

Procedure for Decommissioning Minerva and Minos

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This procedure assumes that both Minerva and Minos are going to be removed for the installation of the Argon Cube experiment. It also assumes that certain parts of the Minerva experiment will need to be reused in Argon Cube.

Minerva Removal

1. Disconnect the Minos power supply water skid and take it to the surface to be disposed of.
2. Disconnect the Minos magnet power supply and take it to the surface. AD should be contacted about the disposition of it.
3. Install a Minerva storage rack on the east side of the cavern to store the Minerva modules that will be reused in Argon Cube.
4. Install one of the Minerva construction racks on the east side of the cavern where the ceiling is not dripping.
5. Remove the roof sections over Minerva and cover the detector with a plastic sheet to protect it from water damage.
6. Remove the first 2" thick steel veto wall plate. Take the plate to the surface and send to the railhead.
7. Remove the first veto wall planes and take them to the surface. They belong to Rochester U. Contact Kevin McFarland-Porter for disposition.
8. Remove the 1" thick steel veto wall plate. Take it to the surface and send to the railhead.
9. Remove the second veto wall planes and take to the surface. See item 7.
10. Remove the vacuum pumps and the G-M helium compressor and take to the surface. Hampton University wants the helium compressor and refrigerator. The vacuum pumps should be stored for future use and belong to FNAL.
11. Remove the aluminum walking platform around the helium target and take to the surface for storage/salvage.
12. Remove the helium target and take to the surface. Remove the refrigerator and send the vessel to the railhead.
13. Remove the helium target support stand and send to the railhead.
14. Now the Minerva modules are ready to be removed. The planes have phototube racks on top of the detector and each rack of phototubes serves four modules. Physicists will disconnect and remove the first rack of PMTs and save the PMT boxes, fiber cables and the electronics cables.
15. Remove the first four modules. To remove a module, bring the strongback up to the module. When the strongback is on the module lift the strongback up just enough to engage the lower plane clips. When they are engaged bolt on the upper clips securing the steel plane to the strongback. Use a man-lift to reach the upper clips and the axial bolts.
16. Remove the axial bolts.
17. Lift the module off the rails.

18. For modules that are not going to be reused, move the strongback to the cart and attach it securely to the cart.
19. Move the cart to the bottom of the shaft using the forklift to push the cart.
20. Hook up the strongback to the shaft crane and lift it to the surface. Every tracking module has six trapezoidal pieces of lead around the perimeter of the scintillator plane. The lead pieces have been painted on both sides, but ESH guidance and rules must be followed. The pieces must be given to the ESH staff for storage, or disposal.
21. Set the strongback flat on the floor. The module is now ready to be disassembled. The scintillator planes should be scrapped or saved as determined by the physicists. The steel frames are taken to the railhead to be scrapped.
22. Minerva has around 120 modules total and 5 frames that have only solid targets on them. Physicists should decide which modules should be saved on the storage rack previously constructed in the cavern. Note that these must be saved as they come off the detector. They will automatically be stored in the order in which they need to be reused in the Argon Cube detector. Modules that are going to be reused should be stacked on the storage rack just as they were used. After the first four modules have been removed the physicists must remove the next PMT rack before more modules can be handled.
23. As the disassembly continues the five solid target modules will be encountered. Most of those have lead parts which must be processed according to ESH rules.
24. After all the modules have been removed, and the racks have been un-cabled move the Minerva electronics racks to the upstream of the cavern and place them on the east side of the cavern for storage and reuse.
25. Remove the access platform and take it to the surface.
26. Remove the Minerva support frame and take it to the surface for storage and reuse. This uncovers the Minos detector, so it can be removed

Minos Removal

1. Take out the Minerva strongbacks and bring down the Minos positioning fixture. Modify the cart so it can carry the Minos fixture.
2. Un-cable the power cables from the magnet. Remove the cooling hoses and hose barbs.
3. Set up the trolley system to remove the center conductor pieces.
4. Cut the conductor flags on each end of the long conductor piece and remove it. In the center of the floor cut the long pieces short enough to easily go up the shaft by the crane. For cutting the conductor use a worm drive saw with a carbide tipped blade. Use several passes – Do not try to cut the conductor in one pass.
5. Continue removing pieces in this manner until the magnet is out.
6. Take apart the trolley system. Cut the long aluminum beam into piece small enough to crane out and take it all to the surface for scrap.
7. Remove the Scintillator bars for the old time of flight detector from the downstream end of the Minos detector.
8. Using a man-lift disconnect all the fiber cables from the first plane.

9. Remove the first section of the walkway on top of the detector.
10. Disconnect the cable for the magnet field monitor.
11. Remove the magnet center collar.
12. Bring the positioning fixture to the first plane and secure the plane to it.
13. Remove the four axial bolts.
14. Move the plane and positioning fixture and secure to the cart.
15. Move the cart to the shaft.
16. Bring a Minos strongback down on the shaft crane.
17. Transfer the plane from the positioning fixture to the strongback.
18. Take the strongback and plane to the surface.
19. Set the strongback with the plane on the floor in the surface building.
20. Grind all the spot welds and remove the scintillator panels and scrap.
21. Pile the steel plate up for the salvage company to haul away.
22. Continue the process until all the planes are on the surface.
23. When all the planes are gone remove the ladder from the rear deck to the top of the bookend.
24. Cut the bookend off and take it to the surface for scrap. Remove the metal gussets at the floor and take to the surface for scrap. Take all the aluminum coil return posts to the surface and scrap.