile crane - A lifting device incorporating a cable suspended latticed boom or hydraulic telescopic boom designed to be moved between operating locations by transport over the road.

3.38 Multi-purpose machine - A machine that is designed to be configured in various ways, at least one of which allows it to hoist (by means of a winch or hook) and horizontally move a suspended load. For example, a machine that can rotate and can be configured with removable forks/tongs (for use as a forklift) or with a winch pack, jib (with a hook at the end) or jib used in conjunction with a winch. When configured with the forks/tongs, it is not covered by this policy. When configured with a winch pack, jib (with a hook at the end) or jib used in conjunction with a winch, it is covered by this policy.

3.39 Net Load –The object being lifted excluding such items as the load block, ropes, slings, shackles and any other ancillary attachments.

3.40 Operational aids - Devices that assist the operator in the safe operation of the crane by providing information or automatically taking control of a crane function. These include, but are not limited to, Category I operational aids: (1) Boom hoist limiting device; (2)Luffing jib limiting device; (3)Anti two-blocking device. Category II operational aids: (1) Boom angle or radius indicator; (2) Jib angle indicator if the equipment has a luffing jib; (3) Boom length indicator if the equipment has a telescopic boom, except where the rate capacity is independent of the boom length.

3.41 Pendants - includes both wire and bar types. Wire type: A fixed length of wire rope with mechanical fittings at both ends for pinning segments of wire rope together. Bar type: Instead of wire rope, a bar is used. Pendants are typically used in a latticed boom crane system to easily change the length of the boom suspension system without completely changing the rope on the drum when the boom length is increased or decreased.

3.42 Qualified person - A person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, successfully demonstrated the ability to solve/resolve problems relating to the subject matter, the work, or the project.

3.43 Qualified signal person - A signal person who meets the criteria for a qualified person.

3.44 Designated spotter – A person who meets the requirements for a qualified signal person.

3.45 Rated capacity - The maximum working load permitted by the manufacturer under specified working conditions. Such working conditions typically include a specific combination of factors such as equipment configuration, radii, boom length, and other parameters of use.

3.46 Rated capacity indicator - See load moment indicator.

3.47 Rated capacity limiter - See load moment limiter.

3.48 Repetitive pickup points - refer to, when operating on a short cycle operation, the rope being used on a single layer and being spooled repetitively over a short portion of the drum.

3.49 Running wire rope - means a wire rope that moves over sheaves or drums.

3.50 Side loading - A load applied at an angle to the vertical plane of the boom.

3.51 Step Potential - is the danger present when two parts of your body (usually your feet) are in two different voltage zones. This difference in voltage causes the current to run through you and shock you, which can be fatal.

3.52 Tagline - means a rope (non-conductive) attached to a lifted load for purposes of controlling load spinning and pendular motions or used to stabilize a bucket or magnet during material handling operations.

3.53 Travel - The moving of a crane on a job site or from job site to job site.

3.54 Trigger Distance - a distance where if the crane could potentially come within this area at any time it must trigger a response from all involved to apply the necessary “Encroachment Precautions”

3.55 Trim - means angle of inclination about the transverse axis of a barge, pontoons, vessel, or other means of floatation.

3.56 Two blocking - A condition in which a component that is uppermost on the hoist line such as the load block, hook block, overhaul ball, or similar component, comes in contact with the boom tip, fixed upper block or similar component. This binds the system and continued application of power can cause failure of the hoist rope or other component.

3.57 Whipline (auxiliary hoist) - A separate hoist rope system of lighter load capacity and higher speed than provided by the main hoist.

3.58 Wire rope - means a flexible rope constructed by laying steel wires into various patterns of multi-wired strands around a core system to produce a helically wound rope

4. PROCEDURE

4.1 Operators

4.1.1 The employer must comply with all manufacturer procedures applicable to the operational functions of equipment, including its use with attachments.

4.1.2 The operator shall be trained and evaluated on each type of crane (equipment specific) before he/she is allowed to operate it. Documentation is required.

4.1.3 Cranes shall be operated only by the following personnel: Qualified/certified/evaluated operators, operator-in-training under the direct supervision of a qualified/certified/evaluated operator, maintenance, and test personnel (when it is necessary in the performance of their duties), and crane inspectors. No one other than the personnel specified above shall enter a crane cab, with the exception of persons such as oilers, supervisors, and those specific persons authorized by supervisors whose duties require them to do so, and then only in the performance of their duties and with the knowledge of the operator or other appointed person.

a. Maintenance, inspection, and repair personnel are permitted to operate the equipment only where all of the following requirements are met:
   i. The operation is limited to those functions necessary to perform maintenance,
   ii. inspect the equipment or verify its performance.
   iii. The personnel either:
      A. Operate the equipment under the direct supervision of a qualified operator; or,
      B. Is familiar with the operation, limitations, characteristics, and hazards associated with the type of equipment.

b. Maintenance and repair personnel must meet the definition of a qualified person with respect to the equipment and maintenance/repair tasks performed.

c. Telescopic Boom Trucks and Military Wreckers shall be operated by NCCC qualified/certified/evaluated Operators except during repair work.

4.1.4 Before operation, the operator shall have read and understood the; rated capacities (load chart), recommended operating speeds, special hazard warnings, instructions, and operator's manual for that specific crane.

4.1.5 Where rated capacities are available in the cab only in electronic form: in the event of a failure which makes the rated capacities inaccessible, the operator must immediately cease operations or follow safe shut-down procedures until the rated capacities (in electronic or other form) are available.

