



**Professional
Employees
Association**

Submission to the
Mount Polley Independent Expert Engineering Investigation and Review Panel

December 2, 2014

SYSTEMIC CHALLENGES

The public service, professional reliance
and the Mount Polley disaster

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INTRODUCTION

In a March 2014 report entitled *Review and Assessment of the Impacts of the Province of British Columbia's Cutbacks in Government Licensed Science Officers*, the Professional Employees Association (PEA) demonstrated that the BC public service has reduced its complement of scientific and technical professionals by 15 per cent since 2009. The report also showed that since 2001, the overall number of licensed professionals employed in government has decreased by 25%. The report warned that these reductions could threaten both public safety and the environment because of inadequate monitoring and inspections.¹

On August, 4, 2014 a tailings pond breach at the Mount Polley mine saw 10 million cubic metres of water and mine tailings flow into Polley Lake and Quesnel Lake. The PEA takes the position that this breach has to be examined in the context of the increasing shift in BC toward a more streamlined regulatory approach to natural resource exploitation, and to the reduced role of public service professional staff in the monitoring and enforcement of safety and environmental standards. We note that the number of licensed professionals employed in the Ministry of Environment has decreased by 31 per cent since 2009, while the Ministry of Energy and Mines has seen a 21 per cent decrease in the number of licensed science officers over the past decade.² The Mount Polley accident represents one of the largest breaches of its kind in the world in the last 50 years; however, it is only one of a significant number of tailings-pond breaches to occur in BC over the last five years. In a recent article in the *Vancouver Sun*, BC's Chief Inspector of Mines noted a total of 49 "dangerous or unusual occurrences" at mine tailings ponds in BC between 2000 and 2012.³

A host of systemic issues has contributed to the province's diminished ability to manage its natural resources. BC's natural resource management policy is underpinned by a statutory framework known as professional reliance, an approach the PEA and a variety of watchdog agencies believe is in a dire need of a thorough review and reconsideration. Internal and external calls for increased staffing resources have gone unanswered. Monitoring, compliance and enforcement functions have been dramatically slashed. Existing licensed professionals in the public service have increasingly expressed concern over trends, such as the frequency at which vacant positions are being left unfilled, the lack of knowledge transfer, poor succession planning, and exacerbated recruitment and retention issues, that jeopardize the level of specialized, in-house skills and knowledge in the public service. All of these systemic issues need to be addressed to ensure better and safer management of BC's natural resources. Government, on behalf of the public of BC,

1 See Appendix A for the full report.

2 These figures are derived from union check-off lists provided by the BC government.

3 "49 'dangerous occurrences' at B.C. mine tailings ponds in past decade: ministry data," *Vancouver Sun*, August 26, 2014. See Appendix B for the full article.

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cannot fulfill its oversight role without addressing these systemic issues. If they fail to do so, similar disasters to Mount Polley are likely to take place.

This submission is primarily focused on the issue of regulatory oversight by the Ministry of Energy and Mines and the Ministry of the Environment; however, the issues identified here have relevance for all of BC's natural-resource-based ministries.

THE PROFESSIONAL EMPLOYEES ASSOCIATION

The PEA is a trade union that represents approximately 1,150 licensed science officers who work for the BC public service. The PEA was formed in 1974 from a need to create a separate bargaining that would align with the particular needs and interests of government employees in job classifications that require membership in a professional association with the statutory authority to license a person to practice his or her profession.

PEA professionals include foresters, agrologists, engineers, geoscientists, veterinarians, psychologists and more. Many of these members hold positions in the Ministry of Energy and Mines and the Ministry of Environment, both areas that have direct responsibility for mining operations in the province. Licensed science officers in the Ministry of Energy and Mines include mine inspectors (permitting and health and safety), geologists, geoscientists, geotechnical inspectors and engineers, reclamation specialists, geochemists and more. PEA members in the Ministry of Environment include environment protection officers, contaminated sites officers, hydrologists, ecologists and geomorphologists.

In recent years, some PEA members have brought forward concerns to the union about the level of oversight provided to mining practices in BC; however, no members have been willing to go on record with those concerns. This is due at least in part to the "cone of silence" the government has imposed on public servants by requiring them to keep certain types of knowledge and information confidential. We believe this reflects the lack of whistleblower protection for public service employees in BC. Ensuring an appropriate and transparent process through which public servants can raise concerns would potentially mitigate risks to public safety and would enable the work of panels such as this to be more fully informed with regard to the front-line perspectives of public servants employed in the natural resources sector.

THE SYSTEMIC ISSUES

Professional Reliance

In the early 2000s, legislative and regulatory changes were introduced that promoted professional reliance as a more efficient model for providing oversight of BC's resource- extraction industries than the traditional practices in place at the time. Under the professional reliance regime,

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regulations were streamlined, the public service was significantly reduced in size, and a greater role was assigned to industry proponents in monitoring their own compliance. Proponents of professional reliance expected that this new model would align with the public interest in managing natural resources and stewarding the environment.

PEA members have conveyed numerous concerns about the impacts of this model. They report that plans and applications for resource utilization submitted by proponents often show inappropriate levels of due diligence. They also report that the ability of government science officers to review industry proposals is hampered by policies that give proponents the legal authority to withhold information.⁴ Add to this the downsizing of the public service and the reduction of resources available to support staff training and development, and the result is a dwindling of expertise in the public service for providing effective oversight. Also, the frequency of changes to mandates, particularly those designating areas of responsibility between the Ministry of Environment and the Ministry of Energy and Mines, is another factor that contributes to poor oversight by adding extra workloads for staff and creating confusion among all stakeholders as to who is responsible for which aspects of mining regulation.

Compliance and Enforcement

An appropriate professional reliance model requires an effective system for ensuring compliance and enforcement of legislated standards. This role is particularly well suited for government staff to perform; however, when the government lacks professional staffing capacity to achieve these necessary goals, the professional reliance regime is undermined, and accidents may occur.

A number of organizations, such as the Forest Practices Board, the University of Victoria Environmental Law Centre, the Office of the BC Ombudsperson, and the BC Auditor General, have recently stressed the urgent need for improved government oversight of BC's professional reliance regime. This viewpoint was echoed by the BC Wildlife Federation, which stated in a recent article in the *Vancouver Sun* that "the government's move in the past decade to rely on professionals hired by industry to make decisions on the land base, with little oversight, has failed."⁵

When introducing the legislative framework for professional reliance, the then-Minister of Forests stated, "I want to underscore to the House that the key objectives of the Forest and Range Practices Act remain the same: a focus on results, not paperwork, and a focus on high environmental standards supported by tough compliance and enforcement."⁶ This statement also reflects the position adopted by the Ministry of Energy and Mines. We would suggest that, in the context of mine inspections, the government has failed to provide the necessary resources to

4 Forest Practices Board, "Haida Gwaii Visual Quality Objectives: Complaint Investigation #131091," November 2014, i.

5 "Hunters, Guides, Trappers Call for More Provincial Oversight of Gas and Mining Sectors," *Vancouver Sun*, November 4, 2014. See Appendix C for the full article.

