EFCOG Best Practice #76

Title: EMS as a Compliance Vehicle – An Example: NPDES Compliance

Facility: Los Alamos National Laboratory, Los Alamos (LANL), NM 87545

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Brief description of the Best Practice

LANL actively seeks to integrate all aspects of environmental compliance through its ISO 14001:2004-registered Environmental Management System (EMS). This Best Practice specifically describes how EMS mechanisms were used to implement new requirements of LANL's National Pollutant Discharge Elimination System *(*NPDES) permit.

LANL currently has 15 EPA NPDES permitted outfalls that historically have discharged approximately 154 million gallons per year of treated effluent from key sanitary waste, computing, high-energy physics and research and development facilities. While these discharges are permitted under the Clean Water Act (NPDES), a new permit issued in August 2008 carries rigorous new enforceable limits on metals and whole effluent toxicity beginning in August 2010 and PCB's in August 2012 with an extremely low discharge limit (0.00064 ug/l). Hydraulic pressure from these discharges contributes to the migration of legacy contaminants downstream. Finally, DOE Order 430.2b *Departmental Energy, Renewable Energy and Transportation Management* and the LANL EMS call for water conservation.

An institutional response to these requirements was implemented through the LANL EMS. A cross-laboratory team developed a business and engineering plan to address all discharges and prioritize requirements. The plan coupled sustainability requirements that stress water conservation and provided a strong business case for the required investment. The plan was vetted during extensive discussions with facility owners and walk-downs of facilities were conducted to develop appropriate engineering options.

The engineering plan developed five parallel projects that are implementing both interim and long-term solutions that will reroute and recycle 85% of the effluent, reduce water consumption enough to meet 16% of all NNSA's water savings goals and, ultimately close 12 of the 15 outfalls. The remaining outfalls will not discharge routinely but will maintain emergency discharge status if needed.

Why the best practice was used:

The LANL EMS serves an integrating function between pollution prevention, environmental sustainability goals, institutional business goals, compliance requirements and mission performance. Without an institutional approach, each facility owner would had to have treated the wastewater locally and been subject to new requirements as early as 2013. By taking a system-wide view of the LANL water and waste water system, the institution arrived at a permanent solution that saved money while achieving DOE sustainability goals.

What are the benefits of the best practice

LANL was faced with serious NPDES compliance deadlines of August 2010 (pH/toxicity/metals) and August 2012 (PCB's) and fines of $25k per day per violation and

Water Quality Standards fines of $10k per day. Based on sampling results, if the new permit limits were in effect, LANL would have had approximately 80 exceedances of the new permit conditions in FY09. Key mission facilities would be out of compliance and subject to an increased EPA focus on enforcement possibly resulting in shutdown.

In addition to financial exposure under 33 USC1319(d), it was determined that compliance fines will be unallowable costs under the contract. Further, regulatory fines and penalties compound existing citizen's lawsuits on ground and surface water contamination and permit negotiations/appeals. It is likely that non-compliance would instigate a new compliance order from EPA with associated legal costs. Finally, engineering analysis of alternative point source treatment at each outfall demonstrated that a separate approach would be more expensive than an integrated strategy.

What problems/issues were associated with the Best Practice

A key problem was raising institutional awareness of the overall problem. This is where the LANL EMS was particularly useful. Since the LANL EMS is organized at the Division and Directorate level, it allowed each organization with an NPDES outfall to identify directly with the potential impacts on their mission operations. Several parallel steps were taken to bring management focus on the problem. First, based on the business case, achieving Zero Liquid Discharge by 2012 was approved by senior management as one of 5 Lab-wide Environmental Objectives in the EMS. This allowed each of the involved organizations to meet a lab-wide objective by participating in the process. Next, the project became one of the Laboratory Director's Improvement Goals. Importantly, the DOE/NNSA Site Office included the project as a performance measures for contract award fee. Finally, the project was integrated into the LANL Site-wide Environmental Impact Statement (SWEIS) Mitigation Action Plan. Collectively, these steps raised awareness and kept management attention on the completion of the project.

How the success of the Best Practice was measured

DOE Orders 430.2b and 450.1 *Environmental Protection Program* require energy and water conservation. Historically, LANL has discharged ~154 M GPY via 15 outfalls. Engineering calculations show that SERF saves ~110 M GPY (~4400 households). To track project progress two methods are used. First, project execution milestones are Performance Based Incentives in the LANL contract with DOE. Results are reported monthly to DOE. Second, project milestones are included as a key element of LANL's Executable Plan for energy and water conservation required under DOE Order 430.2b. Operational energy savings from these operations will also be factored into the Executable Plan. Results are reported to the Site Office and DOE HQ quarterly.

Description of process experience using the Best Practice:

After making a business case for an integrated approach through the EMS, project implementation began with the objective to reduce or eliminate discharges to achieve compliance. The effort was organized into five projects based on geographic proximity. The strategy was to centralize treatment by routing to existing and expandable facilities:

- The Sanitary Effluent Reclamation Facility (SERF) for industrial waste water
- The Sanitary Wastewater Sewer Facility (SWWS) for sanitary waste water

- The Radioactive Liquid Waste Treatment Facility (RLWTF) for radioactive liquid wastes

The overall project hinged on SERF expansion to triple capacity. Several facilities will close their outfalls by routing their discharge water to one of the three treatment facilities. In turn, the SWWS will route its final effluent to SERF for recycle and reuse. SERF treatment is the only viable approach to PCB compliance given large volumes. Compliance sampling has confirmed that the SERF process is effective in removing PCB's to levels below the extremely low limit (0.00064 ug/l) of the permit.

The SERF expansion is a major line item with costs in excess of $13 M, which was approved in August 2009. All five projects have been approved, equipment for storage and treatment (where necessary) has been procured and, as of May 2010, all projects are proceeding to construction in order to meet the initial August 2010 deadline.