4.1.6 In the event a lift is thought to be unsafe by the crane operator, he/she shall immediately stop the lift operation and report the same to his/her supervisor.

4.1.7 The operator shall respond to signals only from a qualified signal person but shall obey a stop signal or emergency stop signal at any time, no matter who gives it.

4.1.8 A signal person must be provided in each of the following situations:

a. The point of operation, meaning the load travel or the area near or at load placement, is not in full view of the operator.

b. When the equipment is traveling, the view in the direction of travel is obstructed.

c. Due to site specific safety concerns, either the operator or the person handling the load determines that it is necessary.

4.1.9 When traveling a crane near overhead power lines the High Voltage Lines and Cables Program must be followed.

Reference: EHSS North America – High Voltage Lines and Cables

4.1.10 Signals to operators must be by hand, voice, or audible.

a. Prior to beginning operations, the operator, signal person and lift director (if there is one), must contact each other and agree on the voice signals that will be used. Once the voice signals are agreed upon, these workers need not meet again to discuss voice signals unless another worker is added or substituted, there is confusion about the voice signals, or a voice signal is to be changed.

b. Each voice signal must contain the following three elements, given in the following order: function (such as hoist, boom, etc.), direction; distance and/or speed; function, stop command.

c. The operator, signal person and lift director (if there is one), must be able to effectively communicate in the language used.

d. When using radio or other electronic device to communicate voice signals the operator shall have a hands-free device.

4.1.11 Communication between the crane operator and the signal person shall be maintained continuously during all crane movements. If at any time communication is disrupted, the operator shall stop all crane movements until communication is restored and a proper signal is given and understood.

4.1.12 Hand signals shall be those provided in Phos-Reference – Standard Hand Signals.

Reference: EHSS-Phos Reference – Mobile Cranes – Standard Hand Signals

4.1.13 The operator shall not leave his/her position at the controls while a load is suspended except where the following provisions are meet:

a. The operator remains adjacent to the equipment and is not engaged in any other duties.

b. The load is to be held suspended for a period of time exceeding normal lifting operations.

c. The competent person determines that it is safe to do so and implements measures necessary to restrain the boom hoist and telescoping, load, swing, and outrigger or stabilizer functions.

d. Barricades or caution lines, and notices, are erected to prevent all employees from entering the fall zone.

4.1.14 The operator must not engage in any practice or activity that diverts his/her attention while engaged in operating the equipment, such as the use of cellular phones (other than when used for signal communications.

4.1.15 Tagging out of service equipment/functions. Where the employer has taken the equipment out of service, a tag must be placed in the cab stating that the equipment is out of service and is not to be used. Where the employer has taken a function(s) out of service, a tag must be placed in a conspicuous position stating that the function is out of service and is not to be used.

4.1.16 Before starting the engine, the operator must verify that all controls are in the proper starting position and that all personnel are in the clear.

4.1.17 If equipment adjustments or repairs are necessary:

a. The operator must, in writing, promptly inform the person designated by the employer to receive such information and, where there are successive shifts, to the next operator.

b. Upon notification, the employer must notify all affected employees, at the beginning of each shift, of the necessary adjustments or repairs and all alternative measures.

4.1.18 The operator shall be responsible for those operations under his/her direct control. Whenever there is any doubt as to safety, the operator shall have the authority to stop the lift until safety has been assured.

4.1.19 When physically or mentally unfit, an operator shall not engage in the operation of equipment.

4.2 Access and Egress

4.2.1 Personnel are required to access and egress at the designed access points while maintaining 3 points of contact while climbing.

4.2.2 Personnel are not allowed to stand on the crane unprotected from a fall.

4.2.3 After ascending, personnel must go directly to the cab to operate the crane or

4.2.4 Personnel leaving the cab must go directly to an egress point to get off the crane

4.2.5 Personnel are allowed to be on the crane deck to check their wire rope, lubrication, clean windows as long as they maintain 3 points of contact.

4.2.6 Rigging equipment, toolboxes, outrigger pads etc... Need to be brought to/from the job in another vehicle or stored where personnel can safely access from the ground.

4.2.7 Keep personnel off the flat bed areas (if unprotected) of the boom trucks, military trucks, knuckle booms, etc.

4.3 Crane Operations

4.3.1 Hoisting of any loads shall be promptly discontinued upon indication of any dangerous weather conditions (lightning or high winds, etc.) or other impending danger.

Reference: EHSS North America – Severe Weather Program

4.3.2 When a local storm warning has been issued, the competent person must determine whether it is necessary to implement manufacturer recommendations for securing the equipment.

4.3.3 At the onset of dangerous weather conditions (lightning or high winds, etc.) or other impending danger the operator may leave the crane cab with the load suspended per manufacturers recommendations and provided conditions at 4.1.13 (c and d) are met.

Reference: EHSS North America – Severe Weather Program

4.3.4 While the operator is not moving a suspended load, no employee must be within the fall zone except for employees:

a. Engaged in hooking, unhooking or guiding a load;

b. Engaged in the initial attachment of the load to a component or structure; or

c. Operating a concrete hopper or concrete bucket.

4.3.5 When employees are engaged in hooking, unhooking, or guiding the load, or in the initial connection of a load to a component or structure and are within the fall zone, all of the following criteria must be met:

a. The materials being hoisted must be rigged to prevent unintentional displacement.
b. Hooks with self-closing latches or their equivalent must be used.
c. The materials must be rigged by a qualified rigger.

