

THE COSTS OF UNCERTAINTY:  
REGULATING HEALTH AND SAFETY  
IN THE CANADIAN URANIUM INDUSTRY

By

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## EDITOR'S FOREWORD

The CRS working paper series examines the policy implications of current issues and problems relating to mineral resources in Canada. This study represents independent research supported by the Centre for Resource Studies. It was prepared under the supervision of Professor Richard Simeon of the Institute of Intergovernmental Relations, and jointly sponsored by the Institute of Intergovernmental Relations and the Centre for Resource Studies.

It is hoped that this work will provide background information for the ongoing process of change in the field of regulation of uranium mining, and will stimulate further research and feedback.

The views presented are those of the author, and do not necessarily represent the views of the Centre for Resource Studies, the Institute of Intergovernmental Relations, or their sponsors.

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## SUMMARY

Federalism, and particularly federal/provincial jurisdictional relationships, have led to considerable uncertainty in the regulation of occupational health and safety and of environmental protection in the Canadian uranium mining industry.

The two principal uranium producing provinces in Canada are Saskatchewan and Ontario. Since 1978, in an attempt to avoid constitutional issues, both these provinces and the federal government as well have proceeded unilaterally with health and safety reforms for the industry. In Saskatchewan this has resulted in areas of overlapping jurisdiction, which have led to uncertainty over the legal enforceability of the provincial regulations. In Ontario, the province has left significant gaps in the protection of both workers and the environment. Little progress can be expected in eliminating these gaps and overlaps until the current administrative and jurisdictional arrangements are understood.

Much-needed reforms have been prevented by the federal-provincial conflicts over the constitutional rights of each level to regulate in this sector. The jurisdictional issue should be resolved as soon as possible. Recommended changes include the following:

- i the Atomic Energy Control Board should withdraw from the regulation of all aspects of occupational health and safety and environmental protection in the uranium mining sector;
- ii a system of concurrent jurisdiction, modelled on that which already exists for environmental protection in other sectors should be established;
- iii federal line departments (Labour and Environment) should set minimum national standards for both conventional and radiological hazards, in occupational health and safety and environmental protection;
- iv provincial line departments should be free to introduce more stringent regulations if they wish, and should be responsible for monitoring and enforcement of all regulations;
- v these changes should be effected through amendments to the 1946 Atomic Energy Control Act.

The natural resources sector promises to be the focus of intense intergovernmental conflict and negotiation in the coming decade. Anything which can be done to resolve this particular regulatory issue may therefore help to ease the pressures in the larger context, and at the same time bring about needed improvements in the standards of occupational and environmental protection in the uranium mining industry.

## RÉSUMÉ

Le fédéralisme, et plus particulièrement les relations juridictionnelles fédérales-provinciales, causent une incertitude considérable quant à la réglementation de l'hygiène et de la sécurité des travailleurs et de la protection de l'environnement dans le secteur de l'industrie des mines de l'uranium.

Les deux principales provinces canadiennes productrices d'uranium sont le Saskatchewan et l'Ontario. Dans le but d'éviter de soulever des questions constitutionnelles, ces deux provinces, de même que le gouvernement fédéral, ont depuis 1978 réformé unilatéralement l'hygiène et la sécurité des travailleurs de l'industrie. En Saskatchewan, cette situation a créé des interférences de juridiction, mettant ainsi en doute la légalité des réglementations provinciales. En Ontario, la province a laissé des lacunes importantes dans la protection des travailleurs comme dans celle de l'environnement. On ne peut espérer de grands progrès dans l'élimination de ces lacunes et de ces interférences avant que les dispositions administratives et juridictionnelles actuellement en vigueur ne soient clarifiées.

Des réformes urgentes n'ont pu être mises en oeuvre en raison des conflits opposant les provinces au gouvernement fédéral sur la question de l'autorité constitutionnelle reconnue dans ce secteur à chaque niveau gouvernemental. Il est essentiel de résoudre cette question de juridiction aussitôt que possible. Voici quelques-unes des réformes recommandées:

- i retirer à la Commission de l'Energie Atomique toute la réglementation de l'hygiène et de la sécurité des travailleurs et de la protection de l'environnement dans le secteur des mines d'uranium;
- ii établir un système de juridiction concourante sur le modèle de celui qui existe déjà dans d'autres secteurs pour la protection de l'environnement;
- iii demander aux ministères fédéraux (Main-d'oeuvre et Environnement) d'établir à l'échelle nationale des normes minimales réglementant les risques conventionnels ainsi que l'exposition aux radiations, dans le domaine de l'hygiène et de la sécurité des travailleurs et de la protection de l'environnement;
- iv donner aux gouvernements provinciaux l'autorité de promulguer à leur discrétion des règlements plus stricts, ainsi que la responsabilité de contrôler l'application de tous les règlements;
- v effectuer ces réformes au moyen d'amendements à la Loi sur l'Energie Atomique de 1946.

Au cours de la prochaine décennie, le secteur des ressources naturelles donnera vraisemblablement lieu à bien des conflits et à bien des négociations entre gouvernements. Toute solution apportée à cette question spécifique de réglementation pourra donc contribuer à atténuer les pressions qui s'exercent dans un contexte plus général, tout en améliorant utilement les normes de protection des travailleurs et de l'environnement dans le secteur des mines d'uranium.

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## 1. INTRODUCTION

The Interim Report of the Porter Commission states that 'the uranium mining and milling component contributes more to public radiation exposure than the remainder of the CANDU fuel cycle including the management of spent fuel.'<sup>1</sup> Two years later, in its Final Report, the commission added: 'The greatest uncertainty over regulatory responsibility and authority exists at the mining stage...'<sup>2</sup> This paper analyzes the causes and consequences of that uncertainty, examining the two principal regulatory fields in the uranium mining industry: occupational health and safety (OHS) and environmental protection (EP). It compares these two fields with one another, as well as comparing the regulatory regimes that exist in Ontario and Saskatchewan, the two provinces in which uranium is currently being mined in Canada.

The central aim of the study is to show how federalism generally, and federal-provincial discord in particular, have contributed to the uncertainty remarked upon by the Porter Commission. In broad terms, then, this is a study of the effects of differing priorities and goals of the governments involved in the uranium mining industry, and the division of legislative powers between them, on the regulatory process. In the course of research it has become clear that, at least in this case, the federal-provincial dimension is so central to current regulatory inadequacies that little progress can be made until the nature of, and reasons for, the current jurisdictional and administrative arrangements are understood.

The study concludes that much-needed reforms to both jurisdictional division of responsibilities and administrative procedures have been thwarted by federal-provincial conflicts over the constitutional right of each level to regulate in this sector. Since 1978, the desire to avoid further intergovernmental strife has prompted each level to proceed unilaterally, attempting to improve the situation through purely administrative reforms that skirt the constitutional issue.

The success of this strategy, and the problems arising from it, have varied according to the policy goals of the provincial governments concerned. In Saskatchewan the chief problems are overlaps, resulting in bureaucratic inefficiency and uncertainty concerning the legal enforceability of provincial regulations. In Ontario on the other hand, there are significant gaps in the legal protection of both workers and the environment resulting from the unwillingness of that government to act until the constitutional issue has been resolved. These are problems which neither provincial government can escape as long as the jurisdic-



tional issue remains controversial and uncertain, and policy goals remain unchanged.

The basic recommendation of this study is that the jurisdictional issue be resolved with all possible speed. Although almost any approach is bound to be controversial, it is argued here that the Atomic Energy Control Board (AECB) should withdraw from the regulation of all aspects of OHS and EP in the uranium mining sector, and that a situation of concurrent jurisdiction modelled on that which already exists in the EP field (outside of this sector) should be established. This means that the federal line departments (Labour Canada and Environment Canada) would set minimum national standards for both conventional and radiological hazards in the OHS and EP fields. The corresponding provincial line departments would then be free to introduce more stringent regulations if they so decide, and they would be responsible for the monitoring and enforcement of all regulations emerging from this arrangement. It is argued that the most effective means of bringing this about is via amendments to the 1946 Atomic Energy Control Act.

No federal inquiries have been conducted in this field, nor has there been any academic analysis, with the notable exception of Bruce Doern's studies. Consequently, this paper relies primarily on the reports of several provincial inquiries: the Ham and Porter Commissions and the Elliot Lake environmental assessment for Ontario; and the Bayda Commission for Saskatchewan<sup>3</sup>. In addition the work of the Select Committee on Ontario Hydro Affairs in 1980 has proved invaluable. As will become clear, their report and this one arrived at parallel conclusions, independently of one another as to the nature of the problems in this sector. We differ only in our recommendations.<sup>4</sup> Interviews with officials of the three relevant governments, trade unions, and business, and with other informed observers, have played a major role in supplementing and updating the work of the provincial inquiries.

The structure of the paper is as follows. Chapter 1 sets up the background to the study, outlining the nature of the hazards in the OHS and EP fields of the uranium mining industry, and the character of the federal-provincial arrangements that existed in this industry prior to the Ham Commission's report. It then summarizes the most important findings of the commission, and traces the political consequences of its report on the regulation of this sector up to the time of Bill C-14.

Chapter 2 examines the attempt by the federal government to reform the AECB's mandate and organization and to clarify jurisdictional uncertainty with a new piece of legislation, the Nuclear Control and Administration Act (Bill C-14) in

1977-78. It then outlines the provincial criticisms of the bill, and the federal response to them, explaining why the bill was allowed to die on the order paper.

Chapter 3 is the heart of the study. It outlines the responses of the two provincial governments to the jurisdictional uncertainty which prevailed in the wake of Bill C-14's demise. It examines the OHS and EP fields in turn, and outlines the major problems in each - gaps and overlaps - that can be traced to the federal-provincial dimension.

Chapter 4 attempts to develop recommendations, based on the analysis and conclusions of the previous chapters, as the to best means of reducing jurisdictional uncertainty, while steering clear of the larger constitutional debates that prevented passage of Bill C-14. It concludes by making explicit a sketch of the normative theory of regulation that has informed this study. For only if we put the problems discussed in this paper into perspective, by outlining the chief issues that would remain if the federal-provincial dimension of the problem could be factored out entirely, will we have a clear idea of how much remains to be done when problems of jurisdictional uncertainty are ameliorated.

## 2. BACKGROUND TO THE PRESENT REGULATORY SYSTEM

This chapter is divided into two parts. The first gives the background necessary to understand the technical and political problems with which this paper is concerned. It outlines the types of hazards that exist in the uranium mining sector, indicating the differences between the Ontario and Saskatchewan mines. It then discusses the regulatory regime that existed in this sector prior to the Ham Commission, focusing on the nature of, and reasons for, the division of responsibilities that developed between the two levels of government.

The second part is concerned with the Ham Commission report and its political aftermath. It begins by sketching the findings of the commission, and the recommendations it made for ameliorating the problems it discovered. It concludes by examining the impact that the Ham Commission had upon the institutional organization of regulatory agencies, as well as upon the perceptions of both levels of government as to the appropriate way to proceed on the jurisdictional issue.

### **Background to the Ham Commission**

#### The Nature of the Hazards

The most serious hazards associated with uranium mining can be divided into those which affect miners, and those which affect the environment and, via environmental pathways, the public health.

#### Occupational Health and Safety

The Ontario and Saskatchewan uranium mining industries differ in several respects. From an OHS perspective, the important difference is that all of Saskatchewan's new mines are open pit, while all of Ontario's mines are now underground. This has implications for both the conventional and radiological aspects of OHS. The conventional hazards can be divided into those related to physical safety in the mines, and those related to longer-term health, such as silica dust inhalation. The physical hazards of underground mining are second only to the forestry industry, because of the difficulties in sustaining a safe work environment thousands of feet below the surface of the earth.<sup>7</sup> The physical hazards of open-pit mining are perhaps more comparable to those of other excavation projects, related primarily to the use of heavy equipment. In addition to the danger of rock falls, the problems of dust levels and diesel exhaust fumes in the underground environment make it more difficult than open-pit operations.

Two different sorts of radiological hazards must be considered: the exposure of the skin to gamma radiation from the uranium ore itself, and alpha radiation from the inhalation of radon and thoron gases and their 'daughters'. Gamma radiation is the greater health hazard in open-pit mines because of the higher radioactivity of the ore, and because of rapid dissipation of the radioactive gases into the atmosphere. Conversely, alpha radiation has traditionally been considered the more serious radiological hazard in underground mines. However, in 1978-79, the ACEB conducted extensive radiation surveys in three underground Ontario mines, and discovered that gamma doses received by some mine workers might approach the dose limit.<sup>8</sup> Thus with both radiation and conventional hazards, the Ontario uranium miner faces particularly dangerous conditions, and hence the Ontario regulatory system faces greater challenges.

### Environmental Protection

The ore extraction process presents little if any hazard to the public or the environment. The major EP hazard therefore involves the 'tailings', or waste materials, from the mining and milling process. The uranium is leached from the crushed  $U_3O_8$  concentrate, known as yellowcake. The remaining solids are tailings, which are piped as a slurry to disposal sites near the mine. There are several disposal methods, but none of those presently employed is considered by the ACEB to be adequate for permanent disposal.<sup>9</sup>

The chief contaminants associated with uranium tailings are radium-226, and sulphuric acid which is formed in the chemical breakdown of pyrites in the ore. Sulphuric acid has not been a significant problem for the Saskatchewan mines to date, because of the character of the ore bodies, although it may become a problem in some future mines.<sup>10</sup> So, the radiological/conventional hazard distinction reappears in the EP field, and there is some controversy as to which of these two contaminants is ultimately the most serious and the least under control.

In addition to radium-226 and sulphuric acid, the tailings also give off quantities of heavy metals (eg. copper), other radionuclides (eg. thorium-230 and lead-210), and, if they are not kept wet, radioactive dust.<sup>11</sup> The principal means by which these contaminants may spread to the wider environment are through:

- i accidental spills in the process of being transported to the disposal site;
- ii dissolution and leaching from the storage site into the water system.

Inadequate precautions in the disposal of tailings can therefore result in pollution of both air and water. Water pollution has been judged by far to be the more significant.<sup>12</sup>

## The Early Regulatory Regime

The history of the nuclear industry in Canada spans almost half a century. Radium was mined in Port Radium, NWT, and shipped to Port Hope for refining as early as 1933.<sup>13</sup> Uranium was known to exist in northern Saskatchewan in the 1930s. It was discovered in the course of prospecting for gold and copper, but it was not until the second world war, and the development of the atomic bomb, that these deposits were recognized as having commercial and strategic importance. In 1944, the federal government created Eldorado Nuclear Limited, a Crown corporation with a monopoly on exploration for uranium and development of uranium mines. Eldorado's first mine was at Uranium City in Saskatchewan.<sup>14</sup>

During the war, the federal presence in the mining sector, as in so many other areas of provincial jurisdiction, was constitutional under the War Measures Act. With the end of the war, the federal government decided, primarily for reasons of international security in the shadow of the cold war, that it should retain jurisdiction over the nuclear industry, including uranium mining. Consequently, in 1946, the federal government passed the Atomic Energy Control Act, invoking its declaratory power under section 92.10(c) of the British North America Act to declare a 'local work or undertaking' to be 'for the general advantage of Canada'. The validity of the Atomic Energy Control Act has been challenged and upheld twice in the courts and does not seem to be in serious doubt.<sup>15</sup>

This act created the Atomic Energy Control Board (AECB) and give it paramountcy over all aspects of regulation in the nuclear industry. The AECB was authorized to control atomic energy materials, equipment, and information, in the interest of safety, physical security, and national security. The act provided the AECB and ministry of Energy, Mines and Resources (EMR), to which the board reports, with a wide array of power including:

The power to regulate, to license, to revoke or suspend licences, to expropriate, to create Crown enterprises, to require the submission of information and reports, and to give grants for research and development. There are no statutory provisions for hearings... As a general statement... the statute conceived in a post-war security conscious environment gives extraordinary powers to regulatory authorities.<sup>16</sup>

Originally, the AECB was much more than a regulatory agency. It was also in direct control of the federal government's Chalk River project, the centre of Canada's experimental nuclear reactor program. By 1952, it had become apparent that the size of the nuclear establishment at Chalk River and its increasing involvement in commercial activities through the sale of plutonium to the United States made a new structure necessary.<sup>17</sup> Accordingly, a new Crown corporation,

Atomic Energy of Canada, Limited (AECL) was created in 1952 pursuant to section 10.1(a) of the Atomic Energy Control Act. Two years later, when AECL was already much larger than the AECB in budget and personnel, it was decided that the act should be amended so that AECL would report directly to the minister for Energy, Mines and Resources (EMR), instead of to the AECB.<sup>18</sup> Although the AECB was given new responsibilities with the passage of the Nuclear Liability Act in 1970 (not proclaimed until 1976), the original Atomic Energy Control Act has not been amended since 1954.<sup>19</sup>

Shortly after the proclamation of the Atomic Energy Control Act, representatives of the Saskatchewan government met with the AECB for the first time on the subject of jurisdiction. They pointed out that the province already had detailed regulations governing mining operations, and argued that confusion would result if the board were to attempt to set out special rules for prospecting, and staking, development, and mining of uranium deposits. The AECB agreed to leave prospecting and staking out of its licensing procedures but insisted on retaining control of development and mining. Provincial legislation alone would apply to the first two stages.

