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PUMP IT OUT:

THE ENVIRONMENTAL COSTS OF BC'S UPSTREAM OIL AND GAS INDUSTRY

West Coast Environmental Law

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INTRODUCTION

Pump it Out is a web-based guide for citizens interested in knowing more about the environmental consequences of a typical 'upstream' oil and gas project in BC. These consequences can be both global (greenhouse gas emissions) and local (seismic lines, roads, pumpjacks, gathering lines, and processing facilities in the farm fields and wilderness areas of north-eastern BC).

West Coast Environmental Law believes it is especially important to understand the environmental consequences now — at a time when major national, provincial, and local decisions are being made. Nationally, Canadians are debating how to implement the Kyoto Accord and Environment Canada is reporting that oil and gas production, processing, and transmission is responsible for much of Canada's increase in greenhouse gas emissions over the last decade.

Provincially, the BC government is beginning to implement its policy to double oil and gas production in five years, de-regulate the oil and gas industry, and cut oversight and enforcement staff. Communities in the Northeast, near the Nechako Basin (North-central BC), and near the Bowser Basin (South-west of Prince George), will be directly affected.

Locally, communities on Vancouver Island are struggling with a choice between the intrusions of wind farms and burning more natural gas.

With *Pump it Out*, West Coast Environmental Law hopes to help citizens and communities better understand their own energy choices and the choices governments are making on their behalf. For each step in a typical oil and gas project, *Pump it Out* documents:

- What happens to the environment as a result?
- What laws apply to the practice and are they enforced?
- What needs to change in order to reduce or eliminate environmental damage?
- What can a concerned citizen do about it?

It is beyond the scope of *Pump it Out* to offer specific advice to landowners who are faced with the prospect of an oil and gas project on their land (e.g. testing a well, negotiating a lease). WCEL lawyers, however, can provide summary legal advice to BC residents. For landowners who are interested in more specific written information, we recommend Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001).

UPSTREAM: THE EXPLORATION AND PRODUCTION SECTOR OF THE OIL AND GAS INDUSTRY

The 'upstream' oil and gas industry is the industry that finds, produces, processes and transports oil and natural gas to the major pipelines that ultimately take the products to refineries and consumers. Click here for references and general information about the upstream industry.

A typical upstream oil and gas project consists of the following steps:

1. COMPANY EXPLORES FOR OIL OR NATURAL GAS DEPOSITS

To search for 'saleable' oil and natural gas, a company will begin by choosing specific locations to explore. Depending on the company, it may choose to 'wildcat' (explore previously unexplored territory) or it may choose to more fully develop an already productive area. To identify the good prospects within this area, the company will most commonly conduct a 'seismic survey' to help identify the depth, shape and composition of underground formations. Information obtained from the seismic survey will help the company make an educated guess about which underground formations are likely to contain oil or natural gas. Click here for references and more general information about exploration.

SEISMIC SURVEYING

What is 'a seismic survey'?

To conduct a seismic survey, an oil and gas company will typically begin by clearing several kilometres of land in a straight line across forested land, non-forested land and water bodies. For some projects, existing lines are used. Historically, these 'seismic lines' have been six to eight metres wide. Over the last ten years the average width has been about five metres.

Along the seismic lines, the company will drill a series of deep 'seismic holes' (40-60 ft) in which to set off dynamite charges, or use mobile machinery to set off vibrations. By measuring the way in which shock waves are reflected back from different rock layers, the company is able to identify geological structures or formations where oil and/or gas may be found. To develop a three-dimensional picture of geological formations ('3-D seismic'), a company will clear dozens of criss-crossing seismic lines to form a grid for testing. Click here for references and more information on seismic surveying.

What happens to the environment as a result of this practice?

In BC's northeast, thousands of kilometres of seismic lines are cut each year. 6,913 kilometres were constructed in 1999, for example, and 10,362 kilometres more were constructed in 2000. The provincial government wants to double the amount of oil and gas activity over the next five years. The ecological consequences of each new seismic line are:

Wildlife

Seismic lines (particularly the grid-like 3-D seismic lines) fragment the wilderness, making life difficult for species like the pileated woodpecker that avoid the edges of wilderness and require minimum 'patch sizes.' 3-D seismic is still very common in BC — especially where the landscape is muskeg — often resulting in 2000 km of disturbance in an area 80 km by 80 km.

The cumulative loss of habitat from seismic lines, roads and pipelines is substantial and is particularly hard on large mammals such as the grizzly bear which need large contiguous tracts of wilderness for 'security cover'.

Seismic lines can alter predator-prey relationships. Wolves, for example, are able to move faster along seismic lines than in the forest, increasing pressure on caribou. Hunting and poaching by humans increase when seismic lines open up previously inaccessible areas.

The use of seismic lines by forestry companies and off-road vehicles can further reduce the amount of habitat available for wildlife.

Reproductive failure in birds is higher near linear disturbances. Clearing operations and dynamite explosions can disturb nesting and calving periods. Repeated disturbances can increase movement rates during times when food supplies are limited, resulting in significant energy losses.

For nine years, University of Alberta researchers have studied the impact of 833,000 km of seismic lines, oil and gas roads, and pipelines on the Alberta's boreal forests. As part of the study the researchers have documented a 20-50% decline in some migratory bird populations 'probably because of habitat disturbance.' In the central-Alberta Swan Hills region, the researchers say grizzly bear populations have dropped from 400 to 80, Woodland caribou are in decline, and some Woodland caribou herds are close to extinction.

Click here for references and more information on seismic surveying and wildlife.

Forests

Trees removed to create seismic lines can no longer serve as 'carbon sinks' to absorb carbon dioxide—one of the major greenhouse gases. For the period 1950 to 1976, oil and gas companies in Alberta cut almost as many trees as the forest industry. Only a few trees cut for seismic lines are salvaged because most are considered to be the 'wrong' species or age class, or impractical to haul out.

Large amounts of greenhouse gases are released when cleared brush and trees are burned or allowed to rot.

Click here for references and more information on seismic surveying and forests.

Soils

Heavy equipment used to make seismic lines can damage roots, and cause erosion and soil compaction. Cleared areas promote increased competition for grass species. Seismic exploration on snow or ice can limit damage to soils.

Ongoing exploration and recreational use by all-terrain vehicles, snowmobiles, animals and off-road vehicles cause soil erosion and make 'regeneration' difficult.

Click here for references and more information on seismic surveying and soils.

Streams and ground water

Pollutants such as herbicides, pesticides, fertilizers, and *E. coli* bacteria from cattle may enter the groundwater through improperly capped seismic holes.

Underground pressure can force groundwater to the surface if holes are not properly plugged.

The construction of seismic lines can alter drainage patterns, increase stream sedimentation and bank erosion, create barriers to fish passage, and destroy aquatic habitats. Seismic exploration on snow or ice can limit damage to streams. In 1996, BC environment ministry officials estimated 9,000 stream crossings were needed for seismic lines, pipelines and road developments.

Landowners in Alberta and BC believe seismic activity is responsible for cracks in basement foundations, and well water that tastes like sulphur and iron.

Click here for references and more information on seismic surveying and water.

Solid Waste

Camps constructed for 20-100 person seismic crews generate solid wastes (e.g., plastic, paper, containers, fuels, vehicle wastes), food waste and human waste. If burned, solid waste can emit substantial air toxins affecting local air quality. If improperly managed, food and human waste can attract wildlife. Leaks from vehicles and mechanical site clearing machines can contaminate the soil and/or water. Click here for references and more information on seismic surveying and solid waste.

What laws apply to this practice and are they enforced?

General (seismic survey)

Need for licence

A company cannot explore for oil or gas without obtaining a 'geophysical licence' from the Oil and Gas Commission [s. 32 *PNGA*]. A company must obtain an approval for each seismic project it wishes to undertake.

Landowner may refuse

A landowner may refuse to allow a company on his or her land to conduct seismic exploration.

The law changes, however, when a company's project progresses beyond 'exploration,' and into 'development' or 'production.' At this point, if a landowner refuses to let the company on his or her land by failing to negotiate a 'surface lease' that is 'satisfactory' to the company, the company can apply to the Mediation and Arbitration Board for an 'entry order.' The Board cannot issue an entry order without requiring a deposit from the company and fixing amounts for compensation and/or rent for the landowner [ss. 12, 16, 19, 21 *PNGA, as amended* by *Miscellaneous Statutes Amendment Act (No. 2), 2000*, s. 36].

Exploration regulations

The Geophysical Exploration Regulations [B.C. Reg. 361/98] govern geophysical operations in BC. Recent amendments to the PNG give Cabinet the power to, by regulation, authorize the Oil and Gas Commission to exempt a company from all or part of the regulations [s. 36(3) as amended by Bill 36].

The GER requires an oil and gas company to supply information about terrain conditions and anticipated environmental impacts of access to an area before it begins any geophysical exploration [s. 4(1) GER]. After completing a project, the oil and gas company must submit a report showing (among other things), the location of any new cut lines [s. 4(4), 4(5) GER].

A company is required to take 'every precaution' to ensure there is no damage or interruption of use to a water pipeline, well or residence, and minimum distances are prescribed [s. 8, Schedule GER].

Shot holes must be plugged and marked immediately after drilling (the regulation requires drilling muds, and other material from the hole to be placed back in the hole) [s. 9, 10 GER].

Drilling must cease immediately if gas or water flows to the surface, although in some cases the hole may be continued as a water well [s. 12 GER].

The company is responsible for additional inspection and reporting if the holes were drilled on frozen land in agricultural areas or areas frequented by persons or domestic animals (i.e., not wildlife) [s. 13 GER].

Power to stop project

Despite issuing a licence, the Oil and Gas Commission can stop the company if it believes the exploration will cause unreasonable damage to 'terrain or environment' [s. 33(3)].

If exploration causes damage to 'land or property,' the company must take immediate steps to prevent further damage, and repair the damage as soon as possible [s. 16 GER].

If the company fails to act, the Commission has the power to make the repairs and recover costs from the company [s. 16 GER].

Power to require bond

The Oil and Gas Commission has the power to require a company to post a performance bond of up to $100,000 [s. 18 GER].

Approval in principle

In 2002, the Province changed the *PNGA* to give the Oil and Gas Commission power to issue 'approval in principle' for oil and gas activities in a specific area [s. 17.1 OGCA]. The Province says this 'general development permit' (GDP) is to allow the Commission to (among other things) prevent a proliferation of roads and pipelines by reviewing at one time multiple projects by multiple companies in the same area.

Environmental or land use terms and conditions for the permit are to be established through discussions with the company, First Nations, and the Commission. When the company applies for subsequent environmental protection-related permits, the Commission would limit its review to environmental and land use issues not already addressed in the general approval.

Depending on the scrutiny given to the general permit, the GDP process could result in less site-specific environmental scrutiny of the approvals an oil and gas company needs to conduct oil and gas activities in BC.

Deputy casts tie breaker

In 2002, the Province also made the Commission less independent by appointing the Deputy Minister of Energy and Mines as chair and director of the Commission and giving him or her the deciding vote in case of a tie.

Although the exercise of Commission authority to issue environmental approvals is still subject 'in all respects' to the Act that contains the environmental approval [s. 17(2) *OGCA*], the Deputy's casting vote is still cause for concern.

Environmental approvals previously issued by the Ministry of Environment (now Water, Land and Air Protection) and then by a 'neutral' Commission, can now be decided by the Deputy Minister of Energy and Mines whose Ministry's first objective is to 'increase investment in energy and mineral resource development in BC'.

Environmental Assessment

Provincial

Provincial legislation does not require an environmental assessment for seismic exploration projects. The Minister can, however, apply the Act to an otherwise uncovered project [s. 6 *EAA*], and order an assessment of any policy, plan or practice of the government [s. 49].

The Executive Director of the Environmental Assessment Office can undertake a class assessment of any category of reviewable projects [s. 20].

Click here for more information about provincial environmental assessment.

Federal

Although a federal environmental assessment is required for seismic exploration on federal land (Northern Canada and on Indian Reserves), in BC federal environmental assessments are limited to seismic projects that might harm fish habitat and require an authorization under the *Fisheries Act* (e.g. a seismic line that crosses a stream), or impede a navigable waterway.

A search of the federal public registry produces very few, if any, examples of upstream oil and gas project assessments since 1995.

Click here for more information on federal environmental assessment.

Wildlife

Once cut, anybody can use the seismic lines for 'ordinary travel' [s. 17(1) GER].

Seismic, drilling, and road building crews may be prevented by the *Migratory Birds Convention Act* and regulations from operating in migratory bird nesting areas at certain times of the year. It is an offence to deposit into water oil, oil wastes or any other substance harmful to migratory birds [s. 5; s. 35 MBR].

The *Canada Wildlife Act* can limit the access of an oil and gas company to federal wildlife or bird sanctuaries [Handbook].

Forests

A company must obtain a licence to cut from the Oil and Gas Commission in order to cut and/or remove Crown timber from provincial forest land [s. 51 *Forest Act*, s. 17 *OGCA*].

A company is not required to reforest a seismic line in a forest outside of an existing Ministry of Forests regulated silviculture operation. The reasons for this policy, according to the Oil and Gas Commission and the Ministry of Forests, are:

- There are minimal or no impacts on the soil;
- Seismic lines are often used again to provide access for further activities;
- Because of narrow seismic widths, natural reseeding can easily occur; and
- Regenerating forest in a mature forest would be difficult and, if successful, would produce trees of a different stand age;

The silviculture industry recommends oil and gas companies be required to 'restore the productive capacity of the forests' affected by seismic disturbances. The Oil and Gas Commission rejected the proposal because the Commission thought it would have a negative financial impact on the investment and profitability of projects and might discourage investment in the province [see OGC Backgrounder: Petroleum Operations and Silviculture Requirements, July 29, 2002].

If a company wishes to use a road that is owned by the Forest Service or has been built by a forestry company on Crown land, it will require a road use permit from the Oil and Gas

Commission [s. 117 *Forest Act*, s. 17 *OGCA*]. The Commission can only issue the road use permit once it has consulted with MOF, and once it is satisfied that use of the road will not cause 'unnecessary disturbance to the natural environment' [s. 117 *Forest Act*, s. 17 *OGCA*].

Streams and groundwater

Use and diversion

If the company needs to divert or use water from a stream, it must obtain an approval from the Oil and Gas Commission (if for less than 12 months), or a licence from the applicable water manager at the Ministry of Sustainable Resource Management if for longer than 12 months [s. 8 *Water Act*, s. 1, 17 *OGCA*].

Changes in and about a stream

If a company wants to make any modification to the nature of a stream, or undertake any activities or construction within a stream channel that may have an impact on a stream, it must obtain a 'changes in and about a stream' approval from the Oil and Gas Commission. A 'change' includes any modification to the land, vegetation, natural environment or flow of water within a stream [s. 9(1)(a) *Water Act*, s. 1, 17 *OGCA*].

On Crown land

If a company holds a water licence or an approval for short-term use, and it wishes to flood or build and operate something on Crown land, it may apply to the Oil and Gas Commission for a permit to do so [s. 26 *Water Act*, s. 1, 17 *OGCA*]. It is standard practice for the Commission to require an application for each proposed short-term water use.

Groundwater wells

Most companies dig groundwater wells. The Province does not regulate groundwater, but occasionally the Commission will regulate a groundwater well as a 'well' under the *Petroleum and Natural Gas Act*. The Commission will also sometimes decide diverting water from the Peace River would be more environmentally responsible, and request the Ministry of Water, Land and Air Protection to consider issuing a water licence.

Federal Fisheries Act

Without a federal authorization, an oil and gas company would violate the *Fisheries Act* if it destroyed fish, harmfully altered fish habitat, or deposited a 'deleterious substance' in water frequented by fish [ss. 32, 35 (1)&(2), 36(3)]. As a result of *Fisheries Act* policy and discretion, however, companies only rarely require *Fisheries Act* authorizations (e.g. only for large gas plants).

Oil and gas activities that have the potential to impact fish and fish habitat are industrial and municipal waste discharges, stream diversions, introduction of silt, barriers to migration, alteration of stream flow, use of chemical, physical or biological agents, and explosives in streams [Handbook]. Before issuing an authorization, the Department of Fisheries and Oceans is required to conduct an environmental assessment under the *Canadian Environmental Assessment Act* [Law List Regulation, *CEAA* s. 5].

Navigable waters

If a company needs a seismic line that will be built or placed in, on, over, under, through or across any navigable water, it must obtain an authorization from the federal Minister of Transport [s. 5 *Navigable Waters Protection Act*]. Before issuing an authorization, Transport Canada is required to conduct an environmental assessment under the *Canadian Environmental Assessment Act* [Law List Regulation, *CEAA* s. 5]

Solid waste

A company must not abandon a campsite until all garbage and slash has been disposed of 'in a manner that will not have an adverse effect on the environment.' The company must also level and restore the site 'as nearly as possible to the conditions that prevailed when operations were commenced' [s. 15 GER].

If a company does not haul and discharge wastewater into a municipal wastewater treatment system, it must obtain a *Waste Management Act* permit or approval [Handbook].

Location-specific laws

Muskwa-Kechika

If the project is located within the Muskwa-Kechika Management Area (Northern Rockies), special rules apply. Click here for more information.

Agricultural land reserve

Companies proposing exploration, wells, pipelines, access roads or production facilities in the Agricultural Land Reserve must obtain approval from the Agricultural Land Reserve Commission (ALRC) — even if the Mediation and Arbitration Board has issued an entry order. Approval from the ALRC can be obtained by complying with the terms of a General Order, or by filing an application with the ALRC. The General Order does not cover production facilities or processing plants [Note: The ALRC is in the process of rewriting its orders and regulations].

Heritage objects

Under the *Heritage Conservation Act* (HCA), a company must obtain Oil and Gas Commission approval before removing or damaging a 'heritage object' that is protected under the HCA (e.g., a burial place or aboriginal rock painting that has historical or archaeological value) [s. 12 *HCA*, ss. 1, 17 *OGCA*].

Local government laws

Depending on the local government, a company may be required to comply with local laws such as development permits, location and 'type of development' bylaws, rules for heavy equipment movement on local roads, and equipment licences to control noise and air pollution. A local government may also limit oil and gas activity in parks or ecological reserves [Handbook].

First Nations

Aboriginal rights (including treaty rights) and aboriginal title are protected by the *Constitution Act, 1982*, s. 35. Hunting, trapping, fishing, ceremonial activities, berry picking, and plant harvesting are examples of aboriginal rights. The majority of First Nations in the oil and gas producing northeast part of the province have treaty rights as a result of an 1899 treaty known as 'Treaty 8.'

Courts have found aboriginal title exists when an aboriginal people occupied the territory at the time the Crown asserted sovereignty (1846), continued to be connected to the land, and had exclusive occupation of the land.

The provincial government, and the Oil and Gas Commission as its agent [s. 2 *OGCA*], are bound by s. 35 of the *Constitution*. The courts have found that although aboriginal and treaty rights are constitutionally protected, the rights are not absolute and may be infringed by the federal and provincial governments where 'justified.' The courts have established a series of tests to determine whether an infringement is justified. Examples are: valid legislative objective, meaningful consultation conducted in good faith, infringement as minimal as possible, and fair compensation.

The Commission's obligations to First Nations may extend beyond s. 35 of the *Constitution*. In addition to being bound by the *Constitution* as agent of the Province, the Commission has a statutory duty to 'encourage the participation of First Nations and aboriginal persons in processes affecting them' [s. 3(c)].