6 Mark Haddock, *Professional Reliance in British Columbia's Environmental Regulations* (University of Victoria, Environmental Law Centre, May 2014), 59.

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adequately meet these stated objectives. This is clearly demonstrated in the annual reports of the Chief Inspector of Mines, which show that the number of mine-inspector visits performed each year has plummeted since the introduction of professional reliance.

In another report from April 2014, the Office of the BC Ombudsperson identified a long list of problems and concerns related to the enforcement of environmental-protection regulations within the Ministry of Lands, Forests and Natural Resource Operations.⁷ The University of Victoria Environmental Law Centre concurred with the findings in this report, noting that similar problems have been observed across several ministries. The UVic report stated, “we will not repeat here the above-noted problems associated with cuts to other government compliance and enforcement staff, and the significant reductions in the number of inspections and compliance actions . . . but they suggest a much broader, systemic problem across the natural resource and environmental protection ministries of the BC government.”⁸ A wide range of solutions is needed to adequately address the need for more robust compliance and enforcement; however, a critical piece of this is an adequately staffed public service with sufficient skills, knowledge and expertise.

Monitoring

The other critical component of a successful professional reliance regime is monitoring. The government needs to know what is happening on crown lands, and must be kept aware of situations that pose potential dangers to the environment and the public. The importance of monitoring is emphasized in the UVic Environmental Law Centre report, which finds that as result of declining professional capacity, “government agencies are much less aware of what is happening on public land. Some have a reduced approval role, but even where agency approval is required, there is little field presence despite the promise that professional reliance would lead to a concerted focus on monitoring and enforcement.”⁹

THE SIZE OF THE BC PUBLIC SERVICE

The number of licensed professionals in both the Ministry of Energy and Mines and the Ministry of Environment has been declining over the past decade. This is not an isolated pattern, but reflects a deliberate shift away from the goal of having an appropriately staffed professional public service.

The Canadian Centre for Policy Alternatives (CCPA), using data from Statistics Canada, reports that overall public sector employment (provincial, federal and municipal) in BC is the leanest per capita of any province in Canada. They also note that BC’s provincial public service is one of the smallest, with 48.8 employees per 1,000 British Columbians; only Ontario and Alberta, which deliver many

7 *Striking a Balance: The Challenges of Using a Professional Reliance Model in Environmental Protection – British Columbia’s Riparian Areas Regulations* (Office of the British Columbia Ombudsperson, Public Report No. 50, April 2014).

8 Haddock, 78.

9 Ibid., 26.

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provincial services through municipal governments, have a smaller provincial public service. In its 2013 report *Reality Check on the Size of BC's Public Sector*, the CCPA reports that the BC public sector "has been fundamentally weakened over the last 20 years and particularly after 2000."¹⁰ The report concludes that "BC's public sector cuts have compromised the provincial government's mandate to protect the public interest through oversight, regulation and enforcement."¹¹

Compensation, Recruitment and Retention

Besides the ongoing reductions in the BC public service through attrition, the public service faces significant challenges in its ability to recruit and retain licensed professionals. These are serious problems that need to be addressed if the government is to be able to recruit and retain the specialized and expert knowledge that professionals bring.

The PEA is not intending to lobby for compensation increases through this review process; however, we believe this is an important part of the overall context underlying the incident at Mount Polley. The BC Public Service Agency (PSA), the central human-resource body for the public service, has provided the PEA with results from its recruitment efforts for licensed professionals in the public service. Between 2010 and 2013, of the three main employee groups that make up the public service (managers, PEA and BCGEU) the number of applicants for PEA positions saw the greatest decline, from 32 applicants per position in 2010 to ten applicants per position in 2013. Moreover, the decrease in applications during this period is especially notable for designated professional engineer, engineer and geologist positions.

The PSA also provided the PEA with retention documents that show rates of voluntary resignation by engineers and designated professional engineers. (Voluntary resignation excludes retirement.) These rates for these classifications are generally higher than the public service average over the 2009 to 2013 period. In 2013, engineer resignation rates were more than double the public service average. The PEA's own exit interviews conducted during this period with members who voluntarily resigned also point to poor compensation as a driving factor in their decision to leave the public service. These individuals left for positions with municipal governments, other provincial governments, or the private sector.

To further explore the role of compensation in the recruitment and retention of licensed professionals, The PEA commissioned a compensation review, conducted by the Hay Group, in 2013. This survey found that in every PEA job classification and level considered, "the current [licensed professional] salary range is low relative to all comparator markets; this is the case even when existing recruitment and retention adjustments are applied. When we consider total cash, the gaps widen, because there is no provision for bonuses or other cash incentives for this group,

¹⁰ Iglika Ivanova, *Reality Check on the Size of BC's Public Sector* (Vancouver: Canadian Centre for Policy Alternatives, April 2013), 15.

¹¹ Ibid.

whereas some others in the market comparator group do provide these.”¹² The report noted that this compensation gap is especially wide for engineers. “Some public sector (provincial, municipal, regional government employers) who compete directly with the Province of BC for engineering talent pay significantly more.”¹³ In many cases, the rate of pay for engineers lags behind the comparable market by up to 40 per cent.

The government’s own 2013 cross-jurisdiction survey of compensation for licensed science officers supports the PEA’s compensation findings. When reviewing some of the critical positions that impact mining operations in BC, we see that compensation for mining inspectors in BC is ranked seventh out of eight compared with other provinces. Senior project geologists are ranked eighth out of eleven for annual compensation rates, and engineers are ranked tenth out of twelve. These rankings indicate a serious deficiency in pay for licensed science officers tasked with managing mining operations in BC.¹⁴

Use of Non-Licensed Technicians in the Public Service

With downsizing and a lack of competitive compensation, it appears that employing professional staff with specialized skills is no longer seen as a realistic objective for the provincial government. As part of this shift, the government has promoted the notion that licensed professional foresters and geologists, etc., can be replaced by resource professionals with generic knowledge. It has acted to downgrade job descriptions and increasingly hires mine inspectors without the geotechnical background that licensed professional engineers bring. Since engineers and geoscientist are increasingly difficult to recruit for mine inspector positions, there has been an increasing reliance on non-licensed applicants to fill these positions.

