Dry Fork Station Procedure

Procedure No.	Revision No.	Page	Of	
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Originator		**Final Approver**	**Date**	**RMP**
Ashley Fraser		Thomas Hutton	11/21/22	
Subject				
Energy Verification and Control Program				

1.0 PURPOSE / SCOPE

1.1 The purpose of the Energy Verification and Control Procedure is to establish consistent measures for the control of hazardous energy. This includes work involving operations, maintenance and construction/modifications at Dry Fork Station.

1.2 The primary objective is to establish a procedure to protect individuals working on equipment from the unexpected release of energy.

1.3 This procedure establishes requirements for periodic inspections which ensure that elements are being followed and employees are being trained.

1.4 This procedure should coincide with the DFS Clearance Program.

2.0 DEFINITIONS OF TERMS

2.1 Affected Employee: an individual whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

2.2 Chemical Energy: the potential of a chemical substance to undergo a transformation through a chemical reaction or, to transform other chemical substances. The most common examples are fuels such as gasoline, coal and natural gas.

2.3 Electrical Energy: the energy created by the flow of electrons between atoms.

2.4 Energy: The ability of an object or system to do work on another object or system. Energy is neither created or destroyed, but can change from one form into another.

2.5 Hazardous Energy: any electrical, mechanical, hydraulic, pneumatic, chemical, nuclear, thermal, gravity or other energy that could cause injury to personnel.

2.6 Limited Approach Boundary: an approach limit at a distance from an exposed energized electrical conductor or circuit part within which a shock hazard exits.

2.7 Mechanical Energy: The energy that is possessed by an object due to its motion or position. This includes:

2.7.1 Gravitational (mass) Energy: the mechanical energy associated with the gravitational field. Mass is attracted to other mass in general relativity.

2.7.2 Hydraulic Energy: the elastic energy created by the force of fluids under pressure

2.7.3 Pneumatic Energy: the elastic energy created by the force of gases under pressure.

2.8 Qualified Employee: shall be trained and competent in the skills and techniques necessary to determine system deenergization.

2.8.1 Electrical Equipment Qualifications:

2.8.1.1 Distinguish exposed live parts from other parts of electric equipment,

2.8.1.2 Skills and techniques necessary to determine the nominal voltage of exposed live parts,

2.8.1.3 Know the minimal approach distances determined by the voltage the qualified employee may be exposed to,

2.8.1.4 Proper use of special precautionary techniques and personal protective equipment,

2.8.1.5 Insulating and shielding materials,

2.8.1.6 Use of insulated tools for working on or near exposed energized parts of electric equipment.

2.8.2 Mechanical Equipment Qualifications:

2.8.2.1 Use of appropriate tools, flanges, vents and drains when appropriate,

2.8.2.2 Skills and techniques necessary to determine the potential hazard associated with the equipment to be worked on,

2.8.2.3 Proper use of special precautionary techniques and personal protective equipment,

2.9 Radiant Energy: movement of light, electromagnetic waveforms or particles that may, or may not be perceivable by the human eye, ear or skin. This includes:

2.9.1 Luminous Energy: the emission of light that does not derive energy from the temperature of the body and is usually a result of a chemical reaction or biochemical reaction.

2.9.2 Sound Energy: radiant wave energy that is an oscillation of pressure transmitted through a solid, liquid or gas, composed of frequencies within the range of hearing and of a level sufficiently strong to be heard.

2.10 Thermal Energy: heat energy; the energy of moving or vibrating molecules.

3.0 APPLICABILITY /RESPONSIBILITY

3.1 Applicability

This procedure applies to all employees, contractors and visitors at DFS that utilize the DFS Clearance Program and work on or operate equipment with the potential of stored energy or an unexpected release of energy.

3.2 Responsibility

3.2.1 Safety Coordinator is responsible for:

3.2.1.1 Providing training on these procedures.

3.2.1.2 Maintaining training records.

3.2.1.3 Reviewing this procedure annually.

3.2.2 Supervisory Authority is responsible for:

3.2.2.1 Safe administration of this program.

3.2.2.2 Enforcing the program and disciplinary action regarding violations of this program.

3.2.3 Operating Authority and Supervisors are responsible for:

3.2.3.1 Ensuring employees understand their responsibilities covered in this procedure.

3.2.3.2 Ensuring that these procedures are followed.

3.2.3.3 Providing training to ensure employees understand their responsibilities, means for verification and the tools necessary to complete the job safely.