4.3.6 Receiving a load. Only employees needed to receive a load are permitted to be within the fall zone when a load is being landed.

4.3.7 During a tilt-up or tilt-down operation:

a. A qualified person shall determine if the operation requires the use of an additional crane/machine to assist.
b. No employee must be directly under the load.
c. Only employees essential to the operation are permitted in the fall zone (but not directly under the load).
d. An employee is essential to the operation if the employee is conducting one of the following operations and the employer can demonstrate it is infeasible for the employee to perform that operation from outside the fall zone:
    i. Physically guide the load;
    ii. Closely monitor and give instructions regarding the load's movement; or
    iii. Either detach it from or initially attach it to another component or structure (such as, but not limited to, making an initial connection or installing bracing).

4.3.8 Operation of service trucks with mounted cranes with a Capacity greater than 2,000 lbs. shall be guided by manufacturer recommendations and guidelines.

4.3.9 Cranes of any type shall not be loaded beyond their maximum rated capacity, nor shall they be subjected to any operations, which could exceed their maximum load capacities, such as shock loads or excessive swing speeds that cause the load to swing out beyond the boom tip radius.

4.3.10 When the rotating superstructure poses a risk of pinching or crushing an employee the employer must erect and maintain control lines, warning lines or similar barriers to mark the boundaries of the hazard areas.

4.3.11 House locks/360-degree locks follow manufactures recommendations for proper use.

4.3.12 Prior to travel on a job site with the jib/extension erected the operator must ensure the manufacturer allows travel with an erected jib/extension.

4.3.13 When a crane must be traveled with the jib erected/boom extended, the controlling entity or his designee must approve the move, plan the route and assign a designated spotter or qualified signal person where needed.

4.3.14 Prior to traveling a crane, a Field Level Hazard Assessment (FLHA) must be completed and attached to the lift plan when a lift plan is required.

4.3.15 Cranes must not be assembled or used unless ground conditions are confirmed to be in compliance with the equipment manufacturer's specifications for adequate support and degree of level of the equipment. Adequate cribbing shall be made available to the operator if needed for proper set-up of crane.

4.3.16 The controlling entity must ensure that ground preparations necessary to meet the equipment manufacturer's requirements concerning ground conditions, including but not limited to ground studies, are provided.

4.3.17 The controlling entity must inform the user of the equipment and the operator of the location of hazards beneath the equipment set-up area (such as voids, tanks, utilities) if these hazards are identified in documents (such as site drawings, as-built drawings, and soil analyses) that are in the possession of the controlling entity

(whether at the site or off the site) or the hazards are otherwise known to that controlling entity.

4.3.18 Cranes being loaded or unloaded at the site must be supervised by a Competent person designated by the Controlling entity.

4.3.19 Cranes shall be loaded or unloaded in designated areas. If designated area is not free of overhead power lines, the High Voltage Lines and Cables Program must be followed.

Reference: EHSS North America – High Voltage Lines and Cables

4.3.20 While traveling the following additional precautions shall be exercised.

a. Permitted cranes traveling on public roadways
   i. The boom should be carried in line with the direction of motion.
   ii. The superstructure shall be secured against rotation (or the boom placed in a boom rack mounted on the carrier), except when negotiating turns when there is an operator in the cab, or the boom is supported on a dolly.
   iii. The empty hook shall be lashed or otherwise restrained so that it cannot swing freely.
b. Non-permitted cranes traveling on the job site:
   i. The boom must be positioned in line with the carrier.
   ii. The house lock must be engaged.
   iii. When traveling at 2.5 M.P.H. or less the block does not require restraining unless the operator cannot control the empty hook.

4.3.21 The crane shall be uniformly level within one percent of level grade and located on firm footing.

4.3.22 Outriggers:

a. When operating with the use of outriggers or stabilizers they must be set in accordance with manufacturer procedures and load charts.
b. While extending or retracting outriggers each outrigger shall be visible to the equipment operator, or a signal person must be posted
c. While extending or retracting outriggers the operator shall give a warning sound, such as sounding the horn or alarm, to notify all personnel in the immediate area that the outriggers are being moved. An automatic warning sound or alarm is the preferred method of warning personnel.
d. A signal person may be used to warn personnel if the equipment is not equipped with an alarm.

4.3.23 When pins or similar devices are being removed from booms employees must not be under the boom, jib or other components. *Exception*. Where the employer demonstrates that site constraints require one or more employees to be under the boom, jib, or other components when pins (or similar devices) are being removed, the A/D director must implement procedures that minimize the risk of unintended dangerous movement and minimize the duration and extent of exposure under the boom.

4.3.24 The operator shall not push or pull anything with a crane boom

4.3.25 Check operation of all applicable operational aids including anti-two-block system each shift to ensure that it is working properly.

4.4 Lifting

4.4.1 Cranes are designed and rated to handle freely suspended loads. The operator must not lift any load when the hook and boom point is not directly over the center of gravity of the freely suspended load.

4.4.2 Side loading of booms shall be limited to freely suspended loads.

4.4.3 Cranes must not be used to drag or pull loads sideways.

4.4.4 The weight of the load must be determined from a source recognized by the industry.

4.4.5 If upon lifting, the LMI, RCI or RCL indicates the load exceeds 75 percent of the maximum rated capacity at the longest radius that will be used during the lift operation the operator must not proceed until the load weight is verified.