To address consultation and potential impact on Treaty rights, the Province entered into seven MOUs with Treaty 8 First Nations in 1998: West Moberly First Nations, Fort Nelson First Nation, Halfway River First Nation, Prophet River First Nations, Blueberry River First Nations, Saulteau First Nations and Doig River First Nations. The Fort Nelson, Doig River and Saulteau First Nations have subsequently terminated their MOUs. The remaining five MOUs expire in 2003. In 2002, the Blueberry River First Nation formally challenged the provincial legal framework for oil and gas in the BC Supreme Court.

In practice, the Province usually forwards requests for oil and gas approvals to First Nations for review, and a company will often negotiate with First Nations in advance of applying.

If a First Nation seeks relief from a court for unjustified infringement of an aboriginal right or title, the result could be an injunction and/or negotiated settlements (Impact and Benefit Agreements).

Click here for references and more information about legal obligations to First Nations.

Compliance and enforcement

In January and March of 2001, the Province conducted 540 inspections as part of a compliance review. The review found 'major' non-compliance of 44% for activities related to stream crossings. The compliance review also found sewage disposal at campsites is 'often poorly managed thus creating health risks for workers and the general public,' and that on many rig sites, the engineer in charge had little knowledge of BC laws. Of 68 campsite

inspections, the authors of the review found 22 cases of major non-compliance and 17 instances of minor non-compliance.

A 2001 special investigation by the Forest Practices Board concluded that the Oil and Gas Commission suffers from a lack of compliance and enforcement policy and procedures, and that it is extremely difficult for operators to get on-site time with government staff to ensure their operations are appropriate. In the Board's view, a significant increase in oil and gas activities in recent years has put further strains on resources.

In 2002, three conservation officers and three support staff were cut from oil and gas regions of the province — a 43% reduction [Parfitt]. Also cut was a unique 2-person conservation officer team that had focussed primarily on the oil and gas industry, and the 7-person Special Waste Unit of the Ministry of Water, Land and Air Protection [Parfitt]. The four remaining officers are responsible for investigating all industrial activities on 72% of the BC land base (the Omineca-Peace region), and must do their own administrative work [Parfitt].

Click here for references and more information on compliance and enforcement.

What needs to change in order to reduce or eliminate environmental damage?

Planning

Through land use planning, communities and First Nations should decide whether they would prefer not to have seismic exploration occur in their neighbourhoods.

Share rights-of-way

The Province should be authorized to require Oil and Gas companies, forestry companies and BC Hydro to use the same 'rights-of-way.'

Technology to reduce seismic line widths

Seismic line widths can be reduced to 2.5 metres if companies use shot-hole drills mounted on specially designed all-terrain vehicles. If companies use new satellite positioning systems and inertial guidance systems, shot points can be located without surveying — making it easier to cut meandering access routes for drilling equipment.

Heli-drilling

Use of helicopter drills and recording equipment can eliminate the need for vehicle access routes completely. Some clearing is still required for safety reasons (helicopter landing sites) and to lay down recording equipment (1.5 metre hand cut lines), but even this need for clearing can be reduced by using existing natural or industrial clearings where available. The noise associated with heli-drilling can disturb or displace wildlife (e.g., grizzly bears or caribou), but proponents of heli-drilling say the ecological costs of conventional seismic surveying are far greater and much longer lasting.

Cost savings to offset additional expense

All these techniques are more expensive than traditional practices, but companies should be able to offset or eliminate the additional costs through:

- High-volume use and purchase.
- Fewer fees to forest companies for cutting timber.
- Lower compensation and issue management costs in relation to landowners.
- Better public relations (e.g., better wildlife management).
- Profits from a new technology business unit.

Share seismic data

The need for seismic lines can be substantially reduced by making seismic information available to all companies (so each company doesn't have to 're-shoot'), or by creating one entity that would be responsible for all seismic exploration in the province.

Mimic ecological forest models

To be consistent with ecological forestry models, seismic lines must be transitory features, similar in impact to clearings caused by dying trees that fall and take other trees down with them. A seismic line that emulated a natural clearing would have the following features: average width less than 2.0 m.; meandering course; intermittent blockage that precludes a linear corridor effect; reforested within a specified (short) period of time; and specified limits on cumulative area that is impacted.

Rubber mats and other technology

The oil and gas industry has publicly expressed interest in minimizing the impact of seismic roads through the use of portable rubber mats (500 for each kilometre of road), snowguns, narrower vehicles, and 'gyrotracks' (which mulch underbrush into faster decomposable vegetation).

Conduct EA

The Minister of Sustainable Resource Management should order the Environmental Assessment Office to conduct an environmental assessment of seismic practices in light of the government policy of doubling oil and gas production.

Click here for references and more information about alternatives to current seismic surveying practices.

What can a concerned citizen do about it?

If you are concerned about an oil or natural gas regulatory decision related to seismic surveying, consider one of the following ways to bring about change (full descriptions are set out in Appendix A).

- Request Commission to set up alternative dispute resolution (ADR)
- Request 'reconsideration' of decision
- Ask a court to strike down approvals or issue injunction
- Organize landowners into advocacy groups
- Request environmental assessment and a role in it

2. COMPANY ACQUIRES SUBSURFACE AND SURFACE RIGHTS TO CONDUCT MORE TESTING

Once seismic surveying and other information identifies a promising location, a company will drill a test well and conduct tests to determine whether there is saleable oil or natural gas under the surface.

Before it can do this, the company must first acquire rights to the oil or natural gas — either by leasing the rights from the owner, or by purchasing existing rights from the company that holds them (in the case of a lease not a permit). In BC, the Provincial Government is the owner of the vast majority of oil and gas rights.

With subsurface rights in hand, the company must then obtain the right to enter onto the surface of the land in order to gain access to the proposed well site, build roads, and drill test wells on the property.

ACQUIRING SUBSURFACE RIGHTS

What are 'subsurface rights'?

Subsurface rights give the holder of the right the exclusive ability to explore for oil and natural gas, drill for oil and natural gas, and if successful, produce the oil and natural gas. In exchange for the rights, a company will agree to certain work commitments (e.g. to drill) and to pay the Province a royalty for using the rights.

A company usually obtains subsurface rights from the Province by successfully outbidding other companies at an auction. In a typical process, a company will first ask the Province to auction rights for a specific area. The Titles Branch of the Ministry of Energy and Mines will then evaluate the request by asking First Nations, government agencies, and a limited number of other stakeholders whether they have any concerns. Based on the comments, the Titles Branch will decide whether to auction the rights, and/or whether any restrictions should be placed on the sale (e.g. restrict access to the area during certain times of the year in order to protect fish and wildlife habitat). Once posted for auction, other companies will have a chance to evaluate the property. On the day of the auction, all interested companies will submit a 'bid'. The successful company is usually the one with the highest bid.

Click here for references and more general information about subsurface rights.

What happens to the environment as a result of this practice?

The Titles Branch (TB) is responsible both for generating revenue from the sale of subsurface rights and for deciding which restrictions should be placed on sales in order to protect the environment. Since an environmental restriction may reduce the amount of money a company is willing to bid for the rights, many people feel the TB is in a conflict of interest, and environmental protection is compromised as a result.

Many people also feel the TB lacks the necessary planning expertise to responsibly evaluate environmental impacts.

Portions of royalties can be set aside to benefit future generations and to address environmental liabilities when the oil and gas industry has left the province. As of 2002, Norway, for example, had set aside Cdn$54 billion in royalty revenue in order to 'transfer wealth to future generations' so they may better cope with the financial challenges connected to an ageing population and an eventual decline in oil revenues. Alaska had set aside Cdn$40 billion to conserve 'a portion of the state's revenue from mineral resources to benefit all generations of Alaskans'. Although it was capped in 1987, Alberta had set aside Cdns$12 billion of oil and gas revenue 'for future generations of Albertans.' BC has set no royalty funds aside.

Click here for references and more information about subsurface rights and the environment.

What laws apply to this practice and are they enforced?

General

The *Petroleum and Natural Gas Act* (PNGA) regulates the disposition of oil and gas rights in BC. The Province owns most of the oil and gas resources in BC — particularly in the oil and gas rich northeast part of the province. Some rights are privately owned because they were included with Crown grants issued before 1891, and the federal government owns a small amount of rights as a result of federal-provincial agreements.

A company is not permitted to explore or produce provincially owned oil and gas unless it is authorized by the *PNGA* or its regulations [s. 110].

For areas known to contain oil or natural gas (Crown Reserves), the Province through the Ministry of Energy and Mines must dispose of subsurface rights at a public auction [s. 70]. In other areas of BC, the company may apply to the Ministry of Energy and Mines [ss. 39 and 51].

Two forms of subsurface rights (called 'tenure') are auctioned. The first, a 'geophysical permit', is an 'exclusive right' to do geological exploration and drilling work for oil or gas on Crown land [s. 38]. Because of an inconsistency in the law, the 'exclusive' aspect of the right is likely limited to drilling a well [see s. 38(2) and advice from Ministry of Energy and Mines staff]. Under a geophysical permit, the Province may require a company to do work, or in lieu of doing the work, post a security that is forfeited if the work is not done within a specified period [s. 43, 44, 45]. To facilitate exploration, the Province is authorized to build [s. 3], pay for [s. 3] and/or supply [s. 8] access roads.

The second type of subsurface tenure, a 'petroleum and natural gas lease' gives a company exclusive rights to produce oil and gas [s. 50]. A company that only holds a 'geophysical permit' can apply for a lease of up to one-half of the permit area [s. 52]. If the minister believes the permit holder has discovered oil or gas while drilling, the permit holder must apply for a lease [s. 52]. If the minister believes the company has not sufficiently developed the leased area, the minister may require the company to begin drilling or surrender the lease [s. 60].

As owner of the resource, the Province charges royalties to tenure holders for the rights they acquire [s. 73]. Unlike taxes, the province is free to bargain royalties at any rate it wishes — as owner of the resource it is not subject to any constitutional restrictions. Private owners must pay a 'freehold production tax' [s. 80].

Location-specific laws

If the project is located within the Muskwa-Kechika Management Area (Northern Rockies), special rules apply. Click here for more information.

First Nations

Click here for information on First Nations.

What needs to change in order to reduce or eliminate environmental damage?

The Ministry of Water Land and Air Protection, or the Ministry of Sustainable Resource Management should evaluate company requests for subsurface rights — not the Titles Branch of the Ministry of Energy and Mines. The ability to attach conditions to a company's tenure is an important opportunity to establish enforceable environmental requirements.

Interested members of the public should be able to participate in the evaluation process.

BC should set aside a major proportion of oil and gas royalties for the benefit of future citizens and to address environmental liabilities.

What can a concerned citizen do about it?

By policy, the Titles Branch does not currently allow members of the public to comment during the process to determine which subsurface rights are auctioned and under what conditions. Contact the Branch and insist on an opportunity to review and comment.

ACQUIRING SURFACE RIGHTS

What are 'surface rights'?

The holder of 'surface rights' has the right to enter onto property in order to build roads and drill wells. Perhaps surprisingly, the Province holds these rights as owner of the subsurface resources — they are not held by local landowners. For all grants of Crown land to private landowners after 1891, the government kept for the Crown the right to enter onto the land in order to extract oil and gas. Landowners, however, are entitled by legislation to receive

compensation. A company may seek rights for land directly over prospective resources, or land nearby — depending on whether it intends to drill vertically, horizontally, or at an angle.

Click here for references and more information on surface rights.

What happens to the environment as a result of this practice?

When negotiating surface access with a company, landowners can take steps to protect their health and environment by securing timing restrictions, fencing and vegetation requirements, and many other access conditions.

For more information on what could be negotiated into a lease, see Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001).

What laws apply to this practice and are they enforced?

General

At common law, a person who holds subsurface rights to oil and gas is entitled to enter onto property without first obtaining a landowner's consent. Common law is law that has evolved over the years as judges consider cases previously decided by other judges. It can be changed or modified by elected officials through the passage of legislation.

In BC, the common law is confirmed in the *Land Act* — on most private land that was once Crown land, the *Land Act* reserves for government the right to enter any part of the land to 'raise and get out' oil and gas (*Land Act*, s. 50). To partially respond to landowner concerns, however, the provincial government has also modified the common law. The *Petroleum and Natural Gas Act* requires a company to obtain a landowner's consent or provide adequate compensation before entering onto land [s. 9].

The process for obtaining surface rights is usually negotiation. If a landowner refuses to negotiate a surface lease that is 'satisfactory' to the company, the company can apply to the Mediation and Arbitration Board for an 'entry order.' The Board cannot issue an entry order without requiring a deposit from the company and fixing amounts for compensation and/or rent for the landowner [ss. 12, 16, 19, 21 *PNGA*]. Orders of the Board are registrable on title [s. 25]. Board orders may be appealed to the Supreme Court of British Columbia only on questions of law [s. 24(2)].

To obtain surface rights on provincial Crown land (and to use Crown sand and gravel), the company must obtain approvals from the Oil and Gas Commission [s. 1, 17 *OGCA*]. To acquire surface rights over unoccupied federal Crown land, companies must negotiate with relevant federal government officials.

If the Crown does not own the oil and gas, a company must reach agreement with the private surface owner.

First Nations

Click here for information on First Nations.

What needs to change in order to reduce or eliminate environmental damage?

The ability to attach conditions to a surface lease is an important opportunity to establish enforceable environmental requirements. The provincial government should develop a model lease that identifies specific environmental protection measures landowners can incorporate (where appropriate) in their surface leases.

What can a concerned citizen do about it?

If you are concerned about an oil or natural gas surface lease, consider one of the following ways to bring about change (full descriptions are set out in Appendix A).

- Landowners can potentially strengthen their negotiating position by finding out what environment and health conditions other landowners have negotiated. Both the Oil and Gas Commission and the Mediation and Arbitration Board are covered by the *Freedom of Information and Protection of Privacy* Act, so if a surface lease has been submitted to either body, a person who makes a request for it under the act has a 'right of access' to it.

- For ideas about what to include in a surface lease, see Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001).

- In 1985, a farmer successfully sued an oil and gas company in trespass because for 26 months the company continued to extract oil and interfere with the farmer's operations after the surface lease had expired. The court awarded the farmer over $20,000. Click here for references and more information about trespass.

- In the face of increasing pressure from the industry, landowners in Alberta have formed more than 60 environmental advocacy groups so individual landowners have better knowledge and support when negotiating with industry. A few years ago there were only about a dozen. [see Henton, D., "Frustration mounts in Alberta oilpatch as environment woes plague farmers" CP January 7, 2002, http://ca.news.yahoo.com/020107/6/gpqc.html].

3. COMPANY BUILDS ROAD AND DRILLS A TEST WELL

Once it holds the necessary subsurface and surface rights, the company will build a road, drill a test hole and then use the test hole to conduct further tests. If oil or natural gas is found, the company will typically drill more wells to determine the extent and commercial potential of the discovery.

In 1997, the oil and gas industry drilled approximately 400 wells in BC's Northeast. Today, companies are drilling 800 or 900 wells per year, and the provincial government's goal is to double that number.

Click here for references and more general information on building roads and drilling wells.

BUILDING A ROAD AND DRILLING A 'TEST WELL'

What is 'building a road and drilling a test well'?

The company typically begins the drilling process by building access roads for delivering heavy drilling equipment to the site and to truck away wastes. It will then clear and level land around the drill site, dig a water well for water supply, and then dig a pit (often lined) on the spot where a well is to be drilled. On this spot, the company will erect a portable, trailer-mounted drilling tower (rig) over the site and drill down through soil and rock. When drilling through rock, the company will inject 'drilling muds' into the drill bit. Drilling muds are used to keep the drill bit cool and lubricated, flush out rock chips, line the wall of the hole to reduce water or oil escape, and keep the well under control if the bit breaks into high-pressure gas or water zones.

Near the well, the company will dig a large pit called a 'sump' where drilling wastes will be stored and treated.

After drilling a few hundred metres, but long before reaching the oil or natural gas, the company will stop drilling in order to cement steel surface casing to the wall of the drill hole.

Wells are normally drilled vertically because vertical drilling costs less than other methods. For some deposits, it is possible to drill horizontally or at an angle ('directional drilling') if a river or other obstacle lies on top.

If the test well is dry or unsuccessful, the company will plug it with cement, abandon it, and then clean up and remediate the site. Click here for more information about abandoning and reclaiming a well.

Click here for references and more information on building a road and drilling a test well.

What happens to the environment as a result of this practice?

Constructing a road

Like seismic lines, roads are 'linear disturbances' and have a number of ecological consequences:

- Roads fragment the wilderness, making life difficult for species like the pileated woodpecker that avoid the edges of wilderness and require minimum 'patch sizes.'

- The cumulative loss of habitat from seismic lines, roads and pipelines is substantial and is particularly hard on large mammals such as the grizzly bear which need large contiguous tracts of wilderness for 'security cover'.

- Roads can alter predator-prey relationships. Wolves, for example, are able to move faster along seismic lines than in the forest, increasing predation pressures on caribou.

- Reproductive failure in birds is higher near linear disturbances.

- Hunting and poaching increase when roads open up previously inaccessible areas.

Click here for references and more information about building a road and linear disturbances.

The construction of roads can alter drainage patterns, trigger landslides, increase stream sedimentation and bank erosion, create barriers to fish passage, and destroy aquatic habitats.

Seismic exploration on snow or ice can limit damage to soils and streams. In 1996, environment ministry officials estimated 9,000 stream crossings were needed for seismic lines, pipelines and road developments. Click here for references and more information about roads and streams.

Trees removed to create roads can no longer serve as 'carbon sinks' to absorb carbon dioxide—one of the major greenhouse gases. Large amounts of greenhouse gases are also released when cleared brush and trees are burned or allowed to rot. Click here for references and more information about roads and trees.

Trucks travelling on oil and gas roads can inadvertently pick up and transport weeds from one eco-system to another — sometimes resulting in considerable problems for farmers.

Drilling a well

Large volumes of drilling wastes (e.g., salts, hydrocarbons, and other chemicals) are disposed of at the well site (in the 'sump') on adjacent land, or at 'dirt farms' outside of Ft. Nelson. Wastes in the sump are treated or neutralized, often by adding dirt. Drilling 'muds' may contain toxic additives and heavy metals that can accumulate in the soil and in the food chain. If there is a risk of encountering water-sensitive subsurface rock formations, toxic muds containing diesel fuel are used. A recent Alberta set of field investigations found 16% of drilling waste disposal operations to be unsatisfactory. Click here for references and more information about drilling wastes.

Sump pits dug to store and treat drilling wastes account for over half of the land disturbances caused by a company during a typical project.

A company will often dispose of water produced from a well by re-injecting it into an underground formation. Re-injecting the water may cause harmful environmental impacts — potentially to below-surface groundwater—but proponents of re-injection think the impacts are less harmful than they would be if disposal took place on the surface.

Spills and leaks of drilling fluid, hydrocarbons, or salt water produced during the drilling can contaminate soil and water. Click here for references and more information on drilling and spills/leaks.

Water wells drilled to get water for drilling muds or enhanced oil recovery can provide a pathway for contaminants if not properly constructed, or may draw down aquifers used for

domestic or agricultural purposes. Click here for references and more information about drilling a well and water.

