

GUIDELINE	PERFORMANCE	EXCEPTIONS
<p>1) Lockout/Tagout Use</p> <p>a) Definitions</p> <p>b) <u>Lockout</u> is the placement of a lock to render a device inoperable</p> <p>c) <u>Tagout</u> is the application of a warning device on a control indicating the control must not be used when the tag is removed by authorized persons</p> <p>d) Use of keys should be controlled</p>	<p>1) Lockout/Tagout Use</p> <p>a) <a href="#">BNL ES&amp;H Standard 1.5.1</a> "Lockout/Tagout Requirements" provides lab-wide definitions for use of Lockout and Tagout devices. C-AD procedures comply with this BNL Standard.</p> <p>b) Lockout at C-AD is the placement of a lock to render a device inoperable</p> <p>c) Tagout at C-AD is the application of a warning device on a control</p> <p>d) Lockout keys are controlled; <a href="#">OPMs 2.6, 2.6.1, 2.6.2, 2.6.3, 2.6.4, 2.6.5, 2.6.6, 2.6.8</a> and <a href="#">9.1.16</a> are examples of C-AD procedures that provide lockout and tagout instructions for specific systems</p>	<p>1) Lockout/Tagout Use None</p>
<p>2) Lockout and Tagout Implementation</p> <p>a) If an isolating device can be locked out, then it should be locked out</p> <p>b) If an isolating device can not be locked out, it should be tagged out</p> <p>c) If major modifications to equipment are made, the addition of lock out capability should be considered</p> <p>d) The following are example administrative controls:</p> <p>i) Generate a list of devices that must be locked out</p> <p>ii) Establish criteria for locking out</p> <p>iii) Control the distribution of and access to keys</p>	<p>2) Lockout and Tagout Implementation</p> <p>a) The C-AD uses locks wherever locks can possibly be applied, or where locks can be retrofitted for the purpose of isolating devices</p> <p>b) Tagouts are used at C-AD if a device cannot be locked out</p> <p>c) New and modified installations are fitted with lockouts in accord with SBMS requirements. See <a href="#">OPM 9.3.1</a>, "Procedure for Reviewing Conventional Aspects of an Accelerator System," section 5.4.5)</p> <p>d) The C-AD uses the following administrative controls:</p> <p>i) Lists of devices that must be locked out. See, for example, <a href="#">OPM 2.6.1.a</a>, "AGS Ring Lockout-Tagout Checklist – Controlled Access."</p> <p>ii) Written criteria for lockout. See, for example, <a href="#">OPM 9.1.16</a> "Lockout / Tagout for Radiation Safety."</p> <p>iii) Controls for the distribution and access of keys. See <a href="#">OPM 4.1.c</a>, "Keys Required to Access Primary Beam Enclosures," <a href="#">OPM 2.6.1</a>, "Lockout Tagout Procedure for AGS and Booster Rings During</p>	<p>2) Lockout and Tagout Implementation None</p>

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<ul style="list-style-type: none"> <li>iv) Specify techniques for verifying the position of locked components</li> <li>v) Document when the position of normally locked component is changed</li> <li>vi) Perform periodic checks of locked components</li> </ul>	<p>Accelerator Operations,” paragraph 5.2.6 and <a href="#">OPM 7.1.39</a>, “Cryogenic Group Lockout/Tagout,” paragraph 5.4.8 for examples)</p> <ul style="list-style-type: none"> <li>iv) Care is taken to employ only the proper test equipment to verify that the system is safe; only persons trained to use test equipment conduct the verification. See <a href="#">BNL ES&amp;H Standard 1.5.1</a>, "Lockout/Tagout Requirements."</li> <li>v) Documentation is associated with specific lockout and tagout procedures. See, for example, <a href="#">OPM 2.6.1</a>, “Lockout Tagout Procedure for the AGS and Booster Rings, During Accelerator Operations.”</li> <li>vi) The requirements for periodic checks are given in <a href="#">OPM 1.5</a>, “Electrical Safety Implementation Plan,” and <a href="#">OPM 13.10.1</a>, “Independent Assessment.”</li> </ul>	
<ul style="list-style-type: none"> <li>3) Protective Materials and Hardware <ul style="list-style-type: none"> <li>a) Includes locks, tags, and chains</li> <li>b) Lockout and Tagout devices should be singularly identified, and meet the following: <ul style="list-style-type: none"> <li>i) Able to withstanding the environment in which they are installed</li> <li>ii) Standardized in size, shape, or color</li> <li>iii) Substantial enough to prevent removal (50# pull minimum)</li> <li>iv) Carry the name of the person applying the device</li> <li>v) Carry a "Warning" notice</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>3) Protective Materials and Hardware <ul style="list-style-type: none"> <li>a) LOTO materials include standardized locks and tags. See <a href="#">BNL ES&amp;H Standard 1.5.1</a>, “Lockout/Tagout Requirements.”</li> <li>b) <a href="#">Locks and tags</a> are singularly identified, and at C-AD they meet the following requirements: <ul style="list-style-type: none"> <li>i) Able to withstanding the environment in which they are installed</li> <li>ii) Standardized in size, shape, or color</li> <li>iii) Substantial enough to prevent removal (50# pull minimum)</li> <li>iv) Carry the name of the person applying the device</li> <li>v) Carry a "Warning" notice</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>3) Protective Materials and Hardware None</li> </ul>
<ul style="list-style-type: none"> <li>4) Lockout/Tagout Program <ul style="list-style-type: none"> <li>a) Establish procedures for the program</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>4) Lockout/Tagout Program <ul style="list-style-type: none"> <li>a) <a href="#">BNL ES&amp;H Standard 1.5.1</a> "Lockout/Tagout Requirements" establishes the BNL Lockout/Tagout program requirements for all Departments and Divisions. <a href="#">OPM 1.5</a>, “Electrical Safety Implementation Plan,” which meets Laboratory requirements, is used by C-AD for Department specific Lockout/Tagout instructions</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>4) Lockout/Tagout Program None</li> </ul>

