From: Waggoner, Larry O
Sent: Thursday, August 25, 2005 11:26 AM
Subject: ALARA Center Activities for Week of August 22, 2005

Attachments: Ideal Portable HEPA Vent System.ppt; TRAINING COURSE.doc; Accumulation of Fissionable Material in Exhaust Ventilation Systems.htm; Ventilation Ducts - An Underrated Fire Hazard.htm; A17.jpg
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1. Loaned BHI several glue-on glove sleeves, HEPA filters, glove-rings, gloves and glue so they can fabricate two glovebags to sample HEPA filters in Building 303-M. Two D&D workers are going to make the glovebags from sheet plastic and glue. PFP plastic shop provided them a tour of their shop to see what resources were available if they needed help.

2. Received word that the new electrical motor used in the Tri-Tool Cutting Machine training class last week hasn't been approved by a Nationally Recognized Testing Lab, which is an OSHA requirement. Tri-Tool's older models made by Milwaukee and Bosch have been approved. TriTool is talking to the motor manufacturer and testing labs about having the new motor tested. If you have purchased a model with the new electric motor or any other electrical equipment that needs to be NRTL tested contact Sami Merriman at 373-2248 and she has the paperwork in place to get an inspector here to test the equipment.

3. PFP Engineer stopped by and discussed need for HEPA filtered vacuum cleaner for scrubber cell decon. He wants to purchase a CFM-137 Wet/Dry unit sold by Nilfisk but it is not approved by a National Recognized Testing Lab. After evaluating other alternatives, it was decided to switch to a pneumatic powered vacuum cleaner. Nilfisk sells a wet/dry vacuum that runs on compressed air that is rated at 240 CFM. See attached photo of the CFM A-17.

4. PFP engineering met at the ALARA Center with engineers from Environmental Alternatives Inc who developed the chemicals that will be used for decontaminating the Scrubber Room. PFP is going to decontaminate the floor of the Scrubber Room because of a 1.2 million DAC air sample when the room was opened. The chemicals will be mixed into a foam and sprayed into the room with an Intelagard sprayer. The chemicals soak into the paint and concrete and float the contamination to the surface. It is then vacuumed up after waiting a minimum of 20 minutes.

5. Groundwater is looking for a camera to look 500' down a well. Recommended they contact Grover Akre of Westec who has several inexpensive cameras that will work. He will be here September 7 working with Terry Lucke on mock-up testing a camera in a 100' pipe. Loaned Central Plateau person a 5 gallon poly bottle, adapter and HEPA filter.

6. A Radcon manager from INEEL requested info on protective clothing and equipment worn at Hanford. Forwarded him the info and provided website addresses and mailed copies of documents they can use for their evaluation. Received call from INEEL Radcon concerning a problem they are having with MSA respiratory equipment. They have had 3 instances of problems with connections near the face piece. Contacted Craig Clairmont and gave him a "heads up". INEEL will forward more information as soon as it's written.

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FOR YOUR INFORMATION

1. Columbia Chapter of the Health Physics Society is offering a course on "Introduction to Radiological Science". See attached message for info.

LESSONS LEARNED

Reducing the Dose Rate of High Active Waste Concentrates. The Karlsruhe Reprocessing Facility in Germany is being dismantled. The main part of the facilities has a series of hot cells, which were used for the reprocessing of spent fuel. The walls of the hot cells were made from heavy concrete, which contained piping that had been used to transfer highly radioactive waste concentrates between hot cells. Some of these pipes developed leaks and this permitted high levels of contamination to spread into the concrete.

The plant is being decommissioned in a series of six steps. They are presently working on step 3, which is to "free" all controlled areas in the process building. This includes decontamination as well as the release procedures for the remaining concrete structures of the process building

The usual method of removing a hot cell involves cutting the concrete walls with diamond wire rope. The resulting concrete blocks are then packed into containers and transported to a Waste Complex for further treatment. There, the blocks are cut into smaller blocks and packed into special containers for final disposal.