Drilling can contaminate drinking water aquifers if not properly cased or abandoned. Gas escaping through soil can kill crops. Migrating gas has been found in a large number of Alberta wells. Click here for references and more information about drilling a well and drinking water/crops.

What laws apply to this practice and are they enforced?

Building a road

More than one set of laws for roads

In a 2002 audit, the Forest Practices Board concluded that the applicable laws for oil and gas road building are inequitable and confusing. Roads constructed under the *Petroleum and Natural Gas Act* (usually temporary roads), they concluded, are subject to the construction requirements of the Forest Practices Code (FPC) — except for road layout and design requirements. For roads authorized under the *Pipeline Act*, it's not clear. For roads authorized under the *Land Act* (usually permanent roads), the FPC's construction requirements do not apply. Only those roads constructed under the *Petroleum and Natural Gas Act* are subject to the road maintenance and deactivation requirements of the Code.

Forests

A company must obtain a licence to cut from the Oil and Gas Commission in order to cut and/or remove Crown timber from the land [s. 51 *Forest Act*, s. 17 *OGCA*].

If a company wishes to use a road that is owned by the Forest Service or has been built by a forestry company on Crown land, it will require a road use permit from the Oil and Gas Commission [s. 117 *Forest Act*, s. 17 *OGCA*]. The Commission can only issue the road use permit once it has consulted with MOF, and once it is satisfied that use of the road will not cause 'unnecessary disturbance to the natural environment' [s. 117 *Forest Act*, s. 17 *OGCA*].

If requested by the Oil and Gas Commission, the company will have to prepare and seek approval for a 'logging plan' — a plan that details environmental protections required by the Forest Practices Code for roads [s. 21(b)]. The Commission has the power to require a logging plan if the Commission determines one is necessary to 'adequately manage and conserve the forest resources of the area' [s. 21(b)]. Prior to 2002, the Commission's practice was to routinely require a logging plan. A logging plan is now requested only if the Commission determines one is necessary.

Streams and groundwater

If the company needs to divert or use water from a stream, it must obtain an approval from the Commission (if for less than 12 months), or a licence from the applicable water manager at MSRM if for longer than 12 months [s. 8 *Water Act*, s. 1, 17 *OGCA*].

If a company wants to make any modification to the nature of a stream, or undertake any activities or construction within a stream channel that may have an impact on a stream, it

must obtain a 'changes in and about a stream' approval from the Commission. A 'change' includes any modification to the land, vegetation, natural environment or flow of water within a stream [s. 9(1)(a) *Water Act*, s. 1, 17 *OGCA*].

If a company holds a water licence or an approval for short-term use, and it wishes to flood or build and operate something on Crown land, it may apply to the Commission for a permit to do so [s. 26 *Water Act*, s. 1, 17 *OGCA*]. It is standard practice for the Oil and Gas Commission to require an application for each proposed short-term water use.

Fish and fish habitat

Without a federal authorization, an oil and gas company would violate the *Fisheries Act* if it destroyed fish, harmfully altered fish habitat, or deposited a 'deleterious substance' in water frequented by fish [ss. 32, 35 (1)&(2), 36(3)]. As a result of *Fisheries Act* policy and discretion, however, companies only rarely require *Fisheries Act* authorizations (e.g. only for large gas plants).

Oil and gas activities that have the potential to impact fish and fish habitat are industrial and municipal waste discharges, stream diversions, introduction of silt, barriers to migration, alteration of stream flow, use of chemical, physical or biological agents, and explosives in streams [Handbook]. Before issuing an authorization, the Department of Fisheries and Oceans is required to conduct an environmental assessment under the *Canadian Environmental Assessment Act* [Law List Regulation, *CEAA* s. 5].

Environmental assessment

Provincial legislation does not require an environmental assessment for road-building projects. The Minister can, however, apply the Act to an otherwise uncovered project [s. 6 *EAA*], and order an assessment of any policy, plan or practice of the government [s. 49]. The Executive Director of the Environmental Assessment Office can undertake a class assessment of any category of reviewable projects [s. 20]. Click here for more information about provincial environmental assessment.

Navigable waters

If a company needs roads that will be built or placed in, on, over, under, through or across any navigable water, it must obtain an authorization from the federal Minister of Transport [s. 5 *Navigable Waters Protection Act*]. Before issuing an authorization, Transport Canada is required to conduct an environmental assessment under the *Canadian Environmental Assessment Act* [Law List Regulation, *CEAA* s. 5]

Wildlife

Seismic, drilling, and road building crews may be prevented by the *Migratory Birds Convention Act* and regulations from operating in migratory bird nesting areas at certain times of the year. It is an offence to deposit into water oil, oil wastes or any other substance harmful to migratory birds [s. 5; s. 35 MBR]. Before issuing an authorization, Environment Canada is required to conduct an environmental assessment under the *Canadian Environmental Assessment Act* [Law List Regulation, *CEAA* s. 5]

The *Canada Wildlife Act* can limit the access of an oil and gas company to federal wildlife or bird sanctuaries [Handbook], but there are not currently any wildlife sanctuaries in north-eastern BC.

Heritage

Under the *Heritage Conservation Act* (HCA), a company must obtain Oil and Gas Commission approval before removing or damaging a 'heritage object' that is protected under the HCA (e.g. a burial place or aboriginal rock painting that has historical or archaeological value) [s. 12 *HCA*, s 1, 17 *OGCA*].

Local laws

Depending on the local government, a company may be required to comply with local laws such as development permits, location and 'type of development' bylaws, rules for heavy equipment movement on local roads, and equipment licences to control noise and air pollution. A local government may also limit oil and gas activity in parks or ecological reserves [Handbook].

Area-specific laws

If the project is located within the Muskwa-Kechika Management Area (Northern Rockies), special rules apply. Click here for more information.

Drilling a well (general)

Authorization required

A company must obtain a 'test hole' authorization from the Oil and Gas Commission before drilling a test hole [s. 89].

Set backs

Under the Drilling and Production Regulation (D&PR), a company cannot drill a well within 80 metres for a permanent building or place of public concourse unless the Oil and Gas Commission considers there to be 'special circumstances' [s. 5 D&PR].

A company cannot drill a test hole within 80 m of a residence, school, church or other public building, or within 200 m of a water well [s. 7 D&PR].

Pollution prevention

The Oil and Gas Commission has power to, by regulation or order, specify or limit well practices in order to protect wildlife or prevent water, air or land pollution [s. 96(1)(n)].

The Oil and Gas Commission has the power to shut down a test well if it believes waste, damage to property or pollution can be prevented [s. 102(2)]. The commission can orally order a company to discontinue drilling operations if the commission thinks methods or practices are inadequate [s. 102(3)].

Agricultural land reserve

Companies proposing exploration, wells, pipelines, access roads or production facilities in the Agricultural Land Reserve must obtain approval from the Agricultural Land Reserve Commission (ALRC) — even if the Mediation and Arbitration Board has issued an entry order. Approval from the ALRC can be obtained by complying with the terms of a General Order, or by filing an application with the ALRC. The General Order does not cover production facilities or processing plants. [Note: The ALRC is in the process of rewriting its orders and regulations].

Heritage

Under the *Heritage Conservation Act* (HCA), a company must obtain Oil and Gas Commission approval before removing or damaging a 'heritage object' that is protected under the HCA (e.g. a burial place or aboriginal rock painting that has historical or archaeological value) [s. 12 *HCA*, s 1, 17 *OGCA*].

Local laws

Depending on the local government, a company may be required to comply with local laws such as development permits, location and 'type of development' bylaws, rules for heavy equipment movement on local roads, and equipment licences to control noise and air pollution. A local government may also limit oil and gas activity in parks or ecological reserves [Handbook].

Approval in principle

In 2002, the Province changed the *PNGA* to give the Oil and Gas Commission power to issue 'approval in principle' for oil and gas activities in a specific area [s. 17.1 OGCA]. The Province says this 'general development permit' (GDP) is to allow the Commission to (among other things) prevent a proliferation of roads and pipelines by reviewing at one time multiple projects by multiple companies in the same area.

Environmental or land use terms and conditions for the permit are to be established through discussions with the company, First Nations, and the Commission. When the company applies for subsequent environmental protection-related permits, the Commission would limit its review to environmental and land use issues not already addressed in the general approval. Depending on the scrutiny given to the general permit, the GDP process could result in less site-specific environmental scrutiny of the approvals an oil and gas company needs to conduct oil and gas activities in BC.

Commission less independent

In 2002, the Province also made the Commission less independent by appointing the Deputy Minister of Energy and Mines as chair and director of the Commission and giving him or her the deciding vote in case of a tie.

Although the exercise of Commission authority to issue environmental approvals is still subject 'in all respects' to the Act that contains the environmental approval [s. 17(2) *OGCA*], the Deputy's casting vote is still cause for concern. Environmental approvals previously

issued by the Ministry of Environment (now Water, Land and Air Protection) and then by a 'neutral' Commission, can now be decided by the Deputy Minister of Energy and Mines whose Ministry's first objective is to 'increase investment in energy and mineral resource development in BC'.

Environmental Assessment

Provincial legislation does not require an environmental assessment for drilling projects. The Minister can, however, apply the Act to an otherwise uncovered project [s. 6 *EAA*], and order an assessment of any policy, plan or practice of the government [s. 49]. The Executive Director of the Environmental Assessment Office can undertake a class assessment of any category of reviewable projects [s. 20]. Click here for more information about provincial environmental assessment.

Although a federal environmental assessment is required for well drilling on federal land (Northern Canada and on Indian Reserves), in BC federal environmental assessments are limited to well drilling projects that might harm fish habitat and require an authorization under the *Fisheries Act*. A search of the federal public registry produces very few, if any, examples of upstream oil and gas project assessments since 1995. Click here for more information on federal environmental assessment.

Area-specific laws

If the project is located within the Muskwa-Kechika Management Area (Northern Rockies), special rules apply. Click here for more information.

Drilling wastes

General

A company that complies with the terms of the Oil and Gas Waste Regulation (OGWR), does not require *Waste Management Act* permits for the discharge of certain drilling muds or certain invert cuttings onto land owned or leased by the company, onto adjacent lands, or onto sites approved by a Ministry of Water Land and Air Protection (MWLAP) manager [s. 7(2)]. The type of drilling mud and invert cuttings covered by the OGWR are set out in the regulation.

The company that discharges the wastes must provide any information the manager may require. For invert cuttings, companies must also analyse the materials against specified parameters before discharging, record volumes, and make the information available for inspection—but only for five years [ss. 7(2)(c), 7(3)].

Pollution abatement order

Despite authorization under the OGWR, if a MWLAP manager is satisfied on reasonable grounds that the release of a substance is causing pollution, the manager may at any time make a 'pollution abatement' order under the *WMA* [s. 2 OGWR; ss. 31, 33 WMA]. Additional requirements may apply if the land involved is part of the ALR (General Order 293/95) [see e.g. s. 7(2)(a)(iii)].

A company that fails to submit information, submits false information, or falsifies information commits an offence and is liable to a fine of not more than $10,000 [s. 10]. If a company cannot meet the terms of the OGWR and requires a permit under the *WMA* is required, it must obtain one from the Oil and Gas Commission [ss. 1, 17 *OGCA*].

Produced water

A company must dispose of all water produced from a well by a method acceptable to the Oil and Gas Commission. Options include earthen pits (for salt water on an emergency basis) and disposal in an underground formation [s. 94 D&PR].

Despite the Special Waste Regulation, a company can discharge into an 'underground formation' any water brought to the surface with oil or gas, or fluids injected into a well to increase flow, if continually measured and tested annually [s. 7 OGWR, s. 97 *PNG*]. If a special waste approval is required, the company must obtain one from the Oil and Gas Commission [ss. 1, 17 *OGCA*].

Before digging an earthen pit ('sump') to store liquid waste from a drilling or well servicing operation, a company must meet detailed design and performance criteria [s. 72 D&PR].

Spills and escapes

Spills

A company must make 'every reasonable effort' to prevent spills (defined as substances escaping, leaking or spilling from a well, flow line or production facility), 'promptly remedy' the cause or source, and 'promptly report' location and severity to the Oil and Gas Commission [s. 107 *PNG*]. The commission has the power to order a company to take steps to contain or eliminate spills that have are or are likely to occur [s. 108 *PNG*].

A company cannot drill a well within 100 m of a body of water or permanent stream ('normal high water mark') without building structures to contain escapes, submitting a 'spill limiting and recovery' plan, and installing automatic shut off equipment [s. 5 D&PR].

Spills of fuels, many chemicals, and gaseous releases, if above a threshold specified in the Spill Reporting Regulation (*WMA*), must be reported immediately to the Provincial Emergency Program or the local RCMP [s. 2 SRR]. For example, the threshold for natural gas is 10 kg if there is a breakage in a pipeline or fitting operated above 100 pounds per square inch that results in a sudden and uncontrolled release of natural gas.

Loss or waste

A company must take 'every reasonable precaution' to stop and prevent loss or waste of oil, gas or water when drilling, producing or processing 'in accordance with good conservation practice' [s. 71 D&PR].

Uncontrolled flow

A company must take 'every reasonable precaution' to prevent a well from flowing uncontrolled [s. 38 D&PR].

Blow out prevention

During drilling and operation, companies are required to install, test, and service blow-out prevention equipment and other equipment that meet specified performance standards [s. 20, 21, 22, 23, 25, 26, 27, 28, 30 D&PR]. There are specific standards for equipment and staff at a sour gas well [s. 31, 32]. During drilling and testing, a company is required to have staff onsite who have been certified in blow-out prevention and other techniques [s. 23, 24, 29 D&PR].

If the Oil and Gas Commission believes tools, casing, equipment or materials used by a company during drilling or production are inadequate, defective or hazardous, the Commission has the power to require replacement or reconditioning [s. 33 D&PR]. A company is required to meet detailed design and performance standards for well casing [s. 35 D&PR].

Power to intervene

If nothing is done to prevent the escape of oil or natural gas from a well or to control a flow of water, the commission has power to take any steps it considers 'necessary or expedient' [s. 101]

Water wells

The use of groundwater is not licensed or regulated in BC.

Drinking water contamination

A company must not drill a well within 200 m of a water well without written approval from the Oil and Gas Commission [s. 5 D&PR].

If the Oil and Gas Commission believes the location or condition of a well may become a source of 'serious water pollution,' the company must abandon the location [s. 5 D&PR].

A company must not allow 'formation water,' oil, drilling fluid, waste, chemical substances or refuse from a well, tank or other facility to:

- Create a 'hazard to public health or safety',
- Run into, contaminate, or remain in a place that might contaminate any fresh water,
- Pass into a body of water frequented by fish (exception for water based drilling fluids discharged into the ocean from offshore drilling operations), or
- Pass into water frequented by migratory waterfowl [s. 72 D&PR].

Under the *Health Act*, if the Medical Health Officer for the region believes a company's activities pose a 'health hazard' or that there is a 'significant risk of an imminent health hazard', she can order a company to prevent or eliminate the hazard [s. 63]. A 'health hazard' is a condition or thing that is likely to endanger the public health (*Health Act* s. 1).

A well or test hole must not be left unplugged or uncased after it is no longer used for the purpose for which it was drilled or converted [s. 44 D&PR].

Compliance and enforcement

A 2002 Forest Practices Board audit of oil and gas road activities in the Fort Nelson area concluded that having different legal requirements and environmental standards for roads is 'inequitable', 'confusing', and 'likely to result in a higher risk of damage to forest resources.'

In addition, the audit found:

- The arrangement under which the Oil and Gas Commission approves a logging plan and the Ministry of Forests enforces it, does not work effectively. The Commission generally approves a plan with the expectation that a company will comply with the FPC as the work progresses. Potential impacts to the environment are not identified in advance of the approval. Companies rely on Commission approval as completing their obligations under the Code and do not carry out Code-required assessments following the approval.

- It is unknown whether the Commission's new policy of relying on assessments instead of logging plans will achieve the same standard of environmental stewardship as the Code.

- No audit of road construction or maintenance was possible because the Oil and Gas Commission was unable to provide an accurate listing of roads in the area, or determine precisely which of the variety of legislated standards in force applied to specific road sections.

- Insufficient drainage and erosion control measures, particularly around fish streams, having the potential to cause significant harm to forest resources in the future.

A 2001 special investigation by the Forest Practices Board concluded that the Oil and Gas Commission lacks the powers to enforce non-compliance (since corrected), and that the Commission suffers from a lack of policy and procedures for compliance and enforcement. The special investigation also concluded that it extremely difficult for operators to get on-site time with government staff to ensure their operations are appropriate, and that a significant increase in oil and gas activities in recent years has put further strains on government resources.

Government data for the year 2000 shows almost six million kilograms of oil-contaminated material was trucked out of BC and dumped, untreated, into an Alberta landfill [Parfitt]. That is enough material to fill 575 industrial dump trucks, each towing a 'pup' trailer behind them. There is reason to believe the actual volume of contaminated material may be considerably higher [Parfitt].

A January – March 2001 government compliance review found 91 of 152 well sites to be out of compliance—although most were 'minor in nature.' The review found that some drilling operations were not registering their sites as generators of special waste and were not reporting the transportation or disposal of invert cuttings. Without this information, the authors conclude the risk to the environment could be 'very high.' Of seven well sites inspected, four were found to be in 'major non-compliance'.

In 2002, three conservation officers and three support staff were cut from oil and gas regions of the province — a 43% reduction [Parfitt]. Also cut was a unique 2-person conservation officer team that had focussed primarily on the oil and gas industry, and the 7-person Special Waste Unit of the Ministry of Water, Land and Air Protection [Parfitt]. The four remaining officers are responsible for investigating all industrial activities on 72% of the BC land base (the Omineca-Peace region), and must do their own administrative work [Parfitt].

A 2003, an investigative journalist reported three all-season roads built into the same natural gas producing area known as 'Ladyfern' — and quoted local industry representatives as saying 'we now have three times the environmental footprint we needed out there' [Nikiforuk].

Click here for references and more information on compliance and enforcement.

What needs to change in order to reduce or eliminate environmental damage?

Helicopter drilling

In areas covered by trees, helicopter-portable drilling can considerably lessen long-term impacts. The noise associated with heli-drilling can disturb or displace wildlife (e.g. grizzly bears or caribou), but proponents of heli-drilling say the ecological costs of conventional seismic surveying are far greater and much longer lasting.

To minimize impact on sensitive environments in Ecuador, one company cleared a single drill site and drilled eight wells from it — accessing oil resources using horizontal drilling technology. Helicopters flew in a complete rig and all support materials, eliminating the need for an access road. Ecuador law requires companies to use helicopter-transported equipment in remote rainforest areas.

Ice roads

For willow or meadow areas, ice road technology can eliminate the cutting of any ground surfaces. Using oak matting on boggy seismic lines, and ice roads made of geo-textile matting and artificial snow in other areas, one company avoided building an all-season road to a well site that ultimately failed to produce saleable gas. In the spring, when the company removed all road and well site materials, all areas covered by matting and snow were reported to have recovered well.

Mitigating higher costs

All these techniques are more expensive than traditional practices, but companies should be able to offset or eliminate the additional costs through:

- High-volume use and purchase.
- Fewer fees to forest companies for cutting timber.
- Lower compensation and issue management costs in relation to landowners.
- Better public relations (e.g. better wildlife management).

- Profits from a new technology business unit.