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<p>5) Procedures for Lockout/Tagout</p> <p>a) Procedures should include, but are not limited to following:</p> <p>i) Statement of intended use</p> <p>ii) Specific steps for placing, removing and transferring of tags and locks</p> <p>iii) Testing requirements to verify the isolation of the energy source</p> <p>b) Specific procedures are not required when all the following requirements are:</p> <p>i) Machine has no stored energy after shutdown</p> <p>ii) Machine has a single, easily identifiable energy source</p> <p>iii) Isolation of the source will completely de-energize the machine</p> <p>iv) Machine is isolated from the energy source and locked out</p> <p>v) A single lockout device only is required</p> <p>vi) Lockout is under the exclusive control of authorized personnel</p> <p>vii) Servicing does not create a hazard to other personnel</p> <p>viii) Employer has a good accident record on the use of Lockout/Tagout</p>	<p>5) Procedures for Lockout/Tagout</p> <p>a) C-AD LOTO-specific procedures, for example <a href="#">OPM 2.6</a>, "Lockout/Tagout Procedure for Personnel Entry into the AGS or Booster Rings," or <a href="#">OPM 2.6.1</a>, "Procedure for Lockout/Tagout of AGS and Booster Rings During Operations," include:</p> <p>i) Statement of intended use</p> <p>ii) Specific steps for placing, removing and transferring of tags and locks</p> <p>iii) Testing requirements to verify the isolation of the energy source</p> <p>b) Personnel applying LOTO not covered by a specific C-AD procedure follow the BNL procedure in <a href="#">BNL ES&amp;H Standard 1.5.1</a> "Lockout/Tagout Requirements." Thus, 5 b) i through 5 b) viii do not apply.</p>	<p>5) Procedures for Lockout/Tagout</p> <p>None</p>

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<p>c) Documentation of Lockout/Tagout Usage should be documented and periodically reviewed</p>	<p>c) Documentation of lockouts and tagouts is via LOTO logbooks which are periodically reviewed by supervisors. See <a href="#">OPM 1.7</a>, "Supervisory Practice for Working With Hazards," and <a href="#">OPM 13.10.1</a>, "Independent Assessment."</p>	
<p>6) Application of Lockout/Tagout</p> <p>a) The program should cover the following procedures:</p> <p>i) Preparation for Shutdown</p> <p>(1) Inform affected personnel of hazards and of controls to be used</p> <p>ii) Machine or Equipment Shutdown</p> <p>(1) Use established procedures</p> <p>iii) Equipment Isolation</p> <p>(1) Apply the lockout or tagout device</p> <p>iv) Affixing Locks/Tags</p> <p>(1) Securely affix tags with qualified personnel</p> <p>v) Stored Energy</p> <p>(1) Render safe any stored energy and prevent any re-accumulation</p> <p>vi) Verification of Isolation</p> <p>(1) Before starting work, verify isolation of the device</p> <p>vii) Release from Lockout/Tagout</p> <p>(1) Before restoring equipment, perform the following:</p> <p>(a) Equipment/Workspace</p>	<p>6) Application of Lockout/Tagout</p> <p>a) The C-AD has formal programs and procedures to:</p> <p>i) Prepare for Shutdown</p> <p>(1) Personnel are informed during scheduled weekly meetings of hazards and controls to be used in a shutdown. See <a href="#">OPM 2.28.a</a>, "C-A Weekly Meetings Diagrams and Table."</p> <p>ii) Machine or Equipment Shutdown</p> <p>(1) See shutdown procedures <a href="#">OPM 5.29</a>, "AGS, Booster Ring and Beam Transport Shutdown" and <a href="#">OPM 8.12.6</a>, "Securing CAS During C-A Shutdown."</p> <p>iii) Equipment Isolation</p> <p>(1) C-AD has specific LOTO procedures to isolate specific devices. See <a href="#">OPM 2.6</a>, "Lockout/Tagout Procedure for Personnel Entry Into the AGS or Booster Rings."</p> <p>iv) Affix Locks/Tags</p> <p>(1) Only trained and qualified personnel are allowed to affix LOTO tags. See <a href="#">OPM 1.5</a>, "Electrical Safety Implementation Plan."</p> <p>v) Stored Energy</p> <p>(1) Stored energy is rendered safe. For example, large vacuum windows are covered prior to work on or near the window</p> <p>vi) Verification of Isolation</p> <p>(1) Personnel are trained to verify isolation of devices before work begins. See <a href="#">ESH Standard 1.5.1 Lockout/Tagout Requirements</a>.</p> <p>vii) Release from Lockout/Tagout</p> <p>(1) Before restoring equipment, personnel are trained in the <a href="#">ESH Standard 1.5.1 Lockout/Tagout Requirements</a> to ensure:</p> <p>(a) Equipment/Workspace</p>	<p>6) Application of Lockout/Tagout</p> <p>None</p>

