

ACCELERATOR DIVISION ES&H PROCEDURE

ADDP-SH-1200

ACCELERATOR DIVISION INITIAL ENTRY SURVEY PROCEDURE

RESPONSIBLE DEPARTMENT ES&H

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TABLE OF CONTENTS

1.0	PURPOSE AND SCOPE.....	1
2.0	BACKGROUND	1
3.0	TRAINING REQUIREMENTS.....	1
4.0	PREPARATION	1
5.0	GENERAL SURVEY PROCEDURE	2
6.0	EXTRA DEPARTMENTAL DISTRIBUTION	4

Attachments

Attachment 1 -	Clipboards Checklist	1 Page
Attachment 2 -	Suitcases Checklist	1 Page

1.0 PURPOSE AND SCOPE

The purpose of this procedure is to state the requirements for completing an initial entry survey for beam line enclosures. Initial entry surveys are conducted during controlled access conditions to characterize and document radiological conditions within an enclosure in preparation for changing the enclosure access status to Supervised Access.

2.0 BACKGROUND

2.1 Beam losses may cause the beam line and other accelerator components to become activated. The radiation exposure rates from activated components inside an enclosure after beam line operations have ceased is termed "residual radioactivity." Residual radioactivity levels normally vary throughout an enclosure, ranging from levels of less than a mR/hr to several R/hr. In the event beam is steered improperly due to device failure or other circumstances, dose rates could reach tens of R/hr. There may also be instances of contamination, arising from radioactivation of dust or cooling water spills on accelerator components. The radiological conditions of beam enclosures are characterized by means of an initial entry survey so that workers are informed about hazards, stay times, dosimetry requirements, and protective clothing requirements for performing work in beam line areas.

2.2 During initial entry surveys, dose rates greater than or equal to 20 mR/hr at one foot from beam enclosure surfaces are posted by the survey team or as directed otherwise by the AD RSO or his designee.

2.3 For extended shutdowns lasting on the order of months, additional posting at greater than or equal to 5 mR/hr at one foot or lower from beam enclosure surfaces may be prescribed by the RSO.

3.0 TRAINING REQUIREMENTS

Persons performing initial entry surveys are required to have some or all of the following training: LOTO II, Radiation Worker, RCT qualification, Controlled Access, ODH, Confined Space, and NuMI/MINOS Underground Safety Training.

4.0 PREPARATION

4.1 Prepare Compartment Clipboards with the appropriate maps and contents using Attachments 1 and 2 as necessary.

4.2 Columns labeled "initials" on Attachments 1 and 2 are to assist the surveyors in checking off equipment as it is readied for surveys.

Note: When performing surveys of the entire Main Injector ring, preparation includes optional preparation of two suitcases with

contents as listed in Attachment 2, and arrangements for two golf carts provided by AD Mechanical Support.

- 4.3 Before starting Linac, Booster, Pbar, Miniboone, 8 GeV Line, Main Injector, TeV Transfer Hall, TeV A-E, TeV F-Sector, Switchyard, Fixed Target Beamlines, NuMI, or any other enclosure initial entry surveys, the applicable 13.8 kV or other power supply must be locked out and tagged out by each surveyor as applicable. The power supply lockbox stations for these power supplies are located in the Main Control Room (MCR).

CAUTION

- 4.4 **During a controlled access to beam line enclosure areas, only main dipole and quadrupoles with exposed conductors are de-energized by performing LOTO II on the applicable 13.8 kV Power Supply System. It is imperative that surveyors avoid touching exposed terminals on terminations other than dipoles and quadrupoles to avoid electric shock or electrocution. If you don't know, ASK!**

- 4.5 Except as stated above, if it is necessary for the surveyors to touch or potentially touch any exposed conductors in any enclosure, then the device specific LOTO procedure must be followed. Contact the AD SSO or AD RSO for further instructions

5.0 GENERAL SURVEY PROCEDURE

- 5.1 Take dose rate measurements at one foot.
- 5.2 Devices ≥ 20 mR/hr at one foot is the minimum labeling requirement unless directed otherwise by the AD RSO.
- 5.3 Labels should be affixed every 6 feet when the extent of the region reading ≥ 20 mR/hr exceeds 6 feet.
- 5.4 If the extent of the area reading ≥ 20 mR/hr is less than 6' , one label close to this area is sufficient.
- 5.5 Affix a date label to each dose rate label.
- 5.6 Write the actual dose rate on a blank white label and affix this label to any > 200 mR/hr labels.
- 5.7 At least one wipe should be taken at all magnet or bellows locations that are >20 mR/hr.

- 5.8 An additional upstream and a downstream wipe should be taken when the dose rate is greater than 50 mR/hr at a foot.
- 5.9 Areas >100 mR/hr will be roped off with barrier tape and posted as high radiation areas with at least three 3-pocket signs. The following inserts will be put into the 3-pocket signs: "High Radiation Area, Contact RSO For Entry, and Keep Out." A 5-pocket sign should be used if the area is also required to be posted with the insert "Contamination Area."

Note: Known contamination areas previously roped off and posted as contamination areas are not typically re-surveyed for contamination, unless directed otherwise by the AD RSO. Roped off and Posted High Radiation Areas also are not surveyed for contamination, unless directed otherwise by the AD RSO.

