Canada's Nuclear Regulator

Audit of CNSC Oversight of Emergency Measures at Class I Nuclear Facilities and Uranium Mines and Mills

Office of Audit and Ethics

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Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

Canada

Table of Contents

Executive Summary

Background

The *Audit of CNSC Oversight of Emergency Measures at Class I Nuclear Facilities and Uranium Mines and Mills* was part of the Office of Audit and Ethics (OAE) risk-based audit plan approved for 2012–13.

Objective, scope and approach

The objective of this audit was to determine whether the governance, control and risk management processes adequately support the effective regulatory oversight of onsite emergency measures at Class I nuclear facilities and uranium mines and mills.

Specifically, the audit followed two lines of enquiry:

- The design and application of controls used by the CNSC to review and assess the adequacy of emergency measures listed in licence applications.
- The planning, conducting and reporting of inspections, as they apply specifically to the licensees' compliance with emergency plans and preparedness, and their implementation of procedures in response to an accidental release of nuclear substances and/or hazardous substances.

Audit fieldwork was conducted from May to December 2012, and included interviews with management and staff, reviews of relevant CNSC documents, detailed testing and analysis of a sample of licence assessments, as well as inspections conducted by CNSC on licensees' documented onsite emergency measures.

The audit did not include an examination of the CNSC's federal emergency management mandate or the agency's internal emergency management regime (i.e., interactions with other federal departments as part of the *Federal Nuclear Emergency Plan*, or the development, maintenance and implementation of the CNSC's Nuclear Emergency Management Program).

Overall conclusion

The existing governance, control, and risk management processes adequately support the CNSC's regulatory oversight of emergency measures at Class I nuclear facilities and uranium mines and mills. However, opportunities exist to strengthen and improve the design and application of some of these processes.

Summary of observations

- The Emergency Management Programs Division's (EMPD) core roles and responsibilities in support of the CNSC's licensing and compliance processes are adequately documented and generally understood. The audit reveals an

opportunity to review EMPD's mandate, to ensure that it appropriately and clearly reflects senior management's expectations with respect to licensee oversight in areas related to emergency management.

- EMPD is engaged in and supports the assessment of licence applications for emergency management and fire protection safety control areas. There are opportunities to strengthen this licensing support role, by ensuring EMPD practices are standardized, better documented and consistently used by all staff.
- EMPD is engaged in the planning, conduct and reporting of inspections focused on the licensee's emergency measures. There are opportunities to improve the coordination and communication between EMPD and the CNSC's Regulatory Operations Branch with respect to planning emergency management-related inspection activities and the subsequent monitoring of the inspection plan.

The findings and recommendations have been communicated to and accepted by management. Action plans addressing the audit's recommendations are scheduled for implementation no later than Q3 2014–15.

1. Introduction

1.1. Background

Under the legislative and administrative framework of the *Emergency Measures Act*, the *Nuclear Safety and Control Act*, the *Federal Emergency Response Plan* and the *Federal Nuclear Emergency Plan*, all levels of government in Canada and various agencies and organizations – including the CNSC – have responsibilities for developing and implementing nuclear emergency preparedness and response plans.

The federal government, through CNSC, regulates the peaceful uses of nuclear energy in Canada, manages nuclear liability, and supports the responses of provinces to nuclear emergencies within their boundaries. In the event of a nuclear emergency at a licensed facility and/or involving CNSC licensed nuclear substance, the main responder is the licensee, while the CNSC will monitor and support the licensee in the emergency response, as required.

Effective emergency management in every aspect of the nuclear industry continues to be one of the highest priorities at the CNSC. In addition to developing and implementing federal nuclear emergency preparedness and response plans for nuclear emergencies that could have impacts outside the bounds of a CNSC-licensed nuclear facility, the CNSC also performs a regulatory oversight of the licensees.

The Canadian nuclear regulatory framework places the onus on the licensees to perform a detailed assessment of their risk environment, to identify potential hazards that could lead to a nuclear emergency. In turn, this licensee risk assessment is overseen by the CNSC.

As part of the licensing process, the licensees are required to have measures and plans in place to prevent, mitigate, respond and recover from a nuclear emergency. The CNSC's licensing oversight is achieved through a detailed review and assessment of the adequacy of the emergency measures listed in the licence application. If satisfied with the licensee's emergency measures and/or plans, the CNSC issues, renews, amends or replaces the licence.

The CNSC's compliance program ensures that licensees comply with the CNSC's regulatory framework and their operating licence. CNSC staff verify compliance through site inspections and reviews of operational activities and licensee documentation. Licensees are also required to report routine performance data and unusual occurrences.

The CNSC's safety and control area (SCA) framework classifies the technical topics used by CNSC staff to assess, evaluate, review, verify and report on regulatory requirements and performance, across all regulated facilities and activities. This audit concentrates on the emergency management and fire protection SCA category.

The emergency management and fire protection SCA category covers emergency plans and emergency preparedness programs which exist for emergencies and for non-routine conditions. This also includes any results of exercise participation. The SCA framework also identifies specific areas as being included in the emergency management and fire protection SCA category: conventional emergency preparedness and response, nuclear emergency preparedness and response, and fire emergency preparedness and response.

The CNSC's Emergency Management Programs Division (EMPD) supports the federal regulator's broad emergency management mandate by:

- providing assurance that adequate licensee emergency programs are in place at Class I nuclear facilities and uranium mines and mills; this includes conducting emergency program inspections and evaluations, as well as emergency exercise evaluations
- administering and implementing the CNSC's Nuclear Emergency Management Program
- providing support and guidance (as nuclear emergency management experts) to CNSC staff, management and external stakeholders
- acting as representatives for the CNSC at emergency management meetings and events, both in Canada and abroad
- administering the CNSC's Duty Officer Program
- contributing to national and international chemical, biological, radiological and nuclear (CBRN) counter-terrorism programs, including development and delivery of the radiological/nuclear portion of the federal CBRN first-responder training program

Finally, several important management initiatives are underway, and will impact the CNSC's oversight of onsite emergency measures at Class I nuclear facilities and uranium mines and mills. These include, but are not limited to:

- The preparation of a draft regulatory document on emergency management, reviewing and incorporating existing information from G-225, *Emergency Planning at Class I Nuclear Facilities and Uranium Mines and Mills,* and RD-353, *Testing the Implementation of Emergency Measures* (action item from INFO-0828, *CNSC Staff Action Plan on the CNSC Fukushima Task Force Recommendations*).
- CNSC *Harmonized Plan* initiatives (including the project on standardized licence conditions and the conduct of technical assessments).
- The development of the Canadian Standards Association's nuclear emergency management standard (in which CNSC is currently engaged).