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<ul style="list-style-type: none"> <li>(i) Machine or equipment is operationally intact</li> <li>(ii) Inspect area and remove non essential items</li> <li>(iii) Person removing the tag/lock should assure that the equipment is properly aligned</li> <li>(b) Personnel               <ul style="list-style-type: none"> <li>(i) Check that affected personnel are safe and are informed of energization</li> </ul> </li> <li>(c) Lockout/Tagout Device Removal               <ul style="list-style-type: none"> <li>(i) The person who applied the isolation device shall be the one to remove it</li> <li>(ii) Document removal of tag via logbook or other methods</li> </ul> </li> <li>(d) Procedures for removal by a person other than who placed the device:               <ul style="list-style-type: none"> <li>(i) Verify that the person who placed device is not available</li> <li>(ii) Make reasonable efforts to inform the person who placed the device that it has been removed</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>(i) Machine or equipment is operationally intact</li> <li>(ii) The area is inspected and non essential items are removed</li> <li>(iii) The equipment is properly aligned</li> <li>(b) Personnel               <ul style="list-style-type: none"> <li>(i) That affected personnel are safe and are informed of energization.</li> </ul> </li> <li>(c) Lockout/Tagout Device Removal               <ul style="list-style-type: none"> <li>(i) That the person who applied the isolation device is the one to remove it</li> <li>(ii) That removal of tags is documented</li> </ul> </li> <li>(d) Procedures such as <a href="#">OPM 2.14</a>, "Removal of Locks and Tags by Others" ensure:               <ul style="list-style-type: none"> <li>(i) That the unavailability of the person who placed device is verified</li> <li>(ii) That reasonable effort is made to inform the person who placed the device that it has been removed</li> </ul> </li> </ul>	

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(iii) Ensure that the affected personnel are informed	(iii) That the affected personnel are informed	
7) Testing or Positioning of Equipment or Components a) When a temporary removal is required: i) Clear the equipment of tools and materials ii) Ensure that personnel leave from the area iii) Remove the lockout/tagout device iv) Perform testing to assure lockout v) De-energize and reapply the lockout/tagout device	7) Testing or Positioning of Equipment or Components a) For temporary removal of LOTO, the specific procedure steps would include the following where appropriate: i) Clear the equipment of tools and materials ii) Ensure that personnel leave from the area iii) Remove the lockout/tagout device iv) Perform testing to assure lockout v) De-energize and reapply the lockout/tagout device	7) Testing or Positioning of Equipment or Components None
8) Periodic Inspections a) Perform audit for compliance with program	8) Periodic Inspections a) C-AD performs self-assessments and audits of its LOTO program. See <a href="#">OPM 1.7</a> , "Supervisory Practice for Working With Hazards". Additionally, the C-AD QA Office performs routine audits of LOTO programs. See <a href="#">OPM 13.10.1</a> , "Independent Assessment."	8) Periodic Inspections None
9) Caution Tags a) Do not use for personnel protection  b) Tags should show: i) Tag identification system ii) Information on any precautions iii) Signature of person applying the tag  c) Keep records of use  d) Apply so that the tag does not interfere with operation of equipment	9) Caution Tags a) The use of Do Not Operate Tags and Caution Tags is described in <a href="#">OPM 2.13</a> "Use of Do Not Operate and Caution Tags." They are not used for personnel protection.  b) Tags show: i) Tag identification system ii) Information on any precautions iii) Signature of person applying the tag  c) <a href="#">OPM 2.13</a> is the record of use  d) Personnel are trained to ensure the tag does not interfere with operation of equipment	9) Caution Tags None

