

FERMILAB
CONTROLLED ACCESS
TRAINING HANDOUT

[FN000311/CR/01]

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1 PURPOSE AND DEFINITIONS

A controlled access is a means by which two or more people may safely enter an interlocked enclosure. A controlled access is typically used instead of a supervised access when it is desired to efficiently resume operation after an access. Because a controlled access does not involve a full radiation survey, configuration control, or searching and securing the enclosure, it minimizes disruption to accelerator operations.

Personnel entering enclosures under controlled access conditions are subject to increased hazards due to a reduction in the level of protection. Because of this, personnel making controlled accesses must have additional training to know what safeguards have been reduced and to understand the procedures necessary to ensure their safety.

The conditions for supervised access and controlled access differ as follows:

Supervised Access: A radiation survey has been completed and documented since the last time particle beams were accelerated or transported through the beam enclosure and the survey results have been appended to the appropriate Radiological Work Permit (RWP). The radiation and electrical safety system interlocks have been dropped to prevent energizing of exposed electrical conductors and to prevent beam from entering the enclosure. Power supplies for beamline components that have exposed electrical connections have been locked-off using configuration control.

Controlled Access: The radiation and electrical safety system interlocks are active and monitoring the status of the enclosure. *Enter keys*, when issued to persons making a controlled access, prevent energizing of exposed electrical conductors and beam from entering the enclosure. A documented radiation survey has not been performed, so no survey data are appended to the RWP, and individuals making the controlled access must measure the radiation levels in the areas through which they travel or at which they work.

2 QUALIFICATION FOR CONTROLLED ACCESSES

To ensure that controlled accesses can be conducted safely and reliably, the following procedures have been implemented:

2.1 WHO IS TRAINED

- Normally, only Fermilab employees and users (as defined in chapter [1080](#) of the Fermilab ES&H Manual) are eligible to make controlled accesses.
- Before issuing enclosure *Enter keys*, either directly or via remote key tree, MCR personnel will verify by using the key logger or TRAIN database that the entrants have the required training. The qualification requirements are:
 - At a minimum, prospective entrants must have completed, and be up-to-date in the following three training courses: [Radiological Worker – Classroom \(Virtual\) \(FN000470/CR\)](#), [Radiological Worker – Practical Factors \(FN000471/OJ\)](#), and [Fermilab Controlled Access \(FN000311/CR\)](#).
 - In addition, the entrant may need to be qualified in [Lockout/Tagout \(LOTO\) Level 2 \(FN000212/CR\)](#), depending on the nature of the planned work activities and where they are to be performed (see section [4.3.2 LOTO4.3.2 LOTO](#)).

- Additional requirements may be imposed in certain cases, such as training and medical qualification for oxygen deficiency hazard (ODH) areas and area-specific hazard training for some experimental enclosures.
- Fermilab Controlled Access training must be renewed annually. Both Radiological Worker courses and (if applicable) LOTO Level 2 require requalification every two years.

2.2 WHO ISN'T TRAINED AND HOW IS THAT HANDLED

- Subcontractor personnel are typically prohibited from becoming controlled access qualified.
 - The exception is for specific contract technicians, approved in advance, who work closely with Lab employees and under a Fermilab supervisor for a significant period of time.
- Untrained workers (e.g., subcontractors) may be permitted to make an escorted controlled access if approved by the appropriate Division Safety Officer (DSO) and/or the assigned RSO. In this case:
 - The unqualified individual must receive a safety briefing from the assigned RSO, or designee.
 - Unqualified personnel must be escorted during the entire access.
 - Although the untrained person must have his/her own enclosure *Enter key*, he/she does not operate the interlock "enter" boxes. Only the qualified escorts may do this. Therefore, although there must be one qualified escort for each unqualified person, a minimum of two qualified people are required to make the access.
 - Escorts are responsible for ensuring that unqualified entrants observe all safety requirements. The individual or organization on whose behalf the requested access is being made is responsible for providing the necessary escorts.