With market expansion and the beginning of the Elliot Lake uranium boom in 1955, a second round of discussions was held between the AECB and the provinces. This time the dialogue was initiated by Ontario Ministry of Mines officials concerned to facilitate the industry's expansion by simplifying licensing procedures. This was the first time that occupational health and safety issues were dealt with specifically. The outcome was an 'understanding' that the provincial authorities would take responsibility for safety in the mines and for the health of the mine workers. This agreement was effected by imposing a condition requiring compliance with provincial laws respecting mines and safety in all AECB licenses. As a result of this agreement, health and safety in the uranium mines was regulated entirely by the provinces until 1976.<sup>20</sup>

The 1955 understanding meant that OHS was regulated by the provincial departments of mines, with some help from the provincial health departments on matters requiring a research approach.<sup>21</sup> The mines departments, given their interest and expertise, focused more on the engineering aspects of mine safety than on the long-term effects of silica dust inhalation and ionizing radiation exposure.<sup>22</sup> Departments of the environment were not created in Ontario until 1972 and in Saskatchewan until 1970.<sup>23</sup> From an environmental perspective, the uranium mining industry was effectively regulated like any other mining industry.

The blanket referencing of provincial health and safety regulations in the AECB's licensing requirements did not in any way prevent the AECB from developing its own more stringent regulations. In the event of any conflicts between

federal and provincial regulations, those of the AECB were legally paramount. Thus it would have been reasonable to assume that the AECB would supplement any provincial regulations that appeared to be inadequate for the task.

In fact, however, the AECB did not develop any supplemental regulations, even after its officials became convinced that a significant gap existed in the area of radiological protection standards. The AECB failed to develop exposure limits for radon gas and its 'daughters'. Although it developed gamma radiation exposure limits in 1960, it failed to apply them to the uranium mining sector. The background to this situation is to be found in work by Bruce Doern;<sup>24</sup> however, for our purposes here, it is sufficient to understand why the AECB failed to act. This was made clear in the testimony of AECB officials to the Ham Commission:

The degree and nature of the Board's involvement were developed in response to the overall policy directions of government. The dominant policy direction was to make administrative arrangements where the provincial agencies were asked to be operationally responsible for health and safety under their regulations and the federal government, through AECB, asserted its control in licensing for purposes of security control over the disposition of ores and concentrates. During the past twenty years or more, there has been continuous pressure from the provinces to place all aspects of the control of uranium mines completely under provincial jurisdiction with no federal involvement. The annual Mines Ministers Conferences have repeatedly urged the federal government to vacate the uranium mining field but the senior level of government refused and maintained a position of cooperative control.<sup>25</sup>

'Cooperative control' boiled down to repeated federal assurances, such as those made by the Minister of EMR in September 1968, that 'except in matters related to national security and foreign policy, uranium mines should be subject to the same rules as those which the provinces exercise over other mines'.<sup>26</sup> The situation seems clear: the federal government, with its concerns centered on international security and on the development of a national nuclear industry, was prepared to concede de facto jurisdiction over matters such as OHS to the provinces in the hope of avoiding a full-scale federal-provincial confrontation over the right of the provinces to manage uranium as a natural resource.

## **The Ham Commission and its Political Fallout**

### The Ham Commission

The Ham Commission had a very high profile from the beginning. It was established by the Ontario government in September 1974, in response to persistent criticism of the OHS situation in Ontario's mines by the Stephen Lewis of the

New Democratic Party, and to a United Steelworker's strike at the Elliot Lake uranium mines. As Doern has observed, the commission managed to open up the regulatory process for the first time by holding public hearings and commissioning its own research, things that the AECB had never done.<sup>27</sup>

The Ham Commission found that, as of the end of 1974, lung cancer deaths (among the 965 uranium miners for whom adequate data could be collected) 'were in significant excess' of those expected among the same number of males in the Ontario population as a whole 'by a total of 36 cases, or 80 percent of the expected deaths'.<sup>28</sup> In short, it appeared that almost twice as many uranium miners had died of lung cancer by 1974 as would have died had their occupational environment been as safe as that of the average Ontario male. Such a statistical correlation was liable to the same criticisms that cigarette companies levelled against correlations between smoking and lung cancer,<sup>29</sup> but Ham argued that it was fair to assume that radon gas was at least one of the causes, 'since the link between lung cancer and exposure to ionizing radiation has been well established in other populations'.<sup>30</sup>

The commission also found that, on the basis of its data, there was no evidence supporting the hypothesis that a 'threshold' exists below which there is no significant excess risk. So it concluded, 'the concept of a maximum safe exposure is not tenable.' The commission immediately drew the implications of this evidence for the role of the regulatory process: 'The Commission considers the issue to be that of setting a standard at as low a level as is practically and economically feasible, having regard to the human risks that are acceptable in return for nuclear power.'<sup>31</sup>

The costs of improvements necessary to reduce those risks, Ham argued, 'are properly passed on to those who benefit from nuclear power.'<sup>32</sup> Finally, the commission noted that, on the basis of the evidence available, it appeared that eight times as many 'potential life years' had been lost in the industry as a result of accidents of mainly industrial origin as had been lost from lung cancer. Consequently, total risks, both conventional and radiological, had to be the basis of measures designed to reduce OHS hazards.<sup>33</sup>

The Ham report also stated that the available evidence was not good enough. There were two components to this problem:

- i the inadequacy of the data available on the radiation levels to which workers had been exposed, and on their health after leaving the industry;
- ii the lack of scientific knowledge concerning the hazards of low level ionizing radiation exposure.<sup>34</sup>



The first problem was traced to the difficulties of maintaining adequate health records for a transient population, inadequate monitoring technology, and inadequate personnel and funds for collecting, coordinating and analyzing epidemiological data. The second problem was, above all, a problem of inadequate Canadian research and development funding in this area. There was no coherent research group devoted to the assessment of radiation hazards in Canada outside of AECL<sup>35</sup>, and AECL research was not of the epidemiological sort that Ham 'considered to provide the best basis upon which to review the standard for exposure to radiation.'<sup>36</sup>

It was discovered in the course of the inquiry that provincial regulatory authorities had statistical evidence of a significant number of excess deaths from lung cancer at least as early as 1970. However, despite the fact that 'mines inspectors issued many letters of instruction to the mines to improve conditions...neither the workers nor their representatives were advised about the emerging status of the problem of lung cancer.' As one miner said: 'We have been led to believe through the years that the working environment in these mines was safe for us to work in. We have been deceived.'<sup>37</sup> Families of miners who had died of lung cancer were unable to get any form compensation from the Workmen's Compensation Board (WCB) prior to 1970. By 1975, only 20 families (against 36 'excess cases') had been granted a pension, and Ham called for compensation on a more 'generous basis of interpretation.'<sup>38</sup>

Ham concluded that the source of these inadequacies was twofold: first, the lack of a clearly defined policy relating to occupational health and safety at both levels of government; and second, the confusion arising from split jurisdictions. The recommendations of his commission were similarly two-pronged. With regard to policy, Ham argued that the AECB must extend its regulatory activities to the entire nuclear fuel cycle and promulgate maximum exposure levels for uranium miners: 'The historical record of conditions in the uranium mines clearly reveals that the current arrangement of undelegated federal jurisdiction and invoked provincial regulation is unsatisfactory.'<sup>39</sup>

Provincially, Ham stressed the need for the Ontario government to develop a general policy framework for the regulation of occupational health and safety, based on an 'internal responsibility system' which would stress a cooperative and open relationship between labour and management. Labour should have access to all information about hazards, and input as to how they should be dealt with, through joint labour-management health and safety committees. And rather than relying solely on company officials to monitor themselves, a system of worker-auditors should be developed to supplement and check the work of both provincial regulators and company officials.<sup>40</sup>

With regard to jurisdictional uncertainties, Ham had much more to say about intragovernmental reforms in Ontario than about intergovernmental reforms. Ham placed a considerable amount of the blame on the nature of the old federal-provincial arrangement. However, beyond the recommendation that AECB expand into the mining sector, the only intergovernmental change recommended was that the AECB undertake the research necessary to develop adequate monitoring and compliance technology, and, with the Department of National Health and Welfare, undertake the required epidemiological research on a national basis.<sup>41</sup>

Intragovernmentally, Ham proposed extensive institutional reform on the grounds that: 'The separation of health from safety for workers is another false dichotomy sustained by policy and the institutional arrangements.' Thus, what had formerly been split between the departments of mines and health would be consolidated under the ministry of labour, with a parallel consolidation of the diverse legislation pertaining to health and safety in the mines, and occupational health and safety generally. In addition to this consolidation of legislation, the new 'internal responsibility' reforms discussed above were to be incorporated in a new act.<sup>42</sup>

## **The Impact Of The Ham Report**

### The AECB

The Ham Commission, even before it had published its findings and recommendations, gave the AECB the political leverage it had hitherto lacked to extend its jurisdiction into the mining sector. Thus, two months after the commission had begun its work, the AECB created a Mines Safety Advisory Committee, with orders to examine the existing situation and make recommendations regarding both conditions for licensing purposes and appropriate health and safety standards.<sup>43</sup> The federal cabinet, too, reacted quickly, appointing Dr. A.T. Prince as the new president of the AECB in 1975. As the first president from a predominantly non-AECL background, Prince had a clear mandate for reform and proceeded accordingly.<sup>44</sup>

That year the AECB set up, for the first time, a 'mission-oriented' research program designed to meet the board's needs as regulator, and to address the inadequacies pointed out by Ham. In 1976 the AECB divested itself of responsibility for the 'basic research' promotion-oriented program that it had hitherto carried out, by transferring it to the National Research Council. The AECB also published tentative limits for exposure to radon daughters in a 1976 amendment to its regulations, though they remained of uncertain applicability in the uranium mining sector until 1978, when uranium miners were declared to be uranium

workers, and so came under the board's responsibility.<sup>45</sup> There could be no doubt that the AECB's intent was to fulfill Ham's recommendation, and to regulate the entire nuclear fuel cycle for the first time.

The case for more fundamental administrative reforms within the AECB was first made forcefully in Bruce Doern's study of the board, prepared for the Law Reform Commission in 1976.<sup>46</sup> The report focused on the lack of openness and independence which continued to characterize the AECB.<sup>47</sup> Doern's criticisms were made all the more forceful by the controversy at this time surrounding the disposal of radioactive wastes from Eldorado Nuclear's Port Hope refinery: 'both the minister and the AECB were in the awkward position of having both the regulator and the possible offender...reporting to the same minister.'<sup>48</sup>

If Ham breached the jurisdictional wall, Port Hope and the Law Reform Commission Report did the same on the administrative front. From 1976, the AECB began to agitate for the legislative changes necessary in order to regulate the entire nuclear industry more effectively. This effort would ultimately lead to Bill C-14.<sup>49</sup>

### The Provinces

In Ontario the response to Ham's institutional recommendations was rapid, but at the jurisdictional level the government was unwilling to implement Ham's recommendation that Ontario include its own standards for radiation in the proposed new legislation. By December 1976, an interim Employees Health and Safety Act (Bill 139) had been enacted. This legislation codified the right of workers to refuse to perform unsafe work, gave the minister of Labour discretionary power to appoint joint health and safety committees, and established the right of an employee or union representative to accompany a government inspector during an inspection of the workplace. The act also sought to increase openness by requiring that copies of all inspectors' directives, orders, and reports to employers, be posted in the workplace, and that WCB supply workers with the statistics at their disposal upon request. Finally, it introduced various provisions designed to make these new measures enforceable, including increased penalties for contraventions.<sup>50</sup>

By 1977, all statutes relating to occupational health and safety had been consolidated under the ministry of labour. This involved the transfer of the mines engineering branch from the ministry of mines, and the occupational health protection branch from the ministry of health.<sup>51</sup>

In the same year, work began on the Occupational Health and Safety Act (Bill 70), which was to supercede Bill 139. Essentially Bill 70 strengthened several aspects of its predecessor: the right to refuse dangerous work gave the judgement of what constitutes 'dangerous' to the worker concerned; joint health and safety committees were made mandatory rather than discretionary for all workplaces of over 20 employees; and one member of each health and safety committee was entitled to inspect the workplace once a month. In addition, and of great potential significance, a new section provided for the control of toxic substances, including the power to set guidelines and/or 'establish exposure standards for designated substances'. Thus, although Ontario maintains that the setting of such standards in uranium mines is an exclusively federal responsibility, legislative provision exists for the day when this might no longer be the case.<sup>52</sup> Bill 70 was tabled in 1978, though it was not passed into law until October 1979.

The public concern with the situation in Elliot Lake also prompted the Ontario government to request that the Environmental Assessment Board review the planned expansion of the mines. The Order in Council was tabled in September 1976 and requested that the board examine all those aspects of the Elliot Lake situation which had not been examined in detail by the Ham Commission.<sup>53</sup>

The regulatory process in Saskatchewan was also influenced in several ways by the Ham Commission report. On the institutional plane, the Department of Labour had been given responsibility for all matters in 1973, under the recently elected NDP government's new Occupational Health Act (1972).<sup>54</sup> Saskatchewan's 1972 act had very similar provisions to those of Bill 70, but by 1977 a new Occupational Health and Safety Act was before the legislature. One of the principal reasons for this revision appears to have been the government's decision to develop its own radiation standards as contained in part 27 of the new mines regulations, authorized by section 13 of the 1977 act.<sup>55</sup> Such a dramatic move by the province, particularly when the standards proposed were more stringent than those of the AECB, was apparently considered to require the full political weight of the statutory proclamation, rather than a 'mere' amendment to the mines regulations by the Department of Labour.<sup>56</sup>

The influence of the Ham Commission also permeated the report of the Cluff Lake Board of Inquiry (Bayda Commission) of 1977-78. Set up to review past and future regulatory practices, as well as broader political, economic and ethical questions associated with the nuclear industry, the Bayda Commission was sparked by a French mining company's proposal to develop the first new uranium mine in Saskatchewan since the market collapse of 1959. Like the Ham Commission, the Bayda Commission pointed to the continuing legal uncertainty associated with the previous federal-provincial division of responsibilities and supported the prin-

ciple that 'where feasible, the promotional and regulatory aspects of nuclear and uranium policy should be the responsibility of different departments'.<sup>57</sup> This principle was extended by Bayda to environmental protection, with its recommendation that responsibility for the enforcement of pollution prevention regulations should be transferred from the Department of Mineral Resources to the Department of the Environment.<sup>58</sup> Ham's arm was indeed long, and helped to push Saskatchewan into even more vigorous institutional reorganization and legislative reform than had occurred in Ontario.

## Conclusions

The 'fallout' from the Ham Commission, from a federal-provincial perspective, took two major forms. First, it propelled both federal (AECB) and provincial (labour and environment ministries) governments into a much more extensive and active regulatory role in the uranium mining sector. Thus, where formerly there had been enormous gaps, overlapping jurisdictions and regulations now became common. Second, by forcing a significant degree of intragovernmental rationalization, it highlighted the lack of intergovernmental rationalization and thus shifted the critical attention of politicians, bureaucrats, and the private sector in that direction. Demands therefore became more pressing for some sort of jurisdictional reform at the intergovernmental level to match that which had already taken place at the intragovernmental level.

