STREAMLINED APPROACH TO WASTE MANAGEMENT AT CRL

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ABSTRACT

Radioactive, mixed, hazardous and non-hazardous wastes have been and continue to be generated at Chalk River Laboratories (CRL) as a result of research and development activities and operations since the 1940s. Over the years, the wastes produced as a byproduct of activities delivering the core missions of the CRL site have been of many types, and today, over thirty distinct waste streams have been identified, all requiring efficient management. With the commencement of decommissioning of the legacy created as part of the development of the Canadian nuclear industry, the volumes and range of wastes to be managed have been increasing in the near term, and this trend will continue into the future. The development of a streamlined approach to waste management is a key to successful waste management at CRL.

Waste management guidelines that address all of the requirements have become complex, and so have the various waste management groups receiving waste, with their many different processes and capabilities. This has led to difficulties for waste generators in understanding all of the requirements to be satisfied for the various CRL waste receivers, whose primary concerns are to be safe and in compliance with their acceptance criteria and license conditions. As a result, waste movement on site can often be very slow, especially for non-routine waste types.

Recognizing an opportunity for improvement, the Waste Management organization at CRL has implemented a more streamlined approach with emphasis on early identification of waste type and possible disposition path. This paper presents a streamlined approach to waste identification and waste management at CRL, the implementation methodology applied and the early results achieved from this process improvement.

Subject Keywords: Waste Management, Waste Identification, Waste Management Plan

1. INTRODUCTION – PROBLEM IDENTIFIED

The Chalk River Laboratories (CRL) site is a large nuclear research and development/industrial site operated by Atomic Energy of Canada Limited (AECL). The CRL site has generated a variety of wastes from diversified operations, such as research reactor operations, isotope production, research and development activities, facility decommissioning, etc. Various on-site waste receivers manage different waste types generated from activities and operations at CRL. Because each receiver has its own processes, requirements and capabilities, this makes the waste management processes complicated. Presently there are five different waste types generated at CRL:

1. Liquid waste;
2. Solid radioactive waste;
3. Hazardous waste;

4. Mixed waste; and
5. Solid clearable waste (likely clean and clean wastes).

These waste types have been grouped into over thirty waste streams that have different handling requirements and separate paths to final disposition. At CRL, the Waste Management Areas manage the solid radioactive waste, the Waste Processing Section manages solid and liquid hazardous wastes as well as clearable waste, the Waste Treatment Centre manages the radioactive aqueous waste and the site Sewage Treatment System manages the liquid sewage.

The following problem areas in the current waste management process have been identified as areas for improvement:

1. There are multiple forms to be completed for different types of waste (i.e., radioactive, mixed, hazardous, clearable), which can cause confusion and errors;
2. There are many different facility personnel engaged in the waste transfer processes leading to the culture of using people perceived to be in the know, and not necessarily the correct person, which can be highly disruptive to the receiving facility;
3. Waste generators may not be aware of the steps that should be taken prior to the generation of waste;
4. Resources for providing assistance in the completion of the waste transfer forms are available, but may not be known to waste generators;
5. Most of the waste generators do not have internal waste management procedures in place and have not designated a staff member to be responsible for waste management activities;
6. Waste Management Plans (WMPs) currently only encompass routine solid radioactive wastes; and
7. Most waste generators find the development of their WMPs challenging because of their lack of expert knowledge on the subject.

Recognizing an opportunity for improvement, the Waste Management organization at CRL has implemented a streamlined approach with emphasis on early identification of waste type and possible disposition path. This paper presents a streamlined approach to waste identification and waste management at CRL, the implementation methodology and the early results achieved from this process improvement.

2. STREAMLINED APPROACH

A streamlined approach with emphasis on early identification of waste type and possible disposition path has been introduced at CRL and the approach includes the following steps:

- Waste identification;
- Pre-characterization;
- Assessment of results;
- Development of WMP; and

- Execution of WMP.

2.1 Waste identification

In the waste identification step, a facility or project identifies the need for waste to be generated. An initial walk down of the facility or a review meeting should be arranged by the waste generator to identify all wastes that will be generated and possible disposition paths for the wastes, based on a set of assumptions. The initial walk down will include the following key stakeholders:

- Waste generator;
- Health Physicist (HP) knowledgeable with the facility or project;
- Environmental Protection (EnvP) representative; and
- Waste Management (WM) representative.