3 POTENTIAL HAZARDS

There are potential hazards associated with controlled accesses. However, following the correct procedures can minimize or eliminate these hazards.

Direct Beam-On Radiation: If a person is in a beam enclosure during beam-on conditions, he or she may be in immediate danger of receiving a large acute radiation exposure.

- If beam is lost by scraping a beam pipe or striking a magnet, the radiation levels could cause an acute exposure in excess of 450 rads. An acute exposure of 450 rads will cause death within 30 days to 50% of those so exposed.
- When an *Enter key* is removed from the key tree to allow access, the beam is inhibited in a fail-safe manner by several devices.
- Possession of the correct *Enter key* for the enclosure being accessed is the primary measure, under the personal control of the individual, that directly prevents energizing of exposed electrical conductors and beam from entering the enclosure during a controlled access. You must possess the correct *Enter key* while inside the enclosure. If you have the correct *Enter key*, beam cannot enter the enclosure.

Electrocution: Fermilab accelerator and beamline enclosures contain various electrical hazards. The interlocked electrical safety system is intended to provide limited protection of entrants from exposed electrical hazards.

- Prior to controlled access into enclosures, the electrical safety system permit is inhibited when an *Enter key* for the enclosure is removed from the key tree, which disables power to exposed electrical conductors with hazardous voltages and/or currents.

- Components with no exposed electrical connections normally remain energized during a controlled access.
- Possession of the correct *Enter key* for the enclosure being accessed is the primary measure, under the personal control of the individual, that directly inhibits the electrical safety system permit during a controlled access.
- Reliance on the safety system alone does not satisfy Lockout/Tagout (LOTO) requirements. Therefore, you must make certain that power has been locked off to any component you work on or may come in contact with.
 - Prior to performing LOTO, the individual must have completed [LOTO Level 2 training](#).
 - Individuals who must operate circuit breakers in order to remove power from components they plan to work on and use test equipment to verify absence of energy before beginning work must also have [Electrical Safety in the Workplace \(NFPA 70E\) training](#) and wear appropriate clothing and protective equipment.
 - The configuration control performed by the Operations Department for supervised access does not satisfy LOTO requirements because those locks are not applied by the people exposed to the hazard.

Residual Radioactivity: After the particle beam strikes an object, the object becomes radioactive. It only takes a beam loss for a short period of time for high levels of residual radioactivity to be present shortly after the beam is turned off.

- During a controlled access, the enclosure has not been surveyed and posted for radioactivity before you enter. Local radiation level postings are not to be relied upon, as they might not be accurate. During a controlled access, you are responsible for the radiation survey in the area where you are working. Previous surveys as to the residual radioactivity level must not be relied upon. The log survey meter (LSM) is the only reliable means of determining radiation levels during a controlled access.
- Individuals making accesses to beam enclosures (during both controlled and supervised accesses) and other posted radiological areas must wear dosimetry specified by the RWP. If a pocket dosimeter is required, individuals must keep daily pocket dosimeter records for the accesses. Accrued dose must be submitted on a weekly basis for tracking into the GetDose web-based tracking system, or by submitting their pocket dosimeter cards to the ESH&Q Section Radiation Physics Science (RPS) Department. This should be done as early in the work week as practical to assist Radiation Safety in dose tracking. This is especially important during scheduled shutdowns.

Removable Radioactivity (Surface Contamination): Small quantities of radioactive material (in the form of dust, metal grindings, etc.) are hazardous if ingested, inhaled, or injected into the body, and can lead to contamination of skin, clothing or other items.

- Comprehensive contamination surveys are not routinely done in preparation for controlled accesses, increasing the possibility of ingesting or inhaling radioactive material. Therefore, you are not permitted to smoke, eat, or drink in any beam enclosures. If you get some radioactive material on your hands, these actions could cause it to be internalized. This is potentially hazardous because the material, a source of radiation, may stay in the body for a long period of time, giving a large dose to a localized area of the body. All posted signs and instructions regarding contaminated areas and protective clothing requirements are to be obeyed. The controlled access RWP will specify the protective clothing requirements for the type of work to be performed, and the frisking requirements upon exit.

