

Decommissioning Information Management in Decommissioning Planning and Operations at AECL (Ref 5054)

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Decommissioning Planning and Operations (DP&O),
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Abstract

As the AECL Decommissioning program has grown over the past few years, particularly with regard to long-term planning, so has its need to manage the records and information required to support the program. The program encompasses a diverse variety of facilities, including prototype and research reactors, fuel processing facilities, research laboratories, waste processing facilities, buildings, structures, lands and waste storage areas, many of which have changed over time. The decommissioning program involves planning, assessing, monitoring and executing projects to decommission the facilities.

The efficient and effective decommissioning planning, assessment, monitoring and execution for the facilities and projects are dependent on a sound information base, upon which decisions can be made. A vital part of this Information Base is the ongoing management of historical facility records, including decommissioning records, throughout the full life cycle of the facilities.

This paper describes AECL's and particularly DP&O's approach to:

- 1) Establishing a decommissioning records and information framework, which identifies what records and information are relevant to decommissioning, prioritizing the decommissioning facilities, identifying sources of relevant information and providing a user-friendly, electronic, search and retrieval tool for facility information accessible to staff.
- 2) Systematically, gathering, assessing, archiving and identifying important information and making that information available to staff to support their ongoing decommissioning work.
- 3) Continually managing and enhancing the records and information base and its support infrastructure to ensure its long-term availability.
- 4) Executing special information enhancement projects, which transform historic records into information for analysis.

1. Introduction

Atomic Energy of Canada Limited (AECL) is responsible for a number of nuclear licenced sites in Canada. There are 3 "Offsite" prototype reactor sites being decommissioned: Nuclear Power Demonstration Reactor (NPD), Douglas Point (DP), and Gentilly-1 (G1). There are two research

laboratory sites, Whiteshell Laboratories (WL), which is currently being decommissioning and Chalk River Laboratories (CRL), which is the oldest, largest and most operationally diverse site. The CRL site has been operated since the 1940's and continues to operate now, and as a result the specific facility or building decommissioning activities are more complex as they are being carried out on an operating site.

AECL has been involved in decommissioning activities at these sites since the 1980s and since that time the decommissioning program continues to grow as sites and facilities are declared redundant, shut down and decommissioned. Significant effort has been put into the Preliminary, Long-term and Detailed, planning of the Decommissioning Program for both individual facilities and CRL Site. The decommissioning program involves planning, assessing, monitoring and executing projects to decommission the building/facilities. The program currently encompasses a diverse variety of facilities, including prototype and research reactors, fuel processing facilities, research laboratories, waste processing facilities, buildings, structures, lands and waste storage areas, Many of these buildings and structures many have been used for a variety of purposes as research and business requirements evolved over their life.

AECL has established a 5-staged process for the Decommissioning Program. The stages are Initiate, Define, Enable, Mitigate, and Remediate (Figure 1).

DP&O - Five Stages of Decommissioning

- Initiate:** Complete operational responsibilities for redundant facilities (vacate, shutdown, turn over)
- Define:** Assess the nature and extent of risks and liabilities
- Enable:** Activities required to execute remediation or mitigation activities (Approvals for facilities and systems)
- Mitigate:** Reduce health, safety & environment risks
- Remediate:** (Liability Removal) Reach decommissioning end state

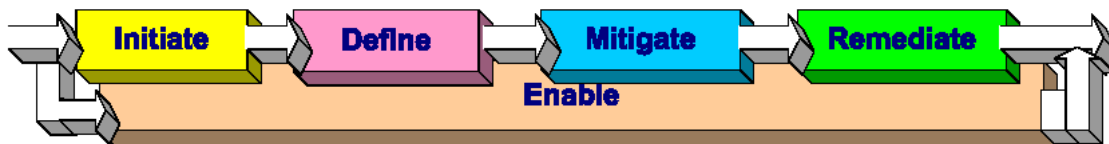


Figure 1 Five Stages of Decommissioning

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2. Background

As AECL's decommissioning experience has grown, so too has its understanding of the value and importance of a comprehensive records and information base. This base contains information for the full life cycle of the site/facility operations (conception to final decommissioning) to ensure the safe and cost effective performance of the decommissioning program. [1]

