1. Purpose. To establish minimum procedures for locking out or
tagging the sources of energy to equipment or systems while
servicing Machinery, Equipment, and Systems (MES) at SERMC.

2. Cancellation. None.

3. Applicability. The procedures in this SOP apply to SERMC
personnel when servicing MES in the SERMC facility and on any
vessel or vessel section not covered by reference (c).

4. Exceptions. This SOP DOES NOT apply to the following:

   a. Navy Region Base Operation Support (BOS) Contractor
      utilizing a Naval Facilities Engineering Command (NAVFAC)
      approved HEC Program for equipment under Region cognizance.

   b. Contractors or other outside entities conducting
      servicing on equipment. Contractors will use their own HEC
      Program.

   c. Shipboard servicing operations under ship’s force
      control are covered by references (c) and (d).
d. Maintenance of diving equipment performed by SERMC diving personnel using References (c) for Hazardous Energy Control (HEC).

e. Work on cord and plug MES, provided the MES is unplugged and the plug is under the exclusive control of the employee performing the servicing.

f. Minor servicing activities performed during normal production operations, including minor tool changes and adjustments, that are routine, repetitive, and integral to the use of the MES (i.e. lathes, mills and drill presses), provided the shop ensures that the work is performed using measures that provide effective protection from energization, startup, or the release of hazardous energy.

g. Equipment removed for reasons other than servicing, as long as all hazardous energy sources have been disconnected and there is no potential for re-accumulation of hazardous energy.

5. Responsibilities

a. Production (C900) Supervisors Will:

(1) Ensure Authorized and Affected employees complete required training in accordance with section 16 of this SOP.

(2) Ensure Authorized and Affected employees comply with procedures in this SOP.

(3) Complete Authorized Employee training.

b. Dive Officer (C970) Will:

(1) Ensure reference (a) and (c) are utilized when performing diving equipment maintenance.

(2) Ensure craft maintenance is conducted utilizing procedures in this SOP in accordance with reference (c) paragraph 1.2 c(2).

c. Safety Department Will:

(1) Conduct an annual evaluation the effectiveness of the HEC Program.
d. Electrical Safety Officer will:

(1) In accordance with reference (a), conduct an annual review of the HEC Program and procedures currently in use to ensure the procedures and the requirements of this SOP are being followed and to identify and correct any deficiencies. The review will commence in October.

(2) Within 15 days after completion of the review, develop and deliver a written report in accordance with reference (a) to the Production Department Head and Safety Department.

(3) Ensure that Lockout Tags-Plus (LOTP) Coordinator(s) are trained to accurately document LOTP systems and maintain the LOTP Binder and Log.

e. Authorized Employees will:

(1) Complete required training in accordance with section 16 of this SOP.

(2) Be a qualified craftsman.

(3) Install or remove a LOTP system in accordance with this SOP when servicing MES.

(4) Take action to ensure hazardous energy is controlled.

(5) Maintain control of HEC key(s).

(6) Have knowledge of the source, type, and magnitude of the hazards associated with the MES, the hazards associated with the release of hazardous energy and the means to control the hazards.

(7) Notify each affected employee that the MES will be shut down and de-energized prior to servicing and that a LOTP system will be implemented.

f. LOTP Coordinator(s) will:

(1) Complete Authorized Employee training prior to being designated in accordance with section 16 of this SOP.
(2) Administer the LOTP Program for SERMC.

(3) Be designated in writing by the Production Department Head.

(4) Ensure compliance with this SOP.

(5) Maintain the LOTP Binder to include all enclosures and sections.

(6) Coordinate the installation and removal of HEC lock and tags-plus systems.

(7) Obtain Production Department Head and Safety Department Head approval when tags-plus is requested to be used.

(8) Conduct a monthly audit of LOTP equipment, logs, and forms. Document audit using enclosure (3) and report results to the Electrical Safety Officer. Take appropriate corrective actions on identified deficiencies.

(9) Conduct Authorized Employee training.

(10) Administer test after Authorized Employee training and retain test records.

(11) Maintain list of Authorized Employees in LOTP Binder.

6. Procedures for Shutdown and Isolation

a. The Authorized Employee will identify:

(1) The source, type, and magnitude of the hazards associated with the MES.

(2) The hazards associated with the release of hazardous energy.

(3) The means to control these hazards.

b. The Authorized Employee will notify each affected employee that the MES will be shut down and de-energized prior to servicing, and that a LOTP system will be implemented.

c. The Authorized Employee will ensure that the MES has been shut down.
d. The Authorized Employee will relieve, disconnect, restrain, or otherwise render safe all potentially hazardous energy that is connected to the MES. Stored, re-accumulating, or residual energy (e.g., capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure) must be dissipated or restrained by methods such as repositioning, blocking, depressurizing, bleeding down, draining, etc.