1.2. Authority

The *Audit of CNSC Oversight of Emergency Measures at Class I Nuclear Facilities and Uranium Mines and Mills* was part of the Office of Audit and Ethics (OAE) risk-based audit plan approved for 2012–13.

1.3. Objectives and scope

The objective of this audit was to determine whether the governance, control and risk management processes adequately support the effective regulatory oversight of onsite emergency measures at Class I nuclear facilities and uranium mines and mills.

The scope of the audit included the CNSC's licensing and inspection activities for the regulatory oversight of emergency measures at Class I nuclear facilities and uranium mines and mills, covering the fiscal years 2010–11 to 2011–12.

The audit did not include an examination of the CNSC's federal emergency management mandate or the agency's internal emergency management regime (i.e., interactions with other federal departments as part of the *Federal Nuclear Emergency Plan*, or the development, maintenance and implementation of the CNSC's Nuclear Emergency Management Program).

1.4. Analysis of risks

During the audit's planning phase, a risk analysis was conducted to identify the potential risks faced by the audit entity, and to evaluate and prioritize their relevance to the audit objective.

The analysis, based on documentation review and preliminary interviews with CNSC representatives, identified two areas of potential risk for further examination during the audit:

- The design and application of controls used by CNSC to review and assess the adequacy of the emergency measures in licence applications.
- The planning, conducting and reporting of inspections, as they apply specifically to the licensees' compliance with emergency plans and preparedness, and their implementation of procedures in response to an accidental release of nuclear substances and/or hazardous substances.

Audit criteria were established to assess the adequacy of the controls established to mitigate these potential risks.

1.5. Audit criteria

The audit criteria used are outlined in Appendix A of this report. In addition to generally accepted best practices for management controls, the criteria were based on the CNSC's regulation and guidance documents related to licensee emergency management (i.e., *Class I Nuclear Facilities Regulations, Uranium Mines and Mills Regulations,* regulatory guide G-225, *Emergency Planning at Class I Nuclear Facilities*

and Uranium Mines and Mills, and regulatory document RD-353, *Testing the Implementation of Emergency Measures)*[1].

1.6. Approach and methodology

The audit was conducted from April to December 2012. The audit findings represent the processes and practices in place as of December 2012.[2]

Audit procedures included interviews with management and staff, reviews of relevant CNSC documents, detailed testing and analysis of a sample of files taken from the licence assessment during the renewal procedures, as well as the results of inspections focused on emergency measures.

Documentation from a sample of files selected from the 2010–11 and 2011–12 fiscal years was reviewed to assess EMPD's involvement and documentation of licence assessments (during the renewal stage), as well as inspections related to emergency measures.

Audit findings were communicated to CNSC management (including EMPD and other internal stakeholders) prior to their finalization.

1.7. Statement of conformance

In our opinion, sufficient and appropriate audit procedures have been conducted to support the accuracy of the observations and conclusions in this report. The findings and conclusions are based on a comparison of the conditions (as they existed at the time of the audit) against established audit criteria that were agreed upon with management.

This audit conforms to the *Internal Auditing Standards for the Government of Canada*, as supported by the results of the OAE quality assurance and improvement program.

[1] At the time of the audit, the CNSC was in the process of revising the existing emergency management guidance documents, and merging them into a single regulatory document/guidance document (RD/GD). Although the draft RD/GD document was near completion, both G-225 and RD-353 were in effect during the period covered by the audit.

[2] The CNSC has a number of initiatives underway, aimed at reviewing and updating existing management controls, some of which will change the processes and practices used for the regulatory oversight of onsite emergency measures. Although these initiatives are noted in the relevant sections of this report, the audit findings and conclusions are based on the processes and practices in use as at December 31, 2012.

2. Audit Observations and Recommendations

2.1. Emergency measures (EM) program governance

We examined the governance structure supporting the CNSC's regulatory oversight role over licensee emergency measures, including the mandates, roles and responsibilities of the CNSC's organizational units involved in this oversight role.

2.1.1. Organizational structure

The CNSC has established an appropriate organizational structure to manage the oversight of licensee emergency measures for Class I nuclear facilities and uranium mines and mills.

The CNSC's overall governance structure includes both the Commission and the CNSC's scientific, technical and professional staff. CNSC staff review applications for licences according to regulatory requirements, make recommendations to the Commission, and enforce compliance with the *Nuclear Safety and Control Act*, its associated regulations, and any additional licence conditions imposed by the Commission.

Within this overall governance framework, the CNSC's governance of its compliance and licensing activities includes two key branches - the Regulatory Operations Branch (ROB) and the Technical Support Branch (TSB).

ROB supports the CNSC by making final regulatory decisions, or making recommendations to the Commission in the areas of licensing, certification and regulation of licensees. TSB supports the CNSC by providing leadership and specialized expertise, as well as by participating in and supporting ROB's licensing and compliance processes, by providing technical input when needed.

Reporting to the Executive Vice-President and Chief Regulatory Operations Officer, ROB's Directorate of Power Reactor Regulation (DPRR) regulates nuclear power plants (Class I-A facilities), while the Directorate of Nuclear Cycle and Facilities Regulation (DNCFR) regulates non-power Class IA facilities (reactors and research facilities) and Class I-B facilities (uranium mining and processing facilities, nuclear substance processing facilities, waste management facilities, and non-reactor research facilities).

Reporting to the Vice-President of Technical Support, TSB's Directorate of Security & Safeguards (DSS) provides expert technical support to ROB and the Commission on the CNSC's full range of nuclear security and emergency management responsibilities. Within DSS, the Emergency Management Programs Division (EMPD) has a broad mandate, covering both the CNSC's own emergency management activities and the federal nuclear emergency management program, as well as supporting CNSC's oversight of licensee emergency measures.