Without a records and information base, the decommissioning program may face greater risks, higher costs, and longer schedules. Examples are:

- Additional cost may be incurred to search for and gather information from available sources.
- Additional characterization activities may be required to gain knowledge about the facility and its risk.
- Projects may take longer, if a conservative approach to decommissioning activities is needed because of unknowns. (For example, more extensive radiological surveying may be required if information/records detailing which radioisotopes were used and where, do not exist or are not clear.)
- Additional work may be required to satisfy the regulator that the risks are known. (For example: Site baseline information is critical when demonstrating that the end state of return to green field (original condition) has been achieved.)
- Projects may face schedule delays if unknowns are encountered or if any incidents occur. (For example, there may be work stoppages if any accidents occur.)
- There may be a need to re-construct information before work can be estimated, planned or executed. (For example: drawings, safety cases, operating environment, evaluations and surveys, equipment qualifications) There may be an increased risk of incidents occurring during the execution of decommissioning work.
- There may be additional time required to determine, validate and confirm the information about the facilities and the old practices, particularly, if few records exist to help substantiate the information or where there is a lack of historical practices/process knowledge because historical operational staff/retirees are no longer available to assist.

A large volume of records must be managed, over the site/facilities' life cycle, and for a minimum of ten years after final decommissioning is completed [2][3], to meet regulatory and operational needs, particularly for license-listed nuclear facilities. This timeframe can be very long for a facility, which may be operated for 50+ years, and then stored in a storage-with-surveillance state for 50+ years before final decommissioning even begins. Site records may be even required for a longer period of time as they may be required during and extended institutional control period after the site is decommissioned.

Site/facilities records may include: drawings, logs, memos, reports, photographs, maps, notes, and forms, in various formats, both electronic (file formats and storage medium) and hardcopy (paper and film).

These collections will continue to grow over the entire facility life, from the initial concept until after the final decommissioning end state is achieved: 1) develop concept and site, 2) design, construct and commission, 3) operates and maintain, 4) shut down, and finally 5) Decommission.

Since a number of AECL's sites and facilities have already operated for close to 50 years, there is a very large volume of historical information which has been generated and must continue to be managed, organized, assessed, protected and made available to staff. Most of these historical records are available only in hardcopy and therefore are not easily accessible for search and access. Where historical records are incomplete, records of the historical operations may need to be captured or generated using alternative methods, such as retiree interviews.

The long-term management of this information can be quite daunting, particularly for reactor facilities whose operational phase alone may be 50 years, followed by another 50+ years for storage-with-

surveillance and then final decommissioning. The management of this information for a site maybe even more challenging.

To tackle this task, Decommissioning Planning and Operations (DP&O) has defined two key goals for the records and information management [4]:

- 1) **Records Management:** (to manage actual record) To manage, organize and protect the records base required for decommissioning that exists, throughout the site and/or facility's life cycle and until at least 10 years after decommissioning. [2] The records base will continue to grow as new records are generated, throughout the decommissioning phases.
- 2) **Information Management:** (to manage knowledge) To create a decision support information base from the records, which have been identified, as important to decommissioning and to make this subset the "vital few". This information will be electronically available to staff to support their decommissioning activities. The information base will continue to grow over time as new information is identified as important, particularly as the decommissioning work moves from strategic and preliminary planning, to detailed planning, storage and surveillance and project execution.

3 Strategy

To achieve the records and information management goals in a cost effective manner, DP&O has embarked on a strategy to manage and improve the information handling by establishing, populating and managing a decommissioning records and information framework. The Decommissioning Information Management Office (DIMO) has been established to implement this strategy.

3.1 Establishing a Framework

The approach taken by DP&O to establish the decommissioning records and information framework was to assess and identify:

- 1) WHAT records/information would be needed for decommissioning,
- 2) WHICH facilities were to be decommissioned,
- 3) WHEN records/information would be required,
- 4) WHERE records/information sources existed of relevant facility records/information,
- 5) HOW records/information were to be managed (practices, tools and facilities).