Human Resources in the BC Public Service

Ongoing reductions in the BC Public Service come at a time when calls are being made for increased staffing resources. In a 2010 memo from Doug Konkin, the then-deputy minister of environment, Konkin identified staffing resources as a key area where improvements could be made to dam safety. He noted that current staff levels were resulting in “staff being slightly behind on scheduled audits and left little time for follow-up of outstanding issues identified during these audits. Additional staff resources would allow for more frequent audits, follow-up on problem dams.”¹⁵ Senior officials in the Ministry of Environment have also flagged reduced staffing for dam inspections as a concern.

12 Rachel O’Connor, *Benchmarking Report: PEA GLP – Compensation Review* (Victoria: Professional Employees Association, 2013), 9.

13 *Ibid.*, 29.

14 2013 Canadian Cross Jurisdiction Survey. See Appendix D for the full report.

15 See Appendix E for the full memo.

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A direct impact of reduced licensed science officers in the public service is fewer mine inspections. The number of mine-inspector visits in BC dropped from 2,021 in 2001 to only 399 in 2004. This decrease was a direct result of the massive layoffs and staff reductions of the early 2000s. The number of inspections has since increased to 1,163 in 2012, though it remains a long way from the high standards of oversight provided prior to 2000. As the BC government contemplates increasing the level of mining activity in BC, it is essential that staff resources be developed to an adequate level for managing this growing industry.

The 2011 BC Jobs Plan identified mining as one of BC's eight key sectors for continued economic growth and contained aggressive targets for expansion including eight new mines and nine mine expansions by 2015. Since those targets were set in 2011, staffing government reductions in the natural resource ministries have continued. As BC continues to increase mining operations, major systemic issues need to be addressed to prevent further threats to public safety and the environment.

Why Licensed Professionals Are Needed in the Public Service

Licensed science officers provide the expert advice and information that the BC government needs to make good decisions about the management of natural resources. Our safety, our environment and our economy are being put at risk by eliminating BC's government scientists and engineers. The stewardship and oversight of mining operations requires an adequate number of geologists, geoscientists, hydrologists, geotechnical inspectors and engineers who can provide independent review, analysis, research, and advice to guide the efficient and effective management of our resource base. Since 2004, the BC government has cut the number of licensed science officers responsible for mining in the BC public service by 21 per cent. These are the engineers and scientists responsible for oversight of all the mines in BC.

Since 2003, the government of BC has increasingly been hiring non-licensed technicians and technologists in place of licensed engineers and scientists. This shift in practice is partly the result of difficulties in recruiting professionals and partly due to a philosophy of relying more heavily on consulting professionals. Licensed science officers have more education and more stringent certification and licensing requirements than technicians and technologists. This provides a greater value to the public when considering the management of BC's natural resources. Maintaining a workforce of licensed science officers provides stability and continuity and is more cost-effective than hiring external contractors. Adequate compensation could minimize the risks associated with greater reliance on lower-skilled technicians and technologist and outside consultants.

CONCLUSION

The Mount Polley accident has provided a wake-up call for government and industry to address the growing deficit of skilled professionals in the BC public service. The government must now act to address inefficiencies in the current professional reliance model and take steps to reverse the staffing cutbacks plaguing the public service. Only when BC's base of skilled professionals has been restored to a more robust level will the province be able to properly monitor activities on crown land and provide assurance to the public that the environment and their safety are not being jeopardized as mining and other resources are developed. Without the trust of the public, the social license to develop BC's vast natural resources will be revoked in the minds of many citizens.

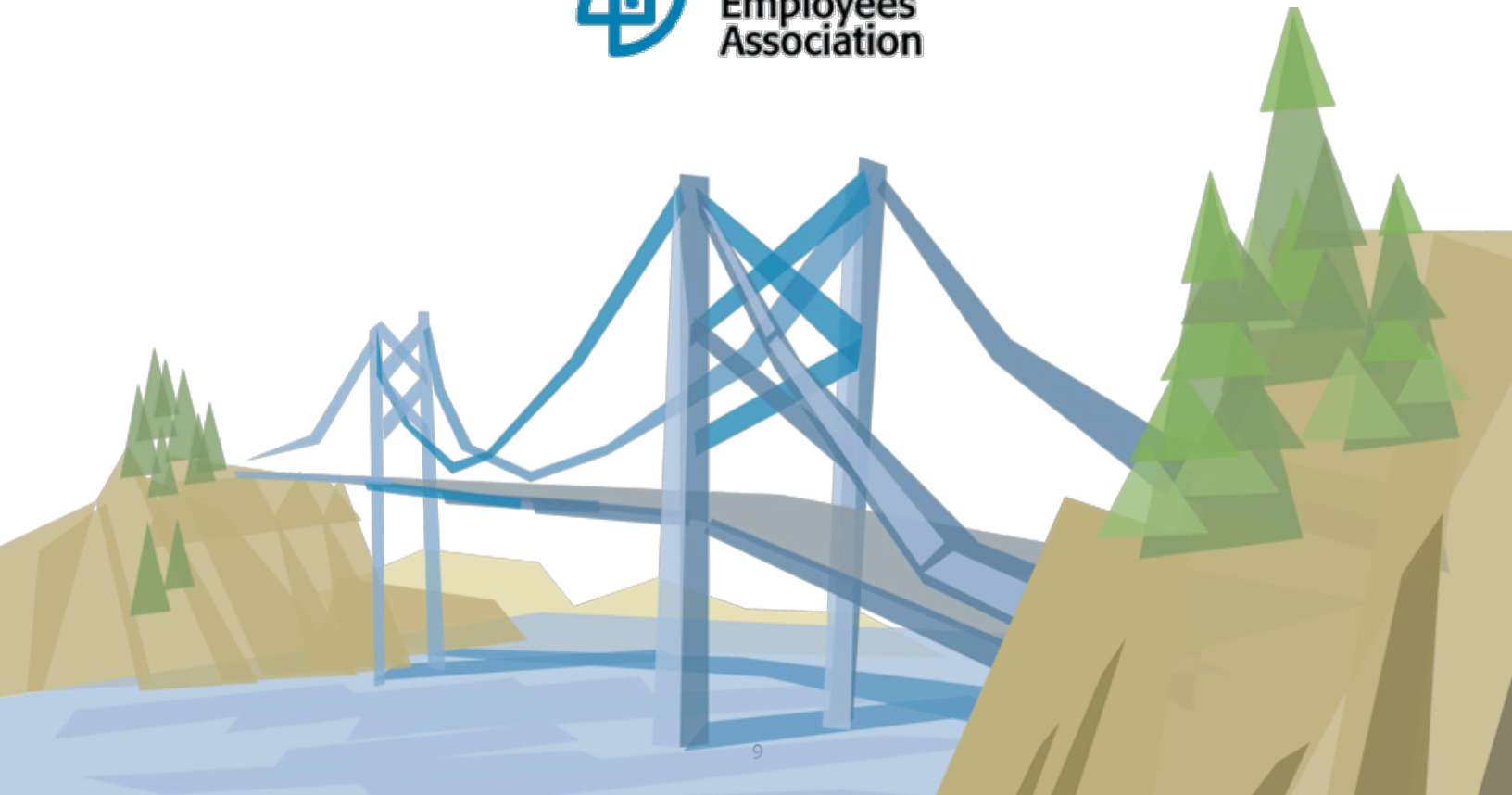
We submit the following recommendations for the investigation panel's consideration:

