

**From:** Waggoner, Larry O  
**Sent:** Friday, February 16, 2007 2:46 PM  
**Subject:** ALARA Center Activities for Week of February 12, 2007

**Attachments:** Loss of filter from MSA.doc; Vent Flow Diagram 005.jpg;  
Field\_Evaluation\_sheet.pdf; Equip Eval Overview 040704.pdf; Yucca Robot.jpg; Yucca Saw.jpg  
Visit our website at [www.hanford.gov/rl/?page=974&parent=973](http://www.hanford.gov/rl/?page=974&parent=973)

- Jerry Eby had another shoulder operation this week and is expected to return to work in about 10 days. You may have noticed that we have started adding information at the beginning of a section to help people find information, i.e., "Contamination Control". This was suggested so that personnel who try and hunt for information later will have an easier time trying to locate it. We welcome any other suggestions that will make this report more useful.
- L.Waggoner will be attending the Waste Management Symposium during the week of February 26. If facilities want me to look for specific items or information please let me know what you're interested in or give me your business cards. Otherwise, I intend to use my best judgment on whether the technology will work at Hanford.

1. Forwarded MSDS on Encapsulation Technology's "Invisible Blue" Capture Coating to WCH Rad Engineer. Forwarded info obtained from PFP on glovebox testing to the Rad Engineering Manager at Oak Ridge. Forwarded info on Fuel Pool Diving provided by K. Mortensen from West Valley and B. Lueck of PFP to Radcon staff at Spent Nuclear Fuels. Forwarded recommendations from FFTF Engineering on improvements needed in the new work instruction being written by Vista Engineering on procuring HEPA filtered vacuum cleaners. Provided tour of the ALARA Center with G. Perkins to David Savage, who is visiting Hanford from the United Kingdom.

2. Contamination Control: Forwarded info on a variable speed HEPA filtered vent unit to WCH personnel working in the 100 Area. Unit is sold by NFS/RPS Services. Discussed contamination control requirements with ALARA Coordinator from SNF for removing a highly contaminated glovebag on the hose-in-hose piping. Recommended that once the glovebag is removed, they resurvey again in a few days to determine if contamination is leaching from metal that was exposed inside the glovebag. Loaned WESF Rad planner a pressurized sprayer to they can spray the work area where they have to remove overhead lighting. They are going to mix water and Elmer's Glue in 15:1 and 25:1 mixtures and practice in a clean area to test the process. Recommended they use Capture Coating by Encapsulation Technologies ([www.fogging.com](http://www.fogging.com)) or CC Wet by Instacote ([www.instacote.com](http://www.instacote.com)) if the glue doesn't work.

3. Visited WESF and watched a demonstration of the Thermo Eberline HFM11 Hand and Foot Monitor. This equipment has many improvements over the older hand and foot counters. It measures wrists and forearms, is easier to maintain, has reduced monitoring times, and many other features. Got a call from R. Maygra of FFS wanting all the Polymeric Barrier System (PBS) sealant we had on hand. Two months ago they had given the ALARA Center 32 five-gallon containers after a job was completed and they had no further use for the PBS. We still hand 9 containers that we hadn't given away to other facilities/contractors. Recommended they use latex paint after they use up the PBS they have. The paint is readily available, cheaper and does a good job as a sealant. Two workers from the burial grounds stopped and looked at temporary shielding materials. They will be back with their entire crew and brain storm the options they have to reduce worker dose when they uncover highly radioactive drums from the burial grounds.

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**FOR YOUR INFORMATION**

1. In case you missed it, attached is a lesson learned from WCH that describes a filter falling from a PAPR. A new document on the QA inspection & Testing of HEPA Filters has just been issued. Read it at: <http://www.hss.energy.gov/NuclearSafety/techstds/standard/std3025/doe-std-3025-2007.pdf>. We received 12 new samples of TLC Stripcoat and 12 samples of Polymeric Barrier System from Bartlett Services. These samples are to be handed out to personnel who aren't familiar with these products. Hanford MSDS numbers are 035971 and 032197. If you want to test them here; bring your own paint brush, roller or sprayer.