These two developments created a problem which the AECB had not hitherto faced. A major change in either its structure (e.g. changing the ministry to which it reports) or its role (e.g. expanding its jurisdiction into all aspects of all sectors of the nuclear fuel cycle) appeared to require legislative change. And legislative change would force the AECB to demarcate clearly its mandate in a sector which always harboured a potentially explosive federal-provincial issue. The AECB represented a federal presence in a number of jurisdictions which generally fall under provincial control: labour, health, environment, but above all, the management of natural resources. Such a confrontation had hitherto been diffused by the largely ad hoc fashion in which federal and provincial legislation and institutions had evolved over the years, and by federal policy directions to ensure that the AECB did not disrupt this pattern. But the imperative for legislative reform of the AECB, together with the mounting federal-provincial discord in the whole sphere of natural resource management and revenues, now combined to throw the jurisdictional issue into sharp relief.

### 3. BILL C-14: CONSTITUTIONAL STALEMATE

The Nuclear Control and Administration Act of 1977 (Bill C-14) constituted the federal government's attempt to reply to the problems raised by the Ham Commission, and the subsequent developments examined in the last chapter. It had two broad goals. First, it attempted to formalize and clarify the AECB's new role in the uranium mining sector, now that the old federal-provincial understanding had collapsed. These were the jurisdictional reforms. Second, it attempted to follow the provincial lead in more clearly distinguishing promotional from regulatory roles of the state, with the AECB playing an exclusively regulatory role and reporting to a nonpromotional ministry instead of EMR. These reforms will be termed administrative.

This chapter will begin with an outline of the jurisdictional and administrative reforms found in Bill C-14. It will then examine the provincial response to the bill, concluding with a discussion of how the federal government and the AECB reacted to provincial criticisms and opposition.

#### **The Nuclear Control and Administration Act (1977)**

The new act was divided into three parts. Part I was concerned with the government's role as regulator of the nuclear industry: specifically, with jurisdictional and administrative reforms to the AECB, which was to be re-named the Nuclear Control Board (NCB). Part II dealt with the federal government's role as promoter of the nuclear industry, a role which that government wished to retain but could no longer assign to the NCB. These two functions, which had hitherto co-existed in an informal fashion in the AECB and its ministry, were to be formally separated and assigned to separate ministries.<sup>59</sup> Although the act did not specify which ministries these would be, it was widely known that the Ministry of State for Science and Technology would receive the regulatory role, while EMR would retain the promotional role.<sup>60</sup> Part III provided for much stronger fines and/or imprisonment for the contravention of the legislation or regulations promulgated under it.<sup>61</sup>

The attempt to separate the regulatory and promotional roles in the new act made it necessary to distinguish more fully and explicitly between the powers and responsibilities of each ministry. In the old act, EMR's role was stated in very general terms and the AECB was then left to provide the specifics, i.e. its regulations. This new necessity was reflected in the relative length of the two pieces of legislation, the old act totalled nine pages, as opposed to 32 pages for Bill C-14. Consequently, when speaking of the jurisdictional aspects of the

new bill, it is necessary to distinguish between changes in the AECB's mandate and the extension of the federal government's jurisdiction.

The AECB's responsibilities under the old act, as we have seen, involved making regulations 'for developing, controlling, supervising and licensing the production, application and use of atomic energy', and 'respecting mining and prospecting for prescribed substances' - a broad mandate indeed. But the old act focused mainly on the security aspects of the industry and did not mention such things as the disposal of radioactive wastes. Bill C-14 explicitly stated the primary focus of the NCB's mandate: to 'ensure the preservation of health and safety of persons and to protect the environment from the hazards associated with the production, possession, and use of prescribed substances.'<sup>62</sup> Where the old act mentioned only of 'prescribed substances', the new act explicitly extended the board's jurisdiction to all aspects of the nuclear fuel cycle by making it responsible for all 'nuclear facilities', 'prescribed equipment', and 'prescribed technology.'<sup>63</sup> Nuclear Control Board licenses were specifically required for all of these devices or activities.<sup>64</sup>

Bill C-14 included a provision for the establishment of a Radioactive Decontamination Fund to be paid into by 'every person to whom a license is issued...at a time and in the manner prescribed by the regulations.' This fund appears to have been oriented to the board's new responsibility as the ultimate guarantor of the 'proper and permanent disposal of all abandoned radioactive wastes and/or facilities.'<sup>65</sup> But there was also a provision, qualifying the 1976 Nuclear Liability Act, which held the operator of any facility liable for the full costs of any decontamination program which the board might be required to undertake.<sup>66</sup> Finally, section 56 made explicit no less than twenty-six categories of regulations which the Nuclear Control Board would have responsibility to develop.<sup>67</sup>

It is difficult to determine whether EMR's jurisdiction over the management of the nuclear fuel cycle was expanded under the legislation. On one hand, given the broad, if vaguely defined powers which the old act gave to the AECB, and the broad but again vaguely defined power which the minister had over the AECB, there seemed to be little room to expand. However, the inclusion of 'facilities' under the act, and explicit statements such as 'the minister may ... lease, loan, sell or otherwise dispose of prescribed substances, nuclear facilities or any deposit or any right or interest in such deposit of prescribed substances', certainly sounded like an expansion of jurisdiction.<sup>68</sup>

The chief administrative reform, the assignment of the NCB to a new ministry, has been noted. Beyond this, the bill had several provisions related to public hearings and freedom of information.<sup>69</sup>

## The Provincial Response

The provincial response to Bill C-14 focused primarily on the constitutional issues which it was perceived to be raising. The need for the sorts of administrative reforms proposed in the bill, if the AECB/NCB was to play any regulatory role at all, had been recognized in both the Porter Commission's Interim Report in Ontario<sup>70</sup>, and the Bayda Commission's Final Report in Saskatchewan.<sup>71</sup> So, while there were some technical criticisms and calls for clarification of the intent of the administrative reforms, these were not a serious problem area and will not be examined in detail here. In the end, all constitutional criticisms concerned perceived federal intrusions into areas of provincial jurisdiction.

At the 35th annual meeting of the Provincial Ministers of Mines (in September of 1978), it was decided that Saskatchewan would draw up a provincial response for presentation to the November federal-provincial conference<sup>72</sup> as a prelude to the First Ministers' Conference on the Economy, scheduled for later in November.<sup>73</sup> The Saskatchewan government produced two papers, one attacking Bill C-14 as it then existed, and the other proposing amendments to the bill. These two papers remain the 'locus classicus' of the provincial position on the jurisdictional issues associated with the AECB and the uranium mining industry.

From the provincial perspective, Bill C-14 represented 'both a considerable broadening of federal jurisdiction beyond the excessive powers already incorporated within the Atomic Energy Control Act... and a ratification of de facto spheres of responsibility, partly through incorporation directly into the act of provisions previously covered by regulations.'<sup>74</sup> According to the general consensus, part II of the bill held the most serious jurisdictional implications:<sup>75</sup>

The abrogation of provincial rights implicit in federally controlled disposition of mineral lands and rights harbours serious long-term implications for the Provinces' ability to manage their own resources. It is conceivable that, given this initial foray into prescribed substances, the federal authority could be extended into other resources as well and particular targets that could readily be considered as 'vital to the national interest' are other energy resources - coal, oil and natural gas. Even if this latter eventuality does not arise, at a minimum the Provinces, by acceding to the principles inherent in Bill C-14, may relinquish effective control of future energy planning simply by default.<sup>76</sup>

Specifically, this paper noted the expanded definitions of 'prescribed substances' and 'nuclear facility' in section 3, and the consequent expansion of EMR's powers to explore for prescribed substances, including the right to acquire, by any means, any deposit including deposits on provincial Crown lands. Once control of these substances was gained, section 63 conferred the power to dispose of these 'expropriated rights' in any manner deemed fit. The



provinces expressed the fear that these broad powers might be the prelude to the creation of a 'Uranocan' and stressed that the federal intent in this regard must be clarified. Finally, the provinces argued that section 66, which prohibits involvement in any phase of prescribed substance activity without a license issued, not only by the NCB, but also by the minister of EMR, 'effectively invalidates any parallel licenses issued by the provinces and taken together with the rest of provisions in Part II removes all discretionary powers of resource management for the prescribed substances.'<sup>77</sup>

Ontario and Saskatchewan appear to have entirely agreed that part II, and the precedent that it appeared to set, was wholly unacceptable. On the jurisdictional issues associated with part I and the NCB, however, there was considerably less agreement on the appropriate role for the federal government. The lack of provincial consensus centered on the areas of OHS and EP and was reflected in the ambiguity of the brief's conclusions:

Unequivocally, resource management is the responsibility of the provinces and any federal initiatives in this area within C-14 should be deleted. Occupational health and safety has been, and should continue to be, the responsibility of the Provinces and the greater federal presence is not required. The answer to the problems experienced between federal and provincial (governments regarding) overlaps in the area of environmental control and regulations does not rest with increased duplication of effort but rather with more effective cooperation and consultation between the two governments.<sup>78</sup>

In fact, Saskatchewan wanted the AECB entirely out of the regulation of OHS in the uranium mining industry, whereas Ontario only wanted the AECB to vacate the field of 'conventional' OHS. The environmental field is more complex, because the inherently interprovincial and often international character of environmental problems means that the federal government has a legitimate role to play in the regulation of all industries, with or without the declaratory power.<sup>79</sup> By contrast, OHS is a 'site specific' or localized sort of problem.

### **The Federal Reaction**

Bill C-14 received first reading in the dying hours of the 1977 parliament, so the real discussion of the bill took place in the latter half of 1978. Although it is impossible to ascertain all of the changes that would have been incorporated in the new version of the bill that was being drafted as a result of these discussions, at least one significant modification had already been made by August 1978. Following meetings between the AECB, EMR, the Department of Justice and the Saskatchewan Mining Association (SMA), the federal government agreed to delete all references to federal regulation at the exploration stage.<sup>80</sup>

The provincial position on the bill was raised by Saskatchewan in the course of the October-November Constitutional Conference, but Saskatchewan's detailed analysis of C-14 was put forth in the November meeting of federal and provincial mines ministers. In late October, the minister of Energy, Mines and Resources was pushing to have the modified bill placed high on the agenda for the new session of parliament. Despite a widely held feeling within the federal government that the bill was of great importance and should be reintroduced with all possible speed, EMR was prevailed upon to delay introduction until the provincial position had been tabled and thorough consultations with the provinces had been held.<sup>81</sup> As a result the bill died on the order paper in October 1978, with the dissolution of parliament.

With the federal government gearing up for the spring 1979 election, discussion of the bill was short-circuited. The election of a Progressive Conservative government delayed discussion until the fall of 1979. At that time, representatives of the SMA met with the new minister of Energy, Mines and Resources, Ray Hnatyshyn, to express their position. Shortly thereafter, the government announced its intention of setting up a parliamentary inquiry to deal with all aspects of the nuclear industry, including regulation and control. Both the provinces and the private sector were to be given a full opportunity to present their views to the inquiry, and so once again further progress on the issue was delayed until the inquiry could begin. The surprise election of spring of 1980 returned the Liberals to power and the parliamentary inquiry was shelved. Since then, the federal energy minister's preoccupation with oil and gas prices has left little time to devote to the relatively quiescent issue of regulation in the nuclear industry.

Neither the AECB nor the provincial regulatory agencies remained inactive following the demise of Bill C-14. Both levels rerouted their energies into unilateral administrative reforms aimed at addressing some of the problems caused by the constitutional/jurisdictional stalemate, while circumventing federal-provincial confrontation. Changes made by the provinces, and the very different directions in which Ontario and Saskatchewan have gone, will be examined in the next chapter.

Reforms within the AECB will not be examined in detail, but one point should be made clearly at this stage. The capacity of the AECB to achieve the administrative reforms recommended by Doern in 1976 and embodied in part I of the new bill by means of changes in its regulations and procedures is strictly limited. First of all, the board can do nothing about those reforms that require a re-drafting of its legislative mandate, such as reporting to a different ministry. Beyond this, the board is politically limited in what it can do in those areas where a reform would have jurisdictional implications (eg., the public hearing process), even though it may formally have jurisdiction over such matters.

In those areas which do not fall under one or both of the first two categories, the AECB will still face a financial limitation. That is, it is more difficult to get an adequate budget from the Treasury Board when the AECB cannot say that the expensive new procedures and responsibilities that it is taking on were assigned by the government.

Finally, there are legal limitations. Changes in the board's regulations have a different status from changes arising from new legislation. The combined result of these four types of limitation is that serious weaknesses remain in the AECB's capacity to regulate the industry effectively, despite its efforts to make do without a new legislative mandate.

To conclude, the administrative reforms which Bill C-14 proposed for the AECB (above all, the separation of regulatory from promotional functions) made essential a more explicit statement of the jurisdiction of each federal agency. This more explicit statement was then perceived by the provinces as a real extension of federal jurisdiction: the transformation of what had formerly been de jure into de facto powers at the very least, and perhaps an extension of the areas in which the federal government could regulate as well. These are complex legal matters, and I have not ventured an opinion as to the correctness of the provincial interpretation. The federal government, in the end, proved unwilling to proceed with the bill in the face of strong provincial opposition. So, as an unintended but direct consequence, administrative reforms crucial to both the public credibility and the operational effectiveness of the AECB were thwarted.

Although it is easy to think about the jurisdictional and administrative concerns of the bill as separate, it does seem that, for the reasons noted above, administrative concerns cannot be addressed without throwing jurisdictional issues into stark relief. If this is so, then the fate of C-14 is more than an unhappy confluence of events; it is a lesson. The AECB will not be able to function effectively until the jurisdictional issues have been clarified and resolved. Yet it is becoming increasingly apparent, as the next chapter will show, that the very presence of the AECB in the uranium mining sector is one of the major sources of complexity and controversy. These observations form the basis upon which recommendations as to the future role of the AECB will be made in chapter 4.

#### 4. JURISDICTIONAL UNCERTAINTY AND ITS CONSEQUENCES

This chapter examines the development of federal-provincial arrangements for the regulation of conventional and radiological OHS and EP after Bill C-14. This evolution can best be understood as an attempt to accomplish needed procedural reforms, and introduce more precise and stringent standards, while avoiding the constitutional issues that had killed the federal bill. The success of this strategy has been limited by the jurisdictional uncertainty which highlighted the constitutional dimension of the problem in the first place, and which remained when constitutional discussions ended in impasse.

Jurisdictional uncertainty may give rise to two sorts of problems - gaps and overlaps. Gaps exist where neither level of government has developed adequate regulatory standards and/or procedures; overlaps exist where both levels have developed standards or procedures in the same area (through their adequacy is a separate issue). This chapter is divided into two parts, examining OHS problems in the uranium mines in the first part, and EP problems associated with the disposal of uranium tailings in the second. In both parts, the regulatory process will be broken down into three stages: information gathering, promulgation of regulations, and compliance procedures. Naturally, the effectiveness of the existing arrangements depends upon the strength of each of these links in the regulatory chain. Without adequate information, regulations are little more than pious hopes; without adequate compliance procedures, the best regulations are 'paper tigers'.

We shall see that gaps and overlaps exist at each stage of the current regulatory process, in both the OHS and EP fields. At the information stage, gaps exist when there is a failure to provide adequate research funding to ascertain accurately the level of risk associated with a particular substance or activity. Overlaps exist where there is a lack of coordination of data collection or research and development programs between the governments and agencies involved, resulting in duplication of effort and other forms of inefficiency.

At the promulgation stage, gaps exist where both levels of government have failed to promulgate standards or procedural requirements in some area where they are clearly needed. Overlaps occur where there are two or more applicable and different regulations, though this will pose a serious problem only if the more stringent regulations are legally subordinate to the less stringent ones.

At the compliance stage, gaps exist where neither level of government is capable of adequately monitoring and/or enforcing the relevant regulations. Overlaps exist when both levels of government attempt to monitor or enforce regulations,

resulting in duplication of work and, in the case of enforcement, the possibility of considerable confusion and delay in prosecutions.

Both sections of this chapter will focus primarily on radiological OHS and EP hazards. This is not to suggest that conventional hazards are in some way less important. The Ham Commission (see chapter 1, p. 8) estimated that five times as many lives were being lost due to conventional hazards as could be attributed to radiation-induced cancer. Nonetheless, there are reasons for my choice of focus and I list two most important.

First, it is the radiological hazards which distinguish the uranium mines from other mines, in terms of dangers to the miners and the environment. This is true not only by virtue of the fact that it is their status as uranium mines that brought in the federal government, and with it all the jurisdictional and administrative complexities that are here examined. It is true also in the sense that the Select Committee discovered that conventional hazards in the uranium mines (of Ontario) were roughly on a par with those of other mines.<sup>82</sup> So if any special policy is needed specifically for uranium mines, it is because of their radiological hazards.