4.4.6 The capacity on the load chart shall never be exceeded.

4.4.7 When operating using the “on rubber chart” the operator must ensure that outriggers are not in contact with the ground.

4.4.8 When using less than fully extended and set outriggers the operator must ensure each of the following conditions are met:

a. Operation with less than fully extended outriggers is permitted if approved by the crane manufacturer.
b. Outriggers shall be set only in positions that correspond to the load/capacity charts supplied by the manufacturer for those positions.
c. A device or system is provided that accurately locates the outrigger beams to coincide with the partially extended outrigger position(s) of the load capacity chart.
d. Visible indication of the manufacturer’s specified outrigger positions shall be provided by means such as stripes painted on the outrigger beams or an electronic display.

4.4.9 A means shall be provided to fasten outrigger floats to outrigger jacks when in use.

4.4.10 Neither the boom nor load shall be lowered below the point where less than two full wraps of wire rope remain on their respective drums or as per manufacturer recommendation.

4.4.11 Pick and carry operation shall not be performed from any erected boom extension, fly or jib unless permitted by the crane manufacturer.

4.4.12 The use of a crane to hoist employees in a man basket is prohibited, unless there is no other safe way to do the job. (See Appendix B - Crane Suspended Man Basket Permit)

4.4.13 Before beginning a crane/derrick operation in which more than one crane/derrick will be supporting the load, the Site Supervisor must appoint a qualified person as the designated Lift Director who must review the lift plan and ensure plan requirements are met.

4.4.14 When lifting loads over roadways, barricades shall be placed to divert traffic.

4.4.15 Hoist ropes shall not be wrapped around the load.

4.4.16 Proper rigging shall be used.

4.4.17 Tag lines shall be used to control suspended loads unless it is unsafe to do so.

4.4.18 When tag lines are used they shall be non-conductive.

4.4.19 The maximum counterweight or ballast specified by the manufacturer for the equipment must not be exceeded.

4.5 Florida Minerals Lift Plan

4.5.1 A non-routine lift checklist is required:

i. During crane/derrick operations in which more than one crane /derrick will be supporting the load.

ii. Personnel lifting.

iii. When there is a potential of encroachment of the minimum approachable distance to electrical transmission/distribution lines whether traveling or lifting.

iv. Crane gross load exceeds 75 percent of the load chart capacity.

v. When lifting over process equipment where:

A. Damage would result in a release of radioactive or hazardous material exceeding established Permissible Environmental Limits

B. The item, if damaged would be irreplaceable or not repairable and is vital to a system, facility, or project operation

C. The cost to replace or repair the item, or delay in operations of having the item damaged would have a negative impact on facility, organizational, or DOE budget to the extent that it would affect program commitments

D. The item, although noncritical, is to be lifted above or in close proximity to a critical item.

vi. When Controlling Entity, Lift Director, Project Manager or Professional Engineer determine a lift plan is required.

Reference: EHSS-Phos Form – Mobile Cranes – Appendix A Non-Routine Lift Checklist

4.6 Concentrates Lift plan

4.6.1 The following are a listing of responsibilities for specific groups /jobs as required as it relates to Concentrates Lift Plans:

a. **Crane Operator:** Complete and execute Standard Lift Plan form for all lifts. Complete and execute Critical Lift Plan form, as applicable. Execute Engineered Lift Plans, as applicable.

b. Supervisor: Complete In-Process Checks (IPC) per site. Facilitate higher level approvals, as required.

c. Project Manager / Engineer or Superintendent: Complete In-Process Checks (IPC) in per site. Review and approve Critical Lift plans. Review Engineered Lift Plans, as applicable.

d. Qualified Engineer: Develop Engineered Lift Plan(s) as required by Engineer Lift Plan Requirements.

4.6.2 A standard lift plan is required for all lifts that do not meet either the critical lift or engineered lift criteria.

Reference: EHSS-Phos Form – Mobile Cranes – Appendix E Concentrates Standard Lift Plan

4.6.3 A critical lift plan is required if any of the criteria below are met.

a. The gross load, or the actual LMI, weight exceeds 75% of the crane's gross capacity.
b. For a lift involving more than one crane, total gross load weight must not exceed 75% of either crane's gross capacity.
c. Lift within 20 feet of energized power lines. (See Mobile Crane Program - Section 4.7)
d. Hoisting personnel. (Permit required. See Mobile Crane Program – Appendix B)
e. Lifting over tanks or pressure vessels containing ammonia, sulfuric acid, gasoline, diesel, fuel-oil, or propane.
f. When management determines it is required.

Reference: EHSS-Phos Form – Mobile Cranes – Appendix F Concentrates Critical Lift Plan

4.6.4 An engineered lift plan is required if any of the criteria below are met.

a. The load is unique, vital to a system, facility, or project operation and, if damaged, would be considered irreplaceable or unrepairable and result in a business impact of greater than $1MM.
b. Losing control of the load would likely result in a catastrophic release of a hazardous material / substance that would likely result in the declaration of a "Facility Emergency."
c. The gross load is 90%, or more, of the crane's gross capacity.
d. When the ground pressure exerted exceeds the soil bearing capacity (SBC). (If unknown, assume 2,000 PSF SBC.) (Use worksheet at the end of the Critical Lift Plan form)
e. When management determines it is required

Reference: EHSS-Phos Form – Mobile Cranes – Appendix G Concentrates Engineered Lift Plan Requirements

4.7 Crossing Public Roadways

4.7.1 Provide lighting at each crossing to be used during nighttime hours and inclement weather

4.7.2 Provide appropriate traffic signage at each crossing

4.7.3 Provide a minimum ¼ mile clear line of site

4.7.4 For Rough Terrain Cranes provide increased visibility for/on the sides of the crane. Some examples include:

a. Reflective tape down the boom
b. Yellow Flashing Beacon
c. Lights mounted on the boom

4.7.5 Dedicated Flagman shall be used to assist Rough Terrain Cranes crossing public roadways.

4.7.6 Dedicated Flagman shall wear a reflective vest.

4.8 Land Cranes & Derricks Mounted on Barges

4.8.1 The maximum allowable machine list or trim shall be the lesser of 5 degrees or the maximum recommended by the manufacturer.