3.1.1 WHAT records/information would be needed for decommissioning

To determine what records and information would be needed for decommissioning, DP&O started by reviewing the decommissioning processes (Figure 2), and the related information flow, particularly the:

- Information inputs to the process,
- Information required during the process and
- Information output from the process.

Process Number: DECOMM00
Process Name: Decommissioning
Process Objective: Reducing Nuclear Legacy Liabilities and Risks at CRL & Off-Sites
Process Owner: Decommissioning Planning and Operations, Director

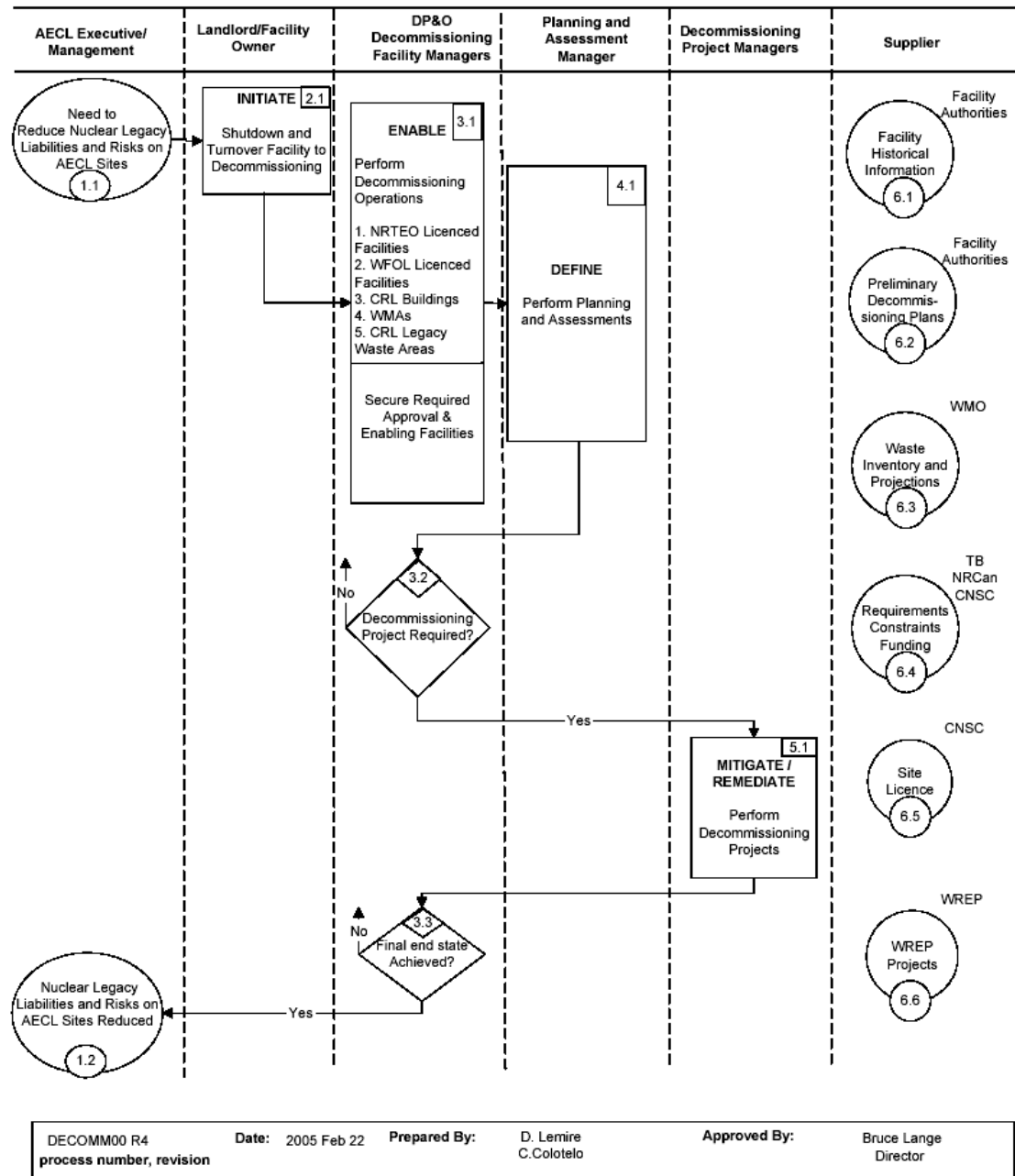


Figure 2 DP&O Decommissioning Process Model

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The result was an information model (Figure3), which was aligned with the decommissioning process. This model identified the key information inputs required by the process, information used to control the process, information and tools used to enable the process and the information (reports, documents, plans and records) produced by the process.