Second, it is the radiological hazards that are surrounded by the greatest scientific uncertainty concerning the real level of risk that continues to prevail, and scientific uncertainty, this paper argues, is both directly attributable to the jurisdictional uncertainty resulting from federal-provincial conflict, and one of the most important technical impediments to effective regulation.

## **Occupational Health and Safety**

### Information

The first stage of any system of regulation is to gain an understanding of the kind and degree of risk associated with each of the hazards found in that industry. As we saw in chapter I, the Ham Commission found that the available data were inadequate for anything more than a crude assessment of radiological risk. Part of the reason was that federal and provincial agencies did not compile adequately detailed information, and failed to coordinate and concentrate such information as there was in any single centre. This aspect of the problem is therefore administrative, requiring certain procedural changes and greater rationalization of intra- and intergovernmental activities. In other words, it is an overlap problem. But there is also a problem of gaps, for the nuclear division of responsibilities for the nuclear industry has resulted in the fail-

ure of both levels of government to assume the financial burden of an adequate research and development program.

As with the administrative reforms proposed in Bill C-14, it has proved impossible to separate administrative from jurisdictional issues in practice. The result has been delays in much needed reforms. For example, the Canadian Centre for Occupational Health and Safety (CCOHS) was created in the October 1976 Speech from the Throne; however, debates about its mandate and the constitution of its executive board delayed the appointment of its first president by more than three years. The CCOHS has no specific mandate in relation to the uranium mining industry at present, but it could play a valuable role in coordinating information pertaining to conventional and radiological hazards in the field, and in conducting research.<sup>83</sup>

To date, the coordination of research related to epidemiological information on radiological hazards, and the technological developments necessary to monitor exposure to those hazards more accurately, has been the responsibility of the Joint Panel on Occupational and Environmental Research for Uranium Production. Created in 1977, the joint panel is composed of representatives of the AECB, federal and provincial line departments, and the industry, with labour observers. As the name implies, it is concerned with both OHS and EP problems. Its role is exclusively one of information exchange and coordination. In its first year, the joint panel considered some forty projects, but their total value was only \$1.5 million, and each member agency was responsible for its own funding: the joint panel itself has no research funds at its disposal.<sup>84</sup>

The absence of any mechanism for determining appropriate levels of funding and the proper distribution of costs between the major members is a direct consequence of the jurisdictional uncertainty that prevails here.<sup>85</sup> It also points us to the major problem at this stage of the regulatory process: 'free riding' in the absence of clear lines of political accountability. 'Free riders' are individuals or groups who benefit from some public good, but do not contribute their fair share to the costs of its production and/or maintenance. If one of the costs of mining uranium is the maintenance of an adequate regulatory system, and one of the prerequisites of such a system is adequate information and such information does not exist, then some or all of those benefiting from the mines are free riding. Jurisdictional uncertainty facilitates free riding because it complicates the determination of who should be held accountable for a properly functioning regulatory system.

What constitutes an adequate research and development program, and hence what total expenditures (costs) ought to be, is an inherently controversial subject because it involves a debate about how much we need to know about what we don't

know. It is therefore impossible to say exactly how much ought to be spent. We should at least be able to point to the areas in which it is clear that work must be done, and try to evaluate (a) how much of that work is presently being done, and (b) whether the present distribution of the costs of work being done seems fair. But even this is extremely difficult because to date such statistics have not been collected and coordinated. Those who wish a comprehensive list of all projects, recently completed or still ongoing, in the OHS and EP fields are referred to the Joint Panel's 1980 Annual Report. They will not, however, find any expenditure figures, and I have been unable to compile them. What follows is therefore inadequate and necessarily tentative. The best that I have been able to do is to follow the Ham Commission in identifying broad areas in which work must be done, and then illustrate with particular cases what I think must be taken to be more general problems.

The Ham Commission identified two areas in which much more research and development were needed: epidemiological studies, and monitoring and protection technology. Epidemiological research is needed for better assessment of the effects of levels of radiation on health problems such as silicosis. These studies are particularly important in the case of radiological hazards because they may help to resolve empirically the continuing controversy within the scientific community as to the effects of low levels of exposure to ionizing radiation. If, as several recent studies seem to suggest, the risk associated with low levels of exposure is considerably higher than the present 'linear hypothesis' model has led us to expect, then the current regulatory standards, and indeed, the economic viability of the industry, are thrown into question.<sup>86</sup>

Three epidemiological studies, one each in Saskatchewan, Ontario, and Newfoundland, are presently under way. The first is being funded by Eldorado, the federal Crown corporation, and the other two are jointly funded by federal departments and the provincial governments involved.<sup>87</sup> The only other direct allocation of funds for epidemiological research that I have been able to discover is \$200,000 in Saskatchewan's 1980 budget earmarked for the investigation of the effects of low-level radiation.<sup>88</sup>

Unfortunately, such studies are of limited value because the long latency period between exposure and disease means that we are studying the effects of exposure levels that existed twenty or thirty years ago. Since devices for monitoring exposure in those days were relatively inaccurate and employed only sporadically, and since present exposure levels are lower, such studies cannot tell us whether current maximum exposure levels are inadequate except by the interpolation of dose-response curves for higher levels of exposure. But the central issue of the current scientific debate is precisely whether such interpolative techniques are valid.

Consequently, the second broad research area is a necessary complement to the first. Means must be developed both for measuring the exposures of individual workers more accurately and for lowering the levels of radiation to which they are exposed, in lieu of more accurate information from the epidemiological research. What has occurred in each of these areas since the Ham Commission?

Federal research and development in this area is divided between EMR and the AECB, with the latter agency playing the larger role. The board has been involved in mission-oriented research only since 1972-73, and this form of research (as opposed to promotional) did not become its primary focus until 1977-78. Up to that point, its expenditures on mission-oriented research totalled less than \$1.2 million. In the last two fiscal years, this sum has increased rapidly, so that the total in those years is just below \$5 million. However, over half of this latter sum went into a special CANDU reactor safeguards plan, and only about 10 percent of those funds was allocated to OHS research of any sort, whether in the mining or the reactor sectors.<sup>89</sup>

The ad hoc manner in which funds are allocated, and the informal character of the division of responsibilities, can also frustrate the development of important new technology, as the case of the personal radon daughter dosimeter will illustrate. These dosimeters are acknowledged by the AECB to be the only way of accurately measuring the radon daughter exposure of individual miners - measurements that are crucial not only to the monitoring of current standards but to an accurate data base for future epidemiological studies.<sup>90</sup> The AECB has so far deemed the level of development of the present technology inadequate, and hence has not yet required their use. This is a debatable point, since such devices are already in use in France and Saskatchewan.<sup>91</sup>

The original personal radon daughter dosimeter was developed by the French atomic energy agency and was being used on an experimental basis as early as 1974. By 1978, full-scale testing, using about 160 of the devices, was being conducted in France. In October of that year, representatives of Canadian industry and labour requested that the AECB lay down performance standards for personal dosimeters so that industry could develop its own varieties of the French model.<sup>92</sup> The AECB, according to the United Steelworkers' testimony, stated that it could not do this on the grounds that it was understaffed and did not have the personnel to draw up such standards.<sup>93</sup> Industry was unwilling to undertake its own research and development in the absence of AECB performance standards. Although AECB did get involved in this field,<sup>94</sup> its budgets for 1978-79 and 1979-80 show that it has allocated only \$4,675 to a 'field test' of one particular dosimeter model. This sum was supplemented by \$10,000 from EMR for the 'development of two personal radon dosimeter systems', for a grand total effort of less than \$15,000.<sup>95</sup>



The personal dosimeter case is particularly illuminating in view of the fact that the AECB officially endorses the 'As Low As Reasonably Achievable' (ALARA) principle with regard to the utilization of monitoring and safety technologies, as well as standards. ALARA was a principle developed by the International Commission on Radiological Protection (ICRP) to compensate for the inadequate state of existing scientific knowledge concerning the risks associated with ionizing radiation exposure. In essence, it states that exposure limits should be continually lowered (i.e., standards made more stringent) whenever, and as soon as, this becomes 'reasonably achievable'. The problem arises, of course, in the interpretation of this criterion.<sup>96</sup>

Saskatchewan officials have argued that the AECB has chosen to interpret this term according to criteria that are primarily economic, and on the basis of economic viability at Elliot Lake rather than in Saskatchewan, while Saskatchewan bases its criteria more on technological considerations.<sup>97</sup> The distinction is not trivial in principle, though sometimes difficult to draw in practice. If the economic criteria are paramount, then 'reasonably achievable' is essentially a criterion for evaluating acceptable costs to the firm (or the state), rather than acceptable risks to the worker. My own discussions with AECB officials suggest that the Saskatchewan officials are right, at least in their first claim: i.e. that ALARA is understood as an economically-defined criterion. AECB officials are almost certainly right in arguing that this is what ALARA was intended by the ICRP to mean, but that says more about the ICRP than the coherence of the present interpretation. If we knew what the real risks were we would, of course, still want to reduce them, but we would not need a distinct ALARA principle. We would reduce them to the level deemed equitable, given the scarce social resources available for such purposes (see chapter 5). In short, if there is not serious uncertainty as to risk, then ALARA is redundant.

It is precisely because significant uncertainty continues with regard to radiological hazards that an ALARA principle - at least, one that is technologically rather than economically defined - makes sense. For it is a way of putting into effect the following principle, which I think most would agree is a fair one: since we do not yet know what are the real risks associated with a given level of exposure, the benefit of the doubt must go to the workers, rather than the consumers who may lose some money but not their health or lives. Errors must be made on the side of safety. If the resources had already been invested to gain this knowledge, then the ALARA principle would be unnecessary. Since we have collectively failed to pay the costs of information in this area to date, and since we have decided to push on with the development of this resource nonetheless, then funds must be allocated to technological improvements which may ultimately prove to have been unnecessary. That is the cost of inadequate information that is recognized and embodied in the ALARA principle.<sup>98</sup>

If the AECB is not adequately funded to undertake expensive research and development, which appears to be the case, then why did it not require industry to develop the dosimeters, as Saskatchewan did? Furthermore, why did the AECB appear to preclude the development of such devices by industry by refusing to issue guidelines? In the absence of answers to these questions, the development of these devices continues to progress slowly in Ontario, and the AECB has not issued a deadline for their introduction. If the AECB is responsible for the development of such devices, then it must be given the funds to do so; if such development is deemed to be the responsibility of the industry or the provinces, then they must be required to do so and guidelines issued to direct them in this endeavour. At present, no one appears to have this responsibility. The Select Committee, having investigated this area in some detail, recommended that 'Both the uranium mining companies and the AECB should commit themselves to a substantial increase in testing and development of personal alpha dosimeters with their early adoption a high priority.'<sup>99</sup>

### Regulation

The second stage of the regulatory process involves the development of procedures and standards. The first part of this section outlines the changes in federal-provincial arrangement pertaining to this and the compliance stage since Bill C-14. The second shows the very different responses of Ontario and Saskatchewan to the present arrangements.

By 1977, it was generally agreed that the old 'arrangement', by which adherence to provincial legislation related to OHS was made a condition of obtaining an AECB license, would have to be abandoned. As Ontario's deputy minister of Labour wrote to the president of the AECB:

If a licensee contravenes the conditions in its license concerning compliance with provincial laws, the license presumably could be revoked or cancelled...However, it would not appear that there would be any way in which the provincial statute itself can be directly enforced nor, indeed, is it clear that the provincial inspector would have the right to insist upon entering the premises for inspection purposes, or doing any other acts necessary to ensure compliance with provincial standards.<sup>100</sup>

There was, however, no consensus as to what should replace the old arrangement. The Ontario Ministry of Labour's position in 1977 was that the issue of who ultimately controlled occupational health and safety in the uranium mining industry was less important than how it was controlled. They argued that the arrangements pertaining to radiological hazard were legally clear and adequate because the AECB was solely responsible for developing these standards, and provincial

monitoring was clearly provided for under section 12 of the AECB's 1974 regulations. Conventional OHS, however, was subject to the concerns expressed above under the existing arrangements. Ontario argued that provincial legislation should be directly referenced in a new set of regulations, so that provincial standards would become the board's standards for Ontario, and provincial inspectors would have the same legal status, whether monitoring radiological or conventional hazards.<sup>101</sup>

Initially, the AECB appears to have favoured this position, but the federal Department of Labour argued that conventional OHS should be turned over to them to be administered under part IV of the Canada Labour Code, then being revised to include appropriate mining safety regulations. Under this arrangement, the provincial role would be reduced to the provision of inspectors, under contract to Labour Canada, who would apply federal regulations.<sup>102</sup>

The position of Saskatchewan's Department of Labour was presented to the Bayda Commission about this time. In contrast to its position of a year later, Saskatchewan accepted the presence of the AECB in radiological OHS on the grounds that only it had available 'the technological expertise in radiation to evaluate the credibility of the mining companies' proposals.<sup>103</sup> Ostensibly, their position was close to Ontario's. However, the fact that Saskatchewan's draft of its new OHS legislation and regulations included radiological standards suggests that the province was already less satisfied with the AECB's process and/or standards than Ontario professed to be.

The federal view prevailed, in section 58 of Bill C-14 which stated that: 'The provisions of part IV of the Canada Labour Code and the regulations made pursuant thereto apply to the operation of any nuclear facility, except as the Board may otherwise order.'<sup>104</sup> Effectively, this gave the AECB control over how much of the conventional OHS field it would delegate to Labour Canada. And it left open the issue of how both the AECB and Labour Canada would develop the regulations for those aspects of conventional OHS deemed appropriate to each.

Following the demise of C-14, events moved rapidly. Throughout the fall of 1978, the Ontario United Steelworkers (District 6) had been making strong representations to obtain coverage for Ontario uranium miners under the Canada Labour Code, a position that placed them in direct conflict with the Saskatchewan branch of the same union which supported exclusive provincial jurisdiction for all aspects of OHS. The rationale for the Ontario Steelworker's position was a legal judgement, rendered earlier in 1978, in which Ontario's OHS Bill 139 was ruled inapplicable to uranium miners. Since neither the AECB nor Labour Canada had regulations applying to conventional OHS in uranium mines at this time, Ontario's uranium miners appeared to be completely unprotected against conventional hazards, in the view of the courts.<sup>105</sup>

Thus, shortly before it became apparent that C-14 would not receive second reading, the AECB referred a written request for part IV coverage from the the union to the federal justice department. In October 1978, the Department of Justice delivered the opinion that 'since the AECB had not issued regulations governing conventional safety and health, and since part IV was subject only to other acts and regulations, then part IV applied'.<sup>106</sup> In effect, this judgement instituted the provisions of section 58 of Bill C-14, at least until such time as this opinion is tested in the courts and ruled incorrect. Legal advice sought subsequently by the Ontario Ministry of Labour argued that the provinces probably had no constitutional power to enact laws relating to radiological OHS hazards. But it appeared that, in the sphere of conventional OHS, a situation of concurrent jurisdiction exists; provincial legislation would be constitutional, provided that it did not conflict with federal legislation. Nonetheless, the legal consultant warned that this was an area of considerable uncertainty.<sup>107</sup>

Administratively, Labour Canada had not the staff, funds, or regulations to administer its newfound responsibilities in the uranium mining sector. Nor was Labour Canada keen to assume this new burden, for this might be perceived by the provinces as a gesture of bad faith in a period of federal-provincial jurisdictional discussions. As well, it could create a gap between the old administrative structure and any new one. Consequently Labour Canada's short-term strategy was to gain provincial cooperation in maintaining existing administrative arrangements, with the provinces regulating conventional OHS on Labour Canada's behalf according to their own legislation. This was accomplished in early 1979 by the signing of separate memoranda of intent with Ontario and Saskatchewan in which the provincial departments of labour agreed to continue the existing process 'until such time as permanent arrangements are arrived at and clearly communicated prior to becoming effective.'<sup>108</sup>

As a condition of this arrangement, Labour Canada agreed to reference provincial OHS laws under the Canada Labour Code,<sup>109</sup> a revision effective on 12 September 1979.<sup>110</sup> This arrangement meant that part IX of Ontario's old Mining Act (1970) and Saskatchewan's new Occupational Health and Safety Act (1977) - with exception of part 27 of the latter's mines regulations<sup>111</sup> - were now federal laws, except where they were interpreted to be in conflict with the Canada Labour Code, or the Atomic Energy Control Act, or their respective regulations.