1. The Ministry of Energy and Mines should immediately increase the number of annual mining inspections it conducts to reflect reasonable historical levels. All aspects of the current regulations applying to mines and mine safety should be reviewed and revised to ensure appropriate oversight is taking place.
2. The BC government should increase the number of mining inspectors, geotechnical inspectors and environment protection officers to be able to meet the regulatory requirements governing the current and future activities of the mining industry.
3. All mining inspectors should possess the geotechnical skills and expertise to assess tailings ponds and other aspects of mining operations for safety and environmental concerns. The government should abandon its practice of hiring outside consultants into mining inspector roles and develop a comprehensive workforce-development plan to ensure sufficient internal professional expertise in the public service.
4. The government should engage an independent, suitably qualified third party or commission to carry out a comprehensive review of BC's professional reliance model. The review should encompass, among other matters, the capability and capacity of professional government staff to carry out monitoring and compliance and enforcement to protect the public interest.
5. The government should bolster its approach to whistleblower protection for public service employees who have knowledge of issues that pose potential risk to the environment or public safety.

We thank the investigation and review panel their consideration.

REVIEW AND ASSESSMENT OF THE IMPACTS OF THE PROVINCE OF BRITISH COLUMBIA'S CUTBACKS IN GOVERNMENT LICENSED SCIENCE OFFICERS

March 2014



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REVIEW AND ASSESSMENT OF THE IMPACTS OF THE PROVINCE OF BRITISH COLUMBIA'S CUTBACKS IN GOVERNMENT LICENSED SCIENCE OFFICERS

A report by the Professional Employees Association

March 2014

Overview

The Professional Employees Association is a labour union representing approximately 2,500 British Columbia professionals in nine chapters. One of its chapters is for Government Licensed Science Officers employed by the provincial government. As of February 2014, this chapter had 1153 members – a decrease of 15 percent since 2009.

[Government Licensed Science Officers](#) include foresters, engineers, agrologists, geoscientists, veterinarians, psychologists, physiotherapists and pharmacists. They provide the provincial government with advice, guidance, research, monitoring and review services to help ensure the efficient and effective management, utilization and oversight of B.C.'s natural resources, infrastructure, food and water resources and some aspects of health care services.

Over the past several years, the number of Government Licensed Science Officers employed by the government has declined sharply due to staff cutbacks and an unwillingness to replace people who retire or resign. Between 2009 and 2014, the number of Government Licensed Science Officers in government service dropped by 15 per cent.

This is an important issue because natural resources are the backbone of the B.C. economy and neglecting their management and monitoring is a threat to the current and future well-being of all British Columbians.

As a result of the reduced number of Government Licensed Science Officers, much of the work they were doing has been cut back, discontinued or contracted out to the private sector. The implications for the people of B.C. could include:

- Loss of resource revenue due to reduced oversight;
- The degradation of forest resources due to inadequate monitoring and inspection;
- Public safety threats if infrastructure like bridges and water supply facilities are not regularly inspected and monitored;
- Threats to the environment if development impacts are not properly assessed;
- Bad decision-making by technical staff due to little or no professional guidance and advice, and;
- Irretrievable loss of ongoing research data due to lack of staff to do the work.

The purpose of this [report](#) is to draw public attention to the implications for all British Columbians of the decline in the number of Government Licensed Science Officers serving their interests and helping protect their natural resources and infrastructure assets. It is not intended to be a definitive study, but rather a snapshot from the perspective of Government Licensed Science Officers themselves to highlight a serious and growing problem.

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Declining numbers

Between 2009 and 2014 there was a significant decline in the number of Government Licensed Science Officers employed by the provincial government as illustrated by the following table:

	2009	2014	% decline	% increase
Foresters	722	529	27	-
Agrologists	190	147	23	-
Geoscientists	49	44	10	-
Engineers	232	216	7	-
Psychologists	60	57	5	-
Veterinarians	16	11	31	-
Pharmacists	16	20	-	25
Physiotherapists	3	4	-	33
Other	71	125	-	76
Total	1,359	1,153	15	-

- Data sourced from BC Government Union-Check Off Lists provided to the Professional Employees Association.
- The “Licensed Science Officer – Other” category may include small numbers of foresters and agrologists, but they do not make up for the losses in the forester and agrologist categories.

The broader implications of the declining number of Government Licensed Science Officers

- **The degradation of forest resources due to inadequate monitoring and inspection.**

A [report](#) by the B.C. Auditor General in February 2012 concluded that the Ministry of Forests, Lands and Natural Resource Operations did not have the capacity to gather enough information to know what’s happening on the ground in B.C.’s forests.

The report noted that the province’s forests contribute to employment, tourism and recreational opportunities, and generate significant revenue for government to finance public services. But current forest management practices that allow private companies to hire forest professionals to oversee and report on their activities are questionable. Forest companies must submit forest stewardship plans to Government to harvest timber. These plans stipulate how the companies will address reforestation and other values. With legislative changes in 2004, these plans are now developed by private sector companies with only minimal oversight from Government Licensed Science Officers.

“We found ministry reports pointing to concerns within individual components of the oversight framework, particularly in the areas of forest stewardship plans, compliance and enforcement and effectiveness evaluations.

“We found two reports that reviewed the utility of forest stewardship plans, both of which identified a number of weaknesses in the plans. A Forest Practices Board report looking at the initial plans found that they generally stated vague and non-measurable commitments that could restrict the ministry’s ability to enforce or hold licensees

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accountable.

“Similarly, in 2009 the ministry evaluated a sample of forest stewardship plans to determine what the plan holders intended to achieve in relation to their restocking obligations. It determined that the plans proposed few innovations in forest practices, as they were generally very similar to the default standards provided by the ministry. The findings of our own review of 15 recent forest stewardship plans were similar to those in these two reports.”