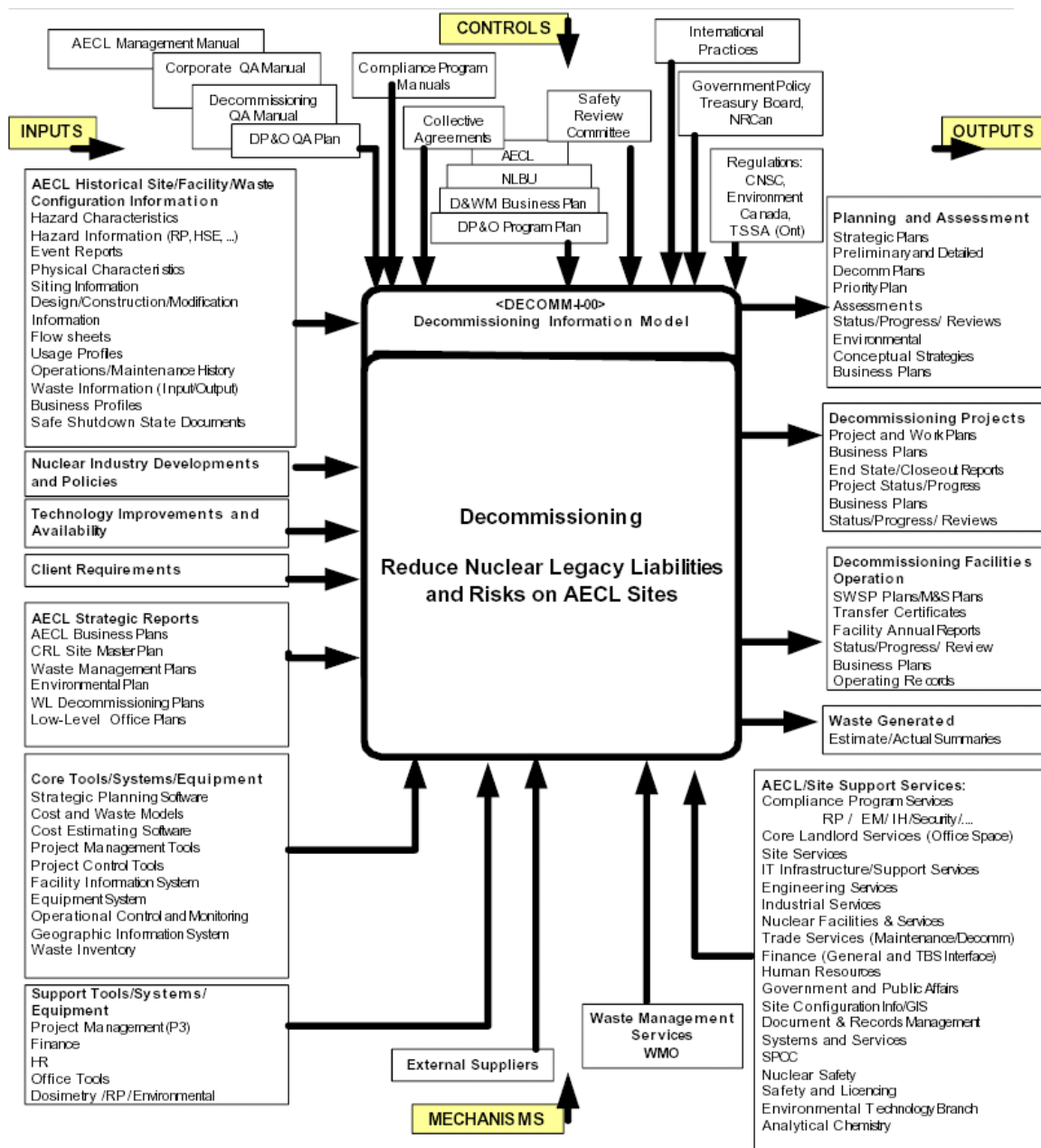


Figure 3 DP&O Decommissioning Information Model

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This information was then categorized and grouped by type to create a Decommissioning Asset Information Model (Figure 4), which identifies the information required for each of the facilities. The key types of information categorized were:

- **General background information** (site, concept, business)
- **Physical characteristics and configuration information** (maps, drawings, modifications, materials, equipment, photographs, services, surroundings)

- **Operations and maintenance information** (licence, status, logs, procedures, operating plans and records, operating instructions, usage/processes, flow sheets, maintenance plans and records, inspections records, purchase orders, parts)
