

## **Waste Management Improvement Initiatives at Atomic Energy of Canada Limited – 13091**

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### **ABSTRACT**

Atomic Energy of Canada Limited's (AECL) Chalk River Laboratories (CRL) has been in operation for over 60 years. Radioactive, mixed, hazardous and non-hazardous wastes have been and continue to be generated at CRL as a result of research and development, radioisotope production, reactor operation and facility decommissioning activities.

AECL has implemented several improvement initiatives at CRL to simplify the interface between waste generators and waste receivers:

- Introduction of trained Waste Officers representing their facilities or activities at CRL;
- Establishment of a Waste Management Customer Support Service as a Single-Point of Contact to provide guidance to waste generators for all waste management processes; and
- Implementation of a streamlined approach for waste identification with emphasis on early identification of waste types and potential disposition paths.

As a result of implementing these improvement initiatives, improvements in waste management and waste transfer efficiencies have been realized at CRL. These included: 1) waste generators contacting the Customer Support Service for information or guidance instead of various waste receivers; 2) more clear and consistent guidance provided to waste generators for waste management through the Customer Support Service; 3) more consistent and correct waste information provided to waste receivers through Waste Officers, resulting in reduced time and resources required for waste management (i.e., overall cost); 4) improved waste minimization and segregation approaches, as identified by in-house Waste Officers; and 5) enhanced communication between waste generators and waste management groups.

### **INTRODUCTION**

Atomic Energy of Canada Limited (AECL) Chalk River Laboratories (CRL) is located in Chalk River, Ontario, Canada and has been in operation for over 60 years. Wastes are generated as a result of various activities, which range from operating research reactors, research & development activities, and decommissioning activities. As a result, a wide variety of waste is generated. The wide variety of waste generated means that different paths have to be taken depending on the waste type and its management route.

Historically the Waste Identification (WI) team, operating as part of Waste Management and Environmental Remediation Division (WM&ER), assumed responsibility for the development and maintenance of Waste Management Plans (WMP) on behalf of waste generators because the generators found the development of their WMP challenging. The WMP documents waste characteristics and estimates volumes anticipated so that the waste receiver can ensure that waste can be received, treated, stored and eventually disposed of safely. In assuming this responsibility, accountability for waste production was perceived to belong to waste management instead of waste generators. Furthermore, in some cases, the WMPs were not followed, which led to problems for WM&ER waste receivers as to how to store or dispose of waste that has not been adequately segregated or characterized.

The areas that needed improvement in the waste management process were identified. The key areas included:

- Waste generators may not have been aware of the steps that should have been taken prior to the generation of waste. Incorrect or incomplete information was provided to the waste receiver. As the paperwork was processed, omissions could have led to delays in waste transfer to the receiver, which could have resulted in frustration on the part of the waste generator.
- Under the Waste Management Program requirements, the waste generator was responsible for waste identification, before the waste was generated, and the resulting WMP and supporting documents (SD). Supporting documents provide supplemental information to the WMP and can include analysis or characterization information.
- When preparing paperwork, the waste generators have to select the appropriate form, depending on the type of waste that is generated. Little direction or guidance was available, or such resources were unknown to the waste generators, as to the correct completion of the forms. Based on waste generator feedback and experience, it was found that this process was too confusing for the generators resulting in frustration and delays.
- When waste generators required information about the waste management process or were ready to transfer their wastes, they might have needed to contact several different groups. This occurred if the generator was transferring clearable, mixed/hazardous and/or radioactive waste at the same time, causing delay and frustration.
- Most of the waste generators did not have designated staff responsible for waste management activities. Facilities had many staff involved in disposition of their wastes including personnel who are not regular facility staff; for example, radiation protection staff. This may have resulted in wastes from these facilities not being adequately identified, segregated, characterized or processed correctly (e.g., correct packaging), which would create delays in the waste management process.

An improvement initiative was proposed for simplifying the interface between waste generators and waste receivers at CRL. This initiative led to changes in the waste management process in order to improve efficiency and consistency to both waste generators and waste receivers.

## DESCRIPTION

### Changes

In order to effectively transition the responsibilities for the waste from WM&ER to the waste generators and define the effective level of support from WM&ER to execute this change, the following actions were taken:

- Waste generators assume responsibility for all aspects of their waste including developing Waste Management Plans (WMP) and processes for managing their waste.
- Waste Management established a Waste Management Customer Support Helpdesk (Customer Support) to assist waste generators (e.g., support for WMP development, processes for dispositioning their waste, arranging pick up of their waste at identified pick up points, etc.).
- Changes in the current waste management process in order to improve efficiency and consistency to both waste generators and waste receivers.