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<p>10) Training and Communication</p> <p>a) Training should include:</p> <ul style="list-style-type: none"> <li>i) Recognition of hazards</li> <li>ii) Purpose of procedures</li> <li>iii) Recognition of the Tagout/Lockout devices</li> </ul> <p>b) Training on limitations of tags:</p> <ul style="list-style-type: none"> <li>i) Tags are warning device only, with no physical protection</li> <li>ii) Tags should be removed by the person who applied them</li> <li>iii) Tags must be legible</li> <li>iv) Tags must withstand environment</li> <li>v) Tags must be securely attached</li> </ul> <p>c) Training on limitation of locks:</p> <ul style="list-style-type: none"> <li>i) Locks may hinder facility systems necessary for safety</li> </ul> <p>d) Retraining:</p> <ul style="list-style-type: none"> <li>i) Provide when there is a change in job, equipment, or hazard</li> </ul>	<p>10) Training and Communication</p> <p>a) <a href="#">BNL Web Courses</a> (Electrical Safety I) and <a href="#">C-AD facility specific training</a> include:</p> <ul style="list-style-type: none"> <li>i) Recognition of hazards</li> <li>ii) Purpose of procedures</li> <li>iii) Recognition of the Tagout/Lockout devices</li> </ul> <p>b) Personnel are trained on the limitations of tags as follows:</p> <ul style="list-style-type: none"> <li>i) Tags are warning device only, with no physical protection</li> <li>ii) Tags should be removed by the person who applied them</li> <li>iii) Tags must be legible</li> <li>iv) Tags must withstand environment</li> <li>v) Tags must be securely attached</li> </ul> <p>c) Training on the limitations of locks is as follows:</p> <ul style="list-style-type: none"> <li>i) Personnel are trained that locks may hinder facility systems necessary for safety</li> </ul> <p>d) Retraining requirements are as follows:</p> <ul style="list-style-type: none"> <li>i) C-AD requires retraining whenever there is a change in job classification. C-AD requires specific LOTO training for specific C-AD equipment. Following initial training, individuals are retrained annually to general LOTO requirements and LOTO specific devices. Electrical Safety I retraining is required every two years.</li> </ul>	<p>10) Training and Communication</p> <p>None</p>
<p>11) Lockout or Tagout Implementation</p> <p>a) Implementation shall be by authorized, qualified personnel only</p>	<p>11) Lockout or Tagout Implementation</p> <p>a) Implementation is by authorized, qualified personnel only. Trained, qualified and authorized personnel are listed in <a href="#">BTMS</a></p>	<p>11) Lockout or Tagout Implementation</p> <p>None</p>

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12) Notification of Personnel a) Notify appropriate supervisors or other personnel when lockout/tagout devices are applied or removed	12) Notification of Personnel a) <a href="#">BNL ES&amp;H Standard 1.5.1</a> "Lockout/Tagout Requirements" establishes generic notification requirements. C-AD procedures establish specific notification requirements.	12) Notification of Personnel None
13) Outside Contractors a) Plant and contractor personnel should inform each other of their requirements	13) Outside Contractors a) <a href="#">BNL ES&amp;H Standard 1.5.1</a> "Lockout/Tagout Requirements" establishes the responsibilities of visitors and contract employees not under C-AD supervision. Outside Departments working at C-AD are subject to requirements in <a href="#">OPM 1.11</a> "BNL Department/Division Requirements for Interaction with C-AD." Outside contractors under C-AD supervision and working at C-AD are subject to requirements in C-AD <a href="#">OPM 1.12</a> "Training and Qualification Plan."	13) Outside Contractors None
14) Group Lockouts a) Procedures must be developed for crews equivalent to procedures for personnel Lockout/Tagout	14) Group Lockouts a) <a href="#">BNL ES&amp;H Standard 1.5.1</a> "Lockout/Tagout Requirements" establishes generic group lockout requirements. C-AD procedure <a href="#">OPM 2.6</a> , "Lockout/Tagout Procedure for Personnel Entry into Booster or AGS Rings" establishes the group lockout requirements for the C-AD rings and <a href="#">OPM 7.1.39</a> , "Cryogenic Group Lockout/Tagout" for Collider cryogenic systems.	14) Group Lockouts None
15) Shift or Personnel Changes a) Procedures should be developed to assure the continuity of Lockout/Tagout protection between personnel or shifts	15) Shift or Personnel Changes a) <a href="#">BNL ES&amp;H Standard 1.5.1</a> "Lockout/Tagout Requirements" establishes generic shift and personnel change procedures for lockout/tagout. These requirements are included in C-AD procedures.	15) Shift or Personnel Changes None