The audit found that the governance structure established for licensing and compliance activities concerning licensee emergency measures for Class I nuclear facilities and uranium mines and mills is adequate and well-managed within the CNSC's overall governance framework.

While governance of the EM oversight activity is shared between ROB and TSB, we note that a fundamental component in the CNSC's oversight of Class I facilities and uranium mines and mills is the requirement for ROB management and regulatory program staff to request technical assessments and recommendations from the appropriate subject-matter experts in TSB.

2.1.2. Mandates, roles and responsibilities for EM oversight

ROB and EMPD mandates, roles and responsibilities for EM oversight are clearly documented and well understood; the EMPD's responsibility for emerging areas of oversight related to licensee EM activities is not yet clearly defined.

We found that ROB's mandated responsibilities for oversight of licensee EM measures, as well as EMPD's mandated responsibility for supporting ROB in this oversight, are clear and well documented. Both ROB and TSB understand EMPD's support role in licensing and compliance reviews for the emergency management and fire protection safety and control area (SCA).

As noted in section 1.1, EMPD has several roles relating to nuclear emergency management. EMPD supports ROB's licensing and compliance activities, by ensuring that adequate licensee emergency measures are in place at Class I nuclear facilities and uranium mines and mills, and by conducting emergency program inspections and evaluations (as well as emergency exercise evaluations) at these facilities.

While both ROB and TSB have a clear understanding of EMPD's core responsibilities for overseeing licensee emergency measures, we note the following opportunities to improve the clarity of EMPD's mandate and responsibilities in areas where the CNSC's oversight role is evolving:

(i) **EMPD's mandate to liaise with third-party organizations with respect to offsite dependencies in licensees' emergency measures and plans.** We note that EMPD's existing mandate for the oversight of licensee emergency measures is limited to the onsite response (i.e., the area inside the fence of the nuclear facility). EMPD's full mandate with respect to nuclear emergency management is not part of the scope of this audit; we note that the broader mandate includes working with municipalities, provinces, and other federal government organizations for the management of offsite (i.e., outside the fence) impacts, in the event of an accident. We have been informed that EMPD has been asked to expand their oversight mandate, and provide ROB and the Commission with licensing and compliance input regarding offsite dependencies that may be contained within licensees' emergency measures and plans (e.g., emergency

measures of municipal or provincial governments). However, we note that the mandate documents that we reviewed do not clearly identify whether EMPD is responsible for reviewing these offsite dependencies within the context of assessing licensees' EM plans.

(ii) **The types of hazards falling under EMPD's purview.** Licensees at Class I facilities and uranium mines and mills prepare EM plans for any hazard that may cause an emergency that includes both nuclear emergencies and non-nuclear (or non-radiological) emergencies. Although the emergency management and fire protection SCA includes both conventional and nuclear emergency preparedness and response, EMPD's current mandate does not adequately describe their responsibility with respect to the licensees' measures for non-radiological emergencies. We have been informed that EMPD has been asked to expand their mandate, and provide licensing and compliance input for the non-radiological components of a licensee's EM plans. Our interviews with management revealed that EMPD's resource allocations have not been adjusted to perform these tasks.

(iii) **EMPD's role in supporting ROB in licensing and compliance verification of *Severe Accident Management Guidelines* (SAMGs).** We found that EMPD's documented mandate does not include providing licensing and compliance support to ROB with respect to either licensee SAMGs or the operating performance SCA. While TSB's Reactor Behaviour Division has a mandated responsibility for this SCA, we were informed that there has been some expectation that EMPD provide ROB with input on licensee SAMGs, and to expand their EM compliance verifications to include an examination of some components of licensee SAMGs. Given the importance of this evolving safety and control area, if CNSC senior management does expect EMPD to have a licensing and inspection role with respect to SAMGs, this role – and the related responsibilities – should be clearly documented and appropriately communicated to all CNSC staff.

Recommendation

1. We recommend that the EMPD mandate be reviewed, updated and communicated to reflect the team's roles and responsibilities, and to ensure a consistent understanding, both internally (within the CNSC) and externally (with licensees). Specifically, the following areas where the team's role is evolving should be examined: interactions with third-party organizations in respect to offsite emergency plans; the type of hazards falling under their purview (i.e., radiological vs. non-radiological); and support in the licensing and compliance verification of the operational response for elements such as SAMGs, as they are implemented.

Management response and action plan

EMPD agrees with the recommendation. The EMPD mandate will be reformulated and communicated to CNSC staff, explaining the roles and responsibilities in the area of emergency response. This will be completed by March 31, 2014.

2.2. Review of licence applications - emergency measures

The audit found that:

- **Controls over the review of licensee emergency measures in new licence applications and licence renewals are well documented and operating as intended.**
- **Procedures for reviewing revisions to approved EM licence conditions require some clarification.**
- **EM-related Commission Member Documents are well supported, although there is no standard for documenting the results of EM licence reviews.**

Our audit examined the CNSC licence application process, to ensure that licensee emergency measures (EM) and/or emergency plans (EP) were reviewed and approved at the licence application stage. We conducted interviews with DNCFR project officers, DPRR senior regulatory program officers and EMPD licensee emergency program officers. From a population of 10 licence renewals during the audit timeframe, we judgementally selected a sample of five licence renewal files from DPRR and DNCFR, for examination.

In the files reviewed, we found that ROB appropriately engaged EMPD to provide EM input to the licence assessment process, culminating in the final Commission Member Document.

2.2.1. Revisions to approved EM plans

The operating licence presents the regulatory requirements for each licensee, and the associated licence conditions handbook (LCH) contains a comprehensive listing of the conditions and safety and control measures described in the licence and the documents directly referenced in the licence.

Included in a licensee's LCH is a list of licensee documents/processes. When revised, these would require either prior written CNSC consent for planned revisions, or the submission of revisions to CNSC, for information. For the second category, the CNSC has established an internal 30-day target for reviewing the revisions and providing the licensee with comments and/or requests for more information.

The documentation on licensee emergency measures and/or emergency planning falls under the second category; this means that if licensee EM documentation is revised, it

has to be submitted to CSNC for information. The current CNSC practice is to route such licensee EM/EP documentation changes to ROB management and staff, who share the information with EMPD staff, asking them to review and comment on the changes within a 30-day target timeframe.