Labour Canada's longer-term strategy was to revise its own mining regulations through consultation with representatives of the provincial governments, business, and labour, incorporating what it deemed to be the best elements of existing and proposed provincial OHS legislation. The intention here was clearly that, should political discussions conclude with federal jurisdiction over conventional OHS in the nuclear industry, Labour Canada would be in a position to

initiate a smooth transition from the federal-provincial arrangements in the memoranda. Thus, when Bill 70 was finally proclaimed in Ontario on 1 October 1979, less than a month after amendments to Labour Canada's regulations were gazetted, the Ontario Ministry of Labour was informed that the federal regulations would not be amended to reference Bill 70. The target date for the new federal regulations was May 1980.<sup>112</sup>

This plan was scrapped in April 1979 when the Steelworkers advised Labour Canada that they were no longer prepared to participate in the drafting of the new regulations on the grounds that the provincial legislation found in Bill 70 was superior to the provisions found in the draft of the new federal regulations.<sup>113</sup> As a result, the Ontario Steelworkers argued, the transfer of jurisdiction for all aspects of OHS to Ontario was in the best interests of the miners, provided that Ontario promulgated radiological regulations and standards.<sup>114</sup> As provincial OHS legislation was endorsed by tripartite committees, the loss of organized labour's support was a significant blow to the legitimacy of the federal regulations. By the summer of 1980, Labour Canada had announced its intention to reference Bill 70 in a further amendment to its mining regulations.

The arrangements described above have given rise to two sorts of problems. First, the legal paramountcy of the AECB over radiological and mixed OHS, and of Labour Canada over conventional OHS in uranium mines, has given Ontario grounds for failing to develop regulations in the former area, and for failing to apply already existing regulations in the latter area. Because neither the AECB nor Labour Canada has yet developed standards for all hazards in these areas, there are in gaps in the protection of Ontario uranium miners.

Second, an overlap problem exists in Saskatchewan. Here the legal paramountcy of the federal regulatory agencies does not undermine the de facto protection of Saskatchewan uranium miners because the provincial government has developed, and requires compliance with, the most stringent regulations in the industry. However, the legal capacity of the Saskatchewan government to enforce its regulations, in the event of a challenge to their constitutionality, is another question. In anticipation of such a challenge, provincial regulators have been forced to adopt clumsy and indirect legal devices which weaken the real force of the regulations by making regulators more reluctant to prosecute.

The silica dust standards case illustrates both types of problem. Silica dust is classified as a 'mixed' hazard (as opposed to conventional and radiological hazards) because small particles of radioactive radon daughters adhere to the silica dust particles. The AECB has jurisdiction over both radiological and mixed hazards, while Labour Canada's jurisdiction is confined to conventional OHS. Unfortunately, the AECB does not yet have any silica dust standards.

Since Ontario's Ministry of Labour has no such standards either, and would not apply them to uranium mines even if it did, a gap exists.

The Saskatchewan situation is different. At present there is no gap because their Department of Labour has silica dust regulations and insists that they be applied to the uranium mines. However, the AECB is reported to be in the process of developing its own silica dust standards in order to plug the regulatory gap noted above. Present information indicates that the maximum permissible limits likely to be incorporated in the AECB regulations will be twice as high (i.e. lenient) as those which presently exist in Saskatchewan.<sup>115</sup> It appears, therefore, that there is a real possibility that a court could use the AECB's paramountcy to overturn the more progressive Saskatchewan regulations.

A parallel problem exists with respect to radiological OHS standards. The maximum levels of exposure permitted by the AECB are 4 WLM<sup>116</sup> of exposure to radon daughters and a whole-body ionizing (gamma) exposure of 5 rems per year. Current federal legislation permits the concurrent exposure of radiation workers to both maxima. Saskatchewan's 1977 OHS legislation incorporates a formula that establishes a combined exposure limit intended to reduce acceptable exposures to less than the sum of the two AECB limits. Such total exposure and dose formulas were called for in the Ham Commission report,<sup>117</sup> and are justified by Saskatchewan on the grounds that two poisons are more dangerous than one, and because:

The additional margin of safety provided in the Saskatchewan formulas may also provide some protection should future findings confirm the conclusions of several researchers that the biological effects per unit of radiation are higher at lower level of exposure. There is, in our opinion, some evidence to suggest that this indeed may be the case ... The recently completed studies on this aspect of radiation are not definite, but collectively they indicate a possibility that there may be some underevaluation of risk per unit of exposure due to this phenomenon.<sup>118</sup>

The Saskatchewan formula now applies to the new mines at Cluff and Key Lakes, through surface lease contracts. Although Eldorado and Gulf (at Rabbit Lake) signed no such agreement, they are reported to be meeting this requirement as well.<sup>119</sup> Ontario has refused to promulgate any radiological standards under the present administrative arrangements. The AECB has stated it has not promulgated such a formula in the four years since the Ham report because it is still reviewing the latest report on the subject from the International Commission for Radiological Protection.<sup>120</sup>

Even the old Eldorado underground mines, which are much more like those at Elliot Lake than the open pit mines, have succeeded in meeting the Saskatchewan government's standards. The average radon exposure level there is now only 1.6 WLM, but the AECB continues to maintain its limit at 4.0 WLM, despite the ALARA principle.<sup>121</sup>

## Compliance

Compliance has two components: the monitoring of the regulations established, and the enforcement of those regulations in cases of infraction. Monitoring is probably the only aspect of the whole process in which no significant problems arise from the existing arrangements. The process, in which provincial inspectors double as federal officials when necessary, works well as long as they are clear as to which set of regulations is applicable.

This is not the case in the enforcement phase, where the inadequacy of the existing arrangements is felt, above all, as the disjunction between monitoring and enforcement. For conventional OHS, if there are any cases where prosecution is required, the provincial ministries must turn the matter over to Labour Canada, and thence, to Justice Canada. Justice Canada, should it decide to prosecute, will then do so under the provincial legislation referenced in the Canada Labour Code's regulations, as qualified by those regulations.

This process is as cumbersome as it sounds, as Saskatchewan's Department of Labour discovered when attempting to prosecute Eldorado Nuclear for a fatal accident which occurred in the Uranium City mine on 29 January 1979. It was almost a full year before the case had made its way through the tangle of administrative channels, by which time at least one important witness could not longer be traced. Finally, on 7 January 1980, Saskatchewan Department of Labour officials were informed by the federal Department of Justice that 'no prosecution is warranted'.<sup>122</sup>

The Ontario Ministry of Labour has no alternative to this process at present, given the policy directives of its government. Saskatchewan could have prosecuted Eldorado for breach of contract regarding the surface lease requirements discussed above, but, had the province won the case, it would not have been able to levy the fines provided for in its OHS legislation. Rather, it could have withdrawn the surface lease, or sought some award from the courts for breach of contract. Thus, while the Saskatchewan approach does give the province a firm legal ground for its legislation, it allows only a very crude legal sanction in reply to noncompliance with its regulations.<sup>123</sup>

The AECB has jurisdiction over mixed and radiological OHS. From the provincial perspective, the problem of disjunction is exactly the same. Once the problem has been passed to the federal level, the process of prosecution is quite different, and even less adequate than that which exists for conventional OHS. The AECB has neither the power to prosecute, nor adequate legal sanctions which the federal Department of Justice might apply. Indeed, the justification given by the deputy minister of Labour Canada for not referencing the provincial OHS leg-

isolation directly in the AECB's regulations, as Ontario had argued it should, was that 'the licensing approach...was virtually unenforceable.'<sup>123</sup> Thus, if the AECB wanted to penalize a mining company for some infraction, its only sanction is to suspend or refuse to renew that company's license - virtually the same crude enforcement technique provided by Saskatchewan's surface lease requirements. Once again, Ontario has no alternative to this process, while Saskatchewan's is no more effective than the AECB's from a practical perspective.

### Conclusions

The nature of the problem created by jurisdictional uncertainty and the existing administrative arrangements depends upon the nature of the provincial response to it, and this was very different in Ontario and Saskatchewan. The response of the Saskatchewan government, following the recommendation of the Bayda Commission, was to attempt to secure the legality of its standards by circumventing the federal government's apparent constitutional invulnerability. The aim was pursued by requiring compliance with all provincial OHS regulations - conventional and radiological - as a condition of the granting of a provincial surface lease at Cluff Lake, and for all subsequent uranium mines. Thus, in the event of any failure to comply, the province can sue for breach of contract, without ever raising the issue of constitutionality.

In Saskatchewan, gaps arising from the existing arrangements have been filled by developing provincial regulations for all aspects of OHS in the uranium mining sector. This strategy translates the problem into one of overlaps and bureaucratic inefficiency because Saskatchewan has had to develop parallel procedures, legislation, and expertise, and the private sector must now deal with both levels of government. The Ontario government, on the other hand, responded to the same initial situation by disclaiming responsibility for the regulation of any aspect of the uranium mining industry. The following speech by the Ontario Minister of Labour may be taken as the current position of his government:

If either the Steelworkers or the uranium mining companies have any problems in this connection, they should be raised with responsible federal authorities (i.e. the federal Department of Labour in respect to conventional health and safety). Unless and until constitutional responsibility for these matters is altered, this is the exclusive responsibility of the federal government. The only action that I could take would be to instruct my inspectors not to act as federal safety officers, and I do not believe that this would be in the interests of the workers.<sup>125</sup>

In fact, as the example of Saskatchewan showed, there were other things that the Ontario government could have done. Perhaps Ontario cannot use the surface



However, the example of Eldorado at Uranium City, and the levels of radon daughter exposure achieved there without any surface lease provisions, is directly relevant. As one Saskatchewan official said: 'The odds of a company being able to proceed against a hostile provincial government are pretty slim. They know that we will get them somewhere along the line.'

The Ontario governments's approach effectively sanctions the existence of gaps. Ontario's miners have no coverage in any of the areas where Saskatchewan's radiological OHS regulations have filled gaps left by the AECB: personal radon daughter dosimetry, gamma exposure monitoring in the mines, silica dust limits, and the technological interpretation of the ALARA principle. Gaps therefore exist in both the conventional and radiological aspects of OHS coverage of Ontario uranium miners, despite the different administrative arrangement that each involves.

## **Environmental Protection**

### Information

There are only two pounds of uranium in every tonne of ore, so tailings are of almost the same weight as the original ore, while they occupy twice the original volume.<sup>126</sup> There are now about 100 million tonnes of these tailings in Canada, 85 million tonnes being located in the Elliot Lake region. Estimates presented to the Select Committee suggest that this figure may be expected to triple within the next twenty years. The Elliot Lake mines alone plan to generate 30,000 tonnes of new tailings every day, seven days a week, to the year 2000.<sup>127</sup>

The need for an expanded program of research and development is not subject to serious doubt. As Ontario's Deputy Minister of Environment argued, the present rate of industrial expansion is such that decisions about the appropriate abandonment technology to be employed must be made very rapidly if enormous retro-active costs are to be avoided.<sup>128</sup> In fact, the Ontario Environmental Assessment Board (EAB) report went so far as to recommend a moratorium on the approval of new tailings areas until the results of research projected for the next three to five years could be evaluated: effectively, a moratorium on industry expansion.<sup>129</sup>

The EAB also recommended that the level and pace of research and development must be increased in a wide variety of areas,<sup>130</sup> and that a contingency fund be established within the next five years as an important means of ensuring adequate disposal in the light of inadequate research.<sup>131</sup>

These recommendations, as well as several more specific ones, were subsequently echoed and endorsed in the Final Report of the Porter Commission,<sup>132</sup> which concluded that 'the major regulatory shortcoming is the complete lack of standards or other requirements governing the post-closure phase of nuclear facilities, including tailings disposal areas. Efforts are under way at both the federal and provincial level to redress these gaps, which constitute an issue of the greatest urgency'.<sup>133</sup> A year later, the Select Committee remarked that 'one of the current frustrations (in the development of more adequate disposal methods) is that there appears to be an impasse on research' and went on to urge that 'It is imperative that regulations be enacted immediately to ensure that long-term responsibility is properly assumed by the industry that creates the long-term problem.'<sup>134</sup>

What sorts of efforts are 'under way'? Are they adequate? Problems of overlap and coordination at this stage have not been great for the simple reason that so little has been done to date. The chief coordinating body for research and development in this field is the same Joint Panel discussed earlier in this chapter.

Although the Joint Panel has existed since 1976, the first step towards the establishment of a comprehensive and integrated national program concerned with uranium tailings disposal was not taken until the fall of 1979. At this time, the Joint Panel organized a meeting of potential uranium tailing researchers, including representatives of both levels of government and their agencies, provincial research councils, universities and the industry. The meeting resulted in a decision to create the National Technical Planning Group. The planning group has since met several times and has decided that its efforts should be focused solely on research related to the long-term abandonment of uranium mine tailings, as the short-term management of tailings was deemed to be under control.

So far, the work of the planning group has been confined primarily to defining its terms of reference. These were approved at the first meeting of the Steering Committee in July 1980, and are as follows:

- i to review present activities and resources of funding;
- ii to propose a research program structure with priorities on objectives defined;
- iii to estimate a program schedule, cost and cash flow;
- iv to propose a program management structure.

The principal problem at this stage is therefore the same as in the OHS field: gaps, understood as an inadequate research and development program, resulting

from unclear lines of accountability. By far the largest single contributor to research and development in this area is the Canadian Centre for Mineral Energy Technology (CANMET), a research branch of EMR. CANMET has had a budget of \$900,000 per year devoted to research related to the management and disposal of uranium tailings for the last four years. But, as the acting Director-General of CANMET has testified:

We are acutely aware of the many more avenues of research and development in the uranium tailings management that we are unable to support...We believe a good beginning has been made...in making substantially more effective use of Canada's total resources for this purpose through the creation of this national technical planning group...But basically it is up to the political people involved, yourselves and others at the federal level, to look at these recommendations and make the final decisions.<sup>135</sup>

CANMET's recommendations included a list of ten areas where it believed work was needed but which it could not afford to do. When asked whether, and to what degree, the provincial governments and industry contribute to CANMET's work, officials estimated that industry might contribute \$.5 million on an ad hoc basis, while the provinces do not contribute anything to CANMET.<sup>136</sup>

Saskatchewan officials noted that the work of CANMET to date has been almost exclusively oriented to Elliot Lake problems, resulting in considerable skepticism about its future role in that province.<sup>137</sup> As CANMET is also the organizing force behind the joint panel, these doubts carry over into that area as well.

It seems clear that some sort of formula for contributions to a combined fund for present research and future post-closure activities is essential, if the ad hoc and inadequate character of present funding is to be improved. It is equally clear that the establishment of such a fund, to say nothing of its contribution formula, is a political issue which will involve difficult bargaining between two levels of government and the industry, as each seeks to have the other bear as large a share as possible of the costs. The AECB, the three relevant ministries of environment, and the Porter Commission all advocate the creation of a fund, but it is argued that the distribution of costs cannot be determined until the total costs can be estimated accurately. Total costs cannot be estimated with any accuracy until adequate research has been carried out to determine a technology for permanent disposal.<sup>138</sup> At the same time, the technology may not be developed without the fund, or at least a contribution formula (which would present the same political problems as a fund).

Which is to be contingent upon which? Saskatchewan has answered the question by setting up its own provincial fund. Ottawa and Ontario continue to discuss the issue. The Ontario industry has traditionally opposed such a fund,<sup>139</sup> and with

good reason. The fund forces issues to the surface that, from the mining company's perspective, are better forgotten. As Ontario's Deputy Minister of the Environment argued:

The province and most of the jurisdictions in Canada...have a nice history of deciding to set up funds to look after tailings after the companies are out of business, which means that the general taxpayer is faced with it. So I think ...that some sort of fund is necessary and we are only hedging as to its exact form at this stage. Otherwise, you can rest assured that unless we have marvelous breakthroughs in technology in the next 40 or 50 years that at some stage the province is going to wind up directly funding the maintenance of these facilities.<sup>140</sup>

Begging the question of whether Saskatchewan's fund is adequate, it seems clear by comparison that Ontario has relied heavily on the federal government, (primarily CANMET, but also some \$245,000 from the AECB in the last two years,<sup>141</sup>) for research and development related to the disposal of uranium tailings. Ontario's government and industry are transferring the costs of adequate disposal to the Canadian taxpayer, and we can only endorse the Porter Commission's recommendation that 'Ontario should contribute its share to any national program for uranium mine and mill waste research.'<sup>142</sup>

### Regulations

Administrative arrangements since C-14 in the EP field have developed differently from those observed in the OHS field, for a number of reasons. First of all, the inter-provincial and international character of environmental problems has meant that the federal government has been involved in all aspects of EP from the beginning. The two levels of government recognized that this was a field in which concurrent jurisdiction must exist, and so they perceived their relation to one another as primarily an administrative problem of coordination. This approach was also encouraged by the fact that federal and provincial environment ministries were all created within two years of one another. This meant that there was no fight for 'turf' between agencies of one level which had traditionally done the job, and a new and expanding agency from the other level, the situation which characterized the OHS field.