Drilling wastes

Safer methods for treating and disposing drilling wastes include waste treatment facilities, thermal destruction, and hazardous waste landfills. Lengthy special approval processes discourage Alberta companies from adopting these safer methods.

Mineral oil and canola are less toxic alternatives to using diesel fuel for 'invert muds', but they are moderately more expensive.

Environmental assessment

The Minister of Sustainable Resource Management should order the Environmental Assessment Office to conduct an environmental assessment of road and well-drilling practices in light of the government policy of doubling oil and gas production.

Roads

The Oil and Gas Commission should examine the various means by which roads are approved for construction, maintenance and deactivation and develop an appropriate framework that eliminates inconsistencies and ensures an appropriate standard to ensure environmental stewardship. As an interim measure, oil and gas sector roads should be authorized under the *Petroleum and Natural Gas Act* rather than the *Land Act*, to ensure environmental standards are applied [Forest Practices Board recommendation].

Click here for references and more information on alternatives to road building and waste disposal.

What can a concerned citizen do about it?

If you are concerned about an oil or natural gas regulatory decision related to building a road or drilling a test well, consider one of the following ways to bring about change (full descriptions are set out in Appendix A).

- Request Commission to set up alternative dispute resolution (ADR)
- Request 'reconsideration' of decision
- Ask a court to strike down approvals or issue injunction
- Sue the company in negligence or nuisance.
- Organize landowners into advocacy groups
- Request environmental assessment and a role in it

TESTING THE WELL

What is 'testing the well'?

Once drilled, the company will test a natural gas well by allowing it to flow for up to 21 days in order to measure the rate, pressure and chemical contents of the gas reservoir. Companies say the longer the test, the more accurate it is. To burn off gases while the chemical content of the gases is being tested, the company will 'flare' the gas by lighting it on fire. Industry and government consider flaring to be the safest way to dispose of the gas while the testing is taking place. Click here for references and general information about testing a well.

What happens to the environment as a result of this practice?

Flaring

Flaring releases a wide range of harmful substances that can damage vegetation and affect human and animal health (examples are: nitrogen oxides (NOx), sulphur dioxide (SO_2), volatile organic compounds (VOCs), carbon monoxide (CO), and benzene).

A 1996 book by Theo Colborn contends that chemicals produced by burning fossil fuels can set off skin disorders, certain cancers, birth defects and reproductive problems. With support from leading air pollution researchers, Alberta ranchers have argued that flaring is responsible for their asthma, coughs, headaches, aching muscles, shortness of breath, and memory loss.

Residents downwind of flaring in both BC and Alberta report premature births, cancer, sick or dead livestock, allergies, multiple sclerosis, bloody noses, and nausea. A 1999 Alberta health study of the Northern River Basin showed rates for six diseases that were higher than other regions in the province: endometriosis, selected congenital anomalies, bronchitis, pneumonia, peptic ulcers, and epilepsy. Given social and environmental differences in the region, however, the study's authors found these results to be inconclusive.

Sour gas wells

Some wells (called 'sour wells') will contain hydrogen sulphide (H2S) — a poisonous gas that is acutely toxic to humans at low levels. Flaring can significantly reduce the presence of H2S, but trace amounts may still remain. At levels as low as 20 parts per million, lung irritation, and damage to eyes can occur. H2S is heavier than air and therefore tends to follow valleys and other similar landforms, rather than dispersing evenly. Forty percent of Alberta natural gas is sour; in BC, the percentage is likely to be higher. One large test well often releases more pollution in a week than a large gas plant does in a month.

Landowners in BC and Alberta report tops of spruce trees dying off, spots forming on poplar trees, and noise from flaring preventing a good night's sleep. Some families report their children developing blisters and sores after playing on wooden fence rails in their yard.

Click here for references and more information about flaring consequences and landowner concerns.

Incomplete combustion

A 1996 study by the Alberta Research Council found that flares don't burn efficiently and leave anywhere from 16 to 38 percent of the gases intact. Incomplete combustion can release more than 250 other hazardous air emissions known to cause cancer, or negatively affect reproduction, respiratory, or cardiopulmonary health.

The study also reports that Oklahoma had 500 cases/year of cattle suspected to be poisoned by oilfield waste. Alberta, which has more wells but fewer cattle, officially had none. Click here for references and more information about incomplete combustion.

Hauling out

Hauling out oil, condensate, or 'produced water' by truck will result in air emissions. Transferring oil or natural gas to the truck or equipment failure may result in leaks of hydrocarbons or H2S. Click here for references and more information about truck emissions.

Climate change

In 1996, the BC upstream oil and gas industry was responsible for 8% of BC's greenhouse gas emissions. The percentage is likely higher today. Nationally, the upstream sector is the source of 16% of Canada's total emissions. Between 1990 and 1996, upstream emissions grew by 70%. Environment Canada reports that much of Canada's overall GHG increase since 1994 was caused by an increase in the amount of oil and gas produced for export—mostly to the United States.

Flaring, venting, leakage at the well site, and processing are the major upstream sources. Overall, emissions from energy production and use account for almost 80% of total GHG emissions.

The provincial government reports that climate change is already responsible for infestations of forest-destroying beetles, and threats to temperature-sensitive sockeye salmon on the Fraser River. Natural eco-systems are extremely vulnerable to climate change, and continued emissions may lead to irreversible damage.

Click here for references and more information about greenhouse gas emissions.

What laws apply to this practice and are they enforced?

Flaring

General

A company must not flare oil or gas from a well or facility, except in such amounts as may required for 'drill stem testing' (test flaring), or unless the Oil and Gas Commission has given permission. The Commission may give the permission orally, but the flare line must meet specified average concentrations requirements for H2S and SO2, and be equipped with specified anchor, ignition, and extinction equipment [ss. 58 and 71(4) D&PR].

A company that complies with the terms of the Oil and Gas Waste Regulation (OGWR), does not require *Waste Management Act* permits for the discharge of air contaminants during test flaring or discharging water accumulated in flare pits. If a company cannot meet the terms of the OGWR and requires a permit under the *WMA* is required, it must obtain one from the Oil and Gas Commission [ss. 1, 17 *OGCA*].

As a general requirement, a company that is operating a flare must ensure that 'ground level concentrations' of H2S from air emissions are not above the concentration specified in the regulation (10 parts per billion) [s. 3]. The OGWR authorizes the discharge of contaminants from well testing flares if the natural gas is 'low sulphur' (less than 1% H2S by volume) or has less than 5% H2S and is discharged through a 12 metre high stack [s. 4(j)].

Reporting

A company that discharges waste under the OGWR must provide any information requested by a *Waste Management Act* manager. Before testing, the company must also notify the WLAP manager in writing of the testing location and expected volume and H2S content.

For water accumulated in flare pits (s. 7(2)(b)), companies must analyse the materials against specified parameters before discharging, record volumes, and make the information available for inspection—but only for five years [s. 7(3)]. Digging up and spreading the contents of flare pits onto land, however, requires a *Waste Management Act* permit.

A company that fails to submit information, submits false information, or falsifies information commits an offence and is liable to a fine of not more than $10,000 [s. 10].

Pollution abatement order

Despite authorization under the OGWR, if a Ministry of Water Land and Air Protection manager is satisfied on reasonable grounds that the release of a substance is causing pollution, the manager may at any time make a 'pollution abatement' order under the *WMA* [s. 2 OGWR; ss. 31, 33 WMA].

Royalties on flared gas

The Province does not charge royalties to a company on the gas it flares while testing—the company essentially only pays royalties on gas that has already been processed. Such a royalty would serve as an economic incentive to reduce the amount of gas flared.

Environmental Assessment

Provincial legislation does not require an environmental assessment for well-testing projects. The Minister can, however, apply the Act to an otherwise uncovered project [s. 6 *EAA*], and order an assessment of any policy, plan or practice of the government [s. 49]. The Executive Director of the Environmental Assessment Office can undertake a class assessment of any category of reviewable projects [s. 20]. Click here for more information about provincial environmental assessment.

It is unlikely that well testing or well flaring is a project for which a federal environmental assessment is required. Click here for more information on federal environmental assessment.

Greenhouse gases

The Province does not have any enforceable standards for CO_2 or other GHG emissions. For projects undergoing environmental assessment in BC, the Province has prepared a 'draft' set of guidelines for preparing a 'Greenhouse Gas Mitigation Plan'. The draft guidelines apply only to projects that expect to increase direct and indirect GHG emissions by a considerable volume (e.g., greater than 65 kilotonnes of CO_2-equivalent) prior to incorporating mitigation measures.

Before the Ministry of Water, Land and Air Protection can approve a Plan under the draft guidelines, it must be satisfied that (among other things) the full range of GHG mitigation options have been considered and evaluated and all practical cost-effective options have been selected for implementation [s. 5.3].

Compliance and enforcement

In January and March of 2001, the Province conducted 540 inspections as part of a compliance review. The review found 'minor' non-compliance of 57% for well sites. OGC inspection statistics for the period January 2000 to December 2001 indicate 146 major infractions and 1499 minor infractions in relation to wells (out of 4368 inspections).

A 2001 special investigation by the Forest Practices Board concluded that the Oil and Gas Commission lacks the powers to enforce non-compliance (since corrected), and that the Commission suffers from a lack of policy and procedures for compliance and enforcement. The special investigation also concluded that it extremely difficult for operators to get on-site time with government staff to ensure their operations are appropriate, and that a significant increase in oil and gas activities in recent years has put further strains on government resources.

In 2002, three conservation officers and three support staff were cut from oil and gas regions of the province — a 43% reduction [Parfitt]. Also cut was a unique 2-person conservation officer team that had focussed primarily on the oil and gas industry, and the 7-person Special Waste Unit of the Ministry of Water, Land and Air Protection [Parfitt]. The four remaining officers are responsible for investigating all industrial activities on 72% of the BC land base (the Omineca-Peace region), and must do their own administrative work [Parfitt].

Click here for references and more information on compliance and enforcement.

What needs to change in order to reduce or eliminate environmental damage?

In-line testing through a pipeline or processing facility can in some cases eliminate the need to flare. Well-logged instrumentation and the use of existing reservoir data can substantially shorten the time necessary for testing.

'Waste' gas that is currently flared could be used to heat homes and businesses (or meet other energy needs). The Alberta equivalent of the Oil and Gas Commission has acknowledged that gas flared over the course of one year near one Alberta community could have heated more than 5000 homes. Others have estimated that gas flared across the world in one year could heat more than 18 million homes.

Flaring is an environmental cost that residents must pay, but a company does not pay royalties on the gas while it decides whether there is enough of it in the ground to justify further investment. Government and industry should be required to collect and report reliable flaring information.

The Province should charge a royalty for the gas a company flares—providing an economic incentive for a company to minimize the amount of gas it flares.

An Alberta provincial advisory committee has recommended 87 ways to improve the regulation and management of sour gas operations.

The Minister of Sustainable Resource Management should order the Environmental Assessment Office to conduct an environmental assessment of well-testing practices in light of the government policy of doubling oil and gas production.

Click here for references and more information about alternatives to flaring.

What can a concerned citizen do about it?

If you are concerned about an oil or natural gas regulatory decision related to testing a well, consider one of the following ways to bring about change (full descriptions are set out in Appendix A).

- Request Commission to set up alternative dispute resolution (ADR)
- Request 'reconsideration' of decision
- Ask a court to strike down approvals or issue injunction
- Sue the company in negligence or nuisance
- Organize landowners into advocacy groups
- Request environmental assessment and a role in it

4. COMPANY 'PRODUCES' OIL OR NATURAL GAS FROM THE WELL

What is 'producing oil and natural gas'?

If the company thinks a well shows commercial potential, the company will 'complete' the well by adding more layers of pipe and concrete. Better, more expensive materials are used if the company expects the well to produce at a high rate for many years.

At first, the natural pressure of the oil or natural gas is likely enough to force the substance to the surface. As the pressure decreases over time, the company will drill more wells, add compressors, or inject water into the well.

The company will continue to produce oil or natural gas from the well until it is no longer economic to do so.

Click here for references and more information about producing oil and gas.

What happens to the environment as a result of this practice?

Injecting water to improve flow

To increase the amount of oil a well can produce, a company will often inject water into a well—obtained from nearby rivers or underground aquifers. This practice is rarely used for natural gas. Typically, a company needs to inject one gallon of water to obtain one gallon of oil. In 2001, Alberta companies obtained 'no fee' permits for 278 billion litres of fresh water—more than the combined yearly consumption of Alberta's three largest cities.

When a company injects water deep into the ground it often stays there for thousands of years—effectively taking it out of the water cycle. Many towns and farmers are running out of water as a result. Governments don't know exactly how much water the oil and gas industry is using or what happens to that water after it has been injected.

Fraccing

Also to improve gas flow, a company will sometimes inject into the ground a high-pressure combination of sand, hydrocholoric acid, and condensate to cause reservoir rock to fracture. This practice, called 'fraccing' (pronounced 'fracking'), can create several deadly chemicals that can affect the nervous system and the development of unborn children.

Explosions or leaks

If a sour gas well explodes or leaks, poisonous H2S and other emissions may be released into the air (examples are: nitrogen oxides (NOx), sulphur dioxide (SO_2), volatile organic compounds (VOCs), carbon monoxide (CO), and benzene).

Click here for references and more information on water use, fraccing, explosions, leaks, and venting.

Venting and flaring

Gas that comes to the surface with crude oil (called 'solution gas') may be captured, flared or escape unburned ('vent') exposing nearby residents to potentially harmful hazardous air pollutants (e.g. benzene, H2S, and unburned hydrocarbons). A company will also flare gas if the well produces an unexpected increase in pressure (called a 'kick'). Click here for more information on flaring.

Surface impacts of more wells

As more wells are added, the environmental impacts of road building and well drilling are repeated. Click here for impacts of road building and well drilling.

Climate change

In 1996, the BC upstream oil and gas industry was responsible for 8% of BC's greenhouse gas emissions. The percentage is likely higher today. Nationally, the upstream sector is the source of 16% of Canada's total emissions. Between 1990 and 1996, upstream emissions grew by 70%. Environment Canada reports that much of Canada's overall GHG increase since 1994 was caused by an increase in the amount of oil and gas produced for export — mostly to the United States.

Flaring, venting, leakage at the well site, and processing are the major upstream sources. Overall, emissions from energy production and use account for almost 80% of total GHG emissions.

The provincial government reports that climate change is already responsible for infestations of forest-destroying beetles, and threats to temperature-sensitive sockeye salmon on the Fraser River. Natural eco-systems are extremely vulnerable to climate change, and continued emissions may lead to irreversible damage.

Click here for references and more information about greenhouse gas emissions.

What laws apply to this practice and are they enforced?

Well production (general)

Approval for 'scheme'

A company must obtain Oil and Gas Commission approval for any 'scheme' to produce, process (natural gas only), store, and dispose oil or natural gas; or gather, store or dispose water [s. 100 PNG].

Power to shut down well

The Oil and Gas Commission has the power to shut down production if a company is contravening the Act, a regulation, or an order [s. 102(1)]. The Commission has the power to shut down a well if it believes waste, damage to property or pollution can be prevented [s. 102(2)]. The commission can orally order a company to discontinue operations if the commission thinks methods or practices are inadequate [s. 102(3)].

Power to protect wildlife or prevent pollution

The Oil and Gas Commission has power to, by regulation or order, specify or limit well practices in order to protect wildlife or prevent water, air or land pollution [s. 96(1)(n)].

Approval in principle

In 2002, the Province changed the *PNGA* to give the Oil and Gas Commission power to issue 'approval in principle' for oil and gas activities in a specific area [s. 17.1 OGCA]. The Province

says this 'general development permit' (GDP) is to allow the Commission to (among other things) prevent a proliferation of roads and pipelines by reviewing at one time multiple projects by multiple companies in the same area.

Environmental or land use terms and conditions for the permit are to be established through discussions with the company, First Nations, and the Commission. When the company applies for subsequent environmental protection-related permits, the Commission would limit its review to environmental and land use issues not already addressed in the general approval. Depending on the scrutiny given to the general permit, the GDP process could result in less site-specific environmental scrutiny of the approvals an oil and gas company needs to conduct oil and gas activities in BC.

Commission less independent

In 2002, the Province also made the Commission less independent by appointing the Deputy Minister of Energy and Mines as chair and director of the Commission and giving him or her the deciding vote in case of a tie.

Although the exercise of Commission authority to issue environmental approvals is still subject 'in all respects' to the Act that contains the environmental approval [s. 17(2) *OGCA*], the Deputy's casting vote is still cause for concern. Environmental approvals previously issued by the Ministry of Environment (now Water, Land and Air Protection) and then by a 'neutral' Commission, can now be decided by the Deputy Minister of Energy and Mines whose Ministry's first objective is to 'increase investment in energy and mineral resource development in BC'.

Area-specific laws

If the project is located within the Muskwa-Kechika Management Area (Northern Rockies), special rules apply. Click here for more information.

Environmental Assessment

Provincial legislation does not require an environmental assessment for well production projects. The Minister can, however, apply the Act to an otherwise uncovered project [s. 6 *EAA*], and order an assessment of any policy, plan or practice of the government [s. 49]. The Executive Director of the Environmental Assessment Office can undertake a class assessment of any category of reviewable projects [s. 20]. Click here for more information about provincial environmental assessment.

It is unlikely that well production is a project for which a federal environmental assessment is required. Click here for more information on federal environmental assessment.

Water use/injection

If the company needs to divert or use water from a stream, it must obtain an approval from the Commission (if for less than 12 months), or a licence from the applicable water manager at the Ministry of Sustainable Resource Management if for longer than 12 months [s. 8 *Water Act*, s. 1, 17 *OGCA*].

If a company wants to make any modification to the nature of a stream, or undertake any activities or construction within a stream channel that may have an impact on a stream, it must obtain a 'changes in and about a stream' approval from the Commission. A 'change' includes any modification to the land, vegetation, natural environment or flow of water within a stream [s. 9(1)(a) *Water Act*, s. 1, 17 *OGCA*].

If a company holds a water licence or an approval for short-term use, and it wishes to flood or build and operate something on Crown land, it may apply to the Commission for a permit to do so [s. 26 *Water Act*, s. 1, 17 *OGCA*]. It is standard practice for the Oil and Gas Commission to require an application for each proposed short-term water use.

A company wishing to inject water into a reservoir in order to increase oil recovery (or apply any other 'enhanced recovery technique') may only do so if it obtains an approval from the Commission and complies with any terms the Commission specifies. The Commission can cancel or suspend its approval of this 'scheme' if it appears to the Commission that the company has contravened the Act, the regulations, an order, or a condition [s. 100].

Fraccing

Government officials say fraccing is regulated by a section of the Drilling and Production Regulation that requires a company to provide a report to the Commission after any operation that has produced a change in a well's production interval or producing characteristics [s. 56].

The OGC requires a report for each separate event and is required within 30 days of the event. Officials say regulatory considerations include maintaining a discrete flow path from the reservoir to the surface, and maintaining integrity of the well bore (hole made by the drilling bit).

Spills/leaks/explosions/venting

Duty to prevent spills, loss, uncontrolled flow

A company must make 'every reasonable effort' to prevent spills (defined as substances escaping, leaking or spilling from a well, flow line or production facility), 'promptly remedy' the cause or source, and 'promptly report' location and severity to the Oil and Gas Commission [s. 107 *PNG*]. The commission has the power to order a company to take steps to contain or eliminate spills that have are or are likely to occur [s. 108 *PNG*].