7. Procedure for Applying HEC Lockout System

   a. Authorized Employee identifies MES that is required to be isolated/locked out.

   b. Authorized Employee fills out blocks 1,2,4,5, and 6 of the HEC Request Form, enclosure (1).

   c. Production Shop Chief reviews HEC Request Form and signs block 7.

   d. Authorized Employee submits HEC Request Form to the LOTP Coordinator.

   e. LOTP Coordinator reviews the HEC Request Form for adequacy and accuracy and assigns a serial number in block 3.

   f. Authorized Employee is provided a HEC lockout system (lock, key, and identification tag).

   g. LOTP Coordinator documents the serial number of the HEC lock provided to the Authorized Employee on the HEC Request Form in block 9.

   h. LOTP Coordinator and Authorized Employee sign block 9 of the HEC Request Form.

   i. The Authorized Employee ensures/verifies that the MES has been shut down in accordance with section 6 of this SOP.

   j. Authorized Employee completes the Point of Contact Information on the identification tag.

   k. Authorized Employee hangs the HEC lockout system at/on all hazardous energy-isolating device(s).

   l. Authorized Employee retains key in their possession.
m. The Production Shop Chief verifies adequacy and accuracy of the lockout and signs block 10 of the HEC Request Form.

n. The Authorized Employee returns the HEC Request Form to the LOTP Coordinator.

o. LOTP Coordinator signs block 11, files HEC Request Form in the active section of the LOTP Binder, and completes HEC Request Log line item.

**NOTE: Block 8 of the HEC Request Form will only be filled out if Tags-plus will be utilized.**

8. **Procedure for Verification of De-energization and Isolation**

   a. The Authorized Employee will verify de-energization and isolation of the MES. Additionally, each Authorized Employee in a group LOTP application who will be servicing the MES will verify de-energization and isolation of the MES.

   b. Verification will be conducted before servicing can begin on any MES under LOTP application.

   c. Verification will be accomplished using MES manufactures guidance, when applicable.

   d. Verification will validate that all energy sources are de-energized and properly isolated.

   e. Verification will be confirmed utilizing appropriate tools, test equipment, and safety measures.

   f. Verification will continue throughout the servicing operation. This may include attempts to start up or actuate MES.

9. **Procedures for Testing or Repositioning**

   a. In each situation in which a HEC lockout system must be removed temporarily and the MES restarted to test it or to position a component, the Authorized Employee will perform the following, in sequence:

      (1) The Authorized Employee will brief the LOTP Coordinator and Production Shop Chief of the testing/positioning procedures prior to the start of work (document on the HEC Request Form, block 6).
(2) Clear tools and materials from the work area.

(3) Remove nonessential employees from the work area.

(4) Remove each HEC lockout system.

(5) Reenergize the MES in accordance with section 12 of this SOP and then proceed with testing or positioning.

(6) If additional work is required before the MES can be considered repaired, de-energize the MES and reapply the LOTP system, in accordance with section 8 of this SOP.


a. Before removing any HEC lockout system and restoring the MES to use, the Authorized Employee will perform the following:

(1) Notify all other authorized and affected employees in the area that the HEC lockout system will be removed.

(2) Ensure that all employees in the work area have been safely positioned or removed.

(3) Inspect the work area to ensure that nonessential items have been removed and MES components are operationally intact.

(4) Ensure that each HEC lockout system is removed by the Authorized Employee who applied it.

b. When the Authorized Employee who applied the HEC lockout system is not available to remove it, the Production Department Head can direct removal by another Authorized Employee, provided the following additional requirements are met:

(1) Verify that the Authorized Employee who applied the HEC lockout system is not in the facility.

(2) Make all reasonable efforts to contact the Authorized Employee to inform him or her that the HEC lockout system will be removed.

(3) Ensure that the Authorized Employee who applied the HEC lockout system has knowledge of the removal before the worker resumes work on the affected MES.
(4) Obtain concurrence from Production and Safety Department Heads.

c. Production Shop Chief signs block 13 of the HEC request form.

d. Authorized Employee removes HEC lockout system from hazardous energy-isolating device(s).

e. Authorized Employee returns the HEC lockout system to the LOTP Coordinator.

f. Authorized Employee signs blocks 13 and 14 of the HEC Request Form.

g. LOTP Coordinator signs block 14 of the HEC Request Form and restores the HEC lockout system back in service, ready for issue.

h. LOTP Coordinator completes the HEC Request Log and files the HEC Request Form in the inactive section of the LOTP Binder.

