

Copy of MP06: Tower Movement from B749 to SNOLAB

- [Overview](#)
- [Shipping Documents and Approvals](#)
- [Preparations](#)
- [Procedure for Tower Movement from B749 to SNOLAB](#)
 - [Phase 0 - Advance preparations](#)
 - [Phase 1 - Movement from B749 to B81](#)
 - [Phase 2 - Movement from B81 to SNOLAB](#)

Overview

This page describes the procedure for moving a Detector Tower from the tower storage area in the SLC South Tunnel (B749) to the SNOLAB warehouse. It is assumed that the tower is already stored in a sealed [Tower Storage Container](#) that has been backfilled with nitrogen per the procedures in [MP01](#), with the storage container mounted to the [Tower Shipping Container](#) and sealed in a wooden [Tower Shipping Crate](#) per the procedures in [MP05](#). This movement plan is divided into 3 phases: phase 0 describes preparatory work to be completed in advance of the move, phase 1 describes the move from the SLC tunnel (B749) to the SLAC loading dock (B81) and is largely the reverse of [MP05](#), and phase 2 describes the move from the SLAC loading dock to the SNOLAB warehouse using a commercial carrier (FedEx Custom Critical).

The companion movement plan [Copy of MP07: Tower Movement from SNOLAB Surface to Low Radon Cleanroom](#) describes movement of the towers underground at SNOLAB and the steps needed to bring towers to the Low Radon Cleanroom. This movement plan will follow the SLAC Enhanced Rigor Work Planning and Control protocol, while MP07 will follow SNOLAB protocols. The [Tower Shipping Readiness Review](#) will review both MP06 and [MP07](#) procedures.

FedEx Custom Critical will be used to transport the towers utilizing an air ride truck with two drivers to minimize transport time ([budgetary quote](#)). The route to be taken is a southerly route where elevations should not exceed 5000' ([FedEx route map](#)).

Shipping Documents and Approvals

The following documents and approvals are needed prior to shipment:

- Enhanced Rigor Work Planning and Control (ERWPC) documentation for MP06, consisting of:
 - The MP06 procedure (this document)
 - The FMEA analysis spreadsheet
 - The Non-Construction Tailgate / Release form
 - The MP06 Approval document that documents completion of the ERWPC process and incorporates the required approval signatures
- Completion of [Copy of MP07: Tower Movement from SNOLAB Surface to Low Radon Cleanroom](#)
- Completion of a [Tower Shipping Readiness Review](#), addressing all review recommendations
- A completed [SuperCDMS SNOLAB Shipping Questions Document](#) for MP06 and MP07
- Written permission to ship the towers from SNOLAB's Director of Operations to ensure SNOLAB is ready to receive the towers

Prior to the start of the MP06 move, there will be a tailgate meeting and signatures for worker acknowledgement and work release documented on the Non-Construction Tailgate / Release form

Prior to departure of the shipping truck, the [Packaging/Transporting Pre-Shipment Inspection Form](#) will be completed.

Preparations

The following items are needed for this movement:

- Detector Tower in Tower Storage Container, mounted on a Tower Shipping Container and sitting in a Tower Shipping Crate in B749 (photos [1](#), [2](#))
- Pressure readout with power source ([24V AC/AC transformer](#)) and power wires
- Small screwdriver for connecting/disconnecting the pressure readout power source
- Laptop computer with data logger software installed
- 2 MSR PowerPacks to ensure the data logger batteries remain charged during shipment
- High tack adhesive tape (blue tape)
- Plastic sheeting
- Warning stickers, tilt/shock sensors, caution tape, and warning signage
- GPS tracker
- Electric Pallet jack (SLAC B749)
- Pallet Jack (SLAC B81 and SNOLAB Warehouse)
- Forklifts (SLAC and SNOLAB)
- Flatbed transport vehicle (SLAC)
- Straps for securing shipping crate
- PPE (safety shoes and hard hat) for anyone involved in rigging operations
- Customs paperwork

Procedure for Tower Movement from B749 to SNOLAB

There are 3 distinct phases to this movement: Advance Preparations, Movement from B749 to B81, and Movement from B81 to SNOLAB.

Phase 0 - Advance preparations

1. Complete [Copy of MP07: Tower Movement from SNOLAB Surface to Low Radon Cleanroom](#).

2. Hold a [Tower Shipping Readiness Review](#) and address all review recommendations.
3. Complete the Enhanced Rigor Work Planning and Control (ERWPC) process for MP06 and obtain the required signatures (Richard Partridge, Norm Picker, Ken Fouts, Rich Poliak, and JoAnne Hewett).
4. Complete the [SuperCDMS SNOLAB Shipping Questions Document](#).
5. Set a target date for the Towers to leave SLAC in consultation with Mike Stoddart and verify that VALE can support the corresponding cage trip to bring the towers underground.
6. Make travel arrangements for a SLAC expert to meet the shipment at SNOLAB and observe the movement of the towers underground.
7. Get a quote from FedEx Custom Critical for an air ride shipment with two drivers taking a [southerly route](#) that keeps elevations below 5000'.
8. Obtain written permission to ship the towers from SNOLAB's Director of Operations to ensure SNOLAB is ready to receive the towers.
9. Create an eshipper for the shipment, attach the FedEx Custom Critical quote to the eshipper, and fill out the export control spreadsheet.
10. Schedule the movement to B81 with the riggers and submit the facilities request for the rigging work.
11. Make a reservation with FedEx Custom Critical to set the pickup date and time. Allow at least 2 hours for the riggers to move the towers from B749 to B81.
12. Coordinate with shipping and receiving at SLAC and SNOLAB to make sure they are ready for the shipment, including movement underground the day after arrival if possible.
13. Charge the batteries on the two MSR PowerPacks and the GPS tracker.
14. Make a go/no-go decision on sending the shipment based on the go/no-go criteria approved in the readiness review. In the event of a no-go decision, cancel the shipping and travel plans and repeat steps 6-14 for the next target date.