The AG’s report also noted that a key component of the timber supply review is assessing the forest inventory, which involves identifying the vegetation and land-based attributes of a timber supply area. This includes aerial imagery and ground sampling to ensure that the ministry has sufficient information to support well-informed decisions.

“We found cases where the ministry lacks the information needed to accurately categorize the attributes of a forested area. In particular, the ministry has limited information on areas affected by pests, diseases, wildfires and other natural disturbances. This is because only small portions of the affected areas are ground surveyed to the extent needed to inform decision-making and assist in timber supply reviews.”

The AG concluded that the ministry’s reliance on industry to update forest inventory information was not working properly because reports required modification when mapping or silviculture data was missing or did not meet the ministry data quality specifications.

“The effect of these deficiencies is that until these records are corrected, they will not be used to update the forest cover inventory, limiting the completeness of the information and its overall usefulness for monitoring and decision-making purposes. Again, this means the Chief Forester has to try to estimate the effect of the disturbances rather than rely on a more valid, updated inventory.”

The AG also found that the government relies on forest professionals hired by industry to make stewardship recommendations to government. But internal ministry reports indicated concerns with this practice, particularly with forest stewardship, compliance and enforcement and effectiveness evaluations.

This lack of proper stewardship has significant financial implications for British Columbians. The government takes in half a billion dollars annually from forestry and this revenue pays for public services. In addition, our forest product exports are worth close to \$10 billion annually and the total value of BC’s timber supply is estimated to be a quarter of a trillion dollars. It makes sense to invest in the proper science to maintain this revenue stream and the biodiversity to make it sustainable.

- **A threat to public safety if infrastructure including bridges and water supply facilities are not regularly inspected and monitored.**

Bridge overload assessment: Government Engineers assess requests for industry vehicles to

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cross Ministry of Transport (MoT) bridges. Often, these vehicles are carrying heavy equipment such as hydroelectric transformers and machinery for the oil and gas, mining and construction industries. The extraordinary weight of these vehicles means the loads must be assessed to ensure that it's safe for them to use public bridges. Overload requests have increased from 11 in 1989 to an estimated 1,000 in 2012. Five different consulting companies have been retained to evaluate overload requests. They were paid approximately \$3.1-million in 2012 at an hourly rate well above what the government paid its own engineers before the work was outsourced.

Unsafe resource bridges: In a report just released, the Forest Practices Board looked at bridges built on resource roads in B.C. since January 2010. The Forest Practices Board is B.C.'s independent watchdog for sound forest and range practices, reporting its findings and recommendations directly to the public and government. The special investigation focused on safety, protection of the environment and planning. Of the 216 bridges examined, 19 were not safe and another 13 were flagged because of serious safety concerns. Only 60 per cent of the 213 bridges inspected had complete plans and on 73 there was no sign-off by a professional engineer to verify that they were planned and built properly. The government has outsourced responsibility for sign-off and safety of B.C. resource bridges to independent companies.

"This report is a wake-up call to those who are not complying with the law or the professional practice guidelines. Due to the potentially significant consequences, there are no corners to cut when it comes to bridge design, planning and construction. The public and government expect and deserve high safety, environmental and professional standards, but those standards are not currently being met."

- **Threats to the environment if development impacts are not properly assessed.**

Overseeing hydroelectric projects: Environmental and engineering professionals ensure that potential environmental impacts are properly managed in the construction and operation of hydroelectric projects. Historically, this work was done by Government Licensed Science Officers. However, changes in the regulatory approach in the past decade allow the licensees to hire consultants to monitor the construction. Reduction in the number of Government Licensed Science Officers over the same period has forced the government to rely heavily on outside consultants to ensure regulatory compliance. The effectiveness varies with the individual consultant's understanding of government and public interests. This also raises the possibility of a conflict of interest and undermines public confidence in the process.

- **Bad decision-making by technical staff due to little or no guidance and advice.**

Reviewing reports of external Professional: In the past decade, many technical reports used as the basis for regulatory decisions have been prepared by external consultants and paid for by the regulated parties. The technical content of many of these reports may not have been critically reviewed in detail by experienced and knowledgeable Government Licensed Science Officers. In fact, a significant number of the reports that were reviewed included conclusions that were inappropriate due to incorrect or biased analyses. It is difficult to establish the cause of these errors. They may have been due to resource constraints (time and budget) or may have been deliberate due to a conflict of interest. Had they not been identified and corrected, many of these errors would have resulted in regulatory decisions that favored the regulated party and

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adversely impacted the environment. Without a sufficient number of experienced and knowledgeable Government Licensed Science Officers to critically review consultant reports, the management and use of B.C.'s natural resources could be compromised.

- **Irretrievable loss of ongoing research data due to lack of staff to do the work.**

Gathering data is essential to accurate long-term planning: The efficient and sustainable use of B.C.'s natural resources depends on careful and accurate planning. In the forest sector in particular, data gathered on the ground by Government Licensed Science Officers in years past provided the basis for timber resource management, the control of pests and the health of the forests. The reduction in the number of Government Licensed Science Officers means much of that data is no longer being collected, leaving big gaps in long-term trend analysis that government is now trying to plug by what amounts to guess work based on aerial imaging of some – but not all – forest lands.

- **Loss of public confidence in the overview and assessment process if private sector proponents of resource development projects are not independently monitored.**

The development of the LNG sector needs more, not fewer Government Licensed Science Officers: B.C. is on the verge of what the government believes will be some of the biggest natural resource development projects the province has ever seen. They could be worth hundreds of billions of dollars over the next few decades. While these projects have the potential for significant benefit for British Columbians, they could become major liabilities if oversight, regulation and stewardship are left almost exclusively to the proponents and their own consultants. Now more than ever, B.C. needs Government Licensed Science Officers to ensure that the LNG sector is developed in a way that provides the maximum possible protection to the environment and is in line with the needs and wishes of the communities in the north.

Conclusion

Government Licensed Science Officers are professionally trained and accredited experts and scientists. They are the first-line stewards of B.C.'s natural resources and primary protectors of the safety of public infrastructure facilities. The PEA believes there are now not enough experts working for the province to adequately look after the interests of British Columbians - and the situation is getting worse.

49 ‘dangerous occurrences’ at B.C. mine tailings ponds in past decade: ministry data



Dangerous occurrences at tailings storage facilities at mines in B.C. between 2000 and 2012 included a breach of a dike, the discovery of sinkholes and leaked tailings.

The vast majority of the dangerous occurrences involved incidents with equipment, which crashed, sunk into tailings storage facilities or flipped over. In several cases, workers were injured and two workers died.