Oxygen Deficiency Hazard: Certain areas of the accelerator and extraction beamlines are classified as ODH areas due to the large quantities of inert gases contained in the cryogenic systems. If these gases were to leak, they could reduce oxygen to less than life-supporting levels. These areas require additional ODH training. ODH procedures are to be followed in these areas at all times.

High Magnetic Fields: During a controlled access, some electromagnets may remain energized with potential exposure of personnel to magnetic fields.

- Components that, when energized, may produce magnetic field strengths above the action level for individuals with cardiac pacemakers may be found in various locations and are posted “Danger: Magnetic Field Hazard”.

Other: Other hazards may be encountered, see your supervisor or DSO for more information.

4 CONTROLLED ACCESS RULES

Personnel who violate the rules pertaining to controlled access are subject to disciplinary action. See FRCM Article 111. For employees, this may include revocation of Controlled Access qualification, leave without pay, and possible termination. Non-employees may be denied use of Fermilab facilities.

4.1 TRAINING RULES

- Training will be verified for each individual prior to making a controlled access.
- Controlled Access and Radiological Worker Training status must be current.
- Based upon the location of the work and the nature of the tasks to be performed, other ESH&Q training requirements such as Lockout/Tagout (LOTO) and Oxygen Deficiency Hazard (ODH) and others may be required.

4.2 ENTER KEY RULES

- *Enter keys* for most AD enclosures are located at the MCR. Other *Enter keys* are located at remote key trees near the enclosure entrances.
 - Ensure that at least one *Enter key* is left in the key tree in case emergency access to the enclosure is required.
- Each Controlled Access qualified individual will be issued an *Enter key* for the enclosure(s) to be accessed.
 - Verify you have the correct *Enter key* for the enclosure to be accessed.
 - Maintain control of the *Enter key* until you return it.
 - Have the *Enter key* physically on your person while in an interlocked enclosure.
- Never give the *Enter key* to another individual, even if you know he/she is qualified to make controlled accesses. The *Enter key* is assigned to you alone.
- Never permit entry to another person who does not have the correct *Enter key* for the area entered, even if you have one. Thus, you are responsible for checking that everyone who makes the controlled access with you possesses the correct *Enter key*. Each person entering an interlocked enclosure must physically display his/her *Enter key* to other personnel participating in the access.
- *Enter keys* used to make controlled accesses should not be removed from the Fermilab site.
- Personally return your *Enter key* to the MCR or remote key tree as soon as the controlled access has been completed.

4.3 PRE-TUNNEL RULES

4.3.1 RWP

Read the Controlled Access RWP for the enclosure to be accessed, if an RWP exists, and completely fill out the sign-in-sheet.

- You must do this each time you obtain an *Enter key*, even if you have made an access earlier in the day.
 - RWPs are not static documents. Entrants may encounter conditions during an access that can result in the RWP being altered. Different requirements may then apply to subsequent accesses.
- Verify that the *Enter key* you were issued corresponds with the enclosure you are entering by checking the *Enter key* barcode number on your *Enter key* against the range specified on the Controlled Access RWP sign-in sheet. This 4-5 digit barcode number is what the RWP sign-in sheet is asking you to write down, not the enclosure sequence number (typically 1-2 digits).

If the applicable RWP requires an LSM for the enclosure to be entered:

- Obtain an LSM from the MCR or Radiation Safety personnel
- Perform checks
 - Calibration check
 - Look for damage (frayed wire, etc.)
 - Battery check
 - Source check
- Make sure you know how to properly use the instrument.