Audit interviews raised the following concerns:

- Although EMPD are consulted on all changes to the licensees' EM, if a licensee proposes significant changes to their EM or EP, the current CNSC practice does not require EMPD to review the changes and provide technical input until after the change is made. There is a risk that licensees could implement significant procedural and/or site changes before EMPD can assess the impact of these changes to the approved emergency plan. If EMPD is not involved in reviewing significant changes prior to their implementation, there is a risk that the changes may not be reflective of the regulatory guidance in place.
- We were informed that the CNSC has the flexibility to advise the licensee, within the 30-day targeted timeframe, that more time is required for an in-depth review of proposed changes to significant processes (i.e., EP). Interviews revealed that the procedures for invoking an extension to the 30-day target are informal and not applied consistently; EMPD may not always have sufficient time to conduct an in-depth review of the licensee's proposed EP changes.

While we note that EMPD's review of licence EM/EP updates, as they arise, provides a degree of control (i.e., any gaps could be identified after implementation), there is the opportunity to implement stronger controls, by requiring the team's review and acceptance prior to significant changes being implemented.

Recommendation

2. We recommend EMPD management to collaborate with ROB, to identify "significant changes" to licensee EM/EP documentation which require EMPD's review and acceptance prior to implementation, along with identifying longer lead times for these types of reviews.

Management response and action plan

EMPD agrees with the recommendation. EMPD management will work with ROB staff to include in the licence condition handbooks (LCHs) those cases where major changes to licensee documentation (which affect licensee emergency response) will require prior notification and review by EMPD, such as:

- changes that affect emergency response staffing requirements (reducing staff)
- major emergency response facility changes
- reduction in drill/exercise frequency
- use of third parties to perform emergency response activities (qualifications, testing, etc.)

These actions will be completed by March 31, 2014, as individual LCHs are revised.

2.2.2. Licence assessment processes and procedures

EMPD's processes and procedures are not documented, although regulatory guidance documents are consistently used to support EMPD licensing input.

The CNSC's *Management System Manual* documents the Commission's core regulatory processes for assessing and issuing licences. The document *Conducting a Technical Assessment* provides CNSC staff with a high-level, standardized approach to performing technical assessments of a licensee's capability to meet regulatory requirements associated with the proposed activity. Additionally, G-225, *Emergency Planning at Class I Nuclear Facilities and Uranium Mines and Mills,* provides more detailed information on EM-related requirements, both to licensees and to the CNSC staff responsible for conducting technical assessments of licensee EM documentation.

Although the CNSC licensing framework guides EMPD's input to licence assessments, we noted that EMPD does not have documented divisional procedures or guidance to address the process steps, types of documents to be reviewed, and methodology and documentation expectations for staff's review. We did, however, find a consistency in the informal practices in place, with EMPD staff interviewed citing, as sources for guidance, existing regulatory guidance documents (G-225 and RD-353), past inspection results and licensee performance.

As part of our audit testing, a sample of five licence renewal files from DPRR and DNCFR were reviewed for EMPD's involvement. This sample was selected judgmentally, from a population of 10 licence renewals during the audit timeframe. We found that EMPD was engaged to provide input to the licence assessment process, culminating in the final Commission Member Documents for all files reviewed. However, there were inconsistencies in the documentation maintained by EMPD staff in support of their reviews; adequate documentation was found for just four of the five files reviewed.

Evidence of management's review and concurrence on licence assessment input is an important process control. We found that the director's signature on the comments disposition form may be kept for the duration of the licensing project, with the final Commission Member Document considered as a corporate record. As there is no requirement to maintain evidence of the technical specialist director's concurrence, this could result in CNSC being unable to substantiate EMPD's management approval of the assessment at a later date.

EMPD agreed with our recommendation #7, that documenting its divisional procedures and guidance for assessing licensee emergency measures would ensure more consistent documentation of their assessment work and of the director's approvals of the CMD input. A consolidated recommendation relating to EMPD divisional procedures is presented in section 2.3.4.

2.2.3. Licence conditions and associated LCH

Conditions relating to licensee EMs are incorporated into licence conditions and associated LCH; the referencing of EMs in LCH is not consistent.

Although licensees must adhere to the *Nuclear Safety and Control Act* and the *General Nuclear Safety and Control Regulations*, they also must adhere to all documents that are approved with their licence application and any conditions stipulated in the LCH.

As part of our audit testing, we reviewed the relevant emergency management and fire protection conditions in the LCH for a sample of five licence renewal files from DPRR and DNCFR. We noted inconsistencies in the wording of licence conditions, as they pertain to licensee emergency measures, in addition to inconsistencies in whether G-225 and RD-353 are referenced in the LCH.

We were informed that, while the risks associated with variations in the wording of individual LCHs is low, EMPD does not have documented procedures or templates for its officers to use when assisting DPRR/DNCFR in developing EM/EP-related licence conditions.

We understand that, as part of the CNSC *Harmonized Plan*, the standardized licence conditions project is underway, and includes EMPD participation. As this project continues, EMPD management will identify and develop guidance and procedures for EMPD staff on how to incorporate standardized licence conditions into their CMD input.

2.3. Planning, conducting and reporting on EM inspections

2.3.1. Inspection planning

The Regulatory Operations Branch (ROB) leads a coordinated performance-based risk-informed approach to planning EM inspections. The planning process includes appropriate input from TSB's EMPD; however, communication between EMPD and DNCFR on the results of the inspection planning activities could be improved.

The CNSC process to plan inspections at Class I facilities and uranium mines and mills is part of the overall CNSC-wide regulatory activity planning (RAP) process, which was subject to a separate OAE internal audit in the 2012–13 fiscal year. The results of that audit (entitled *Audit of Regulatory Activity Planning Processes*) were presented to the CNSC Audit Committee in November 2012, and subsequently approved by the President.

The current audit examined the planning of EM inspections through a review of documentation and interviews with management and staff within ROB and EMPD (to

asses whether the process to identify emergency measures inspections is systematic and risk-informed), and included input from EMPD. We expected that processes would be in place to help identify the relative risk of facilities (from an emergency-measures perspective) to help guide regulatory compliance efforts for those facilities of highest risk.