The B.C. Ministry of Energy and Mines provided details of 49 dangerous occurrences at tailings ponds at the request of The Vancouver Sun following Imperial Metals' Mount Polley tailings dam collapse on Aug. 4.

The dam failure released millions of cubic metres of water and tailings containing potentially toxic metals into Quesnel Lake in central B.C., and has increased scrutiny at the province's 98 tailings facilities, which store mine waste.

The chief inspector of mines' annual reports provide an annual breakdown of the number of dangerous occurrences, but the mines ministry initially balked at providing details of the dangerous occurrences, requested 10 days ago.

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Neither B.C. Mines Minister Bill Bennett nor chief inspector of mines Al Hoffman were available for comment Monday.

“(The dike breach, the sinkholes and tailings leakage) were contained to the respective mine sites and posed no risk to the public,” mines ministry spokesman David Haslam said in a written statement.

Mining Watch Canada program coordinator Ramsey Hart said the dangerous occurrence details should be part of routine disclosure.

“I think the public and even investors would welcome that,” said Hart, noting that information on corrective measures and effects is also needed to provide context.

The incidents that involve tailings facility safety and potential environmental effects included the breach of a new tailings dike for 20 to 30 minutes at the Craigmont copper mine near Merritt on June 3, 2002 at 4 a.m.

Water passed over the dike into a trap and flooded the area before it could be contained. A machine operator constructed a temporary berm on top of the tailings dike to contain the flow, said the government records.

The Craigmont copper mining operation was closed in 1982, but the mine has been operated since to produce magnetite for the coal industry. Companies are responsible for maintaining tailings facilities at closed mines.

On July 27, 2002, sinkholes were discovered at Northgate Gold’s Kemess South gold and copper mine in northern B.C., approximately 250 kilometres north of Smithers. The sinkholes were on the tailings beach, an important buffer between the dam’s embankment and water in the pond.

The largest sinkhole was about 0.7 metres in diameter and the surface had dropped about 0.7 metres into the hole, according to the government information. The Kemess South mine closed in 2011.

Northgate Minerals was purchased three years ago by AuRico Gold, which has responsibility for the Kemess South 375-hectare tailings storage facility and one-kilometre-long, 140-metre-high dam.

AuRico Gold chief operating officer Peter MacPhail said some changes in geotechnical design were made following the discovery of the sinkholes. There were no further incidents, he said.

MacPhail noted the tailings facility (which is in reclamation mode) receives an annual inspection from geotechnical engineers and has a robust design. “It gets a lot of monitoring. There is still staff up there,” he noted.

APPENDIX B

On Sept. 1, 2004, at Barrick Gold's Eskay Creek gold-silver mine, failure of a flow-measuring device on the tailings line caused about 12.5 tonnes of tailings to leak on the ground. The province said all the tailings were recovered. The mine, about 200 kilometres north of Terrace, closed in 2008.

Other incidents involving discharges from tailings storage facilities included:

- On May 21, 2002, water ran over the edge of the MSA North pit at Teck's Line Creek coal operations near Sparwood, causing a mudslide, filling a settling pond and causing muddy water to run into Line Creek.
- On June 25, 2004, turbid water was flowing from a pipe below the tailings pond at the Premier gold mine near Stewart in northwestern B.C. The pipes, part of an old system, were closed after the incident, says the province.

Imperial Metals' Mount Polley mine had two dangerous occurrences between 2000 and 2012, but neither involved dam safety, according to the mine's ministry records.

On Jan. 12, 2007, a hoe machine used for digging flipped on its side when its track went into a hole created by the flow of a discharge pipe. The machine operator smashed the window, waded out and made it to his pickup truck to call for help.

On May 19, 2006, a haul truck owned by a contractor rolled over on its side near the lower main embankment of the tailings storage facility. The primary cause of the rollover was excessive speed, government records stated.

The province has said that in May 2014, the water level in Mount Polley's four-square-kilometre tailings pond was too high, and that the company was ordered to reduce the level by pumping into adjacent pits.

The definition of dangerous occurrences includes the loss of adequate freeboard (the distance between the water level and top of dam), but no instances were recorded by the chief inspector of mines between 2000 and 2012.

Incidents in 2013 are still being reviewed and results will be published in December, according to the province.

Imperial Metals' Huckleberry mine near Houston in northern B.C. recorded five dangerous occurrences, but none were related to dam safety.

One of the fatalities occurred at the Red Mountain mine near Rossland in 2001 when a youth drowned in an abandoned surface pit which had filled with water.

The other fatality took place at Craigmont Mines in 2008 when an excavator working in a water-filled area

tipped over. Operator John Wilson drowned.

The chief inspector of mines has ordered all mines to move up the date of their annual dam safety inspections by four months to Dec. 1. That inspection must be reviewed by a third-party engineer not associated with the tailings storage facility, the inspector has ordered.

[49 Dangerous Occurrences at B.C. Mines](#) by [The Vancouver Sun](#)

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Hunters, guides, trappers call for more provincial oversight of gas and mining sectors



A trio of B.C. groups representing recreational hunters and fishers, guide outfitters and trappers are calling on the B.C. government to retake control of resource extraction practices, planning and oversight.

The 43,000-member B.C. Wildlife Federation, B.C. Trappers Association and the Guide Outfitters Association of B.C. say they believe the government's move in the past decade to rely on professionals hired by industry to make decisions on the land base, with little oversight, has failed.

Forests, Lands and Natural Resources Minister Steve Thomson said Friday he believes professional

APPENDIX C

reliance is working, but is willing to discuss concerns with the groups.

In an Oct. 29 letter to Thomson (and copied to Premier Christy Clark), the organizations said legislative changes are needed, and recommended the role of the Forest Practices Board be expanded to include resource sectors including mining and the oil and gas industry.

The Forest Practices Board, created under the NDP in the mid-90s, is an independent watchdog agency that reports directly to the B.C. legislature. The board audits and releases reports on individual forest companies but also on larger concerns such as the effects of wide-scale logging of beetle-killed timber.

In an interview Friday, Al Martin, B.C. Wildlife Federation director of strategic initiatives, said the changes also need to include hiring more government inspectors.

Noting that the BCWF is not opposed to resource development, Martin said the changes they are asking for “basically provide a counterbalance to the economic development agenda” to ensure the environment is being protected.

Relying on industry professionals does not allow the province to pay enough attention to the cumulative effects that industrial development has on areas for wildlife, watersheds and ecosystems, he said.

Martin said the changes will also help rebuild the public’s trust in environmental protection.

A March B.C. Ombudsperson report on the use of professional reliance to protect sensitive areas around streams during logging concluded there had been a lack of oversight, training, information and reporting by the provincial government.