4.8.2 Rescue Skiff

a. A rescue skiff with oars and ring buoy 30 inches in diameter with at least 90 ft. of line shall be provided.

4.8.3 Operational criteria:

a. Barge mounted cranes require modified ratings due to increased loading from list, trim, wave action, and wind. The load rating of barge-mounted land cranes shall not exceed that recommended that by the manufacturer or qualified person for the particular barge under the expected environmental conditions.
b. All deck surfaces of the barge shall be above water.
c. The entire bottom area of the barge or pontoon is submerged.
d. Cranes shall be blocked and secured to prevent shifting.

4.8.4 Life Preservers:

a. At least one Coast Guard-approved life jacket or work vest shall be provided and worn for each person aboard.
b. Tow rings buoys, 30 inches in diameter, each with at least 90 ft. of line, shall be provided.
c. For night operations, one of the life rings shall have water lights attached to it.

4.9 Telehandler Use

4.9.1 Telehandlers that are configured to hoist and lower (by means of a winch or hook) and horizontally move a suspended load must follow the requirements set out by this program section.

4.9.2 Operators of telehandlers as defined in 4.9.1 must receive training and be certified by an accredited certifying agency (such as National Commission for the Certification of Crane Operators (NCCCO)).

4.9.3 Operators that received most similar crane training, including TSS and/ or TLL certification prior to January1 , 2023 can operate telehandlers as defined in 4.9.1 until that certification expires.

4.9.4 All new NCCCO applicants that will use a telehandler as defined in 4.9.1 must have telehandler certification.

Note: Telehandlers equipped with hooks but not used to suspend, hoist, and lower a load can be used per the Powered Industrial Truck Program and does not require certification by NCCCO or other accredited certifying agency.

Reference: EHSS Phos Program – Powered Industrial Trucks

4.10 Power Line Safety - Safe Working Distances

4.10.1 When operating mobile cranes under or in proximity to power lines they shall be operated in accordance with the High Voltage Lines and Cables Program.

Reference: EHSS North America – High Voltage Lines and Cables

4.11 Railroad Safety – Working Near Railroad Tracks

4.11.1 When operating Mobile Cranes near railroad tracks, they shall be operated in accordance with the recommended minimum clearance of at least 8 feet from the center line of the track. Any areas less than 8 feet shall be marked as low clearance areas.

4.11.2 In high activity work zones, the minimum clearance zone should be clearly delineated by red barricade tape or equivalent. Where there is high potential for workers, materials, or equipment to cross into the 8 feet minimum clearance zone, the track will be blue flagged and locked out per the Railroad Lockout Procedure.

4.12 Equipment Specifications – Safety devices and operator aids

4.12.1 Safety Devices, as noted below, are required on all mobile cranes. Operations must not begin unless all safety devices are in proper working order. If a safety device stops working properly during operation the operator must safely stop operations. If any of the devices listed are not in proper working order the equipment must be taken out of service and operations must not resume until the device is again working properly. Note: Alternative measures are not permitted to be used.

a. Crane level indicator.
b. Boom stops – except for derricks and hydraulic booms.
c. Jib stops (if a jib is attached), except for derricks.
d. Foot pedal brakes must have locks.
e. Hydraulic outrigger jacks and stabilizer jacks must have an integral holding device/check valve.
f. Horn.

4.12.2 Operator aids as noted must be on the equipment unless otherwise specified. Operation must not begin unless the listed operational aids are in proper working order, except where an operational aid is being repaired and where the employer uses temporary alternative measures.

a. Boom hoist limiting device.
b. Luffing jib limiting device.
c. Anti-two-blocking device.
d. Boom angle or radius indicator. (Does not apply to articulating cranes)
e. Jib angle indicator if the equipment has a luffing jib. (Does not apply to articulating cranes)
f. Boom length indicator. (Does not apply to articulating cranes)
g. Load weighing device – equipment manufactured after March 29, 2003, with a rated capacity over 6,000 pounds must have at least one of the following: load moment indicator or load moment limiter. (Does not apply to articulating cranes or derricks).

4.12.3 Articulating cranes manufactured after November 8, 2011, must have at least one of the following:

a. Automatic overload prevention device,
b. Load weighing device,
c. Load moment (or rated capacity) indicator, or
d. Load moment (rated capacity) limiter and approved temporary alternative measures.

4.12.4 The following devices are required on equipment manufactured after November 8, 2011:

a. Outrigger/stabilizer position (horizontal beam extension) sensor/monitor if the equipment has outriggers or stabilizers.
b. Hoist drum rotation indicator if the equipment has a hoist drum not visible from the operator's station.