4.3.2 LOTO

4.3.2.1 MCR GROUP LOTO BOXES

- Certain enclosures require LOTO II training and have group LOTO lock boxes in the MCR. Enclosures with Group LOTO boxes will be noted on the RWPs for those enclosures.
- If the enclosure to be entered has a group LOTO lock box, all individuals entering that enclosure are required to follow LOTO requirements and place their individual LOTO lock on the appropriate group LOTO lock box prior to accessing the enclosure.

4.3.2.2 GENERAL AND WRITTEN LOTO

Perform LOTO on individual components in accordance with Fermilab ES&H Manual Chapter [2100](#), Fermilab Energy Control Program (Lockout/Tagout).

4.3.3 GROUP CHECK ENTER KEYS AT THE ENCLOSURE ENTRANCE

Possession of the correct *Enter key* is the best way to protect access participants from direct beam-on radiation and electrocution hazards, therefore the *Enter key* is required for entry into enclosures. In order to ensure that everyone making a controlled access has the correct *Enter key* in their possession, all members of the access party are responsible for physically displaying their *Enter key* to everyone else, and also visually verifying everyone else's *Enter keys* before accessing the enclosure.

4.4 TUNNEL RULES

4.4.1 TWO-PERSON RULE

All Controlled and Supervised accesses are considered a hazardous work activity that requires application of the two-person rule, even if the entry will be brief and only in the immediate area beyond the gate. At least two people are required to enter the enclosure for a proper controlled access. For supervised accesses, personnel may pass through the door/gate alone only if they are joining a work group already in the enclosure. You should never be in an enclosure alone.

4.4.2 PERSONAL PROTECTIVE EQUIPMENT (PPE)

- All persons making a controlled access shall wear the personal protective equipment (PPE) specified in the applicable RWP for the enclosure(s) to be entered and the type of work to be performed. There are tables detailing the PPE levels required for different work/tasks with the RWPs.
- For large jobs extending over long periods of time (such as magnet changes), a job-specific RWP may be requested. In these cases, Radiation Safety may survey the work area in question and write a job-specific RWP with less restrictive PPE requirements. Requirements for work in the remainder of the enclosure would be dictated by the general controlled access RWP.

4.4.3 LSM USE

- You are responsible for surveying your work area for radiological conditions. Use an LSM to check radiation levels in the area where you are working, as required by the applicable RWP, by holding the flat portion of the LSM probe parallel to the element at a distance of 1 foot.
- While inside, groups may split into smaller working groups as long as each working group has their own LSM.

4.4.4 RADIOLOGICAL CONDITIONS/COMMUNICATION

- If dose rates exceed 100 mR/hr at one foot in your work area, leave the area and inform the Crew Chief and the assigned RSO via the MCR. You must receive permission from the assigned RSO or designee prior to beginning work.
- If you unexpectedly encounter areas where the dose rates exceed 500 mR/hr at one foot, immediately leave the enclosure, check closely for contamination, and inform the Crew Chief and the assigned RSO via the MCR. The Crew Chief and assigned RSO will determine subsequent action.

4.4.5 RESPONSE TO DEVIATIONS

If you should discover that you or another person has somehow entered an enclosure without the correct *Enter key*, or you have otherwise departed from the controlled access procedures in a manner that could lead to a safety concern, immediately exit the enclosure by opening a door or gate without following the controlled access procedure, thereby dropping the interlocks. Then call the MCR and report the circumstances. Dropping the interlocks if a person is found to have entered an enclosure on controlled access without the proper *Enter key* (or other departures from the procedure) will force a search and secure to be performed before running beam in the enclosure. This is necessary because the integrity of the controlled access process has been compromised, even if

the access participants think they have accounted for all personnel after it is discovered that an individual has entered without the proper *Enter key*.

If the safety system interlocks are inadvertently broken during the controlled access, the Crew Chief must choose between of the following options:

1. Transition to Supervised Access
 - Entrants must leave the enclosure and sign the Supervised Access RWP after the radiation survey maps have been appended to it.
2. Re-Secure the Enclosure
 - 2a. Immediately re-secure
 - Entrants must vacate the enclosure while operators secure the enclosure.
 - 2b. Wait until the access has concluded and then re-secure
 - Entrants must continue to follow controlled access rules.

