From: Waggoner, Larry O
Sent: Thursday, October 06, 2005 3:18 PM
Subject: ALARA Center Activities for Week of October 3, 2005

Attachments: INEEL Enclosure.jpg; D&D Articles.doc; IMG_0336.jpg; IMG_0335.jpg
Visit Our Website at http://www.hanford.gov/rl/?page=974&parent=973

1. Received request for information on "fixatives" from the Chalk River Lab, Atomic Energy of Canada Limited. Forwarded them a list of fixatives used at Hanford, an article on how to use expandable foam and a handout on Contamination Control Techniques. Two work planners from SNF stopped by looking for a way to attach a HEPA Filter to the vent on a waste box. The waste box contains highly contaminated fuel canisters that have to be grouted in place before shipment to the burial ground. Gave them three 40 cfm HEPA filters that had been given to the Center after the D&D of Building 233-S was complete. They will have the PFP Plastic Shop fabricate clear PVC sleeves to tape over the waste box vent.

2. Chaired the PHMC ALARA Council meeting for October. Mark Hermanson who works with the Automated Job Hazard Analysis computer program was present to listen to our concerns and suggestions on how to improve the system. He officered to evaluate our suggestions and set up a training class for work planners if the changes are significant. CH2M ALARA Committee held their meeting at the ALARA Center and then 11 personnel, including their Vice President, toured the ALARA Center. Provided brochures of the BROKK Demolition Machine to D&D workers. See www.http://www.brokkinc.com/ This is a great website with videos showing the BROKK in action. Forwarded a list of fixatives used at Hanford to Washington Closure personnel. They are preparing to restart the work in the burial grounds north of the 300 area and intend to use fixatives to control contamination spread.

3. K Basin is looking for a sprayer/fogger to borrow to spray a aerosol fixative inside a glovebox. Referred them to S. Hamblin of Washington Closure Group and PFP who have used small foggers in the past. An engineer working on the demolition of a gaseous diffusion process equipment at ETTP Project at Oak Ridge contacted the ALARA Center looking for advice on the best fixative to coat 250,000 ft2 of floor space that has Tc99 contamination. He wanted a product that was cheap and won't be washed off with water. In addition, he wanted minimum protective equipment when spraying and low risk of a fire. Forwarded him a list of fixatives currently in use at Hanford and recommended he call the manufacturers and get some samples. Our guess is the Hanford contractors would use acrylic paint to fix the contamination. Also told him how EAI had used an Intelagard sprayer to apply chemicals to the contaminated concrete floor of a building near the 300 Area. The chemicals soaked into the concrete and floated the contamination to the surface where it was vacuumed up about an hour later. As we recall, readings on the floor were up to 30,000 dpm/100cm2 before decon. The floor was released from radiological controls after a second application of foam. It's possible Oak Ridge could decon the building instead of fixing the contamination. Suggested they contact EAI at www.eai-inc.com.

4. WRAP has a problem with a crane inside a glovebox that may require workers to enter the glovebox to troubleshoot. Provided the ALARA Coordinator with brochures and a videotape from Inflatable Abatements, which sell inexpensive containment tents. They will need some form of containment attached to the glovebox so workers can remove a hatch and make entry.

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FOR YOUR INFORMATION

1. BNFL used a large tent to cover a construction project at INEEL through the winter. This made a safer work environment for the workers and the job was completed ahead of schedule. At the end of winter, the tent was sold. See attached photo.

2. West Valley DOE Site had excess new protective clothing/bags and offered them to Hanford if we would pay the freight bill. Value of the Shipment is estimated to be ~$40,000 and includes: 632 pair of yellow vinyl suits, 22 pair of TyChem 7500 coveralls, 71 HEPA filter disposal bags, 210 large yellow bags (46" x 72" and 52" x 63") an undetermined amount of Nomex fire resistant clothing, and some power tools. The shipment should arrive next week and will be handed out on a first come basis to needy contractors.

3. Since 1993, we have been collecting articles from trade magazines, presentations at conferences and material we have written. A 10 page list of these articles is attached. We have hard copies of these documents but only a few of these documents are electronic. If you see something that catches your eye, stop by the ALARA Center and you can use our copy machine. If you're located off site, send an email with the ones you want and we'll try and copy them and mail them to you.

4. SNF ALARA Coordinator sent some photos of the underwater debris in K Basins. Two photos are attached. They are trying to vacuum sludge from the basin and have to work-around all the equipment still left in the basin.

5. Interested in an heavy-duty vacuum cleaner with more suction? See the website http://www.ruwac.com/ These units are used to hold robotic platforms to the walls of buildings. See www.icmachines.com International Climbing Machines recommends these units and their website includes schematics of how the units are constructed.

LESSONS LEARNED

1. Last week's "Fluor Your Information" electronic newsletter discussed how Fluor had refurbished water lines by relining them with mortar instead of replacing them. While the piping wasn't radioactively contaminated, this technology could be used in the future on radioactive systems. An EFCOG "Best Practice" that describes the process can be found at http://www.efcog.org/bp/p/29.htm.