4.12.5 Additional safety measures

a. Back-up alarm
b. A fire extinguisher of at least 10 BC shall be kept in the operator's cab.
c. A load-rating chart, with clearly legible letters and figures, shall be provided with each crane, and securely fixed at a location easily visible to the operator, unless rated capacities are available only in electronic form then the following will apply:
    i. Where rated capacitates are available in the cab only in electronic form: In the event of a failure which makes the rated capacities inaccessible, the operator must immediately cease operations or follow safe shut-down procedures until the rated capacities (in electronic or other form) are available.
d. All controls shall be clearly identified by labels or diagrams.
e. All hook and ball assemblies and load blocks shall be labeled with their rated capacity and weight.
f. All general-purpose hooks shall have a spring-loaded hook latch.
g. Hooks used in the connection between the hoist line and the personnel platform (including hooks on overhaul ball assemblies, lower load blocks, bridle legs, or other attachment assemblies or components) must be:
    i. Of a type that can be closed and locked, eliminating the throat opening
    ii. Closed and locked when attached.
h. A seat belt shall be provided in all single control station wheel mounted cranes for use during travel.
i. Seat belts shall be "aircraft" quick release type.
j. Principal walking surfaces shall be of a skid resistant type.
k. All windows shall be of safety glass, or equivalent.
l. A windshield wiper shall be provided on the front window.
m. Hand signal charts must be either posted on the equipment or conspicuously posted in the vicinity of the hoisting operations.
n. Manufacturer's Operating & Safety Manuals shall be maintained on the equipment for use or review by the operator.

4.13 Inspections and preventative maintenance

4.13.1 Inspections are divided into the periods of; Shift, monthly, annual/comprehensive and severe service. During any inspection if a deficiency is identified, an immediate determination must be made by the qualified person as to whether the deficiency constitutes a safety hazard.

4.13.2 Shift Inspection:

a. A competent person must begin a visual inspection prior to each shift the equipment will be used, which must be completed before or during that shift. The inspection must consist of observation for apparent deficiencies. Taking apart equipment components and booming down is not required as part of this inspection unless the results of the visual inspection or trial operation indicate that further

investigation necessitating taking apart equipment components or booming down is needed. Determinations made in conducting the inspection must be reassessed considering observations made during operation. At a minimum the inspection must include all the items under Appendix C – Mobile Crane Shift Checklist

b. Shift inspections shall be documented, signed, and dated by the person completing the inspection.
c. Shift inspection records shall be retained for 30-days.

4.13.3 Monthly Inspection:

a. Each month the equipment is in service it must be inspected by a competent person in accordance with Appendix D - Mobile Crane Monthly Inspection Checklist.
b. Written, dated, and signed inspection reports and records shall be made monthly on each item of Appendix D (Mobile Crane Monthly Inspection Checklist). Records shall be retained for a minimum of three months and shall be readily available.

4.13.4 Annual/Comprehensive Inspection:

a. Mobile cranes shall be inspected at least every 12 months by a qualified person.
b. Written, dated, and signed inspection reports and records shall be made annually on each item of Appendix E - Mobile Crane Annual/Comprehensive Inspection and shall include crane specific inspection criteria specified by the crane manufacturer.
c. Inspection documentation must be retained for a minimum of 12 months.
d. Disassembly is required, as necessary, to complete the inspection
e. This inspection must include function testing to ensure all configured components function properly.
f. The annual/comprehensive inspection shall be performed by a qualified third party independent of the crane owner.

4.13.5 Severe Service

a. Where the severity of use/conditions is such that there is a reasonable probability of damage or excessive wear (such as loading that may have exceeded rated capacity, shock loading that may have exceeded rated capacity, prolonged exposure to a corrosive atmosphere), the employer must stop using the equipment and a qualified person must:
    i. Inspect the equipment for structural damage to determine if the equipment can continue to be used safely.
    ii. Considering the use/conditions determine whether any items/conditions listed in “Annual/Comprehensive Inspection” need to be inspected; if so, the qualified person must inspect those items/conditions.
b. If a deficiency is found:
    i. An immediate determination must be made by a qualified person as to whether the deficiency constitutes a safety hazard or, though not yet a safety hazard, needs to be monitored in the monthly inspections. If the qualified person determines that a deficiency is a safety hazard, the equipment must be taken out of service until it has been corrected, except when temporary alternative measures are implemented. If the qualified person determines that, though not presently a safety hazard, the deficiency needs to be monitored, the employer must ensure that the deficiency is checked in the monthly inspections.

4.13.6 Any part of a manufacturer’s procedures regarding inspections that relate to safe operation (such as to a safety device or operational aid, critical part of a control system, power plant, braking system, load-sustaining structural components, load hook, or in-use operating mechanism) that is more comprehensive or has a more

frequent schedule of inspection than the requirements of this section must be followed.

4.13.7 All documents produced under this section must be available, during the applicable document retention period, to all persons who conduct inspections under this section.

4.13.8 A preventive maintenance program based on the crane manufacturer's recommendations should be established. Dated and detailed records should be readily available.

4.13.9 A load test shall be required on the mobile crane if any repairs have been made on any load bearing part.

4.13.10 The supervisor must act on the deficiencies noted to ensure repairs are made or alternative measures are met.

4.13.11 Equipment that has been idle for 3 months or more must be inspected by a qualified person in accordance with the requirements the Monthly inspection criteria before initial use

5. OPERATOR TRAINING, QUALIFICATION AND EVALUATION

5.1 Crane operators shall receive training on the Mosaic Mobile Crane Program requirements conducted at a frequency of initial only.