See Appendix A for more information about making this change.

5 GENERAL CONTROLLED ACCESS PROCEDURE

5.1 PRE-PLANNING

- Before initiating a controlled access, you should carefully plan your activity (i.e., who you are working with, what equipment you need, training & dosimetry requirements, etc.). Determine where you will be working, what entrance to use in order to reach that location, and what enclosure *Enter key(s)* you will need to obtain.
- Review the hazards associated with your job and complete a written Hazard Analysis if required by Fermilab policy for the type of work that you are going to perform.
- Determine any specific LOTO requirements and lock out any power supplies for beamline components on which you intend to work. Your supervisor should be involved in all phases of this planning process. A written LOTO plan may be required for multiple energy sources.

5.2 MAIN CONTROL ROOM OR REMOTE KEY TREE

- Obtain the correct *Enter key(s)* for the enclosure(s).
 - Inform MCR personnel of the entrants' ID and *Enter key* barcode numbers so the information can be recorded in the access log, and your training status can be verified.
 - If you are at a remote key tree, call the MCR (x3721) to provide this information. Ensure that the remote key tree door is closed when finished.
- Read the applicable RWP(s) and fill out the sign-in sheets completely for the enclosure(s) you plan to access.
 - Verify that the *Enter key* you were issued corresponds with the enclosure you are entering by checking the *Enter key* barcode number on your *Enter key* against the range specified on the Controlled Access RWP sign-in sheet. This 4-5 digit barcode number is what the RWP sign-in sheet is asking you to write down, not the enclosure sequence number (typically 1-2 digits).
 - Ensure you have all requirements specified – dosimetry, instruments, PPE, training, etc.
 - NOTE: PPE available at enclosure entrances.
- Obtain an LSM, if applicable, and perform the required functional tests.

- If required for the enclosure(s) you plan to access, sign out and check a personal oxygen monitor and obtain and inspect an escape pack.
- If you will be entering an enclosure that requires LOTO II training and has a Group Lock box, you should attach LOTO locks and tags to the appropriate group lock box(es).

5.3 CONTROLLED ACCESS ENTRANCE

- Don the protective clothing specified in the RWP for the type of activity you are going to perform.
- Check the status of the interlocks on the panel next to the gate.
- Before anyone inserts and turns an *Enter key* in the interlock enter box, the members of the access party must physically display their *Enter keys* to each other. Your *Enter key* is your protection. Verify that you and everyone on the controlled access have the correct enclosure *Enter key* before entering the enclosure.
- Clear communication is essential for successful controlled accesses.
- To perform the access,
 1. One entrant inserts his or her *Enter key* into the exterior interlock enter box and turns and holds the *Enter key*. Give clear communication to the rest of the access party that the *Enter key* is in and they may open the gate or door.
 2. Other members of the access party may now unlock the gate or door to the enclosure and pass through it.
 3. One of the other entrants then inserts their *Enter key* in the interior interlock enter box and turns it. Give clear communication to the person holding his/her *Enter key* in the exterior box that the *Enter key* is in and they may remove their *Enter key*.
 4. The person holding his or her *Enter key* in the exterior enter box may now remove their *Enter key*, enter the enclosure and close the gate or door.
 5. The person holding the *Enter key* in the interior enter box can then remove their *Enter key*.
 6. Check the interlock system status panel again to verify that the access was successfully carried out without dropping the interlocks. If you encounter problems, call the MCR.
 7. Proceed with your work, remembering to survey your surroundings with the LSM.

5.4 END OF ACCESS

Exit enclosure by reversing the procedure in steps 1-7 above. Return *Enter key(s)* and other items to the MCR or remote key tree. Remove any LOTO locks you placed on the group lockboxes in the MCR.