In order to aid waste generators with their wastes, waste generators were asked to appoint a waste officer for their facility or project. This individual would be trained in the waste management process and the development of a WMP, while being familiar with their own facility's activities.

Customer Support represents a single point of contact (SPOC) to all waste management services. Their mandate is to provide support to all waste generators in a timely fashion. This service serves to inform waste generators about any questions they may have regarding the waste management processes.

A streamlined approach to waste management [1] (Fig. 1) was developed with emphasis on early identification of waste type and possible disposition path, which includes the following steps:

#### 1. Waste identification;

- A facility or project identifies the need for waste to be generated. This step involves an initial walk down of the facility or activity to identify all wastes that will be generated and possible disposition paths. Key stakeholders (e.g. waste generator, waste receiver, health physics, etc.) are to be included in walk down process.

2. Pre-characterization;

- This step is intended to provide basic information to confirm that the chosen routes are correct and define a radiological fingerprint, if possible.

3. Assessment of results;

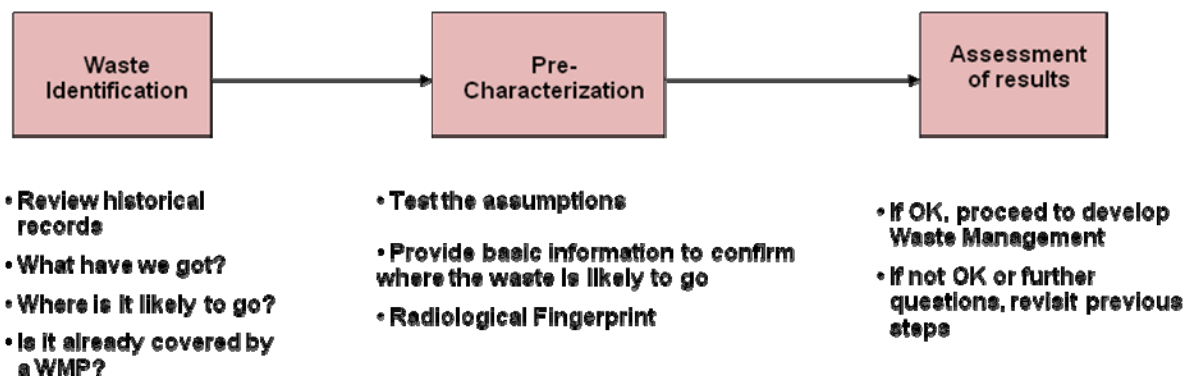
- This step confirms if the facility or project can proceed to develop a WMP. The waste identification and pre-characterization step may have to be re-visited if assumptions have not been confirmed or are shown to be false.

4. Development of WMP; and

- This step documents waste characteristics and estimate the volume of waste to be generated to ensure that the waste receiver has adequate facilities.

5. Execution of WMP.

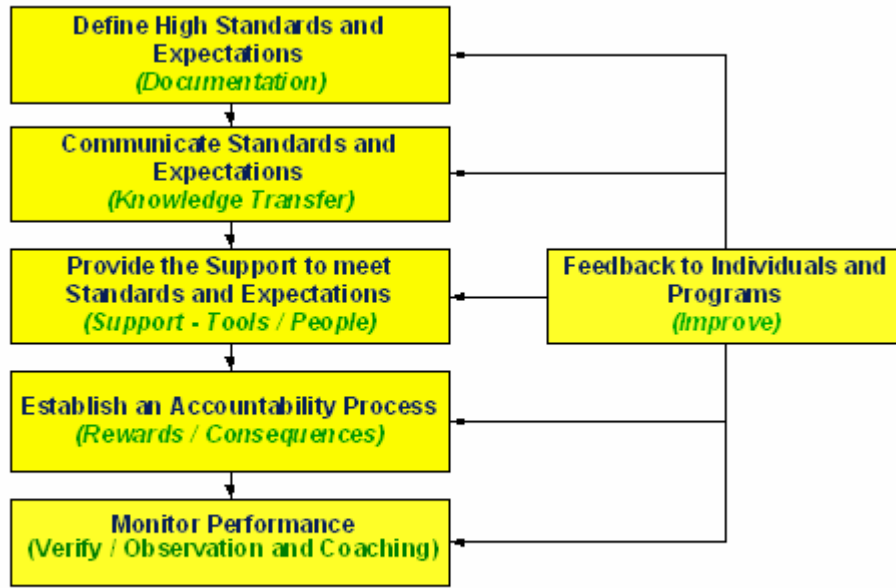
- The waste generator is responsible for managing their wastes according to the WMP.