Criticism has also been levied on inadequate government oversight in the aftermath of the collapse of Imperial Metals’ Mount Polley gold and copper mine tailings dam.

The Vancouver Sun reported last month that the B.C. government conducted no geotechnical inspections of the Mount Polley mine in 2009, 2010 and 2011, and only five geotechnical inspections of B.C.’s 60 operating and shuttered mines in 2010 and 2011.

Inspections have increased since then, and the B.C. government has hired additional geotechnical inspectors.

Martin pointed to the destruction of nine-kilometre Hazeltine Creek from the Mount Polley dam collapse, which spilled millions of cubic metres of water and potentially toxic tailings into Quesnel Lake, and the uncertain effects on aquatic life, including important sockeye salmon.

Thomson, the forests and natural resources minister, said although the government’s view is that the

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model of professional reliance is working, it is open to “exploring” different ways of ensuring good stewardship. “We are not convinced that additional government bureaucracy is necessarily the best way to achieve that,” he said.

Thomson noted the government is working on a policy that would put a greater focus on the assessment of cumulative effects both by government resource managers and industry professionals. The policy also includes ensuring that First Nations interests are taken into consideration, he said.

Tim Ryan, chairman of the Forests Practices Board, said it is feasible for the organization to expand to other resource sectors as its auditors are already on the ground at forestry operations. The forestry operations are often adjacent to natural gas operations, mines, independent power producers and power transmission lines, he noted.

Ryan said it would not cost that much to expand its audits, noting its 22-person organization has had a budget of \$3.8 million for the past seven years.

The audit can end up being a tool for continuous improvement for industry, help assure markets their practices are sustainable, and foster public trust, Ryan said.

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2013 Canadian Cross Jurisdiction Survey PEA Positions

APPENDIX D

	Pharmacist 4 (Pharmacist)		Licensed Science Officer 4 Designated Petroleum Geologist (Senior Project Geologist)		Licensed Science Officer 4 Designated Professional Engineer (Civil Engineer)		Licensed Science Officer 4 Designated Professional Engineer (Petroleum Engineer)		Licensed Science Officer 3 (Forester/Agrologist)		Licensed Science Officer 3 (Mining Inspector)	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
British Columbia Hourly Rates	\$39.80	\$51.89	\$37.36	\$48.69	\$36.46	\$47.54	\$36.46	\$47.54	\$32.59	\$40.70	\$32.59	\$40.70
Average	\$ 39.59	\$ 50.64	\$ 38.67	\$ 48.52	\$ 39.15	\$ 49.48	\$ 41.57	\$ 50.92	\$ 34.31	\$ 44.07	\$ 35.59	\$ 43.33
% Comparison	0.53%	2.41%	-3.49%	0.35%	-7.38%	-4.08%	-14.03%	-7.10%	-5.30%	-8.28%	-9.22%	-6.45%
\$ Comparison	\$ 0.21	\$ 1.25	\$ (1.31)	\$ 0.17	\$ (2.69)	\$ (1.94)	\$ (5.11)	\$ (3.38)	\$ (1.73)	\$ (3.37)	\$ (3.00)	\$ (2.63)
Rank	4		6		8		6		5		7	
# of Matches	9		11		12		8		7		8	
British Columbia Annual Rates	\$72,679.84	\$94,770.75	\$68,237.89	\$88,978.87	\$66,579.77	\$86,816.76	\$66,579.77	\$86,816.76	\$59,510.74	\$74,328.68	\$59,510.74	\$74,328.68
Average	\$ 74,626.33	\$ 95,284.14	\$ 74,475.83	\$ 93,371.69	\$ 75,031.41	\$ 94,700.99	\$ 78,841.25	\$ 99,765.81	\$ 65,301.05	\$ 83,677.95	\$ 67,641.08	\$ 82,368.93
% Comparison	-2.68%	0.54%	-9.14%	-4.94%	-12.69%	-9.08%	-18.42%	-14.92%	-9.73%	-12.58%	-13.66%	-10.82%
\$ Comparison	\$ (1,946.49)	\$ (513.39)	\$ (6,237.94)	\$ (4,392.82)	\$ (8,451.64)	\$ (7,884.23)	\$ (12,261.48)	\$ (12,949.05)	\$ (5,790.31)	\$ (9,349.17)	\$ (8,130.34)	\$ (8,040.25)
Rank	6		8		10		7		7		7	
# of Matches	9		11		12		8		7		8	

Note:

- The "hof Matches" row does not include British Columbia. For example Pharmacist 4 is ranked fourth out of ten (including British Columbia).
- Where applicable, RRAs are included but OSS is not.
- New Brunswick did not participate in this survey.



Memorandum

Ministry of Environment
Water Management Branch

Date: September 22, 2010

To: Doug Konkin
Deputy Minister
Ministry of Environment

Re: Review of the Provincial Dam Safety Program

As requested, staff from the Ministry of Environment have conducted an internal review of the Dam Safety Program. I am writing to convey this report as well as provide you with my observations and recommendations for improving the program.

Background

BC is one of four provinces with a formalized dam safety program which provides oversight to nearly 2000 dams in the Province including some of the largest structures Canada. In a province with very diverse geologic, hydrologic and seismic conditions along with a variety of dam owners and operators, regulation of these structures can pose significant challenges.

In the late 1990's, in response to a significant dam failure a program review by Semmens and Adams and restructuring of the Dam Safety Program was undertaken. A copy of the Semmens and Adams report along with some of the details of the new program is contained in the attached material. The reader is encouraged to review the findings of this report, particularly the executive summary which provides a good overview of the issues. This current review will not attempt to reproduce this information, but will build on the previous recommendations and identify areas where the program can be further improved.

By the early 2000's the recommendations of this review were fully implemented and this is essentially the program that we are delivering today. The new dam safety program is "results-based" with considerable reliance on professionals and dam owners to maintain the safety of these structures. Fundamental to this new program was the shift in Ministry staff role from inspection functions to audit and education functions. The primary responsibility for the safety and operation of these structures rests with the dam owners.

Under this new approach it is anticipated that there will be a certain number of negative results, which in the field of dam safety are represented by dam failures or incidents. On average we have been experiencing several incidents and at least one dam failure in British Columbia annually. While it is possible to further reduce the number of these incidents and failures

through some of the recommendations outlined below, it is not possible to completely eliminate them. In fact if we wish to reduce these incidents and failures to near zero, we may need to move towards a more prescriptive model, and even then they will not entirely be eliminated. The Semmens and Adams report states that “Dams can and do fail”, as a compelling and factual reality.

In general I believe that we have a good, effective, modern dam safety program, however it could be improved through a modest increase in resources along with a refocusing of efforts as described below.