A company must take 'every reasonable precaution' to stop and prevent loss or waste of oil, gas or water when drilling, producing or processing 'in accordance with good conservation practice' [s. 71 D&PR].

A company must take every reasonable precaution to prevent a well from flowing uncontrolled [s. 38 D&PR].

Sour gas

During operation of a well, a company must comply with a number of conditions if the H2S content of the gas exceeds a specified level (10 moles/kilomole), or if a 'emergency planning

zone' for the well/facility includes an occupied dwelling, rural school, picnic ground or other populated area. An emergency planning zone is an area around a well that could be exposed to hazardous concentrations of H2S if a release of gas occurs.

The number and nature of conditions depends on H2S content, well design, well capacity, and proximity to city/town limits. Examples of conditions are: posting signs warning of poisonous gas, adding automatic shut-off equipment and locked fences, obtaining approval for emergency plans in the event of an 'uncontrolled' emission, and installing detection and alarm devices [s. 58 D&PR].

If requested by the Commission, a company must install monitoring stations that record and provide data on the concentration of H2S in flared gas [s. 58(5) D&PR].

Venting

A company must not discharge any gas produced (including 'stock tank vapours') to the atmosphere unless it is burned according to detailed requirements — including ensuring that average concentrations of H2S and SO2 do not exceed limits under the *Workers Compensation Act* and maximum permissible concentrations set by Ministry of Water, Land and Air Protection [s. 58(3) and (4) D&PR].

Blow out

During drilling and operation, companies are required to install, test, and service blow-out prevention equipment and other equipment that meet specified performance standards [s. 20, 21, 22, 23, 25, 26, 27, 28, 30 D&PR]. There are specific standards for equipment and staff at a sour gas well [s. 31, 32]. During drilling and testing, a company is required to have staff onsite who have been certified in blow-out prevention and other techniques [s. 23, 24, 29 D&PR].

Storage

Oil must not be stored in receptacles that the Commission believes are inadequate or likely to allow waste, loss, leakage, evaporation or to constitute a fire hazard or an environmental hazard in general [s. 64 D&PR].

Reporting

A company must immediately report to the Oil and Gas Commission an oil spill or salt water spill at a well or processing facility. It must also make every attempt to recover spilled oil or salt water, obtain Commission approval before burning, commence a rehabilitation program and submit a written report within 2 weeks of the date of the spill [s. 71 D&PR].

Spills of fuels, many chemicals, and gaseous releases, if above a threshold specified in the Spill Reporting Regulation, must be reported immediately to the Provincial Emergency Program or the local RCMP [s. 2 SRR]. For example, the threshold for natural gas is 10 kg, if there is a breakage in a pipeline or fitting operated above 100 pounds-per-square-inch that results in a sudden and uncontrolled release of natural gas.

Power to prevent waste

The Oil and Gas Commission has power to require a company to prevent 'waste' by requiring a company to use an enhanced recovery technique (e.g. re-pressuring, recycling) or to gather, process, market or store natural gas [s. 99 PNG].

If nothing is done to prevent the escape of oil or natural gas from a well or to control a flow of water, the Oil and Gas Commission has power to take any steps it considers 'necessary or expedient' [s. 101]

If the Commission believes tools, casing, equipment or materials used by a company during drilling or production are inadequate, defective or hazardous, the Commission has the power to require replacement or reconditioning [s. 33 D&PR]. A company is required to meet detailed design and performance standards for well casing [s. 35 D&PR].

Density (well spacing)

To avoid 'economic waste', the Oil and Gas Commission is likely to limit the number of wells a company can drill on the site (commonly one for every 640 acres) [s. 9 (oil wells) and s. 10 (gas wells) of the Drilling and Production Regulation].

Before government 'spacing' regulations were established, an operator could drill as many wells as they wanted in order to capture as much of the resource as they could. If two neighbours shared a common pool, both would often drill wells to avoid losing all the resource to the other. Like other jurisdictions, BC enacted the PNG in order to avoid the 'economic waste' associated with unnecessary wells. Recent changes to the PNGA will make it easier for both the Minister of Energy and Mines and the Oil and Gas Commission to allow wells to be closer together [see ss. 29, 36, and 37 of the Bill, amending ss. 65(3), 100(3), 133(2)(r) of the *PNGA*]. The government's interest in coalbed methane is likely behind changes.

Coalbed methane projects require a higher concentration of wells because wells produce less gas at a much lower rate compared to conventional wells. Spacing for coalbed methane wells in some parts of the US is as close as one well every 40 acres. This extremely high density of wells and their associated roads, power lines and compressor stations has led to some exceptionally high environmental costs.

Greenhouse gases

The Province does not have any enforceable standards for CO_2 or other GHG emissions. For projects undergoing environmental assessment in BC, the Province has prepared a 'draft' set of guidelines for preparing a 'Greenhouse Gas Mitigation Plan'. The draft guidelines apply only to projects that expect to increase direct and indirect GHG emissions by a considerable volume (e.g. greater than 65 kilotonnes of CO_2-equivalent) prior to incorporating mitigation measures.

Before the Ministry of Water, Land and Air Protection can approve a Plan under the draft guidelines, it must be satisfied that (among other things) the full range of GHG mitigation options have been considered and evaluated and all practical cost-effective options have been selected for implementation [s. 5.3].

Waste disposal

Before digging an earthen pit to store liquid waste from a drilling or well servicing operation, a company must meet detailed design and performance criteria [s. 72 D&PR].

A company must not allow 'formation water,' oil, drilling fluid, waste, chemical substances or refuse from a well, tank or other facility to:

- Create a 'hazard to public health or safety',
- Run into, contaminate, or remain in a place that might contaminate any fresh water,
- Pass into a body of water frequented by fish (exception for water based drilling fluids discharged into the ocean from offshore drilling operations), or
- Pass into water frequented by migratory waterfowl [s. 72 D&PR].

A company must dispose of all water produced from a well by a method acceptable to the Oil and Gas Commission. Options include earthen pits (for salt water on an emergency basis) and disposal in an underground formation [s. 94 D&PR].

Compliance and enforcement

In January and March of 2001, the Province conducted 540 inspections as part of a compliance review. The review found 'minor' non-compliance of 57% for well sites. Oil and Gas Commission inspection statistics for the period January 2000 to December 2001 indicate 146 major infractions and 1499 minor infractions in relation to wells (out of 4368 inspections), and 239 spills at wells and other facilities. Spills data for the same period indicate 117 spills were reported from wells.

A 2001 special investigation by the Forest Practices Board concluded that the Commission lacks the powers to enforce non-compliance (since corrected), and that the Commission suffers from a lack of policy and procedures for compliance and enforcement. The special investigation also concluded that it extremely difficult for operators to get on-site time with government staff to ensure their operations are appropriate, and that a significant increase in oil and gas activities in recent years has put further strains on government resources.

In 2002, three conservation officers and three support staff were cut from oil and gas regions of the province — a 43% reduction [Parfitt]. Also cut was a unique 2-person conservation officer team that had focussed primarily on the oil and gas industry, and the 7-person Special Waste Unit of the Ministry of Water, Land and Air Protection [Parfitt]. The four remaining officers are responsible for investigating all industrial activities on 72% of the BC land base (the Omineca-Peace region), and must do their own administrative work [Parfitt].

Click here for more information on compliance and enforcement.

What needs to change in order to reduce or eliminate environmental damage?

Oil and gas companies should use alternatives to freshwater sources for increasing production rates. Examples are separating out and using 'produced water' (water that comes out of the ground along with the oil), using salt water from deeper in the ground, and using carbon dioxide pumped up from US factories. [For more information, see CBC-TV, 'Troubled Water' on The National, May 14, 2001 (order transcript at http://www.bowdens.com/index2.html)].

The Minister of Sustainable Resource Management should order the Environmental Assessment Office to conduct an environmental assessment of well-production practices in light of the government policy of doubling oil and gas production.

What can a concerned citizen do about it?

If you are concerned about an oil or natural gas regulatory decision related to well production, consider one of the following ways to bring about change (full descriptions are set out in Appendix A).

- As the Commission to require a company to install monitoring stations that record and provide data on the concentration of H2S in flared gas [s. 58(5) D&PR].
- Request Commission to set up alternative dispute resolution (ADR)
- Request 'reconsideration' of decision
- Ask a court to strike down approvals or issue injunction
- Sue the company in negligence or nuisance
- Organize landowners into advocacy groups
- Request environmental assessment and a role in it

5. COMPANY TRANSPORTS OIL OR NATURAL GAS TO PROCESSING FACILITIES VIA PIPELINE

To begin to get oil or natural gas to market, the company must transport it from the producing well to processing facilities where the oil or gas will be stripped of unwanted substances. To transport the oil and gas the company will construct small pipelines called 'gathering' or 'flow' lines and along the way may install 'compressor stations' in order to create and maintain pressure in the lines.

GATHERING AND FLOW LINES

What is 'a gathering or flow line'?

Gathering or flow lines are pipelines that transport oil or natural gas from producing wells to processing facilities where they will be stripped of unwanted substances. Most gathering and flow lines are buried in the earth for safety reasons. Click here for references and general information about gathering and flow lines.

What happens to the environment as a result of this practice?

Like seismic lines and roads, gathering lines, flow lines, and other pipelines are 'linear disturbances' and have a number of ecological consequences:

- The cumulative loss of habitat from seismic lines, roads and pipelines is substantial and is particularly hard on large mammals such as the grizzly bear which need large contiguous tracts of wilderness to 'security cover.'
- Pipelines can alter predator-prey relationships. Wolves, for example, are able to move faster along seismic lines than in the forest, increasing predation pressures on caribou.
- Reproductive failure in birds is higher near linear disturbances.
- Hunting and poaching increase when pipelines open up previously inaccessible areas.

Click here for references and more information on the ecological consequences of linear disturbances.

Gathering line stream crossings are susceptible to 'slump' and can cause erosion and bank failure. The result can be adverse impacts on water quality, fish and fish habitat. For the year 1996, environment ministry officials estimated 9000 stream crossings were needed for seismic lines, pipelines and road developments. The number will likely be much larger by 2006 because of the provincial government's policy to dramatically increase production.

A gathering line leak or accident can contaminate land and surface water. An Alberta Energy and Utilities Board study reported an average of 734 pipeline failures per year in Canada for the period 1992-1997. The seventeen-year average was 674 failures per year (1980-1997).

Depending on its location, a pipeline may affect surface drainage, destroy topsoil, and/or promote the growth of weeds.

A pipeline, once constructed, may make an otherwise marginal oil or gas field profitable—resulting in more landscape disruptions.

Click here for references and more information on stream impacts, leaks/accidents, and soil impacts.

What laws apply to this practice and are they enforced?

Gathering and flow lines (general)

Province regulates 'intra-provincial' pipelines

The *Pipeline Act* regulates gathering lines and flow lines, unless they cross into Alberta, Yukon, or the United States (in which case they're regulated by the federal government under the *National Energy Board Act*).

Need for certificate

Before constructing a pipeline, the company must obtain a certificate from the Oil and Gas Commission [s. 10 *Pipeline Act*], but surface rights can be acquired after a certificate is issued. When considering an application, the Commission must 'have regard to' all considerations the Commission feels relevant, including the recommendation of the Minister of Water, Land and Air Protection and the 'needs and general good of the residents of BC as a whole.' [s. 11 *Pipeline Act*].

For lands occupied by buildings, the consent of the landowner is not required. For land under cultivation, the company must also obtain written permission from the occupant or post a damage deposit.

Limits on location

A company must locate and construct its pipeline and connected works so as not to 'endanger the public health or safety.' [s. 23 *Pipeline Act*]. The Oil and Gas Commission has the power to direct a company to divert or relocate the pipeline on recommendation of the Minister of Water, Land and Air Protection [s. 14 *Pipeline Act*].

Operating a pipeline

To operate a pipeline, a company must obtain 'leave' from the Oil and Gas Commission [s. 36 *Pipeline Act*]

Agricultural land reserve

Companies proposing exploration, wells, pipelines, access roads or production facilities in the Agricultural Land Reserve must obtain approval from the Agricultural Land Reserve Commission (ALRC) — even if the Mediation and Arbitration Board has issued an entry order. Approval from the ALRC can be obtained by complying with the terms of a General Order, or by filing an application with the ALRC. The General Order does not cover production facilities or processing plants. [Note: The ALRC is in the process of rewriting its orders and regulations].

Approval in principle

In 2002, the Province changed the *PNGA* to give the Oil and Gas Commission power to issue 'approval in principle' for oil and gas activities in a specific area [s. 17.1 OGCA]. The Province says this 'general development permit' (GDP) is to allow the Commission to (among other things) prevent a proliferation of roads and pipelines by reviewing at one time multiple

projects by multiple companies in the same area. Environmental or land use terms and conditions for the permit are to be established through discussions with the company, First Nations, and the Commission. When the company applies for subsequent environmental protection-related permits, the Commission would limit its review to environmental and land use issues not already addressed in the general approval. Depending on the scrutiny given to the general permit, the GDP process could result in less site-specific environmental scrutiny of the approvals an oil and gas company needs to conduct oil and gas activities in BC.

Commission less independent

In 2002, the Province also made the Commission less independent by appointing the Deputy Minister of Energy and Mines as chair and director of the Commission and giving him or her the deciding vote in case of a tie.

Although the exercise of Commission authority to issue environmental approvals is still subject 'in all respects' to the Act that contains the environmental approval [s. 17(2) *OGCA*], the Deputy's casting vote is still cause for concern. Environmental approvals previously issued by the Ministry of Environment (now Water, Land and Air Protection) and then by a 'neutral' Commission, can now be decided by the Deputy Minister of Energy and Mines whose Ministry's first objective is to 'increase investment in energy and mineral resource development in BC'.

Area-specific laws

If the project is located within the Muskwa-Kechika Management Area (Northern Rockies), special rules apply. Click here for more information.

Environmental Assessment

Provincial

Provincial legislation does not require an environmental assessment for gathering and flow lines unless they're long or large (e.g. 40 – 60 km or more). The Minister can, however, apply the Act to an otherwise uncovered project [s. 6 *EAA*], and order an assessment of any policy, plan or practice of the government [s. 49].

The Executive Director of the Environmental Assessment Office can undertake a class assessment of any category of reviewable projects [s. 20].

Click here for more information about provincial environmental assessment.

Federal

Although a federal environmental assessment is required for pipelines on federal land (Northern Canada and on Indian Reserves), in BC federal environmental assessments are limited to pipeline projects that might harm fish habitat and require an authorization under the *Fisheries Act* (e.g. a pipeline that crosses a stream) or impede a navigable waterway.

A search of the federal public registry produces very few, if any, examples of upstream oil and gas project assessments since 1995.

Click here for more information on federal environmental assessment.

Linear disturbances

Authority to build

With a certificate from the Oil and Gas Commission, a company is authorized to enter on to any land (Crown and private) 'lying in the indicated route of its line' in order to make surveys, construct roads/buildings, transport oil or gas, and/or maintain its pipeline [s. 7 *Pipeline Act*].

When exercising these powers, the company must 'do as little damage as possible' and make full compensation to all 'persons interested' for all damage sustained [s. 8 *Pipeline Act*]. With a certificate, the company is also authorized to 'take and appropriate' as much of the land as may be necessary for the pipeline' [s. 16 *Pipeline Act*].

If there is a dispute between a company and the landowner, the Mediation and Arbitration Board is authorized to settle the dispute, grant access, and fix compensation. [s. 16 *Pipeline Act* applying Part 3 of the *PNGA*].

Forests

A company must obtain a licence to cut from the Oil and Gas Commission in order to cut and/or remove Crown timber from the land [s. 51 *Forest Act*, s. 17 *OGCA*].

If requested by the Oil and Gas Commission, the company will have to prepare and seek approval for a 'logging plan' — a plan that details environmental protections required by the Forest Practices Code for roads [s. 21(b)]. The Commission has the power to require a logging plan if the Commission determines one is necessary to 'adequately manage and conserve the forest resources of the area' [s. 21(b)].

Prior to 2002, the Commission's practice was to routinely require a logging plan. A logging plan is now requested only if the Commission determines one is necessary.

Heritage object

Under the *Heritage Conservation Act* (HCA), a company must obtain Oil and Gas Commission approval before removing or damaging a 'heritage object' that is protected under the HCA (e.g. a burial place or aboriginal rock painting that has historical or archaeological value) [s. 12 *HCA*, s 1, 17 *OGCA*].

Navigable waters

If a company needs pipelines or roads that will be built or placed in, on, over, under, through or across any navigable water, it must obtain an authorization from the federal Minister of Transport [s. 5 *Navigable Waters Protection Act*]. Before issuing an authorization, Transport

Canada is required to conduct an environmental assessment under the *Canadian Environmental Assessment Act* [Law List Regulation, *CEAA* s. 5]

Streams/fish

Provincial

If the company needs to divert or use water from a stream, it must obtain an approval from the Commission (if for less than 12 months), or a licence from the applicable water manager at MSRM if for longer than 12 months [s. 8 *Water Act*, s. 1, 17 *OGCA*].

If a company wants to make any modification to the nature of a stream, or undertake any activities or construction within a stream channel that may have an impact on a stream, it must obtain a 'changes in and about a stream' approval from the Commission. A 'change' includes any modification to the land, vegetation, natural environment or flow of water within a stream [s. 9(1)(a) *Water Act*, s. 1, 17 *OGCA*].

If a company holds a water licence or an approval for short-term use, and it wishes to flood or build and operate something on Crown land, it may apply to the Commission for a permit to do so [s. 26 *Water Act*, s. 1, 17 *OGCA*]. It is standard practice for the Oil and Gas Commission to require an application for each proposed short-term water use.

Federal

Without a federal authorization, an oil and gas company would violate the *Fisheries Act* if it destroyed fish, harmfully altered fish habitat, or deposited a 'deleterious substance' in water frequented by fish [ss. 32, 35 (1)&(2), 36(3)].

As a result of *Fisheries Act* policy and discretion, however, companies only rarely require *Fisheries Act* authorizations (e.g., only for large gas plants).

The 'deleterious substance' provision applies up to 200 nautical miles offshore BC. Oil and gas activities that have the potential to impact fish and fish habitat are industrial and municipal waste discharges, stream diversions, introduction of silt, barriers to migration, alteration of stream flow, use of chemical, physical or biological agents, and explosives in streams [Handbook].

Before issuing an authorization, the Department of Fisheries and Oceans is required to conduct an environmental assessment under the *Canadian Environmental Assessment Act* [Law List Regulation, *CEAA* s. 5].

In 2002, a pipeline company was charged under the *Fisheries Act* [s. 36(3)], the Migratory Birds Regulations, and the BC *Waste Management Act* for a 2000 pipeline spill into the Pine River.

Leaks/accidents

A company must 'make every reasonable effort' to prevent the escape, leak or spill from a pipeline, promptly remedy/contain any spill and restore any land or watercourse affected, and promptly report the location and severity to the Oil and Gas Commission. If aware of a

spill or a likely spill, a company must make every reasonable effort to prevent it [s. 38 *Pipeline Act*; s. 107 *PNG*].

The Commission has power to order a company to take steps to contain or eliminate spills, order a group of companies to implement a program of measures to contain and eliminate spills, and recover the costs if the Commission contains or eliminates the spill [s. 39 *Pipeline Act* ; s. 108 *PNG*].