3.2.3.4 Making regular checks on employees to ensure that energy verification is adequate to safely perform the work.

3.2.3.5 Assigning qualified employees and Electrical and Instrument Techs (E&I) for energy verification.

3.2.4 Employees are responsible for:

3.2.4.1 Ensuring their safety and the safety of all individuals working with or around the energy source.

3.2.4.2 Following these verification procedures.

3.2.4.3 Commencing work safely.

3.2.4.4 Completing Job Safety Analysis's to identify potential and stored energy.

3.2.5 Contractors are responsible for:

3.2.5.1 Ensuring their safety and the safety of all individuals working with or around the energy source(s).

3.2.5.2 Being knowledgeable in the equipment being worked on and the associated system.

3.2.5.3 Following DFS Clearance and Verification procedures.

3.2.5.4 Commencing work safely.

3.2.5.5 Working with the On-Site Coordinator

4.0 GUIDELINES /PROCEDURE

4.1 Guidelines

4.1.1 All machines and equipment should be acknowledged as hazardous until otherwise demonstrated.

4.1.2 Prior to starting work on machines or equipment that have been locked out, the qualified employee shall verify that isolation and deenergization of the machine or equipment have been accomplished.

4.1.3 Machines, equipment and processes shall be designed, manufactured, supplied, installed or with the capability to install energy isolating devices to enable compliance with regulations. Such devices shall be capable of controlling or dissipating hazardous energy, or both.

4.1.4 A Job Safety Analysis (JSA) or job briefing shall be prepared to identify all noticeable hazards, ways to mitigate hazards and additional personal protective equipment (PPE) needed for the specific job task being performed.

4.2 Procedures

4.2.1 Pneumatic and Hydraulic Energy

4.2.1.1 Systems normally under pressure must be treated as if hazardous energy were present unless otherwise demonstrated.

4.2.1.2 Verification can be done by using pressure gauges or by measures given by manufacturer's recommendations. Procedures should be

developed for relieving the kinetic and potential hazardous energy to include methods of draining or bleeding the pressure or otherwise accounting for the buildup or accumulation of product and/or pressure.

4.2.1.3 Pressure gauges cannot be relied upon solely and systems with pressure gauges should not be treated any differently than those without them.

4.2.1.4 Work on such systems needs to follow approved, written procedures to include methods of containing the potential energy of a pressurized line or filled tank as the work begins.

4.2.1.5 Drains and vents may be used for energy verification when applicable and the Qualified Employee determines the appropriate position per the scope of work.

4.2.1.6 Drains and vents cannot be relied upon solely due to possible blockage or malfunction.

4.2.2 Thermal Energy

4.2.2.1 Thermal energy can be extreme heat or cold. The source can be the result of a process or reaction. Verification is done with an appropriate thermometer or temperature sensing device.

4.2.2.2 If a temperature concern is not indicated by the environment or the process of work, it is not necessary that every temperature be verified for every type of work. However, when the process, equipment or environment indicates that there may be a need for controlling this hazard, it must be documented that the thermal energy has been controlled.

4.2.2.3 Ambient air and surface temperatures above 105˚F or below 40°F require precautions. Measures to help eliminate temperature extremes may include ventilation, cooling devices, PPE, blanketing or insulating surfaces or additional clothing.

4.2.2.4 Working in extreme temperatures must only be done with a thorough JSA completed and agreed upon by all parties. Controls should be discussed and documented.

4.2.3 Chemical and Radiant Energy

4.2.3.1 Systems normally under pressure must be treated as if hazardous energy were present unless otherwise demonstrated.

4.2.3.2 This procedure cannot account for all possible methods of controlling chemical and radiant energy. It is essential that each work task that

may involve such energies be evaluated through a Job Safety Analysis and the methods to control the hazardous energies be discussed and implemented prior to beginning work when applicable.

4.2.3.3 Employees that could be exposed to these energies must be properly trained before engaging in such work.

4.2.3.4 When working with chemicals, employees must don the correct PPE per the Safety Data Sheet (SDS).

4.2.4 Electrical Energy

4.2.4.1 All electrical work, exposure to live circuits, requires verification with circuit testing equipment by a qualified employee.

4.2.4.2 Test Position, on breakers, will only be allowed when racking breakers under a Green Tag Clearance for E&I job requirements.

4.2.4.3 High Voltage (15 KV & higher)

4.2.4.3.1 Work within the limited approach boundary requires the use of grounds. See the DFS Personal Protective Ground Program.

4.2.4.3.2 Verification

4.2.4.3.2.1 Go to Breaker.

4.2.4.3.2.2 Verify that it is open by use of the site window. (visible connection)

4.2.4.3.2.3 Verify that an air gap is present.

4.2.4.3.2.4 Verify that grounds are installed, when applicable.

4.2.4.4 Medium Voltage (4160 & 13.8 KV)

4.2.4.4.1 ABB ADVAC and AMVAC Medium Voltage Breakers – Completed visually, the below positions indicate that the breaker is disconnected and voltage supplied through the breaker is removed.

4.2.4.4.1.1 Breaker is removed from cubicle.

4.2.4.4.1.2 Breaker is removed and Ground Test Set is installed.

4.2.4.4.1.3 Breaker is racked out into the Disconnect Test position and is visually observed through window that the breaker is in the test position.