11. Procedures for Applying Tags-Plus

a. Production Department Head and Safety Department Head approval is required prior to utilizing tags plus system(s). Approval will be documented in block 8 of the HEC request Form.

b. Authorized Employee will comply with sections 6-10 of this SOP. Affix a tag directly to the hazardous energy-isolating device(s) that cannot be locked. The tag will clearly indicate that the removal of the device from a safe or off position is prohibited. An additional safety measure must also be attached.

12. Procedures for Startup

a. The Authorized Employee will have knowledge of the source, type, and magnitude of the hazards associated with energizing or start-up and the means to control these hazards.

b. The Authorized Employee will ensure that the MES is re-energized and started in accordance with established procedures.

13. Procedures for Group LOTP
a. Each Authorized Employee servicing the same MES in conjunction with each other will lockout the MES with their own HEC lockout system in accordance with section 7 of this SOP.

b. The LOTP Coordinator will coordinate the group lockout. The LOTP Coordinator will provide the initial Authorized Employee with a group lockout hasp.

c. The initial Authorized Employee will remove their lock, apply the hasp and reinstall their lock allowing the additional Authorized employee to install their lock.

d. Removal of lockout systems will be in accordance with section 10 of this SOP.

14. Procedures for Shift or Personnel Change. For servicing that extends beyond one shift, such as awaiting parts or additional equipment, the Authorized Employee will keep their HEC lock on the hazardous energy-isolating device(s) and provide the key to the Product Family Supervisor or Officer. The Product Family Supervisor or Officer will take custody of the HEC lockout system and maintain the HEC key until the MES is ready to be serviced. Product Family Supervisor or Officer will document custody change in block 12 of the HEC Request Form. The HEC lockout system will then be transferred to the Authorized Employee who is completing the remaining servicing. Product Family Supervisor or Officer will close out the original HEC Request Form to allow the Authorized Employee who is going to complete the servicing to establish control of the MES by submitting a new HEC Request Form.

   NOTE: Transfer of custody may be conducted by having the Product Family Supervisor or Officer, LOTP Coordinator, and proposed Authorized Employee visually review the lockout system in place together and concur the transfer without removing the lockout system from the MES. This will prevent accidental startup during the transfer process.

15. Incident Investigation

   a. Each incident involving LOTP that results in, or could reasonably be expected to have resulted in, injury to personnel, damage to equipment, energization or startup, or the
release of hazardous energy, while servicing MES will be investigated.

b. Shops/codes will take necessary precautions to protect employees from the hazard and preserve the incident site.

c. Comply with reference (e).

16. Training

a. Authorized Employees will complete Authorized Employee training provided by LOTP Coordinators and pass the written test with an 80% or better prior to being authorized to service MES.

b. Affected Employees will complete Affected Employee training within 60 days of reporting to SERMC. All C900 personnel are considered affected employees.

c. Production shop Chiefs will complete Authorized Employee training and pass the written test with an 80% or better prior to authorizing servicing of MES.

d. LOTP Coordinators will complete Authorized Employee training and pass the written test with an 90% or better prior to being designated by the Production Department Head.

17. Recordkeeping

a. Completed HEC Request Forms will be maintained in the inactive section of the LOTP Binder for one quarter (13 weeks).

b. Monthly Audit Forms completed by the LOTP Coordinator will be maintained in the monthly audit section of the LOTP Binder until completion of the annual audit by the Electrical Safety Officer.

c. Annual audit completed by the Electrical Safety Officer will be maintained in the annual audit section of the LOTP Binder until the following annual audit is completed.

18. Definitions

a. Additional Safety Measure. A component of the tags-plus system that provides an impediment (in addition to the energy-isolating device) to the release of energy or the
energization or startup of the MES being serviced. Examples of additional safety measures include, but are not limited to, removing an isolating circuit element; blocking a controlling switch; blocking, blanking, or bleeding lines; removing a valve handle or wiring it in place; and opening or guarding an extra disconnecting device. A HEC tag will be affixed at the location of the additional safety measure.

b. Affected Employee. Everyone involved in shipyard employment, as there is a potential for any employee to be in a worksite where hazardous energy controls are in use.

c. Authorized Employee. A trained and knowledgeable employee who performs one or more of the following LOTP responsibilities:

   (1) Executes the LOTP procedures.
   (2) Installs a lock or tags-plus system on MES.
   (3) Services any MES under LOTP application.

d. Capable of Being Locked Out. An energy-isolating device is capable of being locked out if it has a locking mechanism built into it, or it has a hasp or other means of attachment to which, or through which, a HEC lock can be affixed. Other energy-isolating devices are capable of being locked out if lockout can be achieved without the need to dismantle, rebuild, or replace the energy-isolating device or permanently alter its energy-control capability.