This process is facilitated through the recently created Customer Support service within the WM organization. The Customer Support service is a single point of contact (SPOC), which provides guidance to waste generators for issues related to waste management, and direct the questions to a subject matter expert (SME).

2.2 Pre-characterization

The pre-characterization step is intended to provide basic information to confirm that the chosen routes are correct and define a radiological fingerprint, if possible. Pre-characterization of the wastes generated from a facility, project or activity should be co-ordinated for the purpose of testing assumptions from the initial walk down or review meeting. This pre-characterization meeting will include:

- Waste generator;
- WM representative;
- HP knowledgeable with the facility or project; and
- Any other identified specialist support (e.g., Analytical Chemistry, Environment Technology, Waste Characterization Specialists, etc.). If a sampling plan is needed, it will be specified in this step.

2.3 Assessment of results

An assessment of the results from the pre-characterization step will be undertaken to confirm if the facility or project can proceed to develop a WMP. The key personnel involved include a Waste Characterization Specialist, a HP, a EnvP representative, the waste generator and a WM representative. From this process, the waste identification step and pre-characterization step may have to be re-visited if assumptions have not been confirmed or are shown to be false.

2.4 Development of waste management plan

A WMP is used to document waste characteristics and estimate the volume of waste to be generated so that the waste receiver can ensure that adequate facilities are available to receive the waste. A WMP represents an agreement or 'contract' between the waste generator and the waste receiver regarding the nature and volume of the wastes, waste minimization strategy and packaging/transfer arrangements.

The facility or project will nominate an author who will generate the WMP in conjunction with supports from the Waste Management Program, Radiation Protection Program, EnvP Program, waste receivers and any other identified specialist (e.g., Radioactive Materials Transport for offsite shipment).

Information required within a WMP includes a description of:

- the facility, process or activity that produces the wastes;
- the wastes that are to be produced;
- how the waste has been characterized;
- how waste minimization is to be achieved;
- waste monitoring and analysis requirements; and
- packaging requirements.

The WMP shall be reviewed by all of the key stakeholders (i.e., waste generator, waste receivers, Waste Management Program, RP Program, and EnvP Program).

2.5 Execution of waste management plan

Once the approved WMP is released and distributed, the waste generator is responsible for ensuring that wastes are managed according to the WMP. If any questions arise, regarding wastes within or outside of the WMP, the Customer Support service is to be contacted for assistance.

3. IMPLEMENTATION

The WM organization at CRL has implemented an improvement initiative to simply the interface between waste generators and waste receivers [1], whereby the described streamlined approach to waste management is applied, with emphasis on early identification of waste type and possible disposition path.

The initiative leads to improvement in the current waste management process to both waste generators and waste receivers. The following activities have been planned and partially implemented for the initiative:

- Simplified waste transfer and waste identification processes to improve the process efficiency and consistency;

- Designation of waste officer roles by the waste generators for their departments, facilities or projects; the waste officers will act as the SPOC on behalf of the waste generators and will represent their organizations in all waste-related matters;
- Training of the designated waste officers to familiarize them with waste management processes and requirements;
- Clearly defined and communicated waste generator roles and responsibilities to the waste generators, and transferred ownership of WMPs to the waste generators;
- Established and maintained WMPs and other supporting documents for facilities, operations or activities that product waste; and
- Creation of the Customer Support service within the WM organization to provide support to the waste generators.

Successful implementation of the initiative provides a win-win partnership for both waste generators and receivers and will result in the following benefits:

- More consistent and correct information is passed onto waste management and therefore, waste transfers to waste management are expected in a timely manner;
- Knowledgeable staff within the waste generators' organizations regarding waste management to promote waste segregation and minimization;
- Opportunity to utilize new knowledge to reduce waste generation resulting in reduction of waste management cost;
- Single point of contact for waste inquiries;
- Technical support available to solve waste problems;
- Up-front characterization on wastes; and
- Greater ownership by the waste generator and awareness of their waste.