We found that ROB leads the inspections planning process, with EMPD being engaged to provide input on EM compliance inspection planning. We noted that EM inspection planning is guided by the baseline inspection plans established for each licensee, as well as the requirements established in G-225 and RD-353. While EMPD is involved in the ROB inspection planning process, we were informed that EMPD-recommended inspections are not always accepted and included as part of the forward inspection plan. As the DPRR and DNCFR planning processes are performed independently of each other, the observations related to each of these directorates are addressed in separate sections below.

Planning EM inspections at nuclear power plants (NPPs)

DPRR has established a five-year compliance baseline plan for Class I NPPs, with input from technical specialist groups (such as EMPD).

As part of its inspections planning and monitoring process, DPRR has established collaborative planning meetings, along with quarterly management reviews involving EMPD. A forward inspection plan for each nuclear power plant (covering a five-year period) is in place, which identifies the planned inspections by quarter, drawing on EMPD's expertise and resources. Annual inspections involving EMPD are scheduled, reflecting a risk-informed planning basis.

Regular and systematic review of progress against the planned EM inspections is centrally monitored and communicated. The associated documentation includes cancelled or deferred inspections, overall inspection completion and cancellation rates, as well as completed site-conducted and specialist-assisted inspections.

Planning EM inspections at other Class I facilities and uranium mines and mills

DNCFR inspection planning is decentralized: divisions are responsible for planning and monitoring inspections (including EM-related inspections) at their respective facilities. DNCFR divisions have established facility assessment and compliance teams (FACTs), led by a DNCFR project officer, who work collaboratively with TSB technical specialists to consider the assessed risks, and to identify and plan compliance activities for each facility.

We noted that DNCFR has a documented risk assessment methodology and process, which includes ranking the technical risks for each facility using the CNSC safety and control framework. We also noted that, in developing risk assessments for the

emergency management and fire protection SCA, DNCFR solicits and incorporates input from EMPD technical specialists.

Interviews revealed that individual EMPD FACT members were aware of informal guidance on how to establish the frequency of EM inspections based on relative risk; we were informed that this guidance has not been formally communicated to all EMPD FACT members. We also noted that baseline EM inspection plans for DNCFR facilities, which would identify EM inspections falling under the scope of G-225, is not centrally available in either DNCFR or EMPD. Without this guidance and inventory information, there is a risk that EMPD's compliance efforts are not concentrating on the highest DNCFR priorities.

We understand that, under the RAP process, annual workplans are prepared that identify the overall effort for licensing and compliance at the DNCFR facility level. These workplans identify, by facility, the full-time equivalent allocation of EMPD inspection resources required by DNCFR for the upcoming year. We were informed that EMPD is advised of the results of the RAP process, and is aware of the resources required by DNCFR for EM-related inspections, in advance of each fiscal-year.

We found that, during 2010 and 2011, DNCFR did not centrally monitor the initial RAP schedule of planned inspections or update the inspection plan for in-year scheduling changes. We were informed that, without advanced information on changes to the DNCFR inspection schedule, EMPD has experienced challenges in planning their work and allocating specific resources to DNCFR inspections.

We learned that certain DNCFR FACT leaders proactively began documenting quarterly inspection schedules during FY 2012–13; DNCFR management has advised that they are exploring the possibility of expanding this practice across DNCFR's other divisions.

Recommendation

3. The EMPD, in collaboration with DNCFR, should strengthen the coordination and communication for the planning and monitoring of EM-related inspection activities, by establishing guidelines for staff for the frequency of EM inspections based on relative risk, and identifying upcoming EMPD inspections by quarter, across all Class I facilities and uranium mines and mills, within DNCFR.

Management response and action plan

Management agrees with the recommendation. DNCFR and DSS, including EMPD, will instruct their planning officers to coordinate the planning of emergency management activities in advance, and identify the resources need for a five-year planning cycle for baseline compliance of emergency management activities (desktop reviews and onsite inspections). This will be completed by February 28, 2014.

2.3.2. Monitoring of planned inspections

Monitoring of EM inspections conducted against the inspection plan is performed by DPRR; DNCFR monitoring of planned inspections could be strengthened, and EMPD could improve their support to both DPRR and DNCFR with better internal monitoring of EM inspections.

We examined the monitoring activities performed by EMPD, and expected that a tracking of inspections performed against its plan would be in place.

We found that, while DPRR tracks inspections planned against the annual inspection plan, centralized monitoring of planned versus completed inspections is not currently documented within EMPD. We noted that, while DPRR maintains an inventory of its NPP licensees, neither EMPD nor DNCFR maintain a listing of the other Class I facilities and uranium mines and mills falling under regulatory document G-225. Also, there is no available centralized listing of inspections completed by the team in the past.

Without information on completed EMPD inspections against the list of all facilities falling under the scope of G-225, there is a risk that EMPD's compliance efforts are not focussing on the highest DNCFR priorities.

On the ROB side, DNCFR does not currently have in place a centralized monitoring of inspection activities against the plan. The monitoring of inspection activities occurs at the individual staff level, with input from the FACT team. Audit interviews revealed that in-year changes to the EM related inspections planned may be made at the DNCFR staff level. Such changes (i.e., additions, deferrals, or cancellations) are not always communicated, to ensure they are centrally documented and monitored.

As noted in 2.3.1, DNCFR management has advised that they are currently exploring changes to their inspection plan monitoring activities.

Recommendation

4. We recommend that DNCFR strengthen its monitoring of inspections completed against the annual inspection plan, including documenting in-year changes to the inspection plan (i.e., the rationale for cancelled or deferred inspections).

Management response and action plan

DNCFR management agrees with the recommendation. This will be addressed by the actions described in response to recommendation 3 above.

2.3.3. Periodic review and assessment of inspection coverage

Opportunities exist to strengthen the tracking of licensee emergency measures testing, to ensure adequate coverage over the life of the licence, in addition to aligning EMPD's longer-term inspection plan to the exercise schedule of the licensee.

Regulatory document RD-353, *Testing the Implementation of Emergency Measures,* provides guidance to licensees on the expected frequency of drills and exercises. All exercise objectives are to be covered over a five-year period, with a full-scale exercise to be conducted every three years.

Related recommendations from the *Fukushima Task Force Report (*INFO 0824, *Recommendation 10.2 - Enhancing Emergency Response)* required operators of multi-unit nuclear power plants to review their drill and exercise programs to ensure they are sufficiently challenging.