- 5.10 A floor wipe near a point underneath a magnet (or bellows) should also be taken if the dose rate exceeds 100 mR/hr at a foot from the magnet (or bellows). This wipe is in addition to the wipes taken in step 4.10 and 4.11 for a total of 4 wipes.
- 5.11 A surveyor is encouraged to take additional wipes beyond the minimum required wipes stated above whenever prudent. The goal is to ensure that areas are adequately characterized.
- 5.12 Areas > 1000 mR/hr will be fenced with red fences and posted with five 5-pocket signs. The pocket signs should display the following five inserts in the listed order from the top pocket to the bottom pocket: "Keep Out, High Radiation Area, Contaminated Area, Contact RSO For Entry, and (repeat) Keep Out."
- 5.13 The survey teams will count their wipes for 20 seconds on a frisker located at a frisking station. If the background is too high, count the wipes at a location with acceptable background levels. Generally, a wipe count result of 100 counts above background indicates contamination at the 0.45 nCi /100 cm² level. Write the cpm results on the survey map. The survey teams will inform the Radiation Safety Officer (RSO) or his designee of the survey and counting results, and either decontaminate the area, or rope it off and post it as directed by the AD RSO. If possible, contact the RSO or his designee while at the enclosure area for direction, so that the contamination area can be deconned or roped off in a timely manner. Usually if the contamination area is in a relatively low dose rate area, and the contamination area is small, it is more efficient to decon the area. However, if the contamination area is within an area that is already roped off for dose rates, the contamination is usually left in place. Contact the RSO or his designee for direction as needed.
- 5.14 Wipes with no counts on them may be properly disposed of as regular trash. Wipes with counts on them, even if below the 50 cpm threshold, should never be disposed of as regular trash. Several wipes bunched together could combine count rates and surveys could cause the trash to be suspected as containing radioactive material. Dispose of these wipes as rad waste.

- 5.15 Completed survey maps and wipe count results are to be given to the RSO or his designee for review as soon as possible.
- 5.16 The AD RSO or his designee will review the survey maps and insert copies into the appropriate RWP section of the RWP binders in the MCR.
- 5.17 For Accumulator/Debuncher initial entry surveys, post additional copies of the completed and reviewed Accumulator/Debuncher initial entry survey maps at API0
- 5.18 Wipes with ccpm count rates greater than or equal to 100 ccpm will then be prepared for verification counting on a calibrated system by the Radionuclide Analysis Facility (RAF).
- 5.19 A "Wipe Count Request" form is to be submitted with the wipes when they are handed over to the Radionuclide Analysis Facility (RAF).
- 5.20 Request that a representative of the RAF sign the wipe count request form acknowledging receipt of the wipes.
- 5.21 Secure a copy of the wipe count request form with their signature of receipt for AD ES&H Radiation Safety Group records.
- 5.22 Upon receipt of the RAF counting results for the wipes taken during the initial entry survey, the AD RSO or his designee are to review and file these results with the original initial entry survey records.
- 6.0 EXTRA DEPARTMENTAL DISTRIBUTION

None

CLIPBOARDS CHECKLIST

ALL SURVEYS

MAPS

- Print out required blank survey maps from Rad Safety Group shared area.

CLIPBOARD COMPARTMENT

- Numbered wipes (Appropriate quantity for the area)
- Glassine Envelopes (Appropriate quantity for the area)
- Date Stickers (4 sheets)
- Black Ink Pens (2)
- Scissors (1)
- Tweezers (1)

INSTRUMENTS

- LSMs (2 for each survey team)
- Earphones (Optional)

OTHER ITEMS

Rad Level Tape Rolls on stringer:

- 5-20 mrem/hr
- 20-50 mrem/hr
- 50-100 mrem/hr
- 100-200 mrem/hr
- Over 200 mrem/hr

SUITCASES FOR MAIN INJECTOR AND TEV ENCLOSURES

	Suitcase 1		Suitcase 2	
	Quantity	Initials	Quantity	Initials
Signs				
3-Pocket	10	_____	10	_____
5-Pocket	5	_____	5	_____
Inserts				
High Rad Area	15	_____	15	_____
Keep Out	15	_____	15	_____
Contact RSO	15	_____	15	_____
Contamination Area	15	_____	15	_____
Other Items				
Black Ink Pens	4	_____	4	_____
Massolin Cloth for Decon	2 Lg Pkgs	_____	2 Lg Pkgs	_____
Rad Level Rolls:				
5-20 mrem/hr	1	_____	1	_____
20-50 mrem/hr	1	_____	1	_____
50-100 mrem/hr	1	_____	1	_____
100-200 mrem/hr	1	_____	1	_____
Rolls of Boundary Ribbon	3	_____	3	_____
Sheets of Date Stickers	1	_____	1	_____
Small rad bags	3	_____	3	_____
Tie Wraps	Assorted	_____	Assorted	_____
Cutters (for tie wraps)	1	_____	1	_____
Green Duct Tape	1 roll	_____	1 roll	_____
Extra Gloves	5 pr	_____	5 pr	_____
Extra Shoe Covers	2 pr	_____	2 pr	_____
Extra Coveralls	1	_____	1	_____