3.1 Phased approach

The improvement initiative has been developed to include the following steps:

- Implementation of a simplified waste transfer and identification procedure to improve the process efficiency and consistency;
- Development of a Systematic Approach to Training (SAT)-based training for waste officers;
- Scheduled meetings with waste generators to clearly define and communicate the waste generator roles and responsibilities, and designation of waste officer roles by the waste generators for their facilities or activities;
- Training of the waste officers for waste identification (i.e., preparation of WMPs) and waste management processes (i.e., waste minimization, segregation, transfer, etc.);
- Scheduled follow-up sessions with the waste officers to address any issues or concerns they may have;

- Established a timeline for full implementation with each facility or project including transferring the ownership of WMP;
- Measurement of the performance of the initiative and seeking feedback for further improvement; and
- Utilization of the Customer Support service by waste generators to effectively manage their wastes.

The first phase of the initiative included the development of a streamlined approach to waste management and publication of a formal procedure for WMP at CRL. This procedure describes the requirements, responsibilities and processes for the production of a WMP. Based on the Waste Management Program requirements, WMPs are required to be established and maintained for: 1) existing or planned facilities and activities that produce waste and 2) construction, decommissioning, or demolition projects that produce waste.

The second phase of the initiative was the development of a new waste officer SAT-based training course. This course has been developed to give an understanding of the overall waste management process at AECL-CRL, which will enable trainees to understand what is required of them in their respective roles as waste officers. They will have a greater understanding of how the new waste management process benefits them by:

- Obtaining advanced agreement for waste preparation and transfer;
- Reducing time spent to complete different waste forms;
- Reduce waste management cost through waste segregation; and
- Knowing where to obtain help when needed.

The third phase of the initiative was that CRL waste generators would identify waste officers for their facilities or projects. Facilities which had the most significant impacts (quantities and characteristics) on the waste receiver would be the priority group, followed by the smaller-scale waste generators. Through this initiative, a manageable number of staff will be designated and trained as waste officers.

The fourth phase of the initiative was the training of the waste officers. This training was developed into a one-and-half day course with the following objectives:

- Be knowledgeable of the responsibilities for waste management;
- Understanding the waste management process;
- Be aware of who to contact for information or assistance with the waste management process;
- Understanding the process to identify and characterize wastes;
- Be able to prepare a WMP from information provided (with assistance from a SME); and
- Be able to prepare a waste transfer form from information provided in a WMP.

In the final implementation phase (i.e., the fifth phase), the WM organization at CRL will clearly define and communicate the waste generator roles and responsibilities to the waste generators, and transfer the ownership of WMPs to the waste generators. This will entail follow-up sessions

with the waste officers during which any issues or concerns that the generators have can be identified and resolved. During this follow-up session, the waste generator and WM organization will establish a timeline for full implementation of the initiative. The roll out of this initiative will be facility-by-facility for tracking the performance.

Continued measuring of performance will occur through self-assessment and waste compliance inspections.

4. CURRENT STATUS

The current status of the streamlined approach regarding waste management at CRL is:

- A simplified waste transfer and identification process to improve efficiency and consistency has been developed;
- A formal procedure for WMP has been established;
- The SAT-based waste officer training course has been developed;
- Waste generators have identified waste officers for their facilities and activities;
- The waste officer training course began in October 2010 and to date 116 employees have been trained. The training of the identified waste officers will be completed by September 2011; and
- Two facilities are presently going through final implementation phase activities. This initiative will be implemented one facility at a time to track the performance of the initiative.

5. KEY LEARNING POINTS

A key learning point that has been identified during the implementation of the streamlined approach to waste identification and waste management at CRL is that effective communication was required throughout all phases of the implementation and if any of the phases had been omitted, the implementation would not have been a success.

The effectiveness of the initiative will be continuously measured by the waste generator's ability to produce approved WMPs, their adherence to the WMPs, the increased quality from waste transfer forms, and the timely transfer of waste from waste generators to deposition.

6. REFERENCES

[1] Wong P.C.F., Chan, N and Hawrelluk, K., "Waste Management Program at Atomic Energy of Canada Limited", AECL CW-508600-CONF-002, Rev. 0, May 2011.