**Fig. 1 Streamlined Approach to Waste Management**

**Implementation**

Stakeholder buy-in is a requisite for effective implementation of any waste management process change. In order to effect change, a change management process based on the Change, Adaptation and Learning Model (CALM) (Fig. 2) was used. Individual actions for each of the steps are described below.



**Fig. 2 Model and Objectives for CALM**

1. Define the Changes

- a. WM&ER communicated with waste generators to explain their roles and responsibilities;
- b. Waste generators were invited to contribute to the new procedure development;
- c. Waste generators identified waste officers for their departments;
- d. WM&ER provided required training to waste officers;
- e. Waste generators become responsible for their WMP (i.e., updating and revising when required);
- f. The interface between waste generators and waste receivers is simplified (e.g., WM&ER SPOC is provided for interface with customers, simplified forms were developed for use).

## 2. Communicate the Changes

- a. Communications were performed by obtaining senior management buy-in, providing a handout explaining the process to the waste generators, and providing a presentation of changes.
- b. The change approach proposed a partnership between WM&ER and waste generators (e.g., providing WM&ER support and communicating to waste generators that WM&ER will assist them with the development and maintenance of their WMP, waste forms and waste transfers.).
- c. The benefits/improvements were demonstrated using a pilot run partnered with the stakeholders.
- d. Communications were based on one-on-one meetings with waste generators and other stakeholders (e.g., other compliance programs) to discuss changes, impacts and required support to deal with unique impacts and challenges.

## 3. Provide Support for the Changes

- a. A formal training program for waste officers was developed.
- b. Waste officer training included how to identify classes of waste and enable segregation and waste minimization to ensure that the waste officers are able to perform their duties.
- c. Customer Support provided and will continue to provide support to waste generators.

## 4. Benefits of the Changes

- a. WM&ER staff are able to provide substantial support for the facilities assuming this new role.
- b. The facility is able to dispose of waste quicker, minimize re-work and have a SPOC for waste queries.
- c. Waste receivers are able to increase completeness and accuracy in paperwork, which improves consistency in waste management process

## 5. Monitor Performance

- a. The level of successful implementation by the generators.
- b. Monitoring performance includes using performance metrics. Examples of metrics used at AECL include the following: total volume of wastes generated, percentage of facilities in compliance with their WMP, etc.

- c. Using feedback processes, such as waste officer follow-up meetings, Customer Support surveys, and action tracking.

## **DISCUSSION**

### **Benefits**

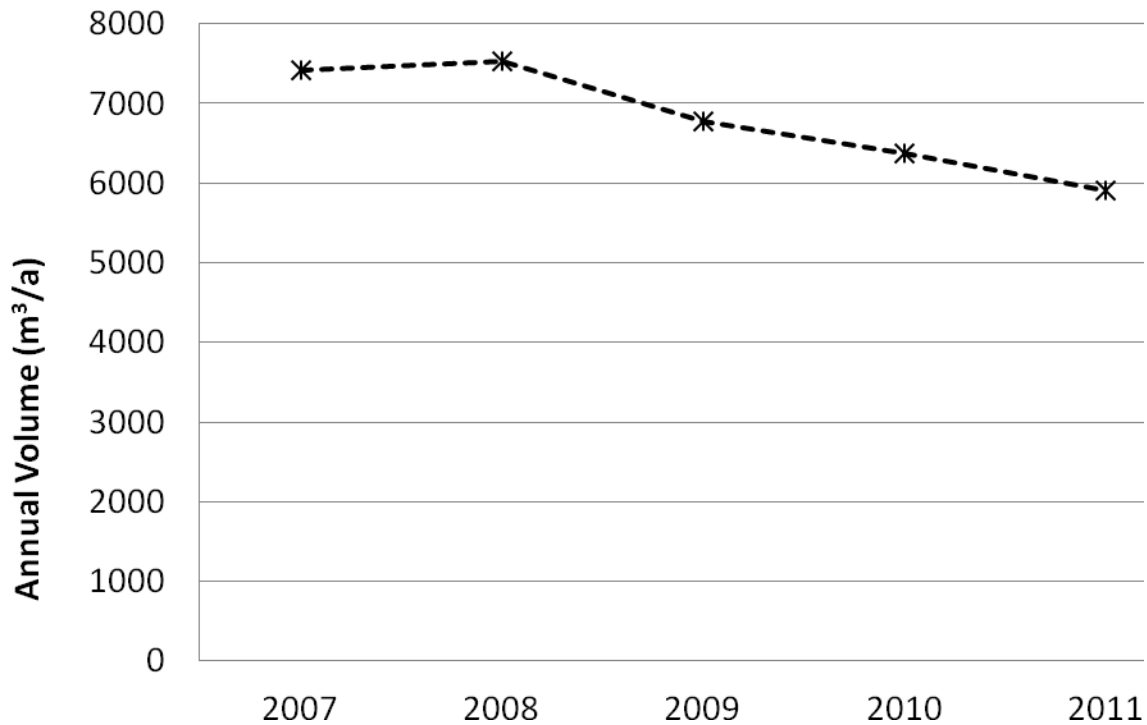
One of the main advantages resulting from the initiative is that a trained individual is present within the facilities who is knowledgeable on waste processes and who are also familiar with the processes conducted within the facility. Therefore, when waste questions arise, waste generators would have a readily accessible source. When more detailed answers are required, resources and contacts are available (i.e., Customer Support).