- **Regulatory and legal information** (nuclear, environmental, industrial – licences, regulations, guidelines, correspondence, permits, authorizations)
- **Health, safety and environmental information** (unusual/unplanned events, hazards/risks (radiological, chemical, industrial), safety assessments, radiological surveys, logs, annual reports, safety meeting minutes)
- **Waste generation information** (waste generated records, characteristics and volume during operations thru decommissioning)
- **Decommissioning information** (strategies, preliminary and detailed decommissioning plans, environmental assessments, analysis reports, characterizations, storage-with-surveillance plans, project plans and end state reports)

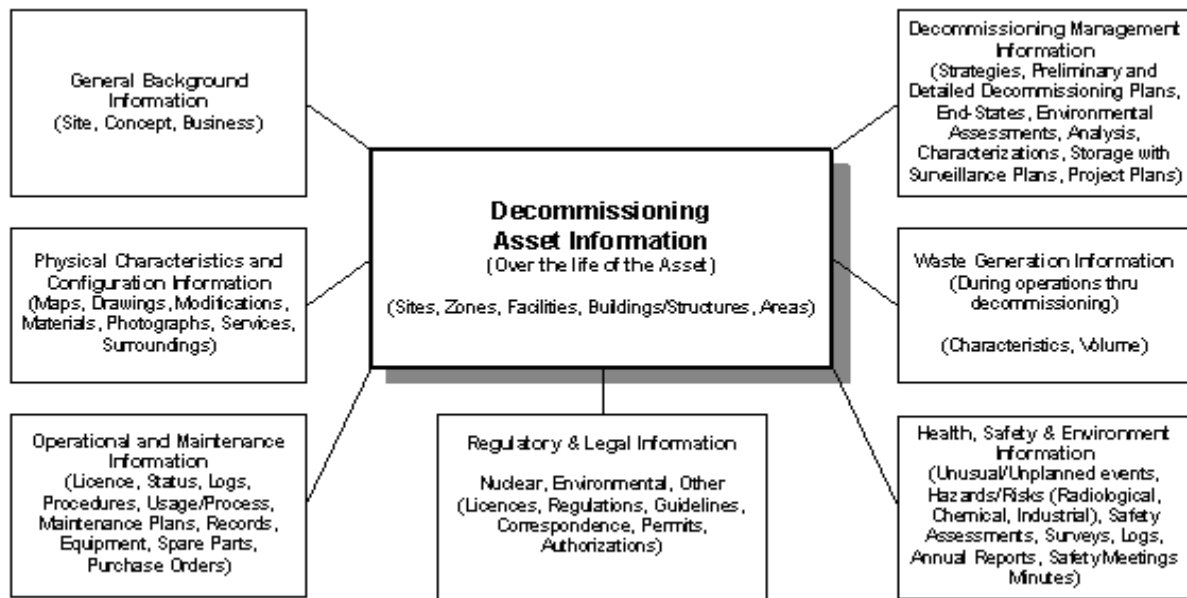


Figure 4 DP&O Decommissioning Asset Information Model

See Appendix A for more detailed example of the information.