5.2 All Mosaic crane operators shall be certified and qualified per the requirements of this section prior to operating mobile cranes. Qualification is achieved via an Evaluation process (see section 5.2.1 below).

5.2.1 Certification is achieved by the National Commission for Certification of Crane Operators (NCCCO) using the following as a minimum:

a. A determination through a written test that the individual knows information necessary for safe operation of the specific type of equipment the individual will operate.

b. A determination through a practical test that the individual has the skills necessary for safe operation of the equipment, including the following:

i. Ability to recognize, from visual and auditory observation, the items listed in Appendix C - Mobile Crane Shift Inspection Checklist

ii. Operational and maneuvering skills.

iii. Application of load chart information.

iv. Application of safe shut-down and securing procedures.

c. Exception: The NCCCO certification is not required only for those workers operating the Military Wrecker style crane. All other section 5.2 requirements of this Program shall apply to all Military Wrecker style crane operators. The Operations Training Department shall be responsible to provide and maintain the specific training requirements for the safe and proper operation of this unique piece of equipment.

5.2.2 Qualification is specific to equipment type including but not limited to size and configuration. Qualification is achieved through an equipment specific evaluation where each operator must demonstrate at a minimum the following:

a) The skills and knowledge, as well as the ability to recognize and avert risk, necessary to operate the equipment safely, including those specific to the safety devices, operational aids, software, and the size and configuration of the equipment. Size and configuration includes, but is not limited to, lifting capacity, boom length, attachments, luffing jib, and counterweight set-up.

b) The ability to perform the hoisting activities required for assigned work, including, if applicable, blind lifts, personnel hoisting, and multi-crane lifts.
c) Evaluation forms Appendices H, I, J, and K Templates meet the minimum requirements.

Note: Site specific evaluation forms may be used in place of the Program Appendix Templates if they meet the minimum requirements.

Reference: Appendix H – MCO Employer Evaluation Form
Reference: Appendix I – MCO Employer Evaluation Load Chart
Reference: Appendix J – MCO Employer Evaluation Vertical Lift
Reference: Appendix K – MCO Employer Evaluation LMI Setup

5.3 Refresher training:
5.3.1 NCCCO certification is required every five (5) years.
5.3.2 The employer must provide refresher training in relevant topics for each employee when, based on the conduct of the employee or an evaluation of the employee's knowledge, there is an indication that retraining is necessary or if there are program changes that require retraining.

5.4 All management personnel responsible either directly or indirectly for mobile crane operations shall attend mobile crane responsibility and awareness training.

6. OPERATOR PHYSICAL QUALIFICATIONS

6.1 Operators and operator trainees who operate non-permitted cranes must successfully pass a Mosaic or equivalent physical examination.

6.2 Operators and operator trainees who operate permitted cranes must successfully pass a DOT physical examination every three years.
6.2.1 All operators and operator trainees shall meet the following physical qualifications:
6.2.2 Vision of at least 20/30 Snellen in one eye and 20/50 in the other, with or without corrective lenses.
6.2.3 Ability to distinguish colors, regardless of position, if color differentiation is required for operation. Adequate hearing, with or without hearing aid, for the specific operation.
6.2.4 Sufficient strength, endurance, agility, coordination, and speed of reaction to meet the demands of equipment operation.
6.2.5 Normal depth perception, field of vision, reaction time, manual dexterity, coordination, and no tendencies toward dizziness or similar undesirable characteristics.

6.3 Evidence of physical defects or emotional instability which could render a hazard to the operator or others, or which in the opinion of the examiner could interfere with the operator's performance.

6.4 Evidence that an operator is subject to seizures or loss of physical control shall be sufficient reason for disqualification. Specialized medical tests may be required to determine these conditions.

7. PROGRAM REVIEW

7.1 The Mobile Cranes Program shall be reviewed annually or as required.

8. CRANE ASSEMBLY AND DISASSEMBLY

8.1 When assembling or disassembling equipment (or attachments), the employer must comply with all applicable manufacturer prohibitions and must comply with either:

8.1.1 Manufacturer procedures applicable to assembly and disassembly, or

8.1.2 Employer procedures for assembly and disassembly.

a. Employer procedures may be used only where the employer can demonstrate that the procedures used meet the requirements in 29 CFR 1926.1406.

b. The employer must follow manufacturer procedures when an employer uses synthetic slings during assembly or disassembly rigging.

8.2 Supervision – competent-qualified person.

8.2.1 Assembly/disassembly must be directed by a person who meets the criteria for both a competent person and a qualified person, or by a competent person who is assisted by one or more qualified persons (“A/D director”).

8.2.2 Where the assembly/disassembly is being performed by only one person, that person must meet the criteria for both a competent person and a qualified person. For purposes of this document, that person is considered the A/D director.

8.3 Knowledge of procedures: The A/D director must understand the applicable assembly/disassembly procedures.

8.4 Review of procedures. The A/D director must review the applicable assembly/disassembly procedures immediately prior to the commencement of assembly/disassembly unless the A/D director understands the procedures and has applied them to the same type and configuration of equipment (including accessories, if any).

8.5 Crew instructions.

8.5.1 Before commencing assembly/disassembly operations, the A/D director must ensure that the crew members understand all the following:

a. Their tasks.

b. The hazards associated with their tasks.

c. The hazardous positions/locations that they need to avoid.