2. Plasma Arc cutting is one of the more popular techniques considered when planning a job that requires extensive metal cutting. The reason is that plasma arc cutting is simple for the worker and the torches, gas and hoses are inexpensive. It is not simple for Industrial Hygiene and Radcon personnel due to the large amounts of airborne debris and Carbon Monoxide gases present during cutting. During plasma arc cutting, an arc is established in a gas or gas mixture that flows through the constricting orifice of a torch nozzle. Very high current densities and high temperatures form in the stream from the torch and the high velocity and the arc melt away the work piece. The problem is that the molten material removed during the cutting process becomes airborne and can travel hundreds of feet. High levels of Nitrous Oxide, carbon monoxide and ozone will be present that cause worker headaches, if breathed. The Electrical

Facility Contractors Group (EFCOG) has written a "Best Practice" that describes some of the radiological, safety and environmental controls used for plasma arc cutting.

EFCOG Best Practice #38

8/13/05

PDF Version

TITLE: Worker Protection from Carbon Monoxide (CO) Production from Plasma Arc Torch Cutting of Stainless Steel in Confined Space

FACILITY: BNFL Inc. (Big Rock Point Major Component Removal Project)

POINT OF CONTACT: Ken Meyer, 303-874-3977, kmeyer@bnflinc.com

BRIEF DESCRIPTION OF BEST PRACTICE:

During the planning phase of a Plasma Arc cutting task, the potential for carbon monoxide production and collection was identified. Selecting the proper combination of engineering and administrative controls, combined with proper personnel protective equipment (PPE) resulted in this work being performed without incident.

WHY THE BEST PRACTICE WAS USED:

BNFL Inc. used plasma arc cutting torches to cut up and remove up to ½-inch thick stainless steel plate inside a Permit Required Confined Space (PRCS) as part of decommissioning activities. A job hazard analysis identified that carbon monoxide (CO) production was likely at levels requiring engineering controls, administrative controls, and PPE. Air monitoring during initial cutting operations confirmed that CO was present at elevated levels. The engineering controls implemented included the use of up to *seven (7) 2,000-cfm HEPA filtered air handlers* to provide both local exhaust ventilation and work area dilution ventilation. The administrative controls implemented were to stop cutting operations when CO levels approached 150 ppm (this administrative level was selected to ensure that the workers inside the PRCS would not exceed the local regulatory ceiling limit of 200 ppm in the event that they had to exit the PRCS without their respirator). The PPE used included 1) a full face supplied air respirator using Grade D breathing air, 2) the appropriate shade welding lens for the radiant energy produced by the plasma arc cutting torch, and 3) fire-retardant radiological anti-contamination outer clothing. All exposed skin was also covered to prevent ultraviolet ray exposure from the operation of the plasma arc cutting torch. CO monitoring was performed using a personal CO monitor with an adjustable alarm setpoint and a data-logging CO monitor to provide a historical record of monitoring activities.

WHAT ARE THE BENEFITS OF THE BEST PRACTICE:

The best practices benefits are: 1) the proper placement of air handler exhaust hoses are essential in the capture and removal of as much CO as possible from the PRCS in the shortest time period, 2) by maintaining the exhaust hose as close as possible to the point of operation the majority of CO generated can be removed before it disperses throughout the PRCS, 3) periodic relocation of exhaust ventilation hoses is essential to maximizing CO removal as the location of cutting is constantly moving, 4) the ideal location of the exhaust ventilation can be estimated by performing calculations prior to the start of cutting however, air monitoring will identify optimum placement of hoses, usually by trial and error, 5) the use of smoke tubes are essential in determining ventilation flow prior to starting the cutting operations, 6) CO monitoring is essential in adjacent work areas to ensure that CO removed from the PRCS does not create a hazardous condition elsewhere, 7) double open-ended 12-inch diameter hoses allowed additional fresh air to be brought down into the PRCS to replace the air removed from the PRCS by the air handler when one open end was placed outside the PRCS in ambient conditions while the other open end is located inside

the PRCS, 8) the use of CO monitors with adjustable alarm setpoints allow for working in higher CO levels due to the increased personal protection factor provided by the full face supplied air respirator while still retaining an alarm capability at higher CO levels, and 9) the use of a data logging CO monitor allows for creating a graphical display of CO concentrations throughout the work period. This also allows for graphical review with the work crew to ensure CO control and/or reduction in CO production has occurred.

WHAT PROBLEMS/ISSUES WERE ASSOCIATED WITH THE BEST PRACTICE:

None

HOW THE SUCCESS OF THE BEST PRACTICE WAS MEASURED:

The work was completed without incident due to the correct combination of engineering and administrative controls and proper PPE.

ALARA CENTER NOTE: During D&D work, the air sucked into the ducting can be very hot and contain sparks. It is essential the ducting be made from metal and contain a spark arrestor to remove sparks that could set prefilters, non-metal ducting, and HEPA filters on fire. You should note the number and airflow of the portable units described in this lessons learned. It takes a lot to remove the airborne debris from the air. Other articles on plasma arc cutting can be found at:

http://www.osti.gov/bridge/servlets/purl/10151409-qYakNB/native/10151409.pdf

http://www.osti.gov/bridge/servlets/purl/761551-R608Eh/webviewable/761551.pdf

http://www.osti.gov/bridge/servlets/purl/473994-E9yPWg/webviewable/473994.pdf

http://www.wmsym.org/Abstracts/2002/Proceedings/14/246.pdf