When storing, piping or distributing, a company must not use oil or gas wastefully or allow it to leak or escape from natural reservoirs, wells, tanks, containers or pipes [s. 71 D&PR].

Spills of fuels, many chemicals, and gaseous releases, if above a threshold specified in the Spill Reporting Regulation, must be reported immediately to the Provincial Emergency Program or the local RCMP [s. 2 SRR]. For example, the threshold for natural gas is 10 kg, if there is a breakage in a pipeline or fitting operated above 100 pounds per square inch that results in a sudden and uncontrolled release of natural gas.

Greenhouse gases

The Province does not have any enforceable standards for CO_2 or other GHG emissions. For projects undergoing environmental assessment in BC, the Province has prepared a 'draft' set of guidelines for preparing a 'Greenhouse Gas Mitigation Plan'. The draft guidelines apply only to projects that expect to increase direct and indirect GHG emissions by a considerable volume (e.g. greater than 65 kilotonnes of CO_2-equivalent) prior to incorporating mitigation measures.

Before the Ministry of Water, Land and Air Protection can approve a Plan under the draft guidelines, it must be satisfied that (among other things) the full range of GHG mitigation options have been considered and evaluated and all practical cost-effective options have been selected for implementation [s. 5.3].

Compliance and Enforcement

290 pipeline 'incidents' were reported to the Oil and Gas Commission in the one-year period December 31, 1999 to January 1, 2002.

A 2002 Forest Practices Board audit of pipeline activities in the Ft. Nelson area found examples of significant non-compliance with the Forest Practices Code. Instances documented in the audit reflect practices that involved insufficient drainage and erosion control measures around fish streams. At four locations, under an approved logging plan, a company building pipelines and access roads did not apply sufficient erosion control measures. In two of these locations, there was excessive erosion of channel banks and slumping road fill entering the stream. Sediment was being transported downstream.

A 2001 special investigation by the Forest Practices Board concluded that the Commission lacks the powers to enforce non-compliance (since corrected), and that the Commission suffers from a lack of policy and procedures for compliance and enforcement. The special investigation also concluded that it extremely difficult for operators to get on-site time with government staff to ensure their operations are appropriate, and that a significant increase in oil and gas activities in recent years has put further strains on government resources.

In 2002, three conservation officers and three support staff were cut from oil and gas regions of the province — a 43% reduction [Parfitt]. Also cut was a unique 2-person conservation officer team that had focussed primarily on the oil and gas industry, and the 7-person Special Waste Unit of the Ministry of Water, Land and Air Protection [Parfitt]. The four remaining officers are responsible for investigating all industrial activities on 72% of the BC land base (the Omineca-Peace region), and must do their own administrative work [Parfitt].

Click here for references and more information on compliance and enforcement.

What needs to change in order to reduce or eliminate environmental damage?

Unlike seismic lines, pipeline rights of way are semi-permanent and thus have no obvious 'parallel' in nature. As a result, some ecological forestry models accept pipelines only with explicit limits on cumulative densities, including integrated planning with the forest industry, the development and implementation of new operating practices, and a reduction in the pace of development.

The Province should be authorized to require Oil and Gas companies, forestry companies and BC Hydro to use the same 'rights-of-way.'

To minimize excavation at its Ecuador project that would damage mature tree roots and cause erosion, one company dropped pipe from a helicopter every four km along the route and built raised pipelines using a special monorail system adapted from grape-growing operations in Europe. By using the monorail system, this company narrowed the necessary right-of-way, avoided permanent openings in the forest canopy, and eliminated the need for an adjacent road. Ecuador law requires companies to use helicopter-transported equipment in remote rainforest areas.

These techniques may be more expensive than traditional practices, but companies should be able to offset or eliminate the additional costs through:

- High-volume use and purchase.
- Fewer fees to forest companies for cutting timber.
- Lower compensation and issue management costs in relation to landowners.
- Better public relations (e.g. better wildlife management).
- Profits from a new technology business unit.

The Minister of Sustainable Resource Management should order the Environmental Assessment Office to conduct an environmental assessment of pipeline practices in light of the government policy of doubling oil and gas production.

Click here for references and more information about gathering/flow lines, ecological forestry models, and more information on the Ecuador project.

What can a concerned citizen do about it?

If you are concerned about an oil or natural gas regulatory decision related to pipelines, consider one of the following ways to bring about change (full descriptions are set out in Appendix A).

- Request Commission to set up alternative dispute resolution (ADR)
- Request 'reconsideration' of decision
- Ask a court to strike down approvals or issue injunction
- Sue the company in negligence or nuisance
- Organize landowners into advocacy groups
- Request environmental assessment and a role in it

COMPRESSOR STATIONS

What is 'a compressor'?

Compressors, driven by large gas or electric engines, create and maintain pressure in a gas pipeline. A company may also need to use a compressor to force gas into a gathering line. Long pipelines require a series of compressors. Click here for references and general information about compressors.

What happens to the environment as a result of this practice?

Combustion emissions and escaped vapour can affect air quality. Noise from compressors can also disturb nearby residents. Click here for references and more information.

What laws apply to this practice and are they enforced?

General (compressors)

No need for permit if compliance with regulation

A company that complies with the terms of the Oil and Gas Waste Regulation (OGWR), does not require *Waste Management Act* permits for air emissions from a 'small' compressor stations (less than 600 kilowatts of total power) [s. 4]. The OGWR authorizes emissions if they are under 30 tonnes of sulphur and 4 tonnes of VOCs in any 15 day period [s. 2].

There are also maximum thresholds for NOx emissions from the gas turbine or internal combustion engines used to power the compressors [s. 6(1)(a)].

As a general requirement, a company that is operating a compressor station must ensure that 'ground level concentrations' of H2S from air emissions are not above the concentration specified in the regulation (10 parts per billion) [s. 3]. If a company cannot meet the terms of

the OGWR and requires a permit under the *WMA* is required, it must obtain one from the Oil and Gas Commission [ss. 1, 17 *OGCA*].

A company that discharges waste under the OGWR must provide any information requested by a *Waste Management Act* manager, and provide a registration report for each facility.

Pollution abatement order

Despite authorization under the OGWR, if a Ministry of Water Land and Air Protection manager is satisfied on reasonable grounds that the release of a substance is causing pollution, the manager may at any time make a 'pollution abatement' order under the *WMA* [s. 2 OGWR; ss. 31, 33 WMA].

Sour gas

During operation of a compressor station, a company must comply with a number of conditions if the H2S content of the gas exceeds a specified level (10 moles/kilomole), or if a 'emergency planning zone' for the well/facility includes an occupied dwelling, rural school, picnic ground or other populated area. An emergency planning zone is an area around a compressor station that could be exposed to hazardous concentrations of H2S if a release of gas occurs.

The number and nature of conditions depends on H2S content and proximity to city/town limits. Examples of conditions are: posting signs warning of poisonous gas, adding automatic shut-off equipment and locked fences, obtaining approval for emergency plans in the event of an 'uncontrolled' emission, and installing detection and alarm devices [s. 58 D&PR].

Approval in principle

In 2002, the Province changed the *PNGA* to give the Oil and Gas Commission power to issue 'approval in principle' for oil and gas activities in a specific area [s. 17.1 OGCA]. The Province says this 'general development permit' (GDP) is to allow the Commission to (among other things) prevent a proliferation of roads and pipelines by reviewing at one time multiple projects by multiple companies in the same area.

Environmental or land use terms and conditions for the permit are to be established through discussions with the company, First Nations, and the Commission. When the company applies for subsequent environmental protection-related permits, the Commission would limit its review to environmental and land use issues not already addressed in the general approval. Depending on the scrutiny given to the general permit, the GDP process could result in less site-specific environmental scrutiny of the approvals an oil and gas company needs to conduct oil and gas activities in BC.

Commission less dependent

In 2002, the Province also made the Commission less independent by appointing the Deputy Minister of Energy and Mines as chair and director of the Commission and giving him or her the deciding vote in case of a tie.

Although the exercise of Commission authority to issue environmental approvals is still subject 'in all respects' to the Act that contains the environmental approval [s. 17(2) *OGCA*], the Deputy's casting vote is still cause for concern. Environmental approvals previously issued by the Ministry of Environment (now Water, Land and Air Protection) and then by a 'neutral' Commission, can now be decided by the Deputy Minister of Energy and Mines whose Ministry's first objective is to 'increase investment in energy and mineral resource development in BC'.

Area-specific laws

If the project is located within the Muskwa-Kechika Management Area (Northern Rockies), special rules apply. Click here for more information.

Environmental Assessment

Provincial legislation does not require an environmental assessment for a compressor station. The Minister can, however, apply the Act to an otherwise uncovered project [s. 6 *EAA*], and order an assessment of any policy, plan or practice of the government [s. 49]. The Executive Director of the Environmental Assessment Office can undertake a class assessment of any category of reviewable projects [s. 20]. Click here for more information about provincial environmental assessment.

It is unlikely that installing a compressor station is a project for which a federal environmental assessment is required. Click here for more information on federal environmental assessment.

Compliance and Enforcement

Oil and Gas Commission inspections at compressors and other facilities for the period January 2000 to December 2001 found 44 major infractions and 128 minor infractions out of 333 total inspections. Statistics from the same period also indicate 122 'spills' from all facilities.

A 2001 special investigation by the Forest Practices Board concluded that the Oil and Gas Commission lacks the powers to enforce non-compliance (since corrected), and that the Commission suffers from a lack of policy and procedures for compliance and enforcement. The special investigation also concluded that it extremely difficult for operators to get on-site time with government staff to ensure their operations are appropriate, and that a significant increase in oil and gas activities in recent years has put further strains on government resources.

In 2002, three conservation officers and three support staff were cut from oil and gas regions of the province — a 43% reduction [Parfitt]. Also cut was a unique 2-person conservation officer team that had focussed primarily on the oil and gas industry, and the 7-person Special Waste Unit of the Ministry of Water, Land and Air Protection [Parfitt]. The four remaining officers are responsible for investigating all industrial activities on 72% of the BC land base (the Omineca-Peace region), and must do their own administrative work [Parfitt].

Click here for references and more information on compliance.

What needs to be done in order to reduce or eliminate environmental damage?

Companies can significantly lower emissions from compressors by replacing older compressors with fuel-efficient models now available on the market.

The Minister of Sustainable Resource Management should order the Environmental Assessment Office to conduct an environmental assessment of compressor facility practices in light of the government policy of doubling oil and gas production.

What can a concerned citizen do about it?

If you are concerned about an oil or natural gas regulatory decision related to a compressor station, consider one of the following ways to bring about change (full descriptions are set out in Appendix A).

- Request Commission to set up alternative dispute resolution (ADR)
- Request 'reconsideration' of decision
- Ask a court to strike down approvals or issue injunction
- Sue the company in negligence or nuisance
- Organize landowners into advocacy groups
- Request environmental assessment and a role in it

6. COMPANY PROCESSES THE OIL OR NATURAL GAS TO REMOVE IMPURITIES

Oil and natural gas in their raw forms contain a number of 'impurities' that the company must remove if the substances are to be marketable. The impurities are removed at a variety of facilities once the oil or natural gas reaches the surface. For example, in a typical gas project the company will build a structure called a 'battery' to separate the gas from oil and water, and then pipe the gas to a 'processing facility' to remove unwanted chemical substances. Click here for references and for general information about processing.

BATTERY

What is a 'battery'?

A battery collects a stream of oil or natural gas from one or more wells, separates it into different streams for oil, gas, and water, and then pipes the now distinct streams to a processing facility to have the remaining impurities removed. It is becoming more common for companies to locate these separation facilities at the well site itself. Click here for references and general information about batteries.

What happens to the environment as a result of this practice?

Alberta officials have documented problems with batteries in relation to emissions and spills. A 1998/99 inspection of batteries that are likely to have problems or located in an environmentally sensitive area revealed 30% to be in 'unsatisfactory condition'. Click here for references and more information about batteries, emissions, spills, and the Alberta inspection report.

What laws apply to this practice and are they enforced?

General (batteries)

No permit required if terms of regulation met

A company that complies with the terms of the Oil and Gas Waste Regulation (OGWR), does not require *Waste Management Act* permits for the discharge of air contaminants from a battery of any size [s. 4(a)]. A company discharging waste under the OGWR must provide any information requested by a *Waste Management Act* manager [s. 8].

As a general requirement, a company that is operating a battery must ensure that 'ground level concentrations' of H2S from air emissions are not above the concentration specified in the regulation (10 parts per billion) [s. 3].

If a company cannot meet the terms of the OGWR and requires a permit under the *WMA* is required, it must obtain one from the Commission [ss. 1, 17 *OGCA*].

Pollution abatement order

Despite authorization under the OGWR, if a Ministry of Water Land and Air Protection manager is satisfied on reasonable grounds that the release of a substance is causing pollution, the manager may at any time make a 'pollution abatement' order under the *WMA* [s. 2 OGWR; ss. 31, 33 WMA].

Threat of water pollution

If the Oil and Gas Commission believes the location or condition of a battery may become a source of 'serious water pollution,' the company must abandon the location [s. 5 D&PR].

Sour gas

During operation of a battery, a company must comply with a number of conditions if the H2S content of the gas exceeds a specified level (10 moles/kilomole), or if a 'emergency planning zone' for the well/facility includes an occupied dwelling, rural school, picnic ground or other populated area. An emergency planning zone is an area around a battery that could be exposed to hazardous concentrations of H2S if a release of gas occurs.

The number and nature of conditions depends on H2S content and proximity to city/town limits. Examples of conditions are: posting signs warning of poisonous gas, adding automatic shut-off equipment and locked fences, obtaining approval for emergency plans in the event of an 'uncontrolled' emission, and installing detection and alarm devices [s. 58] D&PR.

Approval in principle

In 2002, the Province changed the *PNGA* to give the Oil and Gas Commission power to issue 'approval in principle' for oil and gas activities in a specific area [s. 17.1 OGCA]. The Province says this 'general development permit' (GDP) is to allow the Commission to (among other things) prevent a proliferation of roads and pipelines by reviewing at one time multiple projects by multiple companies in the same area.

Environmental or land use terms and conditions for the permit are to be established through discussions with the company, First Nations, and the Commission. When the company applies for subsequent environmental protection-related permits, the Commission would limit its review to environmental and land use issues not already addressed in the general approval. Depending on the scrutiny given to the general permit, the GDP process could result in less site-specific environmental scrutiny of the approvals an oil and gas company needs to conduct oil and gas activities in BC.

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In 2002, the Province also made the Commission less independent by appointing the Deputy Minister of Energy and Mines as chair and director of the Commission and giving him or her the deciding vote in case of a tie.

Although the exercise of Commission authority to issue environmental approvals is still subject 'in all respects' to the Act that contains the environmental approval [s. 17(2) *OGCA*], the Deputy's casting vote is still cause for concern. Environmental approvals previously issued by the Ministry of Environment (now Water, Land and Air Protection) and then by a 'neutral' Commission, can now be decided by the Deputy Minister of Energy and Mines whose Ministry's first objective is to 'increase investment in energy and mineral resource development in BC'.

Area-specific laws

If the project is located within the Muskwa-Kechika Management Area (Northern Rockies), special rules apply. Click here for more information.

Environmental Assessment

Provincial legislation does not require an environmental assessment for a battery. The Minister can, however, apply the Act to an otherwise uncovered project [s. 6 *EAA*], and order an assessment of any policy, plan or practice of the government [s. 49]. The Executive Director of the Environmental Assessment Office can undertake a class assessment of any category of reviewable projects [s. 20]. Click here for more information about provincial environmental assessment.

It is unlikely that installing a battery is a project for which a federal environmental assessment is required. Click here for more information on federal environmental assessment.

Compliance and Enforcement

Oil and Gas Commission inspections at batteries and other facilities for the period January 2000 to December 2001 found 44 major infractions and 128 minor infractions out of 333 total inspections. Statistics from the same period also indicate 122 'spills' from all facilities.

A 2001 special investigation by the Forest Practices Board concluded that the Commission lacks the powers to enforce non-compliance (since corrected), and that the Commission suffers from a lack of policy and procedures for compliance and enforcement. The special investigation also concluded that it extremely difficult for operators to get on-site time with government staff to ensure their operations are appropriate, and that a significant increase in oil and gas activities in recent years has put further strains on government resources.

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Click here for references and more information on compliance and enforcement.

What needs to change in order to reduce or eliminate environmental damage?

Batteries should not be located in environmentally sensitive areas. Better inspections can help minimize emissions, spills, etc. Local residents can help report leaks, spills, etc.

The Minister of Sustainable Resource Management should order the Environmental Assessment Office to conduct an environmental assessment of battery facility practices in light of the government policy of doubling oil and gas production.

What can a concerned citizen do about it?

If you are concerned about an oil or natural gas regulatory decision related to a battery, consider one of the following ways to bring about change (full descriptions are set out in Appendix A).

- Request Commission to set up alternative dispute resolution (ADR)
- Request 'reconsideration' of decision
- Ask a court to strike down approvals or issue injunction
- Sue the company in negligence or nuisance
- Organize landowners into advocacy groups
- Request environmental assessment and a role in it

PROCESSING FACILITY

What is a 'processing facility?

At a processing facility, the company will strip unwanted chemical substances from the oil or natural gas before it is piped further to markets. At a natural gas processing facility, for example, some sulphur from the H2S is removed and sold to fertilizer and chemical companies when prices are suitable. Excess H2S is flared or incinerated, although flaring is less common today than in previous years. Carbon dioxide (CO2) is removed because it erodes metals and promotes a process that clogs pipes. At sophisticated processing facilities, propane, butane, and natural gasoline are removed and sold at a price that often generates significant revenue for the company.

The mixture of H2S and CO2 (collectively known as 'acid gas') is sometimes injected back into the ground.

The company will flare gas at a processing facility if the gas is 'solution gas' (gas that comes to the surface with oil), if the gas is not marketable, or if the company is required to do so in an emergency. Flaring at processing facilities is becoming less common in Northeast BC.

To prevent freezing and corrosion in gas pipelines, the company will remove water from the gas by using a 'dehydration' process. Note: Dehydrators may also be used at well sites and compressor stations.

Click here for references and more general information about processing facilities.

What happens to the environment as a result of this practice?

Flaring

Flaring releases a wide range of harmful substances that can damage vegetation and affect human and animal health (examples are: nitrogen oxides (NOx), sulphur dioxide (SO_2), volatile organic compounds (VOCs), carbon monoxide (CO), and benzene).

A 1996 book by Theo Colborn contends that chemicals produced by burning fossil fuels can set off skin disorders, certain cancers, birth defects and reproductive problems.

With support from leading air pollution researchers, Alberta ranchers have argued that flaring is responsible for their asthma, coughs, headaches, aching muscles, shortness of breath, and memory loss.

Residents downwind of flaring in both BC and Alberta report premature births, cancer, sick or dead livestock, allergies, multiple sclerosis, bloody noses, and nausea.

A 1999 Alberta health study of the Northern River Basin showed rates for six diseases that were higher than other regions in the province: endometriosis, selected congenital anomalies, bronchitis, pneumonia, peptic ulcers, and epilepsy. Given social and environmental differences in the region, however, the study's authors found these results to be inconclusive.