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3.1.2 WHICH facilities were to be decommissioned

To clearly determine the scope of the decommissioning information required and when it would be needed, a detailed list of all facilities (sites, facilities, buildings, labs, services and areas) was developed identifying all the physical decommissioning activities, past, current and future.

3.1.3 WHEN records/information would be required

These facilities were then prioritized based on the overall decommissioning schedule. The associated requirement for records relative to the decommissioning activities was determined. The volume of records

and any known concerns or issues with the records was also determined. This information was then translated into a ten-year information priority list with target facilities for each year.

3.1.4 WHERE records/information sources existed of relevant facility

Once the types of information were identified for a defined set of facilities, an investigation was conducted to determine where the official records exist, and where other supporting or collaborating information might be found. These information sources included: Records Centres, facility records collections, branch collections, project collections, and personal collections, as well as, employee knowledge.

3.1.5 HOW records and information were to be managed

An inventory of current records and information management practices, tools and record storage facilities was performed to find out how information was being managed and to determine the best way to continue to manage, protect and access the information. It was found that a large volume of the records were managed by the company procedures and tools and held within the company records facilities. It was then decided to continue to use the company practices, tools and record facilities for the decommissioning records base, but to look for ways to improve and enhance the actual record bases and the supporting practices, system/tools and records storage facilities to better meet the decommissioning requirements. This would include regularly assessing and reassessing the practices, systems/tools and records storage facilities, to ensure they were appropriate and will meet the long-term records retention requirements.

For the decommissioning information base, it was determined that the existing tools could not meet the decommissioning goals and requirements because the existing tools did not allow direct access by all staff to the electronic records collection and they did not provide a mechanism to identify a subset of the records which are most important to staff (i.e. the short list) As a result, an additional tool, the information bridge, was developed to provide a web-based, easy to use, quick search and access tool for the most important decommissioning information. Where it was possible, the information bridge (Figure 5) was integrated with the decommissioning records base to avoid any duplication of effort.