6 WARNING DEVICES

If you find yourself in an enclosure during a controlled access and hear a loud whooping sound or verbal warning message, you must always treat these audible warnings as real and follow the instructions presented in this training.

The warning sound can be generated as a result of several scenarios:

- An electrical permit is about to be issued.
- Interlocks are being tested.
- A search and secure of an adjacent enclosure is taking place.
- Oxygen levels have dropped below 19.5 percent.

If you hear a warning sound or message, take immediate action:

- Pull the crash cord or push the crash button, if they are available in your area. This will prevent energizing of exposed electrical conductors and beam from entering the enclosure. Then hurry to the nearest exit and open the door or gate without using the controlled access procedure, which will drop the enclosure interlocks. Then exit the enclosure.
- If there are no crash cords or buttons in the area you are in, go immediately to the nearest exit and open the door or gate without using the controlled access procedure, which will drop the enclosure interlocks.
- Leave the enclosure immediately and call the MCR from a telephone outside the enclosure to report what happened. Do not stop at a telephone in the enclosure to call and report the warning.

7 BOUNDARIES BETWEEN INTERLOCK SYSTEMS

At locations where two enclosures meet, all controlled access participants must have two different *Enter keys*; one for the enclosure you are leaving and one for the enclosure you are entering.

In order to pass directly from one enclosure to another, you must have *Enter keys* for both enclosures. At the gates separating the two enclosures, you must use the *Enter key* for the enclosure you are going into in the first interlock box, and the *Enter key* for the enclosure you are leaving in the second interlock box. Depending on the direction you are going, you may or may not need an *Enter key* to unlock the gate itself.

The Tevatron tunnel is divided into three separate interlocked enclosures, and the Main Injector tunnel is divided into two separate interlocked enclosures.

7.1 MAIN INJECTOR

The Main Injector tunnel is divided into two separate interlocked enclosures: MI-10 and MI-20—MI-62. The MI-20—MI-62 interlocked enclosure is further divided into multiple sectors, separated by gates, in an effort to aid the search & secure process if interlocks are only dropped in one sector.

At every door or gate that you are passing through (e.g., the bottom of the stairwells, gates between MI-10 and MI-20—MI-62, and gates between different sectors within MI-20—MI-62), you must first check the status of the interlock boxes on both sides of the gate or door. If the “Enclosure Interlocked” message is flashing, you must use your *Enter key* in the interlock box to pass through using the general controlled access procedure. If the message is not flashing and the interlock box is dark, you do not need to use your *Enter key* in the interlock box to pass through, you may just open the door or gate.

Passing through the gates between MI-10 and MI-20—MI-62 requires individuals to have *Enter keys* for both enclosures.

7.2 TEVATRON

The Tevatron tunnel is divided into two separate interlocked enclosures and one non-interlocked enclosure: F Sector and Transfer Hall are interlocked, and TeV A-E is not interlocked.

The gates at A24, E45, and F47 separate the three enclosures.

- A24 separates Transfer Hall and TeV A-E
- E45 separates TeV A-E and F Sector

- F47 separates F Sector and Transfer Hall

To pass through these gates, ensure you have the appropriate *Enter key(s)* for both enclosures and follow the general controlled access procedure to pass directly from one enclosure to another.

8 SELECT EXPERIMENTAL AREAS

At specific experimental areas, the controlled access RWPs have less restrictive PPE, dosimetry, instrumentation and survey requirements because the enclosures are posted as Radioactive Material Area & Controlled Area, and are therefore not radiological areas. All entrants must read and follow all stated requirement of the applicable RWP(s), have the correct *Enter key* and follow the general controlled access procedures.

8.1 ACCESS CONTROL AT FERMILAB TEST BEAM FACILITY (FTBF)

When a controlled access is desired at the Fermilab Test Beam Facility (FTBF), experimenters must contact the designated Particle Physics Division (PPD) Controlled Access Leader (CAL), who will then call the MCR (ext. 3721) to identify the experimental hall to be accessed and report the names and ID numbers of the individuals making the access. MCR personnel must verify the entrants' training before allowing *Enter keys* to be issued.

