

6.7 COUPP Gamma Source Use Procedure

Written Procedure

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COUPP owns two gamma sources stored in the source locker near the 60T heavy water tank, a 0.1 mCi Co-60 source and a 1mCi Ba-133 source. To transport or use these sources, one **MUST** be a SNOLAB approved user of these sources. The purpose of this procedure and the materials referred to in this procedure is to minimize the radiation exposure of workers, and to prevent the loss of these sources.

Installing the source:

1. Place a ladder next to the COUPP shield such that the source hole is accessible. Locate the water shield's source hole plug, and the eyebolt and chain attached to it.
2. Install a sign on the exterior and next to the source hole of the COUPP shield indicating which radioactive source is currently installed. Prepared signs can be found in the pockets of the COUPP Documentation and Procedures binder.
3. Find a location next to the water shield in which to work. To minimize radiation exposure, ensure that any other workers are stationed at least 1.5m away. A barricade is not required.
4. Insert the eyebolt and chain into the source hole plug and ensure that it is firmly attached.
5. Untangle the chain and lay it's end next to the pig, more than one metre from the plug.
6. Open the pig, and attach the source's clasp onto the last link of the chain. Ensure that the clasp closes.
7. Using the chain to maintain distance, lift the source out of the pig and insert it into the source hole. Slowly lower the source until the plug rests in the hole.
8. Place the empty pig, with the lid open, on top of the shield next to the source hole and replace the ladder.

Source removal:

1. Place a ladder next to the COUPP shield such that the source hole is accessible.
2. Find a location next to the water shield in which to work. To minimize radiation exposure, ensure that any other workers are stationed at least 1.5m away. A barricade is not required as others walking past the worksite will spend an insignificant amount of time exposed to radiation.
3. Place the empty pig, with the lid open, in the work area, ready for the source.
4. Slowly lift the source hole plug out. Lift by the chain once it is in reach. Should the source snag, use no more than 20lbs of peak force to attempt to un snag it.
5. Carry the source to the lead pig, using the chain to maintain distance. Once inside the pig, unclasp the source from the chain and place the lid on the pig.
6. Replace the source hole plug into the source hole, and remove the warning signs.
7. Transport the source back to the source locker using procedure 7.1 COUPP Gamma Source Transport Procedure.

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8. Replace the ladder.

In case of emergency where the source has to be left unattended, place the source in its lead pig, and place the pig either on top of the water shield next to the 'Radioactive Source in Use' warning sign, or directly under the warning sign.

Using this procedure, less than 30 seconds should need to be spent attaching or detaching the source's clasp and less than 5 minutes should need to be spent in proximity to the source. Total radiation exposure with the torso 60cm from the Ba-133 or Co-60 source for 5 minutes is $0.40\mu\text{Sv}$ or $0.25\mu\text{Sv}$ respectively. Hands will receive a slightly higher dose than the rest of the body.

Other uses of the COUPP Gamma Source require a hazard analysis to minimize radiation exposure and prevent the loss of the sources.