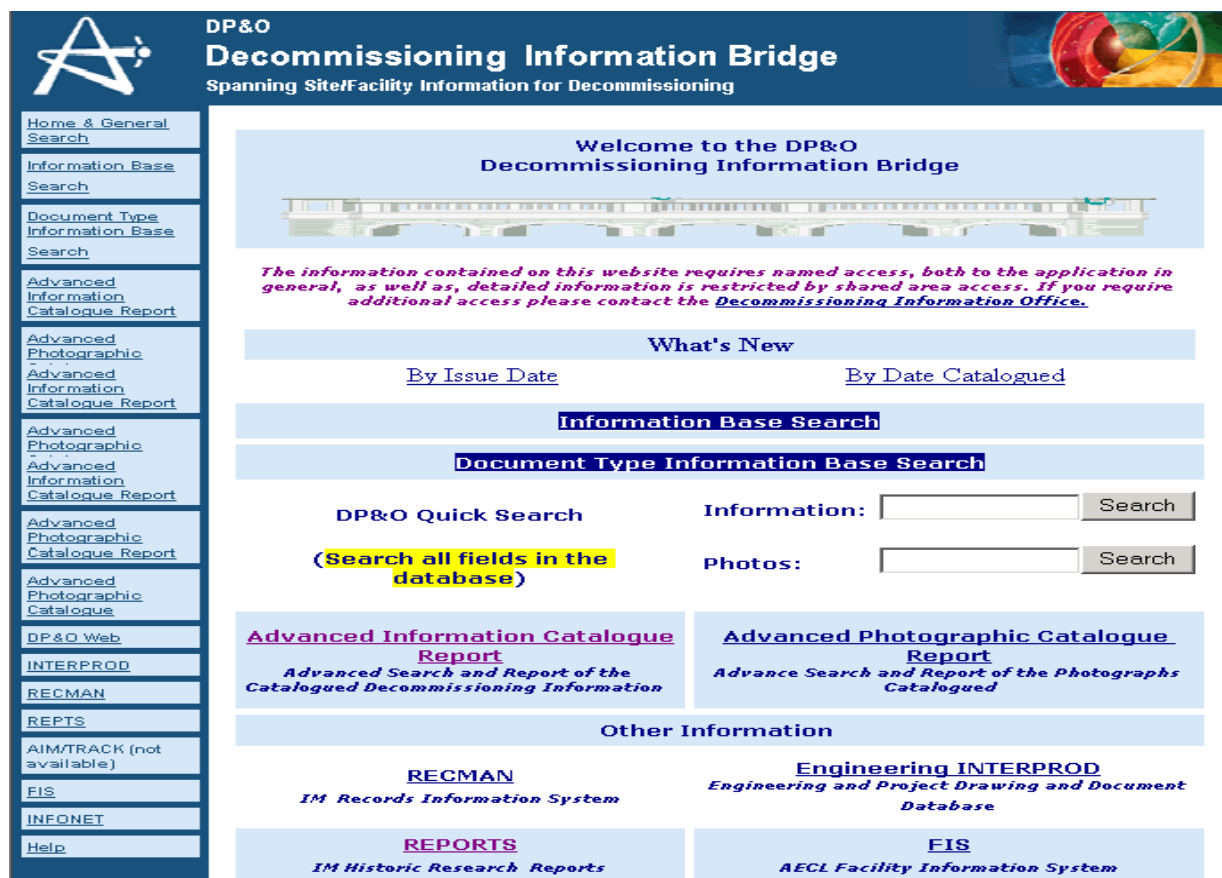


Figure 5 DP&O Decommissioning Information Bridge

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3.2 Populate and Enhance Records and Information Base

Once the decommissioning records and information framework was established, then a series of activities were systematically carried out for each facility within the decommissioning program (Figure 6). This framework was populated and enhanced or improved for each facility by:

- 1) Searching for and collecting facility records
- 2) Organizing the records and information,
- 3) Making the important information accessible.

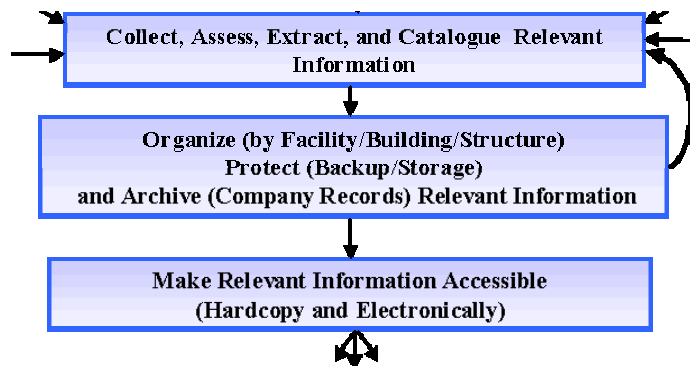


Figure 6 DP&O Process to populate the Framework

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3.2.1 Searching for and collecting facility records

An assessment team of decommissioning, facility and records management staff, with broad and diverse knowledge and expertise on a particular facility, is formed to assemble the records, which will be required for the remainder of each facility's life cycle. The team searches, locates and documents all known sources of records, identifies the types of records or information available for the facility record base, and then identifies the key or important records for the information base. Any issues or concerns raised by the team regarding the records are documented and actions are established.

3.2.2 Organizing the records and information

A core group from Decommissioning Information Management Office (DIMO) works with records management staff, to assemble and organize the records and information which has been identified, verifying the information is available with AECL's records management archive and where necessary, adding the information to the official archive. This activity ensures that all relevant records, which are currently available, are managed, protected and available for future decommissioning activities

3.2.3 Making important information accessible

Where the information has been identified as "important" for current and future decommissioning work by the team and needs to be readily available for decision support and analysis, the DIMO will make information electronically available to decommissioning staff via the Decommissioning Information Bridge (DIB).

3.3 Ongoing management of the records and information

The records and information base, which has been established for each facility, must now be managed, maintained and updated on an ongoing basis. New records will continue to be generated and added to the records and information base for the remainder of the life of the facility, particularly as the various decommissioning activities are carried out. As well, additional information may be found or identified as important and will need to be added.