The result of this set of jurisdictional and institutional factors was a federal-provincial 'Accord for the Protection and Enhancement of Environmental Quality' signed between Environment Canada and provincial ministries of the environment. These accords covered all aspects of EP, with the aim of developing the federal role in such a way as to protect the environment while avoiding duplication among agencies:

Generally, the federal government agrees to establish national baseline effluent and emission standards for specific industrial groups and specific pollutants, and the provinces agree to establish and enforce requirements at least as stringent. Both parties agree to cooperative monitoring programs in areas of joint interest and to free exchange of data.<sup>143</sup>

Thus, with the signing of the federal-provincial accords, the EP field was characterized by a very different set of administrative arrangements from the OHS field. Not only was the federal line department developing standards for both conventional and radiological hazards,<sup>144</sup> but the provincial line departments were legally able, and perhaps even encouraged, to develop more stringent standards if they deemed them appropriate, and to monitor and enforce those standards without any federal mediation or intervention.

The AECB, given its jurisdictional supremacy, might have disrupted these arrangements when it became active in the mining sector, as it had altered the previous OHS arrangements. However, the EP field has largely been left to the environmental ministries. This may in part reflect the fact that it was the Ham Commission and its focus on OHS problems that originally led the AECB to commit some of its limited resources to the mining sector. At present, AECB's role in this field is restricted to licensing waste management sites, and activities of various sorts at the international level. Having developed no EP standards of its own, the board employs those of the provinces by stipulating compliance with them as a condition of each particular license. Thus, an administrative arrangement between the AECB and the provinces which is roughly equivalent to that which existed in the OHS field until 1975 has existed in the EP field since 1975.<sup>145</sup> Put another way, the existing arrangements in the EP field are the inverse of those in the OHS field: the federal government sets a 'floor' below which provincial standards cannot fall, rather than a 'ceiling'.

As in the OHS field, the provincial response has varied according to the general position of the particular government on the jurisdictional issue. Ontario insists that it now has no jurisdiction whatever in the uranium mining industry, despite the difference between OHS and EP noted above. Saskatchewan maintains that its jurisdiction and its legislation will apply in this regulatory field, just as it does for OHS. These policy differences were reflected in the different character of the environmental hearings process carried out in each province, the character of the recommendations of each, and in the standards promulgated by each province after 1978. Once again, the principal Ontario problems are gaps, while those in Saskatchewan are overlaps.

Looking at the hearings process first, the hearings conducted at Elliot Lake between 1976 and 1979 were strictly voluntary, because the Ontario government deemed that it did not have the power to proclaim the hearings under the Envi-

ronmental Protection Act.<sup>146</sup> The result, as Ontario's Deputy Minister of the Environment has noted, was a report which, even after three years of work 'did not have the same precision, for example, that the Ham report had, which gave you some clear idea of what needed to be done...they backed off...from making any major decisions on the big issues, and for that reason they were very conservative.<sup>147</sup> When asked to further explain why 'convervatism' had displaced 'conservationism', he said:

I think the biggest single difficulty had to do with jurisdictional problems. I do not see it so much from the point of view of the limitations that existed on the authority of the Board, but even the Board itself, when it wanted to make a specific decision in a certain area, had its own judgement clouded by the constitutional conditions at Elliot Lake. The recommendations continually fudge just who is supposed to be sorting this particular aspect out because I suspect they were not sure just who should do it and, in some cases, it quite clearly just was not the prerogative of one agency but rather required the cooperation of two or three agencies.<sup>148</sup>

While the uncertainty described by the deputy minister cannot be denied, the contrasting example of Saskatchewan is revealing. The Bayda Commission was appointed early in 1977 to look at the uranium mining sector in that province, where the same federal-provincial arrangements existed, but it was given the full powers of a Royal Commission, as the Ham Commission had been. The Bayda Commission's analysis and recommendations, although they could be faulted for failing to examine past OHS and EP problems at Uranium City, were a model of clarity and precision.

Bayda grasped the jurisdictional nettle, recommending that:

- i the federal-provincial responsibilities for monitoring and compliance be more clearly specified;
- ii regulations and requirements for mine site abandonment procedures be developed in greater detail;
- iii the granting of surface leases require compliance with such regulations;
- iv the administration of such regulations of all others pertaining to pollution control in the mining industry be transferred from the Department of Mineral Resources to the Department of the Environment;
- v the Department of the Environment require an environmental assessment process prior to the approval of any new mining operation;
- vi the province undertake to develop standards for radionuclides and other substances not included in the federal Fisheries Act regulations for mines;
- vii an 'Environmental Protection Fund' be created to finance research and development at present, and monitoring and reclamation after closure of mine sites.<sup>149</sup>

All the recommendations were accepted by the government and have since been implemented. Measures ii and iii were required for the Cluff Lake mine itself, and for all subsequent ones. Measure iv was accomplished with the creation of a Mines Pollution Control Branch in the Saskatchewan Department of the Environment in 1979, and with two Orders in Council passed in January 1980, which transferred the regulations. Measure vi has been accomplished with an amendment to the regulations of the Department of the Environment Act, which are currently being evaluated by various interest and should be in place by November 1980. Measure iii has been policy since the Bayda Commission, but will be formalized with the passing of the new Environment Assessment Act which has been in the draft stage since 1976, and is expected to be passed into law this year.<sup>150</sup> Measure vii was jointly implemented with the announcement of a new Environmental Protection Division in the Heritage Fund, beginning with \$2 million in 1980, with another \$1 million to be contributed by the government for each uranium mill in operation.<sup>157</sup> Finally, under the new regulations vi, penalties for infractions have been increased twentyfold.<sup>152</sup>

In Ontario, on the other hand, the province is negotiating with the federal government regarding the fund recommended by the EAB, but as yet no agreement is in sight.<sup>153</sup> The government has flatly rejected the possibility of a moratorium on the approval of new tailing areas recommended by the EAB and endorsed by the Porter Commission, on the grounds that this would not be feasible at the present rate of industry expansion.<sup>154</sup> As for many of the other recommendations made by the EAB, the government is still 'considering' its reply to them.<sup>155</sup>

The one area where Ontario has done something of note in the regulation stage was effected before the EAB's final report was tabled. In November 1978, guidelines for radium-226, pH (acidity), ammonia, some heavy metals, and total solids, were established under the Ontario Water Resources Act, administered by the Ministry of the Environment. However, these guidelines are 'objectives', just as Ontario's radiological OHS guidelines were before the Ham Commission, and so have no statutory force.<sup>156</sup> In addition, it should be noted, there are no objectives for those substances which are not covered by the federal minimum standards. Thus, in Ontario, gaps exist insofar as there are no standards whatever for thorium-230, thorium-232, or lead-210.

In Saskatchewan, as we observed in the OHS field, the principle problem was with overlapping regulations and conflicts between Saskatchewan officials and AECB. The case of the new Saskatchewan regulations for total radium-226 illustrates the problem well. Prior to the new regulations, all radium-226 standards were for 'dissolved radium'; they measured that amount of radium in solution which would pass through a 3-micron filter.<sup>157</sup> Total radium, on the other hand, gives a more accurate picture of how much radium is in the effluent, since the radium

filtered out in the other process may well redissolve at a later date.<sup>158</sup> To illustrate the significance of this distinction, analysis in one area of Elliot Lake found that while the dissolved radium concentration was between 3 and 5 pCi/l (picoCuries per litre), the total radium concentration was about 26 pCi/l.<sup>159</sup>

The federal-provincial Working Group on Drinking Water concluded that the maximum level for total radium in drinking water should be 27 pCi/l, while the Saskatchewan regulations set it at 10 pCi/l.<sup>160</sup> The result, according to one Saskatchewan official was 'a three-year fight' in which the AECB argued that the technology wasn't available to reduce the concentration to those levels. Saskatchewan officials noted that total radium levels of 10 pCi/l had been achieved in that province for a year and a half, while Ontario mines could not meet such a standard.

### Compliance

In the EP field, as in OHS, the present administrative arrangements have a more serious impact on enforcement than on monitoring. The present situation with respect to prosecutions is less clear than in OHS, because in the EP field the relations of the provincial agencies to the AECB are less clear. Only one case has so far arisen in which a provincial agency tried to prosecute a uranium mining company. Ontario's Ministry of Environment took Denison Mines to court on twenty-two charges of violating the provincial requirements and directions issued in 1977. The case was dismissed, however, before the constitutional issue could be raised and settled, and it is now under appeal.<sup>161</sup>

Of course, the very fact that the province attempted to prosecute on the basis of provincial regulations distinguished the EP field from OHS. However, should the provinces find themselves unable to prosecute on the basis of their regulations (i.e. should the courts rule against the validity of the existing arrangements), then the practice of including provincial regulations in AECB licensing requirements is subject to the same problem that we observed in the OHS field. That is, alternative enforcement procedures are clumsy and might well force Environment Canada to enter the picture in much the same way that Labour Canada did after 1978. To quote a letter from the Ontario Ministry of the Environment to the AECB:

One cannot prosecute directly for violation of a licence condition, but only indirectly for operating otherwise than in accordance with the licence. Admittedly, this would be preferable to licence revocation, but it is still a bit cumbersome. It appears particularly cumbersome if what is wanted is prosecution, for instance, for the violation of a provincial



control order; and what is possible given the constitutional situation, is a prosecution for operation otherwise than in accordance with a licence which contains a condition which incorporates a provincial law which authorizes a control order which has been issued and subsequently violated.<sup>162</sup>

Denison Mines has already stated its intention to challenge the constitutionality of any attempts by the Ontario Ministry of Labour to lay charges under the provincial act,<sup>163</sup> and the same situation might occur in the EP field. This is one reason why the Ontario Ministry of Environment is pushing the Denison case into appeal: to see whether or not the industry is prepared to play the constitutional card.

The Deputy Minister of Environment for Ontario has argued that there are good reasons to suppose that the industry will play it:

I am anticipating the problems that arise when you get into very sharp differences of opinion with large sums involved and find that instead of dealing with them under normal negotiations we have to go through protracted years in courts on constitutional issues. So the question is to clarify the authorities so that these clouds cannot obscure the necessary actions and so that the responsibilities are as clearly defined as possible.<sup>164</sup>

In lieu of a constitutional resolution, the ministry considers that there are three steps to such a reform that are essential:

- i the AECB must automatically incorporate the specific technical requirements called for by the ministry (rather than negotiating each one);
- ii the AECB regulations must be amended to make it clear that licensing conditions may be improved in the interests of environmental, as well as OHS considerations;
- iii the AECB regulations must be amended to make it clear that various control instruments are included with the general laws presently mentioned in the license requirements.<sup>165</sup> (This is a response to the fact that, while the present AECB license requires compliance with 'all provincial laws of general application', it is not clear whether the more particular compliance instruments found in the regulations of the relevant ministries also apply.<sup>166</sup>)

The two agencies have been discussing these reforms since early 1979, although the AECB has not yet given any direct answer on any of the three proposals.<sup>167</sup>

A second significant problem in enforcement arises, not from the administrative arrangement with the AECB, but from exceptions to concurrency in the EP field generally. These stem from the federal government's exclusive responsibility

for its own Crown corporations and for the administration of all aspects of Indian reservations. These exemptions from provincial environmental regulations have recently been invoked by federal and provincial governments respectively, to justify escaping the provisions of provincial environmental regulations.

The first such case to arise was an attempt by Ontario's Ministry of the Environment to prosecute Eldorado's refinery for improper waste management practices. The lawyer for Eldorado Nuclear argued that, as a federal Crown corporation, it should be immune from provincial legislation governing environmental concerns in the uranium industry.<sup>168</sup> The court upheld this argument, and the Ministry of Environment has appealed.

The issue of the Serpent River Indian Reservation was raised in the course of the AEB hearings at Elliot Lake. The problem here centered on the fact that the dissolved radium-226 standard set by the federal government was 10pCi/l, while the provincial standard was more stringent, at 3pCi/l. Under the terms of the Federal-Provincial Accord, this is an acceptable situation under normal conditions, and the more stringent provincial standard should be observed. However, the provincial government refused to enforce its standards, on the grounds that all Indian reservations are an exclusively federal jurisdiction. It is not clear whether this argument is valid, since it is the river, not the reservation, which is polluted, but the result was that the Serpent River Indians received no help from either government. The contamination levels in their water supply were below the federal limit, while the provincial government provided \$50,000 to the neighbouring town of Serpent River to finance water purification equipment.

To sum up, we have seen that, from a purely administrative perspective, concurrent jurisdiction in the EP field had the potential to work better than the exclusive jurisdiction that exists in the OHS field. The former avoids often arbitrary dichotomies between conventional and radiological hazards, makes federal regulations a 'floor' rather than a 'ceiling', and allows the provinces to enforce their own legislation.

However, the entry of the AECB into the regulatory field, even in a more limited capacity than we observed in OHS, reproduced many of the overlaps and legal uncertainties that surrounded Saskatchewan's attempt to regulate. At the same time, it gave the Ontario government what it considered to be adequate grounds for disclaiming any provincial responsibilities for radiological EP, and so resulted in gaps. Thus, the problems associated with the EP field resemble those in the OHS field much more closely than one would have expected, or indeed, hoped.

## Conclusions

In this chapter we have seen significant differences in the sorts of regulatory problems existing in Ontario and Saskatchewan, despite identical conditions of uncertainty and intergovernmental administrative arrangements. The responses to jurisdictional uncertainty depended on the policy priorities of the provincial governments. The explanation of the very different policy priorities of the Ontario and Saskatchewan governments is a complex matter. For our purposes, however, it is enough to know that each province has consistently adhered to a particular position, that it shows every intention of continuing to do so, and that certain types of problems necessarily arise from each kind of response.

The Ontario government took the position that the federal government has exclusive jurisdiction over the regulation of all aspects of the nuclear industry. As a result, Ontario's line departments have been unable to fill the gaps arising from inadequate federal regulations in certain areas.

The Saskatchewan government, in contrast, took the position that a situation of concurrent jurisdiction, at the very least, should exist and would be simulated by the use of civil law instead of constitutional law. The principal problems, therefore, have centred on securing the agreement of the AECB to superior Saskatchewan standards and procedures, and securing the legal enforceability of these regulations in the event that the AECB or the industry should challenge them on constitutional grounds.

The Ontario-Saskatchewan comparison illustrates how far it is possible to develop a good regulatory system, under conditions of considerable jurisdictional uncertainty, if the government in question has the political will and the ingenuity. The OHS-EP comparison, however, has shown us a marked convergence in the types of problems faced by each government, despite the very different nature of the intergovernmental administrative arrangements in these two fields. This comparison, then, shows that there are real limits to how much even the best efforts can accomplish.

At the information stage we saw gaps caused by free riding; research and development expenditures have been inadequate and slow to increase. At the regulation stage, the existing constitutional situation allowed the Ontario government to deny responsibility, again resulting in gaps, while in Saskatchewan inadequate federal regulations overlap with, and threaten to legally undermine, the superior regulations. Finally, at the compliance stage, federal paramountcy with respect to radiological hazards has resulted in a disjunction between monitoring and enforcement that is both inefficient and demoralizing for the provincial regulatory agencies concerned.

## 5. INTO THE FUTURE

We have now acquired at least an outline of the evolution of OHS and EP regulation in the uranium mining industry since the second world war. Two things have become clear in the course of examining this development. First, federal-provincial relations are now more central to regulatory inadequacies than they were initially. Second, these inadequacies are serious, and the need for reform becomes more pressing as the scale of uranium mining accelerates for the first time since the mid-1950s.