e. Energy-Isolating Device. A mechanical device that, when utilized or activated, physically prevents the release or transmission of energy. Energy-isolating devices include, but are not limited to, manually operated circuit breakers; machine connects; line valves; blocks; blank flanges; bolted slip blinds; and any similar device used to block or isolate energy. Control circuit devices (for example, push buttons, selector switches) are not considered energy-isolating devices.

f. Hazardous Energy. Any energy source, including mechanical (for example, power transmission apparatus, counterbalances, springs, pressure, gravity), pneumatic, hydraulic, electrical, chemical, and thermal (for example, high
or low temperature) energies that could cause injury to employees.

g. HEC Lock. A keyed device that utilizes a positive means to hold an energy-isolating device in a “safe” position that prevents the release of energy and the startup or energization of the MES to be serviced. A HEC lock must be:

(1) Green in color and identifiable to the Authorized Employee attaching the HEC lock and exclusively used for lockout applications.

(2) Individually keyed with that key under the exclusive control of the Authorized Employee. A second key may be retained under the control of the LOTP Coordinator or other personnel designated by the shop/code. No two HEC locks will have the same key (i.e., each HEC lock will have unique keys that open no other HEC locks). No more than two keys will exist for any HEC lock.

(3) Each HEC lock will be capable of withstanding the existing environmental conditions for the maximum period of time that servicing is expected to last and will be sturdy enough to prevent removal without the use of extra force or unusual techniques, such as bolt cutters or other metal-cutting tools.

i. HEC Tag and Tag Attachment. A prominent warning device that includes a means of attachment that can be securely fastened to an energy-isolating device in accordance with an established procedure to indicate that the energy-isolating device and the equipment being controlled must not be operated until the HEC tag is removed by the Authorized Employee who installed the HEC tag. Each HEC tag will be capable of withstanding the existing environmental conditions for the maximum period of time that servicing is expected to last, and is made so that weather conditions, wet or damp conditions, corrosive substances, or other conditions in the work area where the HEC tag is used or stored will not cause it to deteriorate or become illegible. Each HEC tag and tag attachment will be sturdy enough to prevent inadvertent or accidental removal. Each tag attachment will have the general design and basic safety characteristics of a one-piece, all-environment-tolerant nylon
tie, be non-reusable, attachable by hand, self-locking, and non-
releasable, and have a minimum unlocking strength of 50 pounds.

j. Individual Lockout. A method where each Authorized
Employee controls each source of hazardous energy with their
assigned HEC lock.

k. Individual Tags-Plus. A method where each Authorized
Employee controls each source of hazardous energy, but at least
one tags-plus application is used.

l. Lockout. The placement of a HEC lock on an energy-
isolating device in accordance with this chapter, thereby
ensuring that the energy-isolating device and the equipment
being controlled cannot be operated until the HEC lock is
removed.

m. Lockout Device. A mechanism that attaches to an
energy isolating device and holds it in a safe position when the
HEC lock is installed, preventing the energization to that MES.
Examples include circuit breaker lockout devices, multiple
person hasps, valve restraining devices, plug covers, chains, or
cables. The lockout device must be capable of withstanding its
environmental exposure for the maximum period of time that
servicing is expected to last and be substantial enough to
prevent removal without the use of excessive force or unusual
techniques, such as with the use of bolt cutters or other metal
cutting tools.

n. LOTP Coordinator. A trained, designated employee who
coordinates and oversees all lockout and tags-plus applications
in the SERMC facility when employees are performing servicing
operations on MES. Designated LOTP Coordinators maintain the
LOTP Binder.

o. Servicing. Workplace activities that involve the
construction, installation, removal, adjustment, inspection,
modification, testing, or repair of MES. Servicing also includes
maintaining MES when performing these activities would expose
the employee to harm from the start-up or energization of the
system being serviced or the release of hazardous energy.

p. Tags-Plus System. A system to control hazardous
energy that consists of an energy-isolating device with a HEC
Tag affixed to it, and at least one additional safety measure. An HEC tag will be installed on the additional safety measure or as close as possible to the additional safety measure.

q. Verification of Isolation. The means necessary to detect the presence of hazardous energy, which may involve the use of a test instrument (for example, a voltmeter), and, for other than electric shock protection, a visual inspection, or a deliberate attempt to start-up the MES.

19. **Forms.** Hazardous Energy Control (HEC) Request Form, HEC Request Log, and HEC Monthly Audit Form are located on the SERMC Safety SharePoint page under the “FORMS” tab: [https://navsea.navy.deps.mil/sites/sermc/106/Pages/default.aspx](https://navsea.navy.deps.mil/sites/sermc/106/Pages/default.aspx)

/s/

Aaron E. Moore, C106