If the beamline is operating at the time the access is requested, an operator will ensure that beam is disabled to the enclosure to be accessed. After the operator has disabled beam and unlocked the associated key tree door, the CAL may issue *Enter keys* to the people making the access. The CAL will inform MCR personnel of the entrants' ID and *Enter key* number so that the information can be recorded in the access log.

After the access, return *Enter keys* to the CAL, who will call the MCR to have the key tree door released, report which *Enter keys* are being returned, place *Enter keys* back in the key tree, and close the key tree door.

9 CRITICAL STEP SUMMARY

- Obtain or call for enclosure *Enter key(s)* from the MCR (ext. 3721). Verify that you have been issued the correct *Enter key(s)* for the enclosure(s) being accessed.
 - Your *Enter key* is your protection. It is the best protection that a person on a controlled access has to mitigate direct beam-on radiation and electrocution hazards found in the enclosures.
 - Maintain possession of your *Enter key* – don't give it to anyone else.
- Read RWP(s), follow all stated requirements, and completely fill out the sign-in sheets where applicable.
- Perform LOTO before entry if necessary.
- Ensure you have required dosimetry, instruments and PPE.
- At the enclosure entrance, verify that you and everyone on the controlled access has the correct *Enter key* for the enclosure before entering.
 - Never permit entry to another person who does not have the correct *Enter key* for the enclosure being accessed.
- Survey your work area for radiological conditions.
- If you hear a warning sound or message, drop the interlocks and exit immediately and call the MCR.
- If you should discover that you or another person does not have possession of the correct *Enter key*, or you have otherwise departed from the controlled access procedure in a manner that could lead to a safety concern, immediately exit the enclosure without using the controlled access procedure, thereby dropping the interlocks. Then call the MCR (ext. 3721) and report the circumstances.

APPENDIX A: CHANGING FROM CONTROLLED ACCESS TO SUPERVISED ACCESS

The change from controlled access to supervised access is made under the exclusive control of the Accelerator Division (AD) Operations Department through the Crew Chief in the Main Control Room (MCR), following consultation between the Operations Department Head, the AD Operations Coordinator, and the assigned Radiation Safety Officer (RSO). No other individual is authorized to make this change.

Three conditions must be met before the Operations Department may change a beam enclosure status from controlled access to supervised access:

1. A radiation survey must be performed by Radiation Safety personnel, or personnel specifically trained to perform an “initial entry survey” (for those enclosures requiring a survey). In those enclosures requiring a supervised access RWP, the RWP and initial entry survey results must be revised since the last time particle beam was in the area or determined to still reflect current conditions.
2. The safety system must be “broken” (interlocks are dropped), requiring a search and secure before exposed electrical conductors can be energized and beam can return to the enclosure.
3. The operators must perform configuration control for the enclosure by locking off power supplies for beamline components that have exposed electrical connections. This is done based on the configuration control list kept in the MCR.

If the safety system is inadvertently broken during a controlled access, the Crew Chief must choose between one of the following options:

Option 1 - The Crew Chief, in consultation with the AD Operations Department Head and the assigned RSO or his/her designee, may elect to make the transition to supervised access. In this case, the operators perform configuration control and the Radiation Safety Group performs a radiation survey of the enclosure and updates the RWP, if appropriate.

- Entrants must leave the enclosure to read and sign the Supervised Access RWP.

Option 2 - The Crew Chief may elect to re-secure the enclosure. The Crew Chief may choose to order a search and secure immediately or wait until the access has been concluded. The enclosure shall be secured no later than the end of the shift unless the oncoming shift assumes responsibility, in which case search and secure must commence within two hours of the shift start.

- Entrants must leave the enclosure while Operators performs the Search & Secure. Once the search and secure is complete, they may re-enter the enclosure and continue to follow controlled access rules.