Sour gas

Some wells (called 'sour wells') will contain hydrogen sulphide (H2S) — a poisonous gas that is acutely toxic to humans at low levels. Flaring can significantly reduce the presence of H2S, but trace amounts may still remain. At levels as low as 20 parts per million, lung irritation, and damage to eyes can occur. H2S is heavier than air and therefore tends to follow valleys and other similar landforms, rather than dispersing evenly.

40 percent of Alberta natural gas is sour; in BC, the percentage is likely to be higher. One large test well often releases more pollution in a week than a large gas plant does in a month.

Landowners in BC and Alberta report tops of spruce trees dying off, spots forming on poplar trees, and noise from flaring preventing a good night's sleep. Some families report their children develop blisters and sores after playing on wooden fence rails in their yard.

Click here for references and more information about flaring consequences and landowner concerns.

Incomplete combustion

A 1996 study by the Alberta Research Council found that flares don't burn efficiently and leave anywhere from 16 to 38 percent of the gases intact. Incomplete combustion can release more than 250 other hazardous air emissions known to cause cancer, or negatively affect reproduction, respiratory, or cardiopulmonary health.

The study also reports that Oklahoma had 500 cases/year of cattle suspected to be poisoned by oilfield waste. Alberta, which has more wells but fewer cattle, officially had none.

Click here for references and more information about incomplete combustion.

Venting

The unburned escape of solution gas (venting) may also expose residents to potentially hazardous air pollutants (e.g., benzene, H2S, and unburned hydrocarbons). Click here for references and more information about venting.

Acid gas injection

If there are problems with an 'acid gas' injection system (for H2S and CO2), the highly concentrated gas is flared and local air quality can be adversely affected because of very high levels of SO2 and some H2S. If there are no problems, acid gas injection facilities normally have very low emissions of SO2. Click here for references and more information about acid gas injection.

Dehydration

The 'dehydration' process used to remove water from gas to prevent freezing and corrosion results in emissions of benzene — for which there is no safe limit. Alberta oil and gas companies voluntarily comply with a standard that 'controls benzene emissions to the lowest level that can be practically achieved.' Benzene is a known carcinogen, is considered to be 'toxic' under the *Canadian Environmental Protection Act*, and is listed on the National Pollutant Release Inventory.

Natural gas dehydration is Canada's second largest source of benzene emissions (vehicle emissions are the largest).

Click here for references and more information about the dehydration process.

Climate change

A considerable amount of energy is needed to remove sulphur from sour gas. At least one public interest group believes that once all energy costs are factored in, sour gas is comparable to coal in terms of GHG emissions. Click here for references and more information about processing and energy use.

In 1996, the BC upstream oil and gas industry was responsible for 8% of BC's greenhouse gas emissions. The percentage is likely higher today. Nationally, the upstream sector is the source of 16% of Canada's total emissions.

Between 1990 and 1996, upstream emissions grew by 70%. Environment Canada reports that much of Canada's overall GHG increase since 1994 was caused by an increase in the amount of oil and gas produced for export — mostly to the United States. Flaring, venting, leakage at the well site, and processing are the major upstream sources. Overall, emissions from energy production and use account for almost 80% of total GHG emissions.

The provincial government reports that climate change is already responsible for infestations of forest-destroying beetles, and threats to temperature-sensitive sockeye salmon on the Fraser River. Natural eco-systems are extremely vulnerable to climate change, and continued emissions may lead to irreversible damage.

Click here for references and more information about greenhouse gas emissions.

What laws apply to this practice and are they enforced?

Processing (general)

Approval for 'scheme'

A company must obtain Oil and Gas Commission approval for any 'scheme' to produce, process (natural gas only), store, and dispose oil or natural gas; or gather, store or dispose water [s. 100 PNG].

Local laws

Depending on the local government, a company may be required to comply with local laws such as development permits, location and 'type of development' bylaws, rules for heavy equipment movement on local roads, and equipment licences to control noise and air pollution. A local government may also limit oil and gas activity in parks or ecological reserves [Handbook].

Approval in principle

In 2002, the Province changed the *PNGA* to give the Oil and Gas Commission power to issue 'approval in principle' for oil and gas activities in a specific area [s. 17.1 OGCA]. The Province says this 'general development permit' (GDP) is to allow the Commission to (among other things) prevent a proliferation of roads and pipelines by reviewing at one time multiple projects by multiple companies in the same area.

Environmental or land use terms and conditions for the permit are to be established through discussions with the company, First Nations, and the Commission. When the company applies for subsequent environmental protection-related permits, the Commission would limit its review to environmental and land use issues not already addressed in the general approval. Depending on the scrutiny given to the general permit, the GDP process could result in less site-specific environmental scrutiny of the approvals an oil and gas company needs to conduct oil and gas activities in BC.

Commission less independent

In 2002, the Province also made the Commission less independent by appointing the Deputy Minister of Energy and Mines as chair and director of the Commission and giving him or her the deciding vote in case of a tie.

Although the exercise of Commission authority to issue environmental approvals is still subject 'in all respects' to the Act that contains the environmental approval [s. 17(2) *OGCA*], the Deputy's casting vote is still cause for concern. Environmental approvals previously issued by the Ministry of Environment (now Water, Land and Air Protection) and then by a 'neutral' Commission, can now be decided by the Deputy Minister of Energy and Mines whose Ministry's first objective is to 'increase investment in energy and mineral resource development in BC'.

Area-specific laws

If the project is located within the Muskwa-Kechika Management Area (Northern Rockies), special rules apply. Click here for more information.

Environmental Assessment

Provincial EA

Larger natural gas processing plants (capacity of 5.634 million m^3 per day) or smaller ones with substantial sulphur emissions (more than 2 tonnes/day) are automatically considered to be 'reviewable projects' under provincial environmental legislation.

Before the legislation was rewritten in 2002, proposals for 'reviewable projects' would automatically undergo an assessment according to procedures set out in the Act and regulations. Under current legislation, the Executive Director has the power to waive this requirement if she believes the project will not significant adverse environmental effects.

The Minister of Sustainable Resource Management has the power to apply the Act to an otherwise uncovered project [s. 6 *EAA*], and order an assessment of any policy, plan or practice of the government [s. 49].

The Executive Director of the Environmental Assessment Office can undertake a class assessment of any category of reviewable projects [s. 20].

Click here for more information about provincial environmental assessment.

Federal EA

Although a federal environmental assessment is required for processing facilities on federal land (Northern Canada and on Indian Reserves), in BC federal environmental assessments are limited to processing facilities that might harm fish habitat and require an authorization under the *Fisheries Act*.

A search of the federal public registry produces very few, if any, examples of upstream oil and gas project assessments since 1995.

Click here for more information on federal environmental assessment.

Flaring/incomplete combustion/venting/spills

Permit required

Unlike for test flaring (where meeting the standards in the Oil and Gas Waste Regulation (OGWR) will relieve the company from the need to obtain a permit), a company wishing to flare natural gas at a processing plant will generally require a permit under the *Waste Management Act* from the Oil and Gas Commission [ss. 1, 17 *OGCA*].

The OGWR does say, however, that the owner or operator is authorized to discharge air contaminants from a processing facility if ambient concentrations of H2S do not exceed 10 parts per billion, and the person who discharges the waste provides any information the *Waste Management Act* manager might require [ss. 3, 6, 8].

To maintain equipment and facilities, the OGWR also authorizes a company to vent natural gas if it contains less than 230 mg of total sulphur/cubic metre, or if it contains more, it is combusted in a flare [s. 4(g) OGWR].

The OGWR doesn't apply to processing facilities that remove or discharge more than 30 tonnes of sulphur or 4 tonnes of VOCs in any 15 day period [s. 2 OGWR]. For processing facilities covered by the OGWR, the company must provide a registration report to the *WMA* manager [s. 6(2)].

Transporting sour gas

A company is authorized to transport sour production liquid if it uses vehicles equipped with H2S venting control devices or sealed to prevent release of any gas [s. 5].

Discharge of wastes

Under certain conditions, a company is also authorized to discharge onto their own land, adjacent land, or any approved site, liquids that accumulate in flare pits [s. 7(2)(b)]. For water accumulated in flare pits, companies must analyse the materials against specified parameters

before discharging, record volumes, and make the information available for inspection — but only for five years [ss. 7(2)(b), 7(3)].

Pollution abatement order

Despite authorization under the OGWR, if a Ministry of Water Land and Air Protection manager is satisfied on reasonable grounds that the release of a substance is causing pollution, the manager may at any time make a 'pollution abatement' order under the *WMA* [s. 2 OGWR; ss. 31, 33 WMA].

A company that fails to submit information, submits false information, or falsifies information commits an offence and is liable to a fine of not more than $10,000 [s. 10]. If a company cannot meet the terms of the OGWR and requires a permit under the *WMA* is required, it must obtain one from the Oil and Gas Commission [ss. 1, 17 *OGCA*].

Duty to take precautions

A company must take 'every reasonable precaution' to stop and prevent loss or waste of oil, gas or water when drilling, producing or processing 'in accordance with good conservation practice' [s. 71 D&PR].

Flaring

A company must not flare oil or gas from a well or facility, except in such amounts as may required from 'drill stem testing' (which shouldn't be necessary when processing), or unless the Commission has given permission. The Commission may give the permission orally, and the sour gas requirements of s. 58 must be followed (flare lines to be a minimum height, fitted with ignition and extinction devices) [s. 71(4) D&PR].

Spills

A company must immediately report to the Oil and Gas Commission an oil spill or saltwater spill at a well or processing facility. It must also make every attempt to recover spilled oil or salt water, obtain Commission approval before burning, commence a rehabilitation program and submit a written report within 2 weeks of the date of the spill [s. 71 D&PR].

Acid gas re-injection

Despite the Special Waste Regulation, the OGWR authorizes the injection of acid gas into underground wells if approved by the Minister (which in practice is the Oil and Gas Commission) under the *Petroleum and Natural Gas Act* [s. 7 OGWR, s. 100 *PNGA*]. If a special waste approval is required, the company must obtain one from the Commission [ss. 1, 17 *OGCA*].

Dehydration

Companies are authorized by the OGWR to discharge air contaminants (including benzene) from dehydrators if they comply with the terms of the OGWR [ss. 4 and 6].

The only requirement under the OGWR for a company installing a dehydrator that combusts low sulphur gas, or combusts high sulphur gas but is rated at less than 150 kilowatts, is to provide any information required by a *Waste Management Act* manager [ss. 4 and 8].

For dehydrators that combust high-sulphur gas and are rated at more than 150 kilowatts, the company must submit a registration report to the manager [s. 6].

Greenhouse gases

The Province does not have any enforceable standards for CO2 or other GHG emissions. For projects undergoing environmental assessment in BC, the Province has prepared a 'draft' set of guidelines for preparing a 'Greenhouse Gas Mitigation Plan'. The draft guidelines apply only to projects that expect to increase direct and indirect GHG emissions by a considerable volume (e.g. greater than 65 kilotonnes of CO2-equivalent) prior to incorporating mitigation measures.

Before the Ministry of Water, Land and Air Protection can approve a Plan under the draft guidelines, it must be satisfied that (among other things) the full range of GHG mitigation options have been considered and evaluated and all practical cost-effective options have been selected for implementation [s. 5.3].

Water/fish

A company must not allow oil, drilling fluid, waste, chemical substances or refuse from a processing facility to:

- Create a 'hazard to public health or safety',
- Run into, contaminate, or remain in a place that might contaminate any fresh water,
- Pass into a body of water frequented by fish (exception for water based drilling fluids discharged into the ocean from offshore drilling operations), or
- Pass into water frequented by migratory waterfowl [s. 72 D&PR].

Compliance and Enforcement

Oil and Gas Commission inspections at processing and other facilities for the period January 2000 to December 2001 found 44 major infractions and 128 minor infractions out of 333 total inspections. Statistics from the same period also indicate 122 'spills' from all facilities.

A 2001 special investigation by the Forest Practices Board concluded that the Oil and Gas Commission lacks the powers to enforce non-compliance (since corrected), and that the Commission suffers from a lack of policy and procedures for compliance and enforcement. The special investigation also concluded that it extremely difficult for operators to get on-site time with government staff to ensure their operations are appropriate, and that a significant increase in oil and gas activities in recent years has put further strains on government resources.

In 2002, three conservation officers and three support staff were cut from oil and gas regions of the province — a 43% reduction [Parfitt]. Also cut was a unique 2-person conservation officer team that had focussed primarily on the oil and gas industry, and the 7-person Special Waste Unit of the Ministry of Water, Land and Air Protection [Parfitt]. The four remaining officers are responsible for investigating all industrial activities on 72% of the BC land base (the Omineca-Peace region), and must do their own administrative work [Parfitt].

Click here for references and more information on compliance and enforcement.

What needs to change in order to reduce or eliminate environmental damage?

An Alberta advisory group, concerned about a proliferation of less-stringently regulated small processing plants, has recommended that no company be allowed to build a plant within 15 km of an existing plant.

Emissions from acid gas flaring can be avoided by requiring the gas plant to be shut down when there is a problem with the acid gas disposal system.

'Waste' gas that is currently flared could be used to heat homes and businesses (or meet other energy needs).

The Minister of Sustainable Resource Management should order the Environmental Assessment Office to conduct an environmental assessment of processing facility practices in light of the government policy of doubling oil and gas production.

Click here for references and more information about processing and less damaging alternatives.

What can a concerned citizen do about it?

If you are concerned about an oil or natural gas regulatory decision related to a processing facility, consider one of the following ways to bring about change (full descriptions are set out in Appendix A).

- Request Commission to set up alternative dispute resolution (ADR)
- Request 'reconsideration' of decision
- Ask a court to strike down approvals or issue injunction
- Sue the company in negligence or nuisance
- Organize landowners into advocacy groups
- Request environmental assessment and a role in it

7. COMPANY ABANDONS WELL AND RECLAIMS WELL SITE/PIPELINES

If a well is dry or no longer in use, the company is required by law to properly abandon and 'reclaim' the well site, production site, batteries and other facilities and pipelines.

What is 'abandonment and reclamation'?

To abandon a well, the company sets cement plugs in the well hole, and in some cases a steel plate is welded across the well opening. Down the well, all drinking water zones are covered with cement to protect groundwater. The company removes all wellhead equipment on the surface.

The land around the well must be restored to 'as close to its original state' as possible (including replacing the topsoil and seeding/replanting).

Pipelines are either 'abandoned in place' or removed.

Click here for references and general information about abandonment and reclamation.

What happens to the environment as a result of this practice?

If improperly abandoned, oil or gas can flow through the well casing and contaminate groundwater.

Alberta Environment estimates that 20,000 wells have been abandoned but not yet certified as 'reclaimed.' Not all of them would be 'orphans' because many might be reclaimed, but not yet certified, in the course of an assessment, or awaiting an inquiry. A 1999 Alberta Environment study reports Alberta citizens don't think oil and gas companies do a good job of keeping them informed about abandonment activities.

In 2002, approximately 4500 wells had been abandoned in BC, but the number changes frequently. BC government officials estimate there are fewer than 50 wells in BC that are truly 'orphaned', but critics say the number is likely to be considerably higher.

Abandoned pipelines can, over time, erode and leak. Long-term structural deterioration of a pipeline may lead to ground subsidence. Ground subsidence can create the potential for water channelling, erosion, topsoil loss, and negatively affect land use and land aesthetics. Ground subsidence can also pose a safety hazard.

Click here for references and more information on the environmental impacts of abandoning or reclaiming a well or pipeline.

What laws apply to this practice and are they enforced?

General (abandoning and reclaiming)

Certificate of restoration

Before a company can abandon a well, test hole, or production facility, the Oil and Gas Commission must issue a 'certificate of restoration' [s. 84 *PNGA*]. The Commission cannot issue the certificate until it has received assurances from officials administering the *Waste Management Act* (s. 26.4), that (for example) an inspection is not needed or the site is not contaminated [s. 84 *PNGA*].

A company must apply to abandon and plug a well or test hole and must meet a number of detailed requirements [s. 45, 46 D&PR]. Once a well, test hole or facility has been abandoned, the company must clear all refuse material, remove waste oil, drain and fill excavations, and remove unused concrete, machinery and materials. It must also level the surface and leave it in the condition 'as nearly as is reasonable to its condition when operations were commenced' [s. 48 D&PR].

Approval in principle

In 2002, the Province changed the *PNGA* to give the Oil and Gas Commission power to issue 'approval in principle' for oil and gas activities in a specific area [s. 17.1 OGCA]. The Province says this 'general development permit' (GDP) is to allow the Commission to (among other things) prevent a proliferation of roads and pipelines by reviewing at one time multiple projects by multiple companies in the same area.

Environmental or land use terms and conditions for the permit are to be established through discussions with the company, First Nations, and the Commission. When the company applies for subsequent environmental protection-related permits, the Commission would limit its review to environmental and land use issues not already addressed in the general approval. Depending on the scrutiny given to the general permit, the GDP process could result in less site-specific environmental scrutiny of the approvals an oil and gas company needs to conduct oil and gas activities in BC.

Commission less independent

In 2002, the Province has also made the Commission less independent by appointing the Deputy Minister of Energy and Mines as chair and director of the Commission and giving him or her the deciding vote in case of a tie.

Although the exercise of Commission authority to issue environmental approvals is still subject 'in all respects' to the Act that contains the environmental approval [s. 17(2) *OGCA*], the Deputy's casting vote is still cause for concern. Environmental approvals previously issued by the Ministry of Environment (now Water, Land and Air Protection) and then by a 'neutral' Commission, can now be decided by the Deputy Minister of Energy and Mines whose Ministry's first objective is to 'increase investment in energy and mineral resource development in BC'.

Area-specific laws

If the project is located within the Muskwa-Kechika Management Area (Northern Rockies), special rules apply. Click here for more information.

If the project is on federally owned land within BC (e.g., Indian reserve, national park, wildlife area, defence lands harbours), federal laws — not BC laws — will govern the granting of rights and the exploration, operation, processing and transportation associated with that project. Click here for information about oil and gas law on federal land.

Environmental Assessment

Provincial legislation does not require an environmental assessment for abandoning a well or pipeline. The Minister can, however, apply the Act to an otherwise uncovered project [s. 6 *EAA*], and order an assessment of any policy, plan or practice of the government [s. 49]. The Executive Director of the Environmental Assessment Office can undertake a class assessment of any category of reviewable projects [s. 20]. Click here for more information about provincial environmental assessment.

It is unlikely that abandoning a well/upstream pipeline is a project for which a federal environmental assessment is required. Click here for more information on federal environmental assessment.

Compliance and Enforcement

Oil and Gas Commission inspection statistics for the period January 2000 to December 2001 indicate 191 wells were inspected for 'final restoration'. Of the 191 inspections, 2 are reported as major non-compliance, 146 as minor non-compliance, and 43 as 'other.'

A 2001 special investigation by the Forest Practices Board concluded that the Oil and Gas Commission lacks the powers to enforce non-compliance (since corrected), and that the Commission suffers from a lack of policy and procedures for compliance and enforcement. The special investigation also concluded that it extremely difficult for operators to get on-site time with government staff to ensure their operations are appropriate, and that a significant increase in oil and gas activities in recent years has put further strains on government resources.

In 2002, three conservation officers and three support staff were cut from oil and gas regions of the province — a 43% reduction [Parfitt]. Also cut was a unique 2-person conservation officer team that had focussed primarily on the oil and gas industry, and the 7-person Special Waste Unit of the Ministry of Water, Land and Air Protection [Parfitt]. The four remaining officers are responsible for investigating all industrial activities on 72% of the BC land base (the Omineca-Peace region), and must do their own administrative work [Parfitt].