We expected to find that management periodically reviews its planning approach, to assess whether appropriate coverage has been achieved. Through interviews with management and staff from ROB and TSB/EMPD, we found that there was a common understanding that ROB regulatory program directors (RPDs) are responsible to ensure that their respective NPP licensees sufficiently tests the emergency measures in place pursuant to RD-353; however, we found that neither ROB nor EMPD centrally track the coverage of exercise and drill activities across all facilities.

Centralized tracking of licensee drill and exercise objectives will allow EMPD to provide feedback to the RPDs on whether the licensee is adequately exercising all objectives over the licence timeframe, in addition to providing input on whether licensees are conducting exercises in the timeframe required.

Lastly, we understand that exercises require significant licensee time and budget commitments, and involve the coordination with third-party organizations, in addition to CNSC's participation.

Recommendation

5. We recommend that EMPD establish a longer term plan that is aligned with the licensees' schedule of full-scale exercises for the site, and establish tracking and reporting mechanisms that will help the team provide stronger planning input to ROB.

Management response and action plan

EMPD agrees with the recommendation. EMPD staff will establish, in collaboration with ROB staff, a long-term plan aligned with the licensees' exercise schedules, by using an existing process that identifies the baseline activities for the emergency management

and fire protection SCA, and will establish a tracking and reporting mechanism within EMPD that will help with better long-term baseline compliance activity. This will be completed by March 31, 2014.

Licensee self-evaluation reports on exercises conducted are being prepared, but are not required to be provided to the CNSC

Under the existing regulatory document RD-353, licensee self-evaluation reports are required to be prepared, but not to also be provided to the CNSC. This type of information would strengthen the risk-informed approach for annual planning of EM inspections; for licensee exercises where EMPD is present to conduct an inspection, such procedures would assist EMPD specialists (participating on inspection teams) in assessing whether the licensee is able to self-identify opportunities for improvement.

Recommendation

6. We recommend that the relative costs/benefits of requiring licensees to report self-assessment reports to CNSC be examined by management, as part of the regulatory document review process for G-225 and RD-353 (currently underway). If the regulatory framework documents are updated to include reporting to CNSC, we further recommend that CNSC management should establish guidance and procedures on how these reports should be submitted and assessed by EMPD.

Management response and action plan

DPRR agrees with the recommendation. The DPRR's Compliance Monitoring Division will work with TSB staff to evaluate and – if required – implement procedures for submission and assessment of licensee self-assessments. This will be completed by March 31, 2014.

2.3.4. Conducting inspections and reporting inspection results

Management receives sufficient, complete, timely and accurate information resulting from inspections performed to make regulatory decisions. EMPD divisional processes, guidance and procedures support the team's input to inspection reports; opportunities exist to improve documentation practices.

EMPD has in place pre-established compliance verification criteria for EM inspections, which are based on RD-353; their use was consistent in the sample of six inspection files reviewed during the audit. We also found adequate documentation supporting EMPD's inspection observations and findings.

Opportunities to improve documentation practices were identified in EMPD, covering two areas: pre-inspection activities and evidence of supervisory review. We found that formally documented divisional procedures within EMPD, specifically addressing pre-

inspection activities, are not established. For example, a review of the licensee's exercise objectives and scenario, and any outstanding action items identified through previous inspections, are not defined in the guidance material.

The file review also revealed that EMPD does not consistently retain in their files evidence that the Director of EMPD concurred with the EMPD licensee emergency program officer's input to the final inspection reports. Two of the six files examined did not contain evidence of such concurrence. It should be noted that the management approval control implemented by EMPD goes beyond what is expected by the CNSC's corporate inspection procedures. The *Type II Inspection Procedures* document requires inspection team members to produce a draft of their assigned section of the inspection report, which is submitted to the ROB inspection leader. Although there is no specific corporate-wide requirement for the technical specialist director to formally approve their staff's input, the interviews conducted reveal a common understanding that while EMPD staff input represents the entire group, the EMPD specialists obtain their Director's approval before submitting their input to the ROB inspection leader.

Recommendation

7. As part of documenting its divisional procedures, we recommend that EMPD record the procedures related to inspection activities. These should include pre-inspection activities (i.e., reviews of exercise objectives, scenario, past action items, etc.) and procedures, to ensure that management's concurrence with inspection results is documented and maintained.

Management response and action plan

EMPD agrees with the recommendation. EMPD will prepare an internal procedure related to inspection activities, including the Type I and Type II checklists, aligned with current inspection and technical assessment processes. This will be completed by December 31, 2013.

2.3.5. Follow-up on inspection action items

We expected to find that a documented process is in place to monitor and follow-up on items requiring corrective action, including the input from technical specialist groups such as EMPD.

We found that ROB project officers (POs) are responsible for follow-up and engaging EMPD for input. CNSC documentation exists to identify the lead inspector's responsibility to record and close the actions in the regulatory information bank. We noted that CNSC process documents do not specify whether ROB POs are required to engage technical specialist staff when assessing or closing action items.

Through interviews with management and staff, we found that a common understanding is in place for ROB staff to seek EMPD's input when making the determination to raise a

particular action item as a “Directive”, “Action Notice” or a “Recommendation”, in addition to seeking their input to close the item.

We reviewed the action item resolutions for the sample of six inspection files we examined. Four of the inspections reviewed required formal follow-up. We found that EMPD was appropriately engaged in three of these files. On the fourth file, we understand that the licensee management team requested the CNSC to assign the action item follow-up to a fully bilingual officer, and that ROB management decided to assign the task to one of its own officers; EMPD was not further involved in the follow-up.

Recommendation

8. We recommend that ROB update the action item follow-up documentation, by formally requiring the technical specialist group’s input to the follow-up process (i.e., assessment of the licensee’s initial response and closure of action items raised through inspections).

Management response and action plan

DPRR and DNCFR management agree with the recommendation. DPRR and DNCFR will review the current action item follow-up process, to ensure specialist input is included in evaluating closure of action items. This will be completed by April 30, 2014.