Having personnel familiar with a facility's processes and those of waste management also allows for opportunities for waste minimization that may not be apparent to waste management staff.

From a waste management perspective, the process gives a medium for feedback on the processes. The information can then be used to improve existing processes or identify potential gaps. Through the waste minimization opportunities presented by waste officers and other staff, AECL was able to achieve a total reduction of over 14% in wastes, while the workforce increased by 15% during the same time period (Fig. 3).

In the same regard, the tools are in place in order to quickly disseminate information (e.g., process updates) through a much smaller pool of individuals.

In addition, less time is spent by waste management to collect and verify information when missing information is submitted on waste transfer forms.



**Fig. 3 Total Solid Wastes Generated at CRL per Year**

### **Challenges and Resolutions**

One significant challenge was the resistance encountered within some facilities. Some waste generators felt that the initiative would add additional time to the existing practices or that it was adding responsibilities and work duties that they felt belonged to waste management.

Previously, the facility would contact several different sources in order to obtain an answer to a waste question. Unfortunately, depending on the contact, the answer could be as varied as the people. As a result, the information may have been incorrect, resulting in delays and frustration. Therefore, the implementation of a SPOC within the facility with correct information should not increase the resource requirements in a facility and may decrease the time spent for the organization as a whole.

As well, implementation on the number of waste officers was left to the discretion of the facilities. Using this methodology allows the waste generators flexibility to account for the complexity of their respective facilities. Therefore, in some facilities, a single individual would be responsible for several buildings or several individuals would be responsible for different sections within a building.



Another challenge was to ensure that consistent responses were given to waste generators' questions. As Customer Support was operated by a group of individuals, training was required to ensure that information was consistent. This training included at least a basic knowledge in the waste management receivers and subject matter experts/SPOC with regards to the various aspects within the waste management processes. In addition, a frequently asked questions sheet was prepared as a quick reference.

## CONCLUSIONS

Waste management plans are an integral part of waste management requirements in meeting CRL's site licence conditions. In partnership with the waste generators, the responsibilities for the development and maintenance of WMP were transferred from WM&ER to the waste generators. The trained waste officers would also be responsible for the development, maintenance, and compliance of the WMP.

Although the Customer Support Service had already been implemented, availability of this support may not have been fully communicated to the waste generators. The service is an integral piece of the waste management improvement initiative. It offers a SPOC to access information about waste management and its process. Communications of the benefits of this service can be more effective as part of the one-on-one meetings with waste generators specified in the communications plan. With increasing use of this service, advice given to generators, with regards to waste management, are improved through consistent messaging, information and support.

Overall, the implementation of the wastes officers has greatly improved the waste management processes on site. Successful implementation of the initiative resulted in the following benefits:

- 1) Waste generators contacting the Customer Support Service for information or guidance instead of various waste receivers;
- 2) Clear and consistent guidance provided to waste generators for waste management through the Customer Support Service;
- 3) Consistent and correct waste information provided to waste receivers through Waste Officers, resulting in reduced time and resources required for waste management (i.e., overall cost);
- 4) Improved waste minimization and segregation approaches, as identified by in-house Waste Officers; and

5) Enhanced communication between waste generators and waste management groups.

Finally, implementing walk downs early the waste management process allowed for early stakeholder buy-in, which significantly decreased last minute troubleshooting. As well, waste generators were informed early as to expectations and packaging, resulting in less handling of wastes and increased safety to workers, which is consistent with the as low as reasonably achievable (ALARA) principle.

## **REFERENCES**

[1] L. Adams, B. Campbell, “Streamlined Approach to Waste Management at CRL”, Waste Management, Decommissioning and Environmental Restoration for Canada’s Nuclear Activities, 2011 September 11-14, Toronto, Ontario, Toronto: Canadian Nuclear Society, 2011.