To ensure that decommissioning staff is aware of new information and records being entered in to the information base, on an ongoing basis, a report is generated from the DIB and distributed to staff identifying all the information recently entered.

As facilities are decommissioned, the records for that facility will need to be reviewed and the record retention requirements re-assessed to determine when the records would no longer be required.

The facility records and information bases need to be re-assessed, on an ongoing basis, to ensure that their content is up-to-date and relevant to the current and future needs of the decommissioning group. The physical characteristics of the original records and backup media are reviewed to ensure the records will be available in the future. As well, the records management practices, system/tools and records storage facilities will also be re-assessed to ensure that they keep up-to-date with new procedures, rules and regulations, technologies, modernization and cost effectiveness.

4 Special information enhancement projects

To enhance the value information contained in some of the historic records DP&O has undertaken some enhancement projects that go beyond the traditional management and improvements to the records and information bases. These projects typically involve extracting or transforming hardcopy information contained within the historic records, into data, which can be used for analysis or decision support purposes. An example would be collecting handwritten logbooks, performing data entry to extract the data documented in the logbooks, standardizing and validating the information and importing this data into databases for analysis and investigation, to support future decommissioning activities.

These special projects have proven invaluable to the Decommissioning group, because the handwritten information is now in a format, which allow for extensive query, analysis and decision support.

5 Summary

The creation and implementation of DP&O's Decommissioning Information Management Program has help ensure that the value of records and information base, which is required for both safe and cost effective decommissioning of AECL's sites and facilities, are recognized and managed.

The program will continue to be refined and enhanced, as both DP&O's and AECL's experience and knowledge are gain regarding the full lifecycle management of records and information, with very long-term retention periods. This long-term records management requirement poses significant ongoing challenges such as, conflicting retention requirements, changes in record ownership, technological changes and advancements, record destruction criteria, long-term storage formats, and long-term records storage facilities.

6 Acknowledgements

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7 References

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Appendix A

Type Of Information	Examples
General descriptions of background, purpose, function and use information	Site selection information Conceptual designs Business case Decision background
Physical characteristics and configuration information	Original drawings and engineering information and all modifications/revision over time, such as: (Project info, drawings, engineering details, maps, photos, aerial photos, systems and process descriptions, work request, work permits, work orders, change control, maintenance history, building condition reports, ground and soil reports, geography and contours) Physical systems/services (inputs/outputs –air, gas, liquid, electrical, telecommunications...)(Ventilation /fume hoods, electrical, mechanical, plumbing (drains, active drains, chemical drains), air, stream, water flow, space usage/characteristics (room types (lab, service, office, utility, process), room classification (nuclear/industrial hazard classification/zoning))) Surrounding (buildings, structures, activities, grounds)
Operational and maintenance information	Operational licenses and constraints, Operations status reports Operation procedures/practices/policies/manuals Operational/usage changes Input/outputs of process/operations Conduct of operations (record requirements) Operational logs operations reports Photographs of operations Maintenance history records Equipment files and part lists
Regulatory & legal information	Regulations pertaining to facility Correspondence with regulators Facility Authorization Permits/licenses Regulatory correspondence Regulatory documents Regulations and guidelines

Health, safety and environmental information	Unusual events/unplanned events (Incident, abnormal occurrences, etc...) Hazards/risks/wastes practices (chemicals, nuclear (including waste), waste disposal logs/forms) Radiological zoning Chemical usage/storage Waste characterizations safety Radiation, safety and environmental history Environmental analysis, assessments and reports Environmental monitoring reports and data Radiation monitoring Radiation survey logs Site safety minutes Safety reviews Annual safety reports Radiation survey reports Tank inspection reports Tank sampling and survey reports Dosimetry/dose information
Decommissioning information (shut down, end-state)	Safe shut down plans and reports Interim and final end-state reports Preliminary/conceptual decommissioning plans Detailed decommissioning plans Project schedules/deliverables, Project deliverables and reports Work packages Project close outs Operational records Storage-with-surveillance reports Annual decommissioning operations reports
Waste generation	Waste characteristics (physical, chemical, radiological) Waste history