4.2.4.4.1.4 Breaker is racked out into the Disconnected position and is visually observed through window that breaker is in the disconnected position.

4.2.4.4.1.5 Breaker removed.

4.2.4.5 480 V Load Centers

4.2.4.5.1 Siemens WL Breakers – Completed visually
The below positions indicate that the breaker is disconnected, shutters are closed, and voltage through the breaker is removed.

4.2.4.5.1.1 Indicator on breaker is in Test or Disconnect.

4.2.4.5.1.2 Breaker removed.

4.2.4.5.1.3 Breaker removed and blank plate installed.

4.2.4.5.2 Eaton – Completed visually
The below positions indicate that the breaker is disconnected, shutters are closed, and voltage through the breaker is removed.

4.2.4.5.2.1 Indicator on breaker is in Test or Disconnect.

4.2.4.5.2.2 Breaker removed.

4.2.4.5.2.3 Breaker removed and blank plate installed.

4.2.4.6 Molded Case Circuit Breakers and Disconnects (480V and Below)

4.2.4.6.1 An Electrical and Instrument Tech (E&I) is required for verification and must document verification within NISOFT and initial the clearance tag in the upper right hand corner with blue ink (i.e. permanent marker or pen).

4.2.4.6.2 Determine all possible sources of electrical supply to the specific equipment. Check applicable up-to-date drawings, diagrams and equipment tags.

4.2.4.6.3 After properly interrupting the load current, open the disconnecting device(s) for each source.

4.2.4.6.4 Wherever possible, visually verify that all blades of the disconnecting devices are fully open or that draw out-type circuit breakers are withdrawn to the fully disconnected position.

4.2.4.6.5 Apply lockout devices in accordance with the DFS Clearance Program.

4.2.4.6.6 Use an adequately rated voltage detector to test each phase conductor or circuit part to verify they are deenergized. Test each phase conductor or circuit part both phase-to-phase and phase-to-ground. Before and after each test, determine that the voltage detector is operating satisfactory.

4.2.4.6.7 Where the possibility of induced voltages or stored electrical energy exists, ground the phase conductors or circuit parts before touching them. Where it could be reasonably anticipated that the conductors or circuit parts being deenergized could contact other exposed energized conductors or circuit parts, apply ground connecting devices rated for the available fault duty.

4.2.4.7 50 Volts or Less

Voltages verified by a qualified employee to be live parts that operate at less than 50 volts to ground need not be deenergized if there will be no increased exposure to electrical burns or to explosion due to electric arc explosion due to electrical arcs.

4.2.4.8 All Corded Equipment with Plugs

Pull the plug.

4.2.4.9 Electrical Equipment with visible means of disconnect.

4.2.4.9.1 Whenever possible visually verify that all blades of the disconnecting device are fully open or that draw out type circuit breakers are withdrawn to the fully disconnected position.

4.2.4.9.2 Verify that there are no visible signs of damage.

4.2.4.9.3 When the physical opening of the contacts cannot be visibly verified the individuals need to follow Section 4.2.4.6 of this procedure for verifying disconnects.

4.2.4.10 All other electrical scopes of work require the assistance of an E&I.

4.2.5 Other Mechanical Energy

4.2.5.1 Mechanical energy takes many forms.

4.2.5.1.1 Elastic energy can be found in springs, elastics, diaphragms, and other distorted solids designed to store energy.

4.2.5.1.2 Working machines that may have transitional mechanisms or rotational parts.

4.2.5.1.3 Gravitational forces.

4.2.5.2 Verifying mechanical energy has no industry standards. It must be confirmed or eliminated by using schematics and drawings as well as observational methods and industry best practices.

4.2.5.3 When mechanical energy is present, hazards and precautions will be discussed to ensure affected and authorized employee safety.

4.2.5.4 Objects subject to falling need to be secured in a manner that prevents the object from shifting unexpectedly. This can be accomplished by:

4.2.5.4.1 Lifting the items in approved slings according to properly developed procedures.

4.2.5.4.2 Blocking raised items with blocks or cribbing designed to account for the weight of the object.

4.2.5.5 Transitional motion must be secured to prevent unexpected movement.

4.2.5.6 Rotational Motion must be accounted for and discussed as part of the Job Safety Analysis. Mitigation shall be determined by the individuals on the job.

5.0 ATTACHMENTS

Not Applicable

6.0 REFERENCES

6.1 OSHA 1910.147, The Control of Hazardous Energy (lockout/tagout).

6.2 OSHA 1910.269(d), Hazardous Energy Control (lockout/tagout) Procedures.

6.3 NFPA 70E, Standard for Electrical Safety in the Workplace.

6.4 DFS Clearance Program

6.5 DFS Personal Protective Grounding Procedure

00-SP-027 Energy Verification and Control Program (E)

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