This chapter is divided into two parts. The first addresses the issue of what sorts of changes are necessary to eliminate, or at least ameliorate, the gaps and overlaps which have been documented here.<sup>169</sup> The second addresses the general issue of what the goals of a regulatory system such as this ought to be, so that we may gain some idea of how the federal-provincial dimension of regulation fits into the wider scheme of things.

### **Jurisdictional Reform**

The chief concerns of this section are to show, first, what reforms are needed to reduce jurisdictional uncertainty, and, second, how narrowly jurisdictional issues in this regulatory sphere can be separated from the constitutional disputes in a way which will avoid a repetition of the Bill C-14 debacle.

I want to begin by asking this question: Is it preferable to have the uranium mining industry regulated on the 'sector' model of the AECB, or on the 'category' model of the federal and provincial line departments? If this way of asking it seems cryptic, the question is really an old and familiar one. The union movement has always faced a problem of whether to organize on an industry by industry (or sector) basis, or on a trade-skill (or some other category) basis; any regulatory system faces a parallel problem. To put it concretely, should the entire nuclear industry be regulated by an agency exclusively concerned with this sector, or should it be regulated by dividing it up into problem categories such as EP, OHS, national security, etc., with an agency responsible for each type of problem in this and every other sector of the economy?

It might be possible to argue a strictly theoretical case for the superiority of one method over the other in a federal system, but I will make no such attempt here. Rather, I wish only to assert that, whichever method of organization is preferred, there are strong grounds for keeping it as homogenous as possible, and for mixing the two methods together only when it is unavoidable.

We have already seen that the administrative difficulties of coordinating the activities of two levels of government have been considerably augmented by the fact that the AECB is organized on a sector basis while the provincial regulators are organized on a category basis. So, for example, if the AECB had not been constituted with reference to radiological hazards in particular, no distinction of institutional and legal importance would have been necessary between radiological and 'conventional' hazards. It was the inadequacy of this distinction, in practice, which required the category of 'mixed' hazards, from which arose the gap in silica dust protection for Ontario miners, noted in chapter 3.

I would argue that it is much more difficult to draw clear boundaries between five agencies organized on two competing principles than between two (federal and provincial, by sector) or four (federal and provincial, by category) agencies organized on one common principle. If last point is granted, then the question which follows is: in which direction should reforms try to move? toward a sector approach or a category approach?

The sectoral approach might at first seem to be the more attractive option. After all, even in a federal system this approach would involve clarifying the boundaries between only two agencies, as opposed to four on the current category approach. I find such an argument unconvincing, for the following reasons.

First, while the AECB itself is now organized upon sectoral lines, this is not true of the provincial regulators, which are line departments. The latter are all defined on a category basis, and are responsible for all sectors in which their category of problem arises. A consistent sectoral approach would thus require either exclusive AECB jurisdiction and no provincial regulatory role at all in this sector, or a set of major institutional reforms at the provincial level to create a provincial equivalent of the AECB. The first option seems out of the question, not simply because it would be a considerable waste of provincial expertise and resources, but also because it is clear that AECB is presently unable to regulate all aspects of the entire sector alone. That is why the federal line departments have had to enter the picture, and why the provincial departments continue to supply most of the manpower and expertise in the latter two stages of the regulatory process. The second option would require the second major set of institutional and administrative reforms of provincial regulatory agencies in this sector since 1976, with all the temporary disruptions and uncertainties which such changes necessarily entail.

Secondly, regardless of whether such a change should entail exclusive federal jurisdiction or concurrent federal and provincial jurisdiction, one agency or two, those agencies would not fit in well with the overall regulatory context. Both the federal and provincial levels of government have increasingly moved

toward a category approach, as they have sought to separate the regulatory from the promotional functions of the state. For example, regulation of OHS in the mines was originally a responsibility of the department of mines, hence broadly sectoral, but now all OHS regulation is to be the responsibility of departments of labour. This, as I argue in the next section, has been a salutary development. The point here is that, if the uranium mining industry were to diverge sharply from this trend, it would present all the problems that such anomalies create for bureaucracies that are attempting to rationalize their activities.

Third, the reverse process, the move to a category approach, would not be attended by the problems listed above. The AECB could simply withdraw from the uranium mining sector, as far as OHS and EP are concerned, passing any and all federal responsibilities in these fields to the federal line departments with which it already deals. As we have seen, the AECB has only been in this sector for the last 5 years in any serious way, and this transfer would not be as large-scale or traumatic as the other options discussed. No new agencies would have to be created. The only agency that would have to be restructured would be the AECB. The number of over-lapping jurisdictions would be reduced. It would be clear, I think, that the federal government was not trying to aggrandize its own role in the industry by such a move, and so provincial cooperation would be much more likely here than for the alternative strategy which we saw embodied in Bill C-14.

Finally, there are good reasons for thinking that the constitution of the AECB is inappropriate to the types of judgement which it is called upon to make, while the line departments are better suited to the task. This point will become clear in the course of the discussion in the next section.

Let me assume, then, that the reader has been convinced that the category approach is the one toward which we should strive, and that our success in this endeavour would be a significant step towards simplifying, and thereby clarifying, the division of regulatory responsibilities in the OHS and EP fields. The next question will then be: if we had the choice, would we prefer a categorial regulatory regime in which there is exclusive federal, or exclusive provincial, or concurrent jurisdiction within the categories?

Exclusive provincial jurisdiction throughout the entire nuclear industry is acknowledged by all provinces to be impossible and undesirable. Only the AECB has the expertise, one generally-acknowledged argument runs, to regulate adequately the nuclear power sector. Focusing exclusively on the uranium mining sector, however, there is less of a consensus, as we saw at the close of chapter 2. Should exclusive provincial jurisdiction be preferred, if it were restricted to the uranium mining sector or, still more narrowly, to the OHS and EP fields of that sector?

On balance, I don't think so. While the presence of the AECB may be unnecessary, or even a source of confusion, some federal presence cannot be avoided. Aside from the very real international security considerations, the EP aspects of the uranium mining sector are inherently transprovincial, so that the federal government will have to become involved. So, too, at the information gathering stage of both OHS and EP regulation, only a coordinated national effort will secure the necessary data in an efficient and fair fashion. The listing of these sorts of practical considerations could continue.

Beyond them lie considerations of principle, to be further discussed in the next section. Here I would say only that there is a strong case for arguing that, even if perfect uniformity of standards cannot be achieved across sectoral and provincial boundaries, there ought to be minimum standards of OHS and EP which are universal, just as this is recognized as the goal in health care, education, unemployment insurance, and so on. Again, this would be a role that only the federal government could play, in the uranium mining industry as in any other.

Exclusive federal jurisdiction, of course, already exists, de jure, throughout the nuclear industry. That it is not the de facto situation ought to tell us something. The same arguments against exclusive federal jurisdiction in the form of the AECB - strong provincial opposition, waste of provincial resources, lack of funding and expertise to do the entire job at the federal level - apply to the exclusive case of a regime organized by categories. In addition, because of the rather different problems facing the industry in the two provinces, it does seem that one of the benefits of a federal system, i.e. the flexibility to allow some regional variation in government goals and priorities in response to differences in situation, ought to be preserved if possible.

By process of elimination we are brought to the concurrent jurisdiction option. Concurrency would make both levels of government responsible for the regulation of the sector, reducing opportunities for free riding, which I argued was the major reason why jurisdictional uncertainty appeared as gaps rather than overlaps in Ontario. Concurrency would also mean that the legislation and regulations of both levels of government are legally valid beyond any doubt, thus eliminating one of the major worries of Saskatchewan in the OHS field, and of both provinces with regard to radiological hazards in the EP field. The current problem at the compliance stage, i.e. the disjunction between provincial monitoring and federal enforcement, would also be eliminated. If the provincial regulations are clearly legal in their own right, and not simply by virtue of federal referencing, then the provinces can prosecute on that basis without any need for federal mediation.

If the regulations of both levels are clearly legal, the question remains as to which regulations should take precedence in cases of overlap. This brings us to the issue of paramountcy: concurrency always implies either federal or provincial paramountcy. As we have seen with the de facto concurrence that already exists in this sector, the problem with federal paramountcy has been that it creates a ceiling rather than a floor. What we really want is just the reverse: we should try to replicate the model of the existing federal-provincial EP Accords in the OHS and EP fields of the uranium mining sector. The federal government will establish a set of minimum standards which must be met, and the provinces may promulgate and directly enforce more stringent standards should they decide to do so.

Will provincial paramountcy give us this sort of legal arrangement? The answer is, I think, 'No'. Provincial paramountcy per se means simply that, where there is an overlap, the provincial regulations will always prevail. But we want the most stringent standards to prevail, regardless of which level of government originates them. Hence, the issue of federal or provincial paramountcy appears to be peripheral to our main concerns. Either will allow for the possibility of an accord-style division of responsibilities between the two levels of government, but neither will do the work of such an accord, which can and must be signed as soon as concurrency has been established.

This, I would argue, is the best possible solution in an imperfect world. Some duplication and inefficiencies will remain, but this is a problem of administrative rationalization, which can be improved upon gradually by evolving a more specialized role for each level of government. If, in the meantime, the sorts of jurisdictional uncertainty which we have observed can be transformed into a minimum of bureaucratic inefficiency, then progress has been made.

The question remains: can this 'best possible solution' be implemented, and if so, how? No one, not even a constitutional lawyer, should pretend to certainty on such an issue, for even if the legal road is clear, the political one may not be. I will, nonetheless, venture that it is indeed possible by at least one route which will also be politically attractive. The 1946 exercise of the declaratory power gave the federal government exclusive jurisdiction over all sectors of the nuclear industry, but there is no reason why all responsibilities in this industry must be assigned to the AECB, or why federal exclusivity of jurisdiction need to continue to apply to any or all of those sectors.

By amending the 1946 Atomic Energy Control Act, concurrency could be declared to obtain for the OHS and EP categories in the uranium mining sector. If parallel problems exist in the nuclear power sector as well, then concurrency could be expanded from the mining sector to the entire nuclear industry. I have some



evidence to suggest that parallel problems do exist, and would therefore recommend that a study like this one be commissioned for the nuclear power sector as soon as possible.<sup>170</sup> Whatever the decision on the extent of concurrency, the federal line departments, Labour and Environment Canada, would then be given responsibility for looking after the federal side of the program in these areas, instead of the AECB.

The beauty of this approach is that, unlike the formal constitutional amendment which seems to be the only alternative, the federal government can accomplish it unilaterally, and hence quickly. Yet, unlike most unilateral federal moves, the provinces (if consulted in advance) are almost certain to perceive the change as a real improvement, and very probably the best that can be hoped for.

This approach does not alter the constitutional situation created by the original federal exercise of the declaratory power, for it is only altering the content of that declaration. Federal-provincial conflicts regarding the appropriate use of the declaratory power, to say nothing of the rights of the provinces to manage the development of natural resources, will therefore remain. Indeed, the entire natural resources sphere promises to be the focus of intense inter-governmental debate and negotiation in the coming decade. Anything, therefore, which can be done to separate the regulatory issues examined here from the larger context, should be done with all speed. I am suggesting that the above proposal meets these specifications unusually well.

### **The Goals of OHS and EP Regulations**

This paper has been concerned with the origins and consequences of a set of obstacles to the proper functioning of a particular regulatory system, and possible ways of surmounting those obstacles. The obstacles in question arise from a federal system of government and, more particularly, from federal-provincial conflicts over property rights in natural resources.<sup>171</sup> This is essentially a technical problem, and the regulatory goals implicit in the analysis to this point have been correspondingly technical in character. That is, the system must develop the means by which adequate information concerning the level of risks, and the costs of reducing those risks, can be obtained, and it must develop the legal and administrative means to ensure that the standards and procedures developed can be properly monitored and enforced.

The question remains, however: what should the normative goals of a regulatory system such as this be? Put another way, if we could assume for a moment perfect success in achieving the technical goals, what aims would guide the development of our regulatory system from that time forward? The importance of this

question can be demonstrated, I think, by this observation: a reader might agree with every factual claim and substantive argument that this paper makes, and still conclude that nothing ought to be done about these problems. Why? He or she might believe that the standards which presently exist in the industry are already too stringent, or that they are 'just right' when their overly stringent character is 'discounted' by the current technical shortcomings. Consequently, this critic might say, further expenditures of scarce social resources ought to be directed to other areas: the regulation of mercury pollution perhaps, or the creation of more jobs in the Maritimes, and so on.

How are we to reply to such a sceptic? We must, it seems have some sort of a normative theory of regulation against which the regulatory system in question is being evaluated when we assert that the time and effort required to write this report, let alone to act on its recommendations, are justified. The task of this concluding section is to sketch out the normative theory which has hitherto been implicit in this analysis.

I propose, following Calabresi and Bobbitt,<sup>172</sup> to regard a regulatory system as one means of allocating scarce social resources. The nature of the scarce resources in question may vary, but there will always be two dimensions to this allocation problem. The first-order, or quantitative, determination establishes the quantity of a good (or bad) to be produced (or allowed to exist). The second-order, or distributive, determination establishes how those goods or ills will be distributed between all those in the set of relevant actors. In the absence of regulation, both first- and second-order determinations will be established by that concatenation of private economic and political powers which we euphemistically term 'the market'. Regulation, therefore, is necessary when the outcomes which might be expected from the market are not deemed to be ethically and/or politically acceptable.

In the regulatory system that we have been considering throughout this paper, we have been concerned with particular sorts of cost: the human and environmental costs of mining uranium. These costs are to be measured in terms of risks to workers in the industry, to the environment and, via environmental pathways, to the general public. Clearly, there are human risks associated with every occupation, and environmental and public health risks associated with every industry. The function of a regulatory system must therefore be to determine the acceptable level of each sort of risk in a particular industry (quantitative determination), and to determine who will bear the costs of achieving that level of risk, and of failing to achieve a lower level of risk (distributive determination).

The task of a normative theory of regulation is therefore to develop and justify the criteria for making these determinations. Put in its crudest form, how do we justify decisions which must be made concerning:

- i how many people our society is prepared to have sicken or die in order to produce a particular good (e.g. uranium for export or indigenous power);
- ii who those people are going to be;
- iii how they will be compensated for their losses, if at all, by the rest of us?

In the real world, these decisions are made every day on any number of bases. They may, for example, be decided on the basis of public furor or quiescence, or on the basis of the power of one interest group vis-à-vis its opponents. But any normative, as opposed to descriptive, theory of regulation must be based upon clearly stated criteria supported by reasoned arguments. In my view, the appropriate criterion for making the quantitative judgement is the 'risk comparison' principle; for the distributive judgement, it is the 'cost internalization' principle.

The principle of risk comparison prescribes the equalization of risks across all industries to the greatest degree possible, and the institution of some system of compensation where this is not possible. This assumes a considerable level of knowledge as to the relative levels of risk in various industries, as well as possibility of comparing them.<sup>173</sup> It implies that, if information gathering or risk reduction in some industries is intrinsically more difficult, then, other things being equal, their development should be discouraged where substitutes exist, and expenditures should be increased to deal with these special problems if no substitutes exist.

The principle of cost internalization prescribes that, in the interests of both social justice and economic efficiency, the people producing a particular good should assume all costs of production, insofar as this is practicable, including the costs of reducing risks to the levels established by the risk comparison test. Considerations of social justice are relevant because, in the absence of regulations designed to promote this end, the aim of the producing firm will be to turn as many of the costs of production into public costs as it can. The costs of risk, because they are often less tangible than other costs (such as labour and capital), are particularly prone to such 'externalization'.

Considerations of economic efficiency are relevant because cost externalization means that the firm is not taking a true measure of all the relevant costs of production into account when setting its prices. So, for example, a firm required to internalize all pollution costs associated with the production of 'y'

might develop a technology that costs \$x more but reduces the pollution clean-up costs it would have to bear by \$5x. A firm that does not concern itself with such costs, however, has no reason to spend that additional \$x, and the public is saddled with the \$5x cost of clean-up. True, in the latter case the individual consumer purchases good 'y' for slightly less, but the public is still out of pocket by \$5x. This problem is compounded in the production of uranium oxide in Canada by the fact that 'the public' and 'the consumers' are not even roughly equivalent. About 90 percent of Ontario's production and virtually all of Saskatchewan's is exported.<sup>174</sup>

These two principles cannot, of course, ever be fully realized. To begin with, our ignorance will often be such that we do not know when risks have been fully equalized. Then there are some industries which are inherently more dangerous than others and yet which seem to us indispensable. Finally, in a mixed economy with reliance on private investment, if full cost internalization were implemented, investment and productivity would fall.