2.4. Other areas of examination

2.4.1. Continuous improvement

We expected that a process be in place to identify continuous improvement opportunities – such as a review of results across facilities, to identify best practices and lessons learned. Through interviews with EMPD management and staff, we found that continuous improvement is handled informally within the small team, with training focusing on on-the-job training, supported by cross-training on licensee files. The emergency measures topic was reviewed horizontally across licensees, through the *Fukushima Task Force Report* and the *CNSC Staff Action Plan*, which identified (among other action items) the need to strengthen existing regulatory guidance documents.

While no recommendations are raised through this audit, it is important to note that the emergency measures field requires specialized skills and competencies; given the focus on on-the-job training within EMPD, this represents a time investment, to ensure that seasoned staff can share their experience with new staff. Given the observations regarding the need to document divisional procedures – in addition to the potential impact to the team if fully-trained staff were to depart – the informal continuous improvement approach may need to be revisited in the future.

2.4.2. Performance reporting

We examined the performance metrics that management has identified to report on licensee performance for emergency measures. We reviewed at a high level the processes in place for aggregate reporting to the public (i.e., the DPRR *CNSC Staff Integrated Safety Assessment of Canadian Nuclear Power Plants* annual report, and DNCFR's *CNSC Staff Report on the Performance of Canadian Uranium Fuel Cycle and Processing Facilities*).

We found that the performance measures for the emergency management and fire protection SCA and the supporting specific areas are adequately defined, and that technical specialist groups (such as EMPD) are consulted on individual safety-significant ratings raised through inspections, in addition to being consulted on ratings for the facility. No specific recommendations are raised through this report.

3. Overall Conclusion

The existing governance, control, and risk management processes support the CNSC's regulatory oversight of emergency measures at Class I nuclear facilities and uranium mines and mills, although opportunities exist to improve the design and effectiveness of these processes. Specifically:

- Emergency Programs Management Division (EMPD) core roles and responsibilities in support of the CNSC's licensing and compliance processes are adequately documented and generally understood. There is an opportunity to clarify EMPD's mandate, to ensure that it appropriately and clearly reflects senior management expectations on oversight issues related to emergency measures.
- EMPD is engaged in the assessment of licence applications for the emergency management and fire protection safety and control area. EMPD could strengthen its licensing support role, by documenting its existing practices ensuring they are consistently used.
- EMPD is appropriately engaged in the planning, conduct and reporting of inspections focused on licensee emergency measures. Ongoing projects aimed at strengthening the coordination and communication between EMPD and Regulatory Operations Branch should result in improved monitoring of the inspection plan and better utilization of EMPD resources.

We would like to acknowledge and thank management, for their support throughout the conduct of this audit.

Appendix A: Audit Criteria

The following detailed criteria were used for each line of enquiry in this audit:

Line of enquiry 1: Review of licence applications – emergency measures

1.1 A governance structure is in place to ensure that emergency plans (EP) are reviewed and approved at the licence application stage.

1.2 Processes, guidance and procedures documents are in place to support the consistent and transparent review of EP.

1.3 EP are reviewed and approved in accordance with processes, guidance and procedures documents in place, and against the requirements presented in legislation, regulations, regulatory documents and guidance documents.

Line of enquiry 2: Planning, conducting and reporting of inspections on emergency measures

Planning

2.1 The process to identify inspections to be conducted on Emergency Measures (EM) at Class I nuclear facilities and uranium mines and mills is systematic and risk-informed, and includes input from technical specialists such as the Emergency Programs Management Division (EMPD).

2.2 Management monitors EM inspections performed against its plan.

2.3 Management periodically reviews its systematic, risk-informed planning approach, to assess whether appropriate coverage for EM has been achieved.

Conducting

2.4 Guidance and procedures documents are in place to support the conduct of consistent and transparent EM inspections.

2.5 EM inspections are conducted and approved in accordance with processes, guidance and procedures documents in place, and against the requirements presented in legislation, regulation, regulatory documents, and the licence.

Reporting

2.6 Management receives sufficient, complete, timely and accurate information resulting from inspections performed to make regulatory decisions.

2.7 There is a process in place to identify continuous improvement opportunities, such as the review of results across facilities, to identify best practices and lessons learned.

2.8 Management has identified appropriate performance measures to report on the extent of compliance with legislative and regulatory requirements.

2.9 There is a process in place to monitor and follow-up on items requiring corrective action.

The audit criteria are based on:

- Office of the Comptroller General's *Audit Criteria Related to the Management Accountability Framework*
- *Class I Nuclear Facilities Regulations,* paragraph 6(k), and *Uranium Mines & Mills Regulations,* subparagraph 3(c)(x)
- Regulatory guidance documents in place at the time of the audit:
  - Regulatory guide G-225, *Emergency Planning at Class I Nuclear Facilities and Uranium Mines and Mills*
  - Regulatory document RD-353, *Testing the Implementation of Emergency Measures*

Appendix B: Audit Recommendations and Management Action Plan

The following table presents a summary of the recommendations and management action plans (MAP) raised in section 2 (Observations and recommendations) of the report:

Recommendation 1. The Emergency Programs Management Division (EMPD) mandate should be reviewed, updated and communicated to reflect the team's roles and responsibilities, and to ensure a consistent understanding, both internally (within the CNSC) and externally (with licensees). Specifically, the following areas where the team's role is evolving should be examined: interactions with third-party organizations in respect to offsite emergency plans; the type of hazards falling under their purview (i.e., radiological vs. non-radiological); and support in the licensing and compliance verification of the operational response for elements such as *Severe Accident Management Guidelines*, as they are implemented.		
Action owner (office of primary interest)	**Management response and action plan**	**Timeline**
Director General, Directorate of Security & Safeguards, in conjunction with Director, Emergency Management Programs Division	The EMPD mandate will be reformulated and communicated to CNSC staff explaining the roles and responsibilities in the area of emergency response.	March 31, 2014
Recommendation 2. EMPD management should collaborate with the Regulatory Operations Branch (ROB), to identify "significant changes" to licensee emergency measures documentation which require EMPD's review and acceptance prior to implementation, along with identifying longer lead times for these types of reviews.		
Director General, Directorate of Security & Safeguards, in conjunction with Director General, Directorate of Power Reactor Regulation	EMPD management will work with ROB staff to include in the licence condition handbooks (LCHs) those cases where major changes to licensee documentation, (affecting licensee emergency response) will require prior notification and review by EMPD, such as: - changes that affect emergency response staffing requirements (reducing staff) - major emergency response facility changes	March 31, 2014, as LCHs are revised.

