
# C-A Environmental Management System Highlights 2004

## C-A Department Clean-up Spotlight:

Over the last decade, the Collider-Accelerator has generated an annual average of 3500 cu-ft of low level radioactive waste. The fixed target high-intensity proton program has terminated for now and although our routine operations wastes will decline there are significant waste management activities needed to manage waste from the former fixed target program. Thus, the average level of solid low-level radioactive waste output, the management of which represents a significant portion of our waste cost, is expected to continue over the long term; that is, through the next 5 or 6 years.

As funding allows, non-routine waste will be packaged and disposed of. This year, the three remaining neutrino horns, depleted uranium beam stop, and components from "Inner Mongolia" are our first priority. Over the next several years, break down of old beam lines, disposal of saved equipment in the "Inner Mongolia" High Radiation Area, and disposal of excess activated steel and concrete will be focused on. If funding allows and methods are developed, disposal of some of our highly activated equipment will also be done. This year already, 80,000 lbs. of legacy steel was packaged by the C-A ES&F Division and shipped for disposal. This year we will also vent the remaining deuterium and hydrogen gas cylinders and work on removing PCB capacitors as funding allows.

## C-A Department Continual Improvement Spotlight:

The power consumption in the RHIC helium refrigeration system has been dramatically reduced to save C-AD approximately $2,600 in electrical costs for each day of operation, which translates to approximately $455,000 for a six-month RHIC run. The modifications that reduced the power consumption have also increased the reliability and flexibility of RHIC operations. The refrigeration system needs so much power because, in order to guide the gold ions on their path inside RHIC, the accelerator employs 1,740 superconducting magnets that are cooled to -452° F (-269.5° C) using seven tons of helium. To chill the helium and remove the heat load at the operating temperature of -452° F, RHIC's helium refrigerator consumed more than 10 megawatts (MW) of electrical power when RHIC was commissioned in 1999. One megawatt is enough to power 1,000 homes. In 2001, the power consumption was reduced to 9.3 MW by upgrades initiated by control system programmer Deiter Zantopp of the RHIC Cryogenics Controls Group (CCG) at C-AD. This year, the power consumption has been reduced to a level just above 7 MW. "The project involved modifying the refrigerator system's 'control philosophy,' reducing the potential for oil contamination, and improving the design at the cold end of the refrigerator," said Project Leader Ahmed Sidi-Yekhlef, C-A. In the past the supply pressure for the RHIC refrigerator used to be kept constant by the control system regardless of the cooling demand from the accelerator rings. Now, with the improved design, the supply pressure for the refrigerator is constantly adjusted by the control system to meet the cooling demand and it is kept as low as possible to save energy. During the RHIC shutdown in the summer of 2003, many changes were made to the refrigerator system. The CCG, led by Anne Reuter and technical supervisor Len Masi, continued upgrades to improve system reliability, and Zantopp reprogrammed the control system to the new philosophy. The Cryogenic Operations Group, led by cryogenic engineer Tony Nicoletti and technical supervisor Andy Warkentien, did multiple piping changes on both the warm and cold ends of the refrigerator to improve system reliability and efficiency and reduce helium contamination. The system's increased reliability and flexibility is due to the fact that the compressors are no longer operating at higher pressures and power levels causing the system to last longer. The control system is now better able to handle transient occurrences, such as magnet quenches, which occur when a superconducting magnet goes into "normal conducting" and deposits heat energy into the refrigeration system, that result in higher heat loads for the refrigerator. Work will continue in the redesign of the 30-year-old refrigerator system and it is expected that future reductions in power consumption will be realized.

# C-A Department Pollution Prevention Spotlight:

Preventing pollution is everyone's responsibility and everyone's participation in waste minimization at the point of generation is required to help the Laboratory meet that goal. With just a little extra work we can all reduce waste. Here are just a few tips:

- Always make an effort to replace hazardous cleaners and chemicals with environmentally friendly products if possible. Call Joel Scott or Mel Van Essendelft and they will help you find a substitution.
- If you've got an idea to minimize waste, then let Joel or Mel know.
- If you're adding or changing a known hazardous or radioactive process contact Joel (7520) or Mel (2905) to review it for compliance.

# C-A Department Compliance Spotlight:

We must comply with regulatory requirements. Some of our specific compliance goals this year are:

- Consistently meet all SPDES permit limits and comply with the Liquid Effluents subject area.
- Implement Corrective Actions to Achieve Article 12 Conformance.
- Improve Resource Conservation and Recovery Act (RCRA) and Radiological Waste Compliance.
- Meet Federal and State Air Program Requirements including reducing the use of and eventual phase out of Ozone Depleting Substances (ODS).
- Schedule and conduct regulatory compliance assessments to evaluate compliance to applicable regulations on a three-year cycle.

In addition to these goals, this year the Laboratory will "kick the tires" with Compliance assessments on Liquid Effluents, RCRA and the close-out & transfer of FRDP Issues.

# C-A Department EMS Targets:

For each major process we have an Environmental Management Program document which describes the program and the environmental goals (Objectives) that we want to accomplish. It states what we will do (Targets) to accomplish those goals, tells how we will accomplish those goals by listing the Budget and Operational Controls used, tells who is responsible to accomplish them in a list titled Structure, Authorities, Responsibilities, and how we measure (Performance Indicators) the success in accomplishing those goals.

As the C-A EMS systems matures our Objectives and Targets become more specific. Our objectives are developed from Laboratory requirements as well as Departmental requirements. Listed below are *some* of the Targets to accomplish this year's objectives.

- Review all experiments for Work Planning requirements, including consideration of liquid effluents that will be generated. Obtain approval for 100% of liquid discharges not specifically authorized by the Liquid Effluents subject area.
- Close out all Article 12 audit corrective actions.
- Review all emission points for compliance, documentation, and forward any updates to the ESD Subject Matter Expert.
- Participate in the Laboratory-wide compliance assessments.
- Monitor waste generation and report on a quarterly basis. Analyze for pollution prevention opportunities.
- Submit a minimum of two pollution prevention project proposals.
- Ensure preventive maintenance is adequate and performed on all EMS related systems.
- Ensure that appropriate spill materials are available and track, report and reduce spill costs.

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