2. Contamination Control/Improving capture of airborne particulate: Two weeks ago, we recommended personnel purchase the Kestrel 1000 Wind Gauge to measure ventilation flow rates and we have received two of these units. Please contact us to borrow one to test your ventilation flow rates. We need you to convince us that it won't get contaminated before loaning it out. You can test it here using our ventilation systems. The use of these instruments will be included in future containment and ventilation training classes. ***In our opinion, every radiological work facility needs this or an equivalent method of measuring air flow.***

J. McDonnell from NFS/RPS recommended we look at the Air Flow Conversion Formulas at [http://www.nfsrps.com/cat\\_air\\_instruments.html](http://www.nfsrps.com/cat_air_instruments.html) when we start using our new Kestrel 1000. Other models of Kestrel Wind meters are also sold at this website. He also cautioned we use care if we try and measure the flow rate of a vacuum cleaner. Due to the small diameter of the hose, high velocities of air flow are generated at the face of a vacuum cleaner hose and it's possible to pull the vanes off the air flow indicator impeller if we try and measure the vacuum cleaner suction. Should this happen, replacement impellers can be purchased at <http://www.nkhome.com/store/product.php?productid=16147>. The attached diagram shows the dynamics of what happens when air is drawn into a hose. Air is pulled from all directions including behind the hose. Workers are told to position the hose at 90-180 degrees from them at a distance of one duct diameter or closer in order to capture airborne particulate. This ensures the maximum amount of contamination is drawn away from the worker's breathing zone. *NOTE: At a distance of one duct diameter, the flow rate measurement is about 7.5 % of the flow rate measured at the face of the hose. That's why it's important to get the suction close to the contamination source. We also recommend installing a scoop, flange, or other device on the end of the hose to block air being drawn from the wrong direction and force the incoming air to pass through the region in front of the hose where the potential airborne contamination is being created.*

3. Nationally Recognized Testing Labs: OSHA has mandated a requirement that electrical equipment needs a complete and thorough evaluation to ensure each tool and piece of electrical equipment is safe. Tested tools have a mark near the motor that shows the product has been tested. A list of approved testing labs can be found at <http://www.osha.gov/dts/otpca/nrtl/index.html> These Labs are approved for tools and equipment in the United States. In Europe and other areas, they have a different set of Labs with their own markings. If you have a product that hasn't been tested, you can get it tested by calling [Scott Myrick at \(509\) 376-1861](mailto:Scott.Myrick@underwriter.com). He will contact the Underwriter's satellite lab in Camas, WA or an equivalent NRTL and arrange for a Field Evaluation. If you need to talk directly to the Underwriter's Lab, contact Paul Asbury at (877) 854-3577, ext 55759. Attached is description of the Underwriter's Field Evaluation Program and a copy of the Lab Equipment Evaluation Overview that provides a summary of what is involved in a Field Evaluation. These inspections can be a effective way to deal with electrical equipment that has been purchased or installed in the field that doesn't have a safety certification mark.

#### 4. **New ISO Standard #21482 - Ionizing-Radiation Warning** □ **Supplementary Symbol To Be Published 15 February 2007**

2 February 2007



A new radiation warning symbol, to supplement the existing trefoil symbol, has been published by ISO as Standard #21482 - Ionizing-Radiation

Warning □ Supplementary Symbol. The trefoil symbol has no inherent meaning and only those people who have been educated in its meaning have knowledge that it represents the presence of ionizing radiation. The new symbol is the completion of a multiyear effort by the IAEA to develop a universal radiation warning symbol with the message of "Danger-Stay Away" that anyone anywhere will understand. The new symbol was developed with human factor experts, graphic artists, and radiation protection experts. Many possible symbols were initially tested with international children, and then those symbols that were most successful in conveying the desired message were tested further by the Gallup Institute in both people with limited education and those educated in 11 countries around the world. The new symbol universally conveyed the intended message regardless of the person's age, education, or cultural background.

The symbol is intended for IAEA Category 1, 2, and 3 sources defined as dangerous sources capable of causing death or serious injury. The symbol should be placed on the device housing the source, as a warning not to dismantle the device or to get any closer. Where practical, it should be placed under the device cover such that it is not visible under normal use but would be visible if anyone attempts to disassemble the device. The symbol is not intended for doors or shipping containers.