Observations and Recommendations

1. Priority

Many of the provincial Dam Safety Officers do not work full time on dam safety issues and other competing priorities such as water licensing, IPPs and flood safety issues take time away from dam safety activities. Ensuring dam safety activities are a priority for these individuals is essential for an effective dam safety program.

The Province and specifically the Ministry of Environment currently owns and operate a number of dams. Some of these structures are not fully compliant with the Dam Safety Regulations with respect to inspection, operation and review. Compliance with the Regulations must be a priority for all provincial staff.

Many of these provincial dams have been constructed or acquired over the years for flood control, water supply or habitat enhancement purposes; however inspection and maintenance resources to manage these structures are not always available. Some dams have been transferred or defaulted to the Province and continue to be maintained on an ad hoc basis. The suite of dams owned by the Province should be reviewed; a business case for their operation or removal should be developed, along with a plan for removal of those structures that are no longer required.

2. Resources

The Dam Safety Program was transformed to a results-based model in part due to the excessive resources required to maintain the existing approach. After the transformation the Ministry assigned approximately 8.5 full-time equivalents (FTEs) to this program, however this number has fallen to 5.5 in recent years. This has resulted in staff being slightly behind on scheduled audits and left little time for follow-up of outstanding issues identified during these audits. Additional staff resources would allow for more frequent audits, follow-up on problem dams and an application of the Dam Safety Program as originally designed.

3. Program Design

While the Provincial Dam Safety Program is a good model there are a number of minor improvements that could be made. These include a change to the Dam Safety Regulation which would bring the classification system in line with the 2007 Canadian Dam Association

Guidelines, along with the minor updates of the provincial dam database. In addition, an internal review of consequence classifications for all dams in BC may be warranted, however this is a highly technical, labour intensive process. Although the program currently has an 87% return of annual compliance reports a review of the regulatory framework in regard to improving that number and general efficiency and effectiveness should be undertaken.

4. Other Related Risks

While the recent failure of the dam near Oliver has brought attention to the dam safety program there are several other water related risks that could attract future attention from a similar failure.

Mine tailing dams are not regulated by the provincial Dam Safety Program, even though they are similar in nature. An MOU exists between the Ministry of Environment (MOE) and the Ministry of Energy Mines and Petroleum Resources (MEMPR) which assigns MEMPR as the lead with respect to these structures. The public is not likely to make the distinction between one of these structures and a regulated dam, so a consistent approach to risk ranking and mitigation could be advantageous. MOE staff will explore these issues with MEMPR staff.

The majority of the **dikes** in the province, both those with an identified owner and orphan structures (provincial) do not meet current provincial standards. In many cases regular inspection and maintenance of these structures is not being undertaken by the owners. It is therefore very possible that failures of these structures could occur during flood events, below design levels. The current provincial Flood Protection Program is addressing some of the infrastructure upgrades associated with these structures; however a considerable backlog in inspection, maintenance and capital investment exists.

Associated with the 44,000 water licenses in the province are **authorized works**, most of which are not covered by the Dam Safety Regulations. A very small portion of these works do include structures which could pose a risk to public safety. These include high pressure water conveyance structures such as pipelines and penstocks along with other works associated with the hydroelectric industry. IPPs, most of which are run of river include many works not associated with a dam. As such they are not subject to the normal audit programs. Due to the limited number of these types of works and a high standard of design the overall risk is generally low, however it may be prudent to identify any higher consequence structures for additional oversight similar to the Dam Safety Program.

Conclusions

The model and tools employed by the Provincial Dam Safety Program are appropriate; however the effectiveness could be significantly improved with some relatively minor resource and program enhancements as outlined above. There are some related hazards associated with other water control structures which could also be reduced by a similar review.

Glen Davidson, P.Eng.
Comptroller of Water Rights
Ministry of Environment

Report on the BC Dam Safety Program 1967 to 2010

Introduction:

This report will describe the development of the BC Dam Safety Program from 1967 until the present day. The report was commissioned as a result of the events that occurred near Oliver BC on June 13, 2010 when the failure of a small dam apparently triggered a destructive debris torrent in the Testalinden Creek adjacent to the Okanagan River.

History of Dam Failures in British Columbia:

Despite the large number of dams in BC, there have been only two known fatalities as a result of dam failures. The first occurred in 1912 in the Vancouver Island port community of Union Bay. The Langley Lake Dam, which was poorly designed, collapsed during a winter rainstorm causing extensive damage to part of the town and the coal loading facility. Due to some advanced warning, the densely populated lower creek area was quickly evacuated, but one person died in the flood. During the 1948 spring flooding, a placer miner went missing following the failure of the Devick Lake Dam 30 kilometres north east of Kamloops. The body was never recovered and he was presumed drowned by the dam failure inundation. The main CN rail line was washed out on the North Thompson River, and considerable damage was done in the Heffley Creek area.

In the last 30 years, on average, there has been one recorded dam failure per year. Most of these failed dams have been small dams which caused minor damage which was sometimes reported in local media. The Cannon Creek Dam breach, in May 1995, was the most damaging failure in that time period (until the events near Oliver, June 13, 2010) and the impact on the Dam Safety Program was far reaching. This report will describe the development of the BC Dam Safety Program before the Cannon Creek Dam failure and after, and will explain how this near disaster was the catalyst for change. The report will outline the findings of the formal review of the provincial Dam Safety Program, conducted in 1996, and then focus on how the program evolved after that.

Dam Safety Program History

Prior to the establishment of the current provincial dam safety program in 1967, the safety of dams was regulated by Regional Engineers on an ad hoc basis. A number of dams failed during the flood season of 1948 causing wide spread damage and one fatality. An index of dams for the Interior of BC was created following the 1948 floods and dam inspections by Regional Engineers and technical staff were carried out. The dam building boom of the 1960's created the need for a formal Dam Safety Program to review and authorize the construction of major projects such as the WAC Bennett and the Mica Dams and to inspect all major dams. The Provincial Dam Safety Program was established in Victoria in 1967 by the Comptroller of Water Rights to ensure that Major Dams in the province were designed, constructed, operated and maintained to acceptable standards for public safety. Major Dams were initially defined as meeting the size criteria for ICOLD⁴ dams, but soon the dam height definition was dropped from 15m (50 feet) to 9m (30 feet). Smaller dams continued to be inspected by Water Rights staff in some regions under the Regional Engineers. The regional offices began to turn to the Dam Safety Program in Victoria for assistance with plans review and approval. Additional staff were added in Victoria in 1971 and 1975 to undertake dam inspections as well as specialized work such as underwater inspections and dam

⁴ International Commission on Large Dams