Our two principles, then, are 'signposts', necessary (though inadequate) because we have to know in what direction we should be moving, as well as from where we have come. For, while it is an important truth that OHS and EP regulation in the uranium mining sector (and probably in most industries) has made significant strides in the last decade, it is more important to know where they should go in the next, and why they cannot remain where they are today. I think that the present system is, in short, unjust; it can and should be made more just. The fact that it can never be made perfectly just should be no deterrent to action. This must form the basis of my reply to the skeptic: the entire sphere of OHS and EP has only recently been taken seriously and is unacceptably far from realizing either principle. The technical problems arising from the uncertainties over federal and provincial roles in OHS and EP in the uranium mining sector are particularly complex and urgent, as we have seen.

The very adoption of these principles as regulatory ideals is a normative choice. Furthermore, when we consider that these ideals can never be fully realized, and so there will never be fully clear-cut criteria for deciding between conflicting policy goals and the values that underpin each, then we have some idea of what inherently political judgments these must always be. And we see what breadth of discretion will necessarily be associated with this sort of political choice. A clear understanding of why regulation must always be, in the end, a political rather than a technical problem is very important because it has considerable bearing upon one final argument that might be advanced against the overall approach and recommendations found in this paper.

The central assumption of such a critique would be that the chief problem with the regulation of OHS and EP in this sector is not jurisdictional uncertainty, but rather the relationship between the existing regulatory agencies and their governments. That is, this critique would focus on the perceived conflict of interests inherent in a state which attempts both to promote and to regulate indigenous industry, as all modern industrial states do. Such an analysis leads to prescriptions that regulatory agencies must be made independent of the state as promoter, just as they must be independent of private promoters. It follows that the only way in which the regulatory system can be 'protected' from the state's interest in promoting the development of the industries in question is by isolating the regulatory process from the political process. And since this will never be fully possible, the argument concludes, regulatory systems are inherently unworkable, and should be dismantled. This line of argument may sound incredible, but I think it underlies many of the 'neo-conservative' arguments for de-regulation.

The reply to be made to the neo-conservative is that there is no reason to believe that regulatory and political systems ought to be independent of each other. I have argued here that collective normative (or political) judgments are an inherent and fundamental part of any regulatory process. If political judgments must be made - (and allowing the market to determine these factors is equally a political judgement), - then the central organizational goal must be to ensure that those who make such judgments are (a) clearly identified and (b) politically accountable for their decisions. Representative democratic political institutions are far from perfect, but they are best we have been able to devise to date for meeting these requirements. Ministers of government departments are the only ones who should make the sort of collective value choices with which we are here concerned, for only they are properly accountable to the public.

What is really at issue is which ministers these should be; from which level of government and which department. As the state has become more involved in both its promotional and regulatory roles, government departments have become increasingly oriented to one function or the other. Labour, environment, and health departments have all been created to play an almost exclusively regulatory role, while trade and commerce, finance, and mines departments continue to play a primarily promotional role. This division has led to the tensions that often exist between regulatory and promotional line departments, and sometimes between line departments and the governments which they are expected to serve.

This view supports Bruce Doern's argument that the ministry to which the AECB reports is an important factor in determining its orientation and clout. It also supports the argument that the AECB's mandate should be transferred from

EMR to a regulatory ministry as soon as possible. At the same time, it should show us why this has not been the major regulatory problem in the period following the Ham Commission. Both provincial governments reoriented the accountability of structures of their regulatory agencies in this fashion immediately after release of Ham's report. Had it not been for the jurisdictional uncertainty which this paper has documented, these provincial regulators would have developed a superior regulatory system regardless of what became of the AECB's problems.

In order to ameliorate this jurisdictional uncertainty, the AECB (though not the federal government) should be removed from any role in the uranium mining sector. Furthermore, the AECB should be reformed with all speed, for it will almost certainly continue to play the central regulatory role in the nuclear power sector, whatever happens in the uranium mining sector.

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80. See the Minutes of the Saskatchewan Mining Association, entitled 'Visit of Representatives of SMA to AECB' (August 11, 1978), pp. 1-4.
81. Discussions with federal officials indicated that the prime minister had personally written to Gillespie (then minister of EMR) reminding him of the importance of the federal government's commitment to 'turn over a new leaf' in federal-provincial consultation, as outlined in the federal document of that period, A Time for Action.

82. For a detailed discussion and comparison of conventional OHS hazards in Ontario's mines, see Select Committee, Final Report, pp. 16-21.

83. CPMN, Proceedings, p. 87; and Canadian Centre for Occupational Health and Safety, President's First Report to the Council of Governors (January 24, 1980), p. 4

The report of the Economic Council of Canada, Reforming Regulations (Minister of Supply and Services Canada, 1981) makes the following recommendation, with which I wholeheartedly agree:

'We recommend that the federal and provincial governments provide adequate resources for the CCOHS to enable it to carry out the research and liason that will put Canada at the forefront of nations in dealing with such issues as those involving hazardous chemicals and radiation, which will be of concern in the years ahead.' (p. 107, recommendation #52).

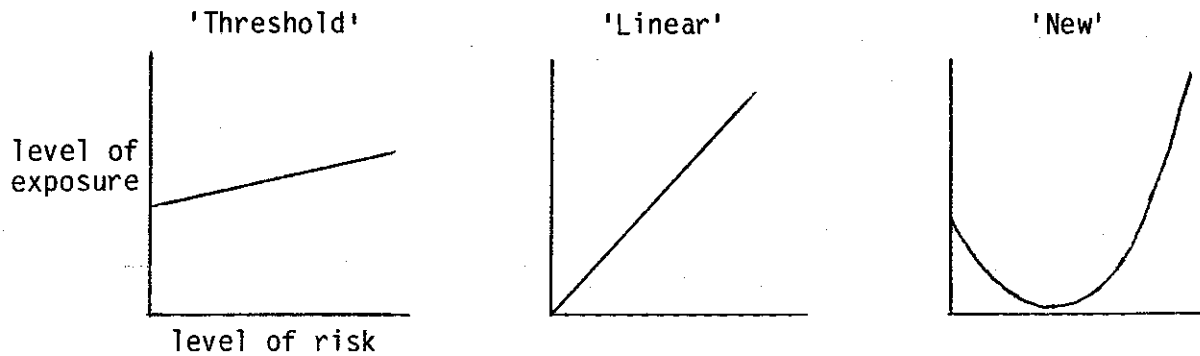
84. Basuk and Nichols, pp. 101-102.

85. Interviews with Saskatchewan officials (July 1980).

86. For some sense of the issues and dimensions of this controversy see: Globe and Mail, 'Scientists Feud Behind Scenes over Radiation' (August 11, 1980), p. 17; EAB, Final Report, Chapter 13, pp. 222-7; Select Committee, Hearings (July 10, 1980), pp. 10-17, (testimony of Dr. Gordon Edwards).

As I understand it, what is at issue in this debate is the following. Until recently, the scientific consensus on the health hazards of low-level radiation was that there are two models that might correctly describe the exposure-risk relationship - either the 'threshold' model or the 'linear' model. The former suggested that, up to a point, exposure would entail zero risk. The latter argued that risk increased in direct relation to exposure, so that even minute exposures must entail some risk, however small. The first epidemiological study conducted in this country (see the Ham Commission, chapter 1, p. 8) found no evidence that any threshold existed, and the operating assumption upon which regulatory agencies in Canada worked shifted to the linear hypothesis.

In the last few years, however, a new hypothesis has been put forward by several scientists, based on serious but inconclusive research. It argues that the risk associated with long-term exposures to low levels of radiation (such as miners receive) is actually greater than it would be for shorter-term exposures to higher levels of radiation. The proposed explanation is as follows: short exposures to high radiation are more likely to destroy the capacity of the cells to replicate themselves, while lower levels may disrupt the DNA structure in such a way as to generate cancer without so damaging the cells that they cannot replicate themselves. The three hypotheses can be illustrated graphically like this:



To date, the new hypothesis is not favoured by most scientists working in this area. Should it prove to be the correct one, however, its implications are serious and obvious. At present, all anyone who takes this issue seriously can do is urge further research and echo the Saskatchewan Ministry of Labour's position on ALARA and related matters.

87. Select Committee, Hearings (July 23, 1980), p. 27 (AECB); and G.W. Gibbs and P.Pintus, Health and Safety in the Canadian Mining Industry, (Centre for Resource Studies, Queen's University, August 1978), pp. 21-2)
88. Saskatchewan, Budget Speech (1980).
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93. Select Committee, Hearings (July 22, 1980), pp. 18-19, (United Steelworkers, District 6).
94. Select Committee, Hearings (July 23, 1980) p. 13 (AECB).
95. AECB, Annual Reports (1978-79 and 1979-80), pp. 23-25.
96. See the excellent discussion of the ALARA principle in Porter Commission, Final Report, Volume 6, pp. 90-1.
97. Interviews with Saskatchewan officials (July 1980).
98. As long as heated debates within the scientific community continue, I think we may take it that our information is still inadequate.
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100. Ontario Ministry of Labour. Brief to the Select Committee on Ontario Hydro Affairs (July 23, 1980), Appendix IV, p. 2 (hereafter cited as Brief

101. Ibid, pp. 9-10. (letter from Ont. Minister of labour to federal Minister Labour)
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  110. Canada Labour Code, 'Canada Occupation Health and Safety Regulations for Uranium and Thorium Mine' (P.C. 1979-2231), p. 3.
  111. Part 27 of the Mines Regulations specified Saskatchewan's radiological regulations, and so was excluded from the Canada Labour Code, which applies only to conventional OHS regulations.
  112. Ontario Ministry Of Labour, Brief, appendix IV, pp. 54-55, letter from DM of Labour Canada to DM of Ontario Ministry of Labour.
  113. Select Committee, Hearings (July 23, 1980), p. 50, testimony of Labour Canada.
  114. Select Committee, Hearings (July 10, 1980), pp. 4-9, testimony of United Steelworkers, District 6.
- A detailed account of these developments was eventually included in the Select Committee's Final Report, pp. 5-10.
115. Interviews with federal and provincial officials (July 1980).
  116. WLM is a 'working level month', or exposure for 170 hours to mine air in which the radioactivity averages one WL over that period. One WL (working level) is the level of radioactivity that occurs when the complete decay of the short-lived daughters of radon RN-222 in one litre of air yields alpha energy of  $1.3 \times 10^5$  MEV.
  117. Ham Commission, Final Report , p. 86.

118. Saskatchewan Labour, OHS Branch, 'Presentation Pertaining to the Health and Safety of Workers in the Mine of the Key Lake Mining Corporation' (July 1980), pp. 6-7, hereafter cited as Key Lake Presentation.
119. Ibid., p. 7. A recent communication from Saskatchewan's Chief Inspector of Mines notes that with the proposed closure of Eldorado Nuclear in June 1982, and the application for a new lease by Gulf Minerals (allowing the inclusion of new provisions like these in the Cluff and Key Lake contracts), all existing and future uranium mines in Saskatchewan will be under some degree of provincial jurisdiction via contract law.
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122. Saskatchewan Labour, 'Chronology of Events Following the Death of Kluny Harbaan, Eldorado Nuclear Limited' (1980).
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125. Ibid., p. 67. (Statement by Robert Elgie, Minister of Labour for Ontario, 14 March 1980).
126. Porter Commission, Final Report, Volume 6, p. 30.
127. Ibid., p. 28.
128. Select Committee, Hearings (July 29, 1980), pp. 30-31, testimony of Ontario Ministry of Environment.
129. Ibid., pp. 28-9, or see EAB Final Report, recommendations 10-37 pp. 10-41 and p. xxviii.
130. EAB, Final Report, 'Summary and Recommendation', p. x.
131. Ibid., p. xxviii.
132. Porter Commission, Final Report, volume 1, p. 67.
133. Porter Commission, Final Report, volume 6, p. xvi.
134. Select Committee, Final Report, pp. 33-34, Recommendations 21, 22, 23.
135. Select Committee, Hearings (July 31, 1980), pp. 34-35 (CANMET).
136. Ibid., pp. 33-34.
137. Interviews with Saskatchewan Environment officials (July 1980).
138. Select Committee, Hearings (July 29, 1980), p. 41, testimony of Ontario Ministry of Environment.

139. Ibid., p. 45.
140. Ibid., p. 39.
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142. Porter Commission, Final Report, volume 1, p. 67.
143. Select Committee, Hearings (July 29, 1980), p. 27, testimony of Ontario Ministry of Environment.
144. Ibid., p. 28; and Bayda Commission Final Report, pp. 98-99.
145. Select Committee, Hearings (July 29, 1980), p. 42, Ontario Ministry of Environment.
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148. Ibid., pp. 43-44.
149. Bayda Commission, Final Report, pp. 119-120.
150. Saskatchewan Environment, 'Presentation to the Key Lake Board of Inquiry', Formal Hearings - Phase II, (June 1980), pp. 7-10.
151. Saskatchewan, Budget Speech (1980).
152. Interviews with Saskatchewan Environment officials. (July 1980).
153. Select Committee, Hearing, (July 29, 1980), pp. 39-42, 45, Ontario Ministry of Environment.
154. Ibid., pp. 28-9, 44-45.
155. Ibid., pp. 20-21.
156. Ibid., p. 21.
157. Interviews with Saskatchewan Environment officials (July 1980)
158. EAB, Final Report, p. 131.
159. Ibid., p. 130.
160. Interview with Saskatchewan Environment official (July 1980).
161. Select Committee, Hearings (July 29, 1980), p. 4.
162. Ibid., pp. 9-10.
163. Ibid., p. 9.

164. Select Committee, Hearings (July 29, 1980), pp. 16 (quote), and 18-19, Ontario Ministry of Environment.
165. Ibid., pp. 10-12.
166. Ibid., pp. 14-15.
167. Interviews with provincial environmental officials (July 1980).
168. Globe and Mail (April 16, 1980), p. 10.
169. The view that jurisdictions should be consolidated in lieu of a constitutional change, but that this is best done by excluding the federal line departments rather than the AECB from the OHS and EP fields, is put forward by the Select Committee, Final Report, pp. 14-15, Recommendations 3, 4 and 5.
170. Discussions with members of the Select Committee on Ontario Hydro Affairs in the summer of 1980 indicated that the conservative government was pursuing a policy of free riding and cost externalization in the nuclear power sector as well. Of particular interest, I think, would be a study of the federal-provincial program for the disposal of high-level radioactive wastes produced by Ontario Hydro's reactors, focusing on the reasons for the delays that have plagued the program, as well as Ontario's financial contribution.
171. I use 'property rights' here in the current legal sense which sees property as a 'bundle of rights' to use, modify, manage, consume or destroy, claim income, alienate, etc. The classic exposition of this conceptions is A.M. Honeré, 'Ownership', in A.G. Guest (ed.), Oxford Essays in Jurisprudence (First Series). But see also C.B. Macpherson, Property: Mainstream and Critical Positions (U. of T. Press, Toronto, 1978), 'Introduction'.
172. Guido Clabresi and Philip Bobbitt, Tragic Choices (W.W. Norton & C., New York, 1978), especially 'Introduction' and chapter 3.
173. Only one attempt to compare risks between various modes of energy production has been published to date. This was the Inhaber Report, commissioned by the AECB, and officially entitled Risk of Energy Production (AECB-119). For an outline of its methodology, see Herbert Inhaber, 'Is Solar Power More Dangerous than Nuclear?' New Scientist (18 May 1978), pp. 444-6.

The report has since been withdrawn from circulation by the AECB because of criticism leveled from many directions at its methodology and at a number of central assumptions which were made where no data existed. For a brief critique in this vein, see Giles Provost's article in Quebec Science, Vol. 16. (June 1978), pp.15-17.

Nonetheless, the idea behind the Inhaber report is sound: total risks should be the standard of comparison, so far as possible. What is required



is a great deal more methodological work, gathering of information which does not yet exist, and the recognition that some kinds of risk will nonetheless be difficult to compare. This is precisely the sort of task for which the Canadian Centre for Occupational Health and Safety should be suited. To get some idea of the work which would be required, and how little has been done to date, see Science Council of Canada, Policies and Poisons: The Containment of Long-term Hazards to Human Health in the Environment and in the Workplace (Minister of Supply and Services, Canada, October 1977).

174. Porter Commission, Final Report, Volume 1, p. 67.

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