8.6 Protecting assembly/disassembly crew members out of operator view.

8.6.1 Before a crew member goes to a location that is out of view of the operator and is either in, on, or under the equipment, or near the equipment (or load) where the crew member could be injured by movement of the equipment (or load), the crew member must inform the operator that he/she is going to that location.

8.6.2 Where the operator knows that a crew member went to a location out of his/her view, the operator must not move any part of the equipment (or load) until the operator is informed in accordance with a prearranged system of communication that the crew member is in a safe position.

8.7 Working under the boom, jib or other components

8.7.1 When pins (or similar devices) are being removed, employees must not be under the boom, jib, or other components, except where the employer demonstrates that site constraints require one or more employees to be under the boom, jib, or other components when pins (or similar devices) are being removed, the A/D director must implement procedures that minimize the risk of unintended dangerous movement and minimize the duration and extent of exposure under the boom.

8.8 Cantilevered boom sections:

8.8.1 Manufacturer limitations on the maximum amount of boom supported only by cantilevering must not be exceeded.

8.8.2 Where manufacturer limitations are unavailable, a registered professional engineer familiar with the type of equipment involved must determine in writing this limitation, which must not be exceeded.

8.9 Weight of components: The weight of each of the components must be readily available.

8.10 Rigging: When rigging is used for assembly/disassembly, the employer must ensure that the rigging work is done by a qualified rigger.

8.10.1 All slings are protected from abrasive, sharp or acute edges and configurations that could cause a reduction of the sling's rated capacity, such as distortion or localized compression.

8.10.2 When synthetic slings are used, the synthetic sling manufacturer's instructions, limitations, specifications and recommendations must be followed.

8.11 Assembly/Disassembly and/or changing the length of booms and jibs:

8.11.1 The employer must strictly adhere to all manufacturer procedures during all phases of assembly, disassembly and/or changing of boom or jib length.

8.11.2 None of the pins (top or bottom) in the pendants or boom sections are to be removed when there is tension in any part of the assembly.

8.11.3 None of the pins (top or bottom) on boom sections whether resting on the ground or cantilevered are to be removed until the boom section(s) are properly supported.

8.12 Assembly/disassembly in proximity to power lines:

8.12.1 Assembly/disassembly below power lines is prohibited. No part of a crane/derrick, load line, or load (including rigging and lifting accessories), whether partially or fully assembled, is allowed below a power line unless the employer has confirmed that the utility owner/operator has de-energized and (at the worksite) visibly grounded the power line.

8.12.2 Assembly/disassembly inside Table A clearance prohibited. No part of a crane/derrick, load line, or load (including rigging and lifting accessories), whether partially or fully assembled, is allowed closer than the minimum approach distance under Table A to a power line unless the employer has confirmed that the utility owner/operator has de-energized and (at the worksite) visibly grounded the power line.

8.12.3 There must be at least one electrocution hazard warning conspicuously posted in the cab so that it is in view of the operator and at least two on the outside of the equipment.

9. CONTRACTORS

9.1 Contractors are required to follow all Mosaic Safety and Health programs.

10. REFERENCES

10.1 ASME: B30.5 (2021) Mobile and Locomotive Cranes

10.2 OSHA: 29 CFR 1926 Subpart CC - Cranes and Derricks in Construction

10.3 MSHA: 30 CFR 56.16007 - Taglines, Hitches and Slings

10.4 Power Crane and Shovel Association: Standard No. 2 - Mobile Hydraulic Cranes

11. APPENDICES

11.1 Appendix A - Non-Routine Lift Checklist

11.2 Appendix B – Crane Suspended Man Basket Permit

11.3 Appendix C - Mobile Crane Daily Prior-to-Use Daily Checklist

11.4 Appendix D – Mobile Crane Frequent (Monthly) Inspection Checklist

11.5 Appendix E – Concentrates Standard Lift Plan
11.6 Appendix F – Concentrates Critical Lift Plan
11.7 Appendix G – Concentrates Engineered Lift Plan Requirements
11.8 Appendix H – MCO Employer Evaluation Form
11.9 Appendix I – MCO Employer Evaluation Load Chart
11.10 Appendix J – MCO Employer Evaluation Vertical Lift
11.11 Appendix K – MCO Employer Evaluation LMI Setup
11.12 Phos-Reference – Standard Hand Signals

12. REVISION LOG

Revision Log				
Rev. No.	Requested By	Approved By	Revised By	Rev. Date
0	Initial Issue for Mosaic	Safety Dept.	Safety Dept.	5/14/07
1	J Heaser – addition of Crossing Public Roadways section	Safety Dept.	Safety Dept.	6/22/09
2	J Heaser – change safe working distances	Safety Dept.	Safety Dept.	7/28/10
3	Revision to meet new requirements of OSHA 1926 Subpart CC and applicable sections of ASME B30.5. Reformat for ISO.		Bo Collier - Crane Tech; Lex Dixon	8/9/2011
4	Facility & Peer review Groups	Safety Dept.	Lex Dixon	4/25/2012
4.1	Lift Plans Project Team		Nicole Jacobson	10/5/2016
4.2	RCA Corrective Action	EHS PMO	EHS PMO	10/04/2022
5	Revision to meet latest requirements of OSHA 1926 Subpart CC and applicable sections of ASME B30.5.	Safety Dept.	PMO	08/22/2023
6	Four Corners – remove Military type wrecker from NCCCO training requirements	Safety Department	PMO	08/15/2024