In the near future, many source manufactures have agreed to use the symbol on newly manufactured large sources such as irradiators, teletherapy heads, and industrial radiography units. Strategies to place the symbol on existing large sources are being developed by the IAEA. The standard can be obtained at [www.iso.org](http://www.iso.org). For further information about the new supplementary symbol, you may contact Carolyn MacKenzie at [c.mackenzie@iaea.org](mailto:c.mackenzie@iaea.org).

4. These seven documents are available as PDF files through the Technical Standards Program Home Page at the following URL: <http://tis.eh.doe.gov/techstds/> This address will take you to the "DOE Technical Standards Full-Text Documents" section of the Technical Standards Home Page. Clicking on "Approved Standards" on the left margin takes you to "Online Approved DOE Technical Standards." Locate the appropriate document number

[DOE-HDBK-1105-2002, Radiological Training for Tritium Facilities,](#)  
[DOE-HDBK-1106-97, Radiological Contamination Control Training for Laboratory Research \(Change Notice 1, March 2002\),](#)  
[DOE-HDBK-1108-2002, Radiological Safety Training for Accelerator Facilities,](#)  
[DOE-HDBK-1109-97, Radiological Safety Training for Radiation-Producing \(X-Ray\) Devices \(Change Notice 1, February 2002\),](#)  
[DOE-HDBK-1141-2001, Radiological Assessor Training,](#)  
[DOE-HDBK-1143-2001, Radiological Control Training for Supervisors, and](#)  
[DOE-HDBK-1145-2001, Radiological Safety Training for Plutonium Facilities](#)

5. Something for the Engineers: National Engineers week starts this Sunday and all engineers on distribution are invited to look at [www.Heli-Cal.com/](http://www.Heli-Cal.com/) This is a product that has been around for awhile but it is new to the ALARA Center Staff. These flexible couplings allow you to connect misaligned pipe and reduce vibration and allow for expansion. I added two photos from Yucca Flats. The first shows a robot tractor being tested inside the Yucca Flats Tunnels. The second shows a large saw used to cut blocks of rock.

## LESSONS LEARNED

1. Work Practice: CH2M is now using a "Super Box" to transport highly contaminated long-length equipment removed from underground tanks by railcar to a sub-contractor (Pacific Eco Solutions) for size-reduction. In the past, long-length equipment would be size reduced using saws and/or shears in Tank Farms before it was packaged in smaller waste boxes. The "super box" is 5' X 5' X 60'. This change in

work practice means the highly contaminated equipment is only handled once in the farm and it then can be size-reduced at PEcoS in controlled conditions. This reduces risk to workers, the environment and saves time.

2. The website below shows some innovative thinking by WCH on survey techniques used on soil excavated near old radiological work facilities/burial grounds.

[http://www.washingtonclosure.com/news/WCH\\_Newsletter2/Vol\\_02\\_Issue\\_05/vol\\_02\\_issue\\_05.pdf](http://www.washingtonclosure.com/news/WCH_Newsletter2/Vol_02_Issue_05/vol_02_issue_05.pdf)

Hopefully, off-site personnel can read this article. But in case you cant: To paraphrase it:

During excavation of burial grounds, WCH personnel turned up highly radioactive spent fuel elements and reactor hardware. These were found in mounds of dirt that were 20-30 feet high. This created a condition where workers were constantly at risk of exposure to radioactive and hazardous materials. Open team discussions were held and a new technique was developed. The excavator operator in supplied air, digs up and mixes waste material in place. Air samples are taken and then dump trucks spread the material in a series of shallow sorting cells. Each cell is about 300 feet long and 20 feet wide. The excavated soil is added to the cell until it is about 3 feet deep. A low soil berm along the edge of the cell provides shielding for the excavator operator. A team-designed gamma array survey instrument is then hung from the excavator arm and held about a foot above the soil in the cell. The excavator slowly moves along the cell surveying the soil. Any suspect materials are removed and workers sort the soil by hand using long handled tools. The remaining soil and debris are loaded into containers for disposal at the ERDF trench. The survey instrument is called a "gamma pipe and is made by taking PVC pipe, placing remote reading gamma detectors inside and then placing pipe caps over the end. WCH is now able to survey waste material faster and more accurately and use less water to suppress the dust. With a smaller area to survey, they have less surveys, and use fewer signs, boundary rope and posts. Contact Rex Miller at (509) 373-1319 or Steve DeMers at (509) 531-0729 for more details.