	- reduction in drill/exercise frequency - use of third parties to perform emergency response activities (qualifications, testing, etc.)	
Recommendation 3. The EMPD, in collaboration with the Directorate of Nuclear Cycle and Facilities Regulation (DNCFR), should strengthen the coordination and communication for the planning and monitoring of inspection activities related to emergency measures (EM), by establishing guidelines for staff for the frequency of EM inspections based on relative risk, and identifying upcoming EMPD inspections, by quarter, across all Class I facilities and uranium mines and mills within DNCFR.		
Director General, Directorate of Security & Safeguards, in conjunction with Director General, Directorate of Nuclear Cycle and Facilities Regulation	DNCFR and the Directorate of Security & Safeguards (DSS), including EMPD, will instruct their planning officers to coordinate the planning of emergency management activities in advance, and identify the resources need for a five-year planning cycle for baseline compliance of emergency management activities (desktop reviews and onsite inspections).	February 28, 2014
Recommendation 4. DNCFR should strengthen its monitoring of inspections completed against the annual inspection plan, including documenting in-year changes to the inspection plan (i.e., the rationale for cancelled or deferred inspections).		
Director General, Directorate of Nuclear Cycle and Facilities	This will be addressed by the actions described in response to recommendation 3 (above).	February 28, 2014
Recommendation 5. EMPD should establish a longer term plan that is aligned with the licensees' schedule of full-scale exercises for the site, and establish tracking and reporting mechanisms that will help the team provide stronger planning input to ROB.		
Director General, Directorate of Security & Safeguards, in conjunction with Director, Emergency Management Programs Division	EMPD staff will establish, in collaboration with ROB staff, a long-term plan aligned with the licensees' exercise schedules, by using existing process that identifies the baseline activities for the emergency management and fire protection SCA, and will establish a tracking and reporting mechanism within EMPD that will help with better long-term baseline compliance activity.	March 31, 2014

Recommendation 6. The relative costs/benefits of requiring licensees to report self-assessment reports to CNSC should be examined, as part of the regulatory document review process for G-225 and RD-353 (currently underway). If the regulatory framework documents are updated to include reporting to CNSC, we further recommend that CNSC management establish guidance and procedures on how these reports should be submitted and assessed by EMPD.		
Director General, Directorate of Power Reactor Regulation, in conjunction with the Director, Emergency Management Programs Division and Director General, Regulatory Framework Division	The Directorate of Power Reactor Regulation (DPRR) Compliance Monitoring Division will work with Technical Support Branch staff to evaluate and, if required, implement procedures for submission and assessment of licensee self-assessments.	March 31, 2014
Recommendation 7. As part of documenting its divisional procedures, EMPD should record the procedures related to inspection activities. These should include pre-inspection activities (i.e., reviews of exercise objectives, scenario, past action items, etc.) and procedures, to ensure that management's concurrence with inspection results is documented and maintained.		
Director, Emergency Management Programs Division	EMPD will prepare an internal procedure related to inspection activities, including the Type I and Type II checklists, aligned with current inspection and technical assessment processes.	December 31, 2013
Recommendation 8. ROB should update the action item follow-up documentation, by formally requiring the technical specialist group's input to the follow-up process (i.e., assessment of the licensee's initial response and closure of action items raised through inspections).		
Director General, Directorate of Nuclear Cycle and Facilities in conjunction with Director General, Directorate of Power Reactor Regulation	DPRR and DNCFR management agree with the recommendation. DPRR and DNCFR will review the current action-item follow-up process, to ensure specialist input is included in evaluating the closure of action items.	April 30, 2014

Appendix C: Glossary

Emergency – an abnormal situation, which requires prompt action beyond normal procedures from the CNSC, to reduce the risk to persons, to limit damage to properties or the environment (source: *Nuclear Emergency Response Plan*).

Emergency plan – A documented scheme of assigned responsibilities, actions and procedures required in the event of an emergency. It contains a brief, clear and concise description of the overall emergency organization, as well as a designation of responsibilities and procedures (including notifications) involved in coping with any or all aspects of a potential credible emergency (source: Public Safety Canada).

Emergency exercise – The simulation of emergency events in order to test the integrated performance of an emergency response scenario (source: CNSC RD-353).

Emergency drill – The testing of a procedure or other specific aspect of an emergency plan (source: CNSC RD-353).

Emergency management – A program, arrangement or other measure for dealing with an emergency (source: CNSC RD-353).

Emergency response – The integrated set of infrastructural elements necessary to provide the capability for performing a specified function or task required in order to prevent, mitigate or control the effects of an accidental release (source: CNSC RD-353).

Licensee emergency plan – The documented measures required of applicants and licensees under paragraph 6(k) of the *Class I Nuclear Facilities Regulations* and subparagraph 3(c)(x) of the *Uranium Mines and Mills Regulations*; encompasses both emergency preparedness and emergency response measures (source: CNSC G-225).

Nuclear emergency – Any event which has, or could lead, to a radiological threat to public health and safety, property, or the environment (source: *Federal Nuclear Emergency Plan*).

Offsite – The area outside the boundary of a nuclear facility. The municipal, provincial and federal levels of government are responsible for offsite emergency planning, preparedness and response (source: *Federal Nuclear Emergency Plan*).

Onsite – The area inside the boundary of a nuclear facility, also called the exclusion area. The operators of nuclear facilities are responsible for onsite emergency planning, preparedness and response (source: *Federal Nuclear Emergency Plan*).

Radiological emergency – an emergency caused by an actual or environmental hazard from ionizing radiation emitted by a source other than a nuclear installation.

CMD – Compliance Monitoring Division (CNSC)

DNCFR – Directorate of Nuclear Cycle and Facilities Regulation (CNSC)

DPRR – Directorate of Power Reactor Regulation (CNSC)

DSS – Directorate of Security and Safeguards (CNSC)

EMPD – Emergency Management Programs Division (CNSC)

NPP – nuclear power plant

RAPs – regulatory activity plans

ROB – Regulatory Operations Branch (CNSC)

SAMG – *Severe Accident Management Guideline*

TSB – Technical Support Branch (CNSC)

UMMD – Uranium Mines and Mills Division (CNSC)