During the dismantling, two concrete blocks were found with high dose rates and could not be handled in the normal manner. Each of these blocks contained piping that had been cut off prior to wall sawing. The piping protruded about 4-6" on the outer and inner surfaces of the block. Reports indicated the outer pipe connections had been plugged and the connections that would have been inside the hot cell were pinched off. The concrete on the inner side of the block was coated with epoxy resin and surface dose rates were up to 11 Rem/h.

The two blocks weighed 6 and 7 tons each and were shipped to a work facility in a shielded container. Plan was to remotely decontaminate and size reduce the blocks after they were unloaded. A mobile steel shield was used to reduce work area dose rates. A continuous dose rate monitoring system was installed and workers wore electronic dosimetry. Prior to starting, preparations were made to collect the contamination, debris, and dust. Interferences were encountered getting tools around the protruding pipes, which were located a few inches from one another.

A remote controlled miniature excavator was equipped with a percussion jack hammer that had a self-constructed absorber unit. A die-shaped loosening chisel was used as the standard tool, allowing the removal of 2-3mm in one step. A modified industrial vacuum cleaner equipped with a cyclone separator removed the coarse dust upstream of the filters and finer dust was deposited into a collection drum. The drum was placed in a shielded 55 gallon cask and quick disconnects were installed on the hoses to make drum changeouts easier. The suction tube was held by a separate manipulator that moved in parallel with the loosening chisel. All tools were checked out on a mockup prior to use.

The concrete block with the lowest dose rate was selected to be done first. Detailed radiation surveys were taken from all surfaces of the block. The dose info was relayed to the riggers that had to position the blocks on a work bench. When removing the block from its container it was found that only some of the piping had been plugged. All pipes in the area of the highest dose rate were open.

The epoxy resin layer on the inner side of the block could be removed easily with the loosening chisel. Areas of increased dose rates were visible due to their dark discoloration. After removal of the first concrete layers the dose rate on the surface of the block surprisingly ***increased*** by a factor of 100. No explanation was found for the increase in dose rate. Decontamination continued and after removal of 4" of the concrete, the dose rate was low enough to stop decontamination, (<500 mRem/h).

The concrete dust was sucked off and collected in the collection drum. The maximum reading on the surface of the unshielded collection drum was 700 mRem/h. The two concrete dust drums and one drum of coarse rubble were subjected to gamma spectrometry and neutron measurement to determine their activity inventory and, in particular, their uranium and plutonium concentrations. In total, 213 pounds of dust and rubble were collected with an overall activity of about 1.25 Ci.

The second block was decontaminated using the same method and the dose rate readings did increase between the second and third attempts just like the first block. Dose rates to the workers were well below the prejob estimate due to the continued use of the mobile shield.

USEFUL INFORMATION ABOUT VENTILATION AS AN ENGINEERED CONTROL AND THE HAZARDS ASSOCIATED WITH D&D

Air Changes in a Radiological Facility: The Industry Standard for ventilation is to exchange the volume of air in a room 7-12 times per hour. At most Hanford radiological facilities, we try to get at least 20 air changes per hour. This ensures that any particulate that may become airborne flows towards the ventilation suction. Air changes are determined by comparing the volume of the containment or room to the flow rate of the vent system.

Getting air to flow towards the suction doesn't mean there is enough flow to capture the particle and get it to flow into the suction and be trapped on the HEPA filter. Much of the airborne particulate will fall out of the air stream before it ever reaches the suction.

If you're serious about capturing airborne particulate, you must look at the source of the contamination and determine the direction and amount of air flow at the source. We tell workers to get their suction hose as close as possible to the work but no farther away than the diameter of the suction hose. In addition, we teach workers to block off flow coming from unwanted directions by installing a flange, scoop or other device to force more air to pass through the region where the airborne particulate may be present. We call this using "localized" or "point-source" ventilation. See Attached Power Point Vent Presentation The presentation provides examples of the techniques used to capture airborne particles.

During D&D, facilities are faced with removal of ventilation systems that may contain quantities of highly radioactive material. Forwarded the attached DOE Bulletin, which was issued 15 years ago to PFP D&D manager. In addition, the removal of a ventilation system may create a fire hazard. See attached DOE Bulletin from 1989.