Phase 1 - Movement from B749 to B81

1. Hold a tailgate meeting to go over the work plan, responsibilities, and areas of concern. Obtain worker acknowledgement and work release.
2. Take pictures of the shipping crates that show the final storage container pressure in B749.
3. Connect the data logger to a laptop and verify that the data logger is still logging data. Stop the data logger and restart with a 50 Hz sampling rate for the accelerometers, following instructions on the [Tower Storage Container](#) Confluence page.
4. Remove the plastic sheeting covering the shipping crates.
5. Attach a fully charged MSR PowerPack to each data logger.
6. Disconnect the pressure readout power wiring at its source, keeping the power wiring connected to the pressure readout.
7. Use high-tack tape to secure the pressure readouts, PowerPacks, and wiring to the shipping crates.



8. Have the rigging crew use the electric pallet jack to move the shipping crate to rest just inside the South Adit entrance, keeping the shipping crate vertical and taking care to minimize shocks during the transfer. Note that the tunnel floor slopes downwards until reaching the adit tunnel which has an upward slope. Stop work immediately if there is any risk that the tower could be dropped or damaged. The shipping crate should not be slid across the floor.



a.

9. Repeat step 8 for the second shipping crate (if applicable).



10. Have the rigging crew use a forklift to move each shipping crate onto the flatbed transport vehicle. Stop work immediately if there is any risk that the tower could be dropped or damaged. Straps should be used to secure the shipping crate to the transport vehicle.



a.



11. Have the rigging crew transport the shipping crates to the B81 loading dock, taking care to minimize shocks during transport.



12. Have the rigging crew use a forklift or pallet jack to move the shipping crates from the transport vehicle to the loading dock. Stop work immediately if there is any risk that the tower could be dropped or damaged. The shipping crates should not be slid across the floor.
13. Once out of the tunnel, move the tower location in etraveler to B81 and record the pressures and data logger configurations on the [Tower Storage Container](#) Confluence page (there is no internet access in the tunnel).

Phase 2 - Movement from B81 to SNOLAB

1. Affix any customs documents to the shipping crates.
2. Affix appropriate handling signage (fragile, this side up, etc.), tilt, and shock sensors to the shipping crates.
3. When the FedEx Custom Critical truck arrives, confirm the plan for the move with the trucking crew and give them the GPS tracker, which is to be carried in the cab in a position likely to receive GPS and cell phone signals.



4. Have the FedEx crew use a pallet jack to move the crates onto the FedEx truck, taking care to minimize shocks during transport. Stop work immediately if there is any risk that the tower could be dropped or damaged. The shipping crates should not be slid across the floor. The preferred orientation of the crates is with the long side in the direction of travel. SNOLAB does not have a loading dock, so the crates will need to be positioned in a manner that allows a pallet jack on the truck to position the crates for pickup by a forklift.



a.

5. Crates shall be secured with straps and metal cross members shall be placed to limit the crate motion in the event the straps fail.
6. Project lead and the FedEx driver shall do an inspection to confirm the crate is secured and prepared in accordance with the shipping plan and this procedure. Complete the [Packaging/Transporting Pre-Shipment Inspection Form](#). Both the driver and the SuperCDMS Project representative shall sign the form.
7. Confirm with the driver the expected arrival time at SNOLAB.
8. Move the tower location in etraveler to In-Transit SLAC_to_SNOLAB and create a new shipment for the GPS tracker.
9. FedEx Custom Critical is cleared to depart and transports the shipping crates from SLAC to SNOLAB.
10. Notify the SNOLAB and Vale teams that the towers were picked up and confirm the planned work schedule.
11. During the shipment, monitor the location of the truck using the GPS tracker and weather/road conditions along the route. In the event of poor conditions, the truck should be directed to return to SLAC if has not yet reached El Paso, TX. Notify the SNOLAB and Vale teams if the shipment is delayed.
12. Once the shipment has crossed the border and an ETA at SNOLAB has been established, confirm plans for meeting the truck and moving the Tower Shipping Crates to the warehouse.



13. Upon arrival at Creighton Mine Shaft 9, SNOLAB surface staff should meet the truck and assist in Vale sign-ins and guiding the truck to the transfer point near the north (?) SNOLAB warehouse entrance.



a.



14. Use a pallet jack on the FedEx truck to position the first crate into position for forklift pickup. Use a forklift to move the crates from the FedEx truck to the warehouse entrance, taking care to minimize shocks during transport. Stop work immediately if there is any risk that the tower could be dropped or damaged. The shipping crates should not be slid across the floor.



a.



15. SNOLAB surface staff should carefully move the first crate indoors using a pallet jack or the warehouse forklift, ensuring the crate remains level and taking care at all times to minimize shocks during transport. Stop work immediately if there is any risk that the tower could be dropped or damaged. The shipping crate should not be slid across the floor. Place the crate in a location where they will not be subject to impact from forklifts or other equipment. If for some reason movement indoors cannot occur before close of workday, place crate in a secure location overnight and cover with plastic sheeting to protect the crate from the elements.



a.

16. Repeat steps 14-15 for the second shipping crate if applicable.
17. Retrieve the GPS tracker from the FedEx crew.
18. Connect the pressure transducer readouts to a power source (24V AC/AC transformer) and record the storage container pressures upon arrival on the [Tower Storage Container](#) Confluence page.
19. Rope off the crate storage area with Caution tape fastened to stanchions and signage prohibiting unauthorized disturbance of the crates.
20. Move the tower location in etraveler to SNOLAB Surface and stop the GPS tracking.