Click here for references and more information on compliance and enforcement.

What needs to change in order to reduce or eliminate environmental damage?

The province of Alberta has set up a multi-million dollar 'Orphan Fund' to pay for the costs of cleaning up well sites and pipeline sites 'orphaned' by the companies responsible for them. The fund does not cover orphaned processing facilities or wells/pipeline sites that have been designated 'contaminated sites' under Alberta legislation. BC does not have an 'Orphan Fund' but Oil and Gas Commission officials say creating one is a priority for the Commission in 2002/03.

Alberta companies pay into the fund an annual levy on inactive wells, and as of 2001 the fund contained $4 million. The Alberta Energy Utilities Board (EUB) has the power to decide which well/pipeline site are to be considered 'orphaned' and whether money from the fund is to be spent reclaiming the site or going after the company responsible for orphaning it. The EUB has recently delegated administration of the fund to a 'not-for-profit' agency called the 'Orphan Well Association.' In the year 2001, the EUB spent $4 million out of the fund on 42 wells and 301 sites.

The Minister of Sustainable Resource Management should order the Environmental Assessment Office to conduct an environmental assessment of abandonment and reclamation practices in light of the government policy of doubling oil and gas production.

Click here for references and more information on the Alberta industry's orphan fund.

What can a concerned citizen do about it?

If you are concerned about an oil or natural gas regulatory decision related to abandoning a well or pipeline, consider one of the following ways to bring about change (full descriptions are set out in Appendix A).

- Request Commission to set up alternative dispute resolution (ADR)
- Request 'reconsideration' of decision
- Ask a court to strike down approvals or issue injunction
- Sue the company in negligence or nuisance
- Organize landowners into advocacy groups
- Request environmental assessment and a role in it

8. COMPANY TRANSPORTS OIL AND GAS TO 'DOWNSTREAM' SECTOR

Once produced and processed the oil or gas is transported to refineries and consumers via pipeline, oil tanker or truck.

Click here for references and general information about transportation to the downstream sector.

DOWNSTREAM: THE REFINING AND MARKETING SECTOR OF THE PETROLEUM INDUSTRY.

In the 'downstream' oil and gas sector, refineries, gas distribution utilities, product wholesalers, service stations and petrochemical companies refine, distribute, and market oil and natural gas products to consumers. 'Refining' is the conversion of raw petroleum into useable products like gasoline. Gas products are usually distributed by huge inter-provincial and international pipelines.

The downstream sector is governed by a different set of laws than the upstream sector, and a review of these laws is beyond the scope of this paper.

Click here for references and general information about the downstream oil and gas sector.

APPENDICES

A. WHAT CAN A CONCERNED CITIZEN DO ABOUT IT?

REQUEST COMMISSION TO SET UP ADR

The Oil and Gas Commission has a statutory duty to encourage 'consensual alternative dispute resolution methods' (ADR) in order to resolve disputes that arise when issuing oil and gas approvals [s. 8]. Any 'interested person' may request the Commission to set up an ADR process for any particular dispute [s. 8(2)]. An environmental group has already taken part in an ADR to address concerns related to a well application [see OGC website, Well authorization b-94-B/94-G-6 WA#12592]. They describe their experiences as disappointing.

Except for constitutional obligations for the Province to consult with First Nations, there are no legal requirements for companies to notify residents or others of a potential project before a decision is taken — although non-binding guidelines recommend companies undertake some consultation and notification. Examples of guideline recommendations are: for wells, notify residents who live within 0.5 – 3.0 km; for flaring, consult with the landowner, and notify residents who live within 0.3 km; for pipelines, notify residents and local government authorities [see Oil and Gas Handbook, Section 3 "Planning Framework"].

REQUEST 'RECONSIDERATION' OF DECISION

For most Oil and Gas Commission approvals, a multi-stakeholder advisory committee set up under the *OGCA* can also request the Commission to 'reconsider' a decision by setting up an ADR process [s. 9]. If the Commission agrees to reconsideration by ADR, the Commission's original decision is suspended until the Commission takes a decision again [s. 9]. Ask members of the advisory committee to seek a reconsideration on your behalf.

ASK A COURT TO STRIKE DOWN APPROVALS OR ISSUE INJUNCTION

Using a process known as judicial review, citizens can challenge permits and approvals issued by government or require government to take action. Judicial review will only be successful in limited circumstances. Grounds for judicial review include failing to take account of relevant factors, fettering discretion, improper notice, bias, arbitrariness and improper purpose, and *ultra vires*.

A person interested in striking down a government approval should consult a lawyer. Generally, government officials are trained to avoid making mistakes that could invalidate approvals, but every year there are a number of successful judicial reviews. Often, however, the end result is not any different — government simply re-issues the approval making sure it respects all proper processes.

Citizens concerned about oil and gas issues have successfully persuaded a court to strike down an approval because it was improperly issued and to stop a company from doing any exploration while the court considered the issue. In 1995 a guide outfitter convinced a court to strike down a licence to cut issued by the Ministry of Forests (MOF). MOF — despite its objections to the project—issued the licence believing it was bound by a decision by the (then) Ministry of Energy, Mines and Petroleum Resources (MEMPR) to allow road access.

After MOF re-issued the licence, two non-profit groups temporarily stopped a company from building the road by obtaining an injunction from the Supreme Court. To do so, they successfully demonstrated they had a right to challenge the decision 'in the public interest', that there was a serious issue to be tried, and that the potential environmental costs outweighed potential financial hardships for the company.

Ultimately, the court upheld the licence on the grounds that MEMPR had authority to approve the overall project, that MOF's environmental concerns were considered when MEMPR balanced economic and environmental considerations, and that MOF had properly restricted its environmental review to the harvesting of trees from the access road.

Click here for references and more information about challenging a government decision.

SUE THE COMPANY IN NEGLIGENCE OR NUISANCE

There are very few examples of citizens successfully suing oil and gas companies for health and property damage caused by oil and gas activities. One reason is that landowners often obtain compensation through the Mediation and Arbitration Board or settle privately with a company (and agree not to disclose the settlement). Establishing a link between harm suffered by a landowner and an oil and gas company's activities is also difficult.

In 1998, a Chetwynd BC family failed to convince a court that an oil and gas spill caused chemical sensitivities in the family. A vacuum truck dumped the contents of a septic tank on property adjacent to the family's driveway. Mixed in with the sewage was some oil and gas waste from a previous job that had not been thoroughly removed from the tank. The court was not persuaded that any of the family's medical experts had sufficient expertise in the area of known effects of hydrocarbons on humans, and found 'overwhelming evidence' that exposure to the spill was the least likely explanation for the families illnesses.

In 2000, however, an Alberta rancher successfully sued Mobil Oil in both negligence and nuisance for loss of herd productivity and fertility, the death of cattle and the loss of reputation as a successful purebred breeder. He was awarded almost $180,000. The Rancher successfully established a causal link between damage to his cattle and Mobil's failure to 'effectively fence' well and battery sites or do more than simply cover with soil a flare pit that had been used to flare solution gas. The rancher had kept remarkably thorough records over a ten-year period.

More than 25 cases of landowner suing oil and gas companies are now in the Alberta court system — most of which were initiated in the past two years.

Click here for references and more information about citizen suits.

ORGANIZE LANDOWNERS INTO ADVOCACY GROUPS

In the face of increasing pressure from the industry, landowners in Alberta have formed more than 60 environmental advocacy groups so individual landowners have better knowledge and support when negotiating with industry. A few years ago there were only about a dozen. [see Henton, D., "Frustration mounts in Alberta oilpatch as environment woes plague farmers" CP January 7, 2002, http://ca.news.yahoo.com/020107/6/gpqc.html].

The benefits of cooperation among landowners are best for linear projects like seismic lines and roads.

REQUEST ENVIRONMENTAL ASSESSMENT AND A ROLE IN IT

Federal EA

In circumstances where an oil and natural gas project requires an authorization to harm fish habitat (e.g. if it crosses a fish-bearing stream), or interfere with a navigable waterway, the federal government is required to conduct an environmental assessment. Most environmental assessments involve the preparation of a summary report, and for these assessments, public participation in the assessment is at the discretion of the federal department. Ask to be included.

Click here for more information on federal environmental assessment.

Provincial EA

Although oil and natural gas projects are not automatically covered by provincial environmental assessment legislation, the Minister of Sustainable Resource Management has the power to require one anyway.

The Minister also has the power to order an assessment of any government policy, enactment, plan, practice or procedure. Ask the Minister to assess a project, and/or order an assessment of each step of a typical oil and natural gas project in light of the government's policy of doubling oil and gas production.

Click here for more information on provincial environmental assessment.

B. REFERENCES AND ADDITIONAL INFORMATION

General description of 'upstream' industry

For more general descriptions of the upstream oil and gas industry, see:

- Canadian Petroleum Association, "A Preliminary Inventory of CH4 and VOC Emissions From Upstream Oil and Gas Operations in Alberta," (Calgary: CPA, 1990), at p. 2]
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Description of 'exploration'

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- Cullen, S., *Natural Gas in Canada and the United States: From Wellhead to Burner-tip (Study No. 52)*, (Calgary: Canadian Energy Research Institute, 1993) at p. 1.22 to 1.24.
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at p. 4.].
- Petroleum Communication Foundation, 'Quick Answers' <http://www.pcf.ab.ca/>.

Description of 'seismic testing'

For information about seismic testing, see:

- Forest Practices Board, *Seismic Line Crossings of Streams, East of Fort Nelson, BC: Special Investigation Report* (Victoria: Forest Practices Board of BC, November 2001), at p. 1. <http://www.fpb.gov.bc.ca/reports/special_invest/sir08/sir08.pdf>.
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- Schneider, R. *The Oil and Gas Industry in Alberta: Practices, Regulations, and Environmental Impact*, (2001) available at <www.borealcentre.ca/reports/oil/oil.html>.

Seismic lines (and other linear disturbances): impact on wildlife

For information on wildlife impacts of seismic exploration, building roads, building pipelines, and other linear disturbances, see:

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- James, A.R. 1999, Effects of Industrial Development on the Predator-Prey Relationship between Wolves and Caribou in Northwestern Alberta. Ph.D. Thesis, University of Alberta, Edmonton, AB.
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For information on the University of Alberta study, see:

- Montaigne, F., 'Boreal: The Great Northern Forest', National Geographic Magazine, June 2002, p. 45.
- Struzik, E., 'Magazine slams Alberta's forest management', National Post, May 27, 2002, p. A9.

Seismic lines and roads: impact on forests

For a description of the ESSA Technologies study of human impact in boreal forest see:

- Parfitt, B., "Unnatural Gas: The high environmental cost of an ignored industry's 'clean' blue flame burns a few critics in the forgotten Peace," Georgia Straight, Volume 30, No. 1497, Aug 29 – Sept 5, 1996.

For statistics on forest harvesting by oil and gas companies in Alberta, and salvage/regeneration rates, see

- Schneider, R. *The Oil and Gas Industry in Alberta: Practices, Regulations, and Environmental Impact*, (2001) available at <www.borealcentre.ca/reports/oil/oil.html>.

Seismic lines: impact on soils

For information on seismic exploration and impacts on soils, see:

- Canadian Association of Petroleum Producers, Environmental operating practices for upstream petroleum operation. Volume II: geophysics (Calgary: Canadian Association of Petroleum Producers, 1999), E-3, 199a.
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- Schneider, R. *The Oil and Gas Industry in Alberta: Practices, Regulations, and Environmental Impact*, (2001) available at <www.borealcentre.ca/reports/oil/oil.html>.

Seismic lines: surface water and ground water

For information on seismic exploration, road building, and impacts on surface water and ground water see:

- Canadian Association of Petroleum Producers, Environmental operating practices for upstream petroleum operation. Volume II: geophysics (Calgary: Canadian Association of Petroleum Producers, 1999), D-13.
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at pp. 6-7.

For story of slide at Fisher Creek triggered by Talisman Energy road built over the objections of MOF and MELP and estimates of stream crossings by environment ministry staff, see:

- Parfitt, B., "Unnatural Gas: The high environmental cost of an ignored industry's 'clean' blue flame burns a few critics in the forgotten Peace," Georgia Straight, Volume 30, No. 1497, Aug 29 – Sept 5, 1996.

For information on the landowner concerns in both BC and Alberta, see:

- Nikiforuk, Andrew, *Saboteurs: Wiebo Ludwig's War Against Big Oil* (Toronto: MacFarlane Walter & Ross, 2001).

Seismic lines: solid waste

For information on seismic lines and solid waste, see:

- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at p. 8.
- Ministry of Water, Land and Air Protection, Ministry of Forests, and the Oil and Gas Commission, *Report on the Oil and Gas Compliance Review, January and March 2001* (Ft. St. John: Oil and Gas Commission, 2001).

Seismic lines: obligations to First Nations

For information on seismic lines and obligations to First Nations, see:

- Rankin, M. et al., "Regulatory Reform in the British Columbia Petroleum Industry: The Oil and Gas Commission" 38 Alta. L.R. 143 (June 2000) at 156-163.

- Rankin, Murray, "Offshore Oil and Gas and Coastal British Columbia: The Legal Framework", unpublished paper 2001, at p. 5-11.

For information on Provincial MOUs with Treaty 8 First Nations, see:

- Oil and Gas Commission, Memoranda of Understanding, First Nations <http://www.ogc.gov.bc.ca/firstnations.asp>.

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- Union of BC Indian Chiefs, Press Release, 'UBCIC Supports Blueberry River First Nation's Legal Action Against Province of BC,' October 2, 2002.

Seismic lines: less damaging alternatives

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- Schneider, R. The Oil and Gas Industry in Alberta: Practices, Regulations, and Environmental Impact, (2001), pp. 8, 21, <www.borealcentre.ca/reports/oil/oil.html>.

Rubber roads, snowguns, narrower vehicles, and 'gyrotracks' are profiled in

- "Putting energy and people to work: BC's oil and natural gas industry," A Special partnership marketing supplement for the Canadian Association of Petroleum Producers, Globe and Mail, Wednesday, October 24, 2001.

Description of ''subsurface right'

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- Cullen, S., *Natural Gas in Canada and the United States: From Wellhead to Burner-tip (Study No. 52),* (Calgary: Canadian Energy Research Institute, 1993) at p. 1.31.
- Lucas, A, Hunt, C., *Oil and gas law in Canada* (Toronto: Carswell, 1990).
- Sasaki, Harvey, "Surface Rights in British Columbia: A Guide to the Legislation and Regulations for the Petroleum and Natural Gas Industry" (Victoria: Ministry of Agriculture & Fisheries, 1988).

Subsurface rights: environmental impacts

For more information, see:

- The 'Alaska Permanent Fund' http://www.apfc.org/.
- The 'Alberta Heritage Savings Trust Fund' http://www.revenue.gov.ab.ca/business/ahstf/index.html.
- The 'Norwegian Government Petroleum Fund' http://odin.dep.no/fin/engelsk/p10001617/006051-990060/index-dok000-b-n-a.html,

Description of 'surface rights'

For more general information about the nature of surface rights and the process for securing them, see:

- Lucas, A, Hunt, C., *Oil and gas law in Canada* (Toronto: Carswell, 1990).
- Sasaki, Harvey, "Surface Rights in British Columbia: A Guide to the Legislation and Regulations for the Petroleum and Natural Gas Industry" (Victoria: Ministry of Agriculture & Fisheries, 1988).

Description of 'building a road and drilling a test well'

For information on building a road and drilling a test well, see:

- Cullen, S., *Natural Gas in Canada and the United States: From Wellhead to Burner-tip (Study No. 52),* (Calgary: Canadian Energy Research Institute, 1993) at pp. 1.47–1.48, 1.50-1.52.
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at p. 9.

For information on the number of wells drilled in BC's Northeast, see:

- Parfitt, B., 'A Georgia Straight Investigation finds that the BC government is unable to account for huge amounts of toxic waste', Georgia Straight, June 27 – July 3, 2002.

Drilling a test well: drilling muds and other wastes

For information on drilling a test well and drilling muds, see:
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at pp. 13, 18-20.

Drilling a test well: spills and leaks

For information on drilling a test well and spills/leaks, see:
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at p. 18.

Drilling a test well: water wells

For information on drilling a test well and spills/leaks, see:
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at p. 20.

Drilling a test well: drinking water and crops

For information on drilling a test well and spills/leaks, see:
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at pp. 20-21.

Building a road and drilling a test well: less damaging alternatives

For information on the ARCO project in the Ecuadorian rainforest, see:
- International Petroleum Industry Environmental Conservation Association (IPIECA), *Biodiversity and the Petroleum Industry — A guide to the Biodiversity Negotiations, 3rd Edition* (London: IPIECA, 2001), Case Study <http://www.ipieca.org/publications/biodiversity.html>.
- Pynn, Larry, 'Ecuadorean 'copter model suggested for northeast BC gas explorations', Vancouver Sun, May 27, 2000, p. C2.
- Sawchuk, W., 'The VILLANO Heliportable Oil Drilling and Flowline Project,' (unpublished report, May 27, 2000).

For information on ice road technology, see:
- Chetwynd Environmental Society, 'Ice Road Technology in the Murphy Oil Chicken Creek b-94-B/94-G-6 Natural Gas Drilling Project (unpublished report, December 31, 2001).

Rubber roads, snowguns, narrower vehicles, and 'gyrotracks' are profiled in
- "Putting energy and people to work: BC's oil and natural gas industry," A Special partnership marketing supplement for the Canadian Association of Petroleum Producers, Globe and Mail, Wednesday, October 24, 2001.

For information on disposal of drilling wastes, see:
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at pp. 18, 20.

Description of 'testing the well'

For general information on testing a well, see:
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at p. 17, 18, and descriptions of 'flaring' and 'H2S' in glossary.

Testing a well: flaring, sour gas and H_2S

For information on flaring, sour gas, and H_2S (when testing and processing), see:
- Colborn, T, Dumanoski, D., Myers, J.P., *Our Stolen Future* (New York: Dutton, Penguin Books, 1996).
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at pp. 13, 17, 34, 38, and descriptions of 'flaring' and 'H_2S' in glossary.
- Marr-Laing, T, Severson-Baker, *Beyond Eco-terrorism*: *The Deeper Issues Affecting Alberta's Oilpatch* (Drayton Valley: Pembina Institute for Appropriate Development, February 1999).

For information on both flaring and landowner concerns about flaring, see:
- Nikiforuk, Andrew, *Saboteurs: Wiebo Ludwig's War Against Big Oil* (Toronto: MacFarlane Walter & Ross, 2001): Alberta Research Council report [p. 84], the Theo Colborn book [85], the Northern River Basin Human Health Monitoring Program [s. 253-254], and farmer health concerns in both BC and Alberta [see for example, pp. 98-100, 255].

For the Alberta health monitoring study in the Northern River Basins, see:
- Alberta Health, *Northern River Basins Human Health Monitoring Program* (Edmonton: Alberta Health, 1999). <http://www.health.gov.ab.ca/public/document/nrbs_report.pdf>.

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For information about incomplete combustion (testing and processing), see:
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at p. 17 and description of H2S in glossary.

For information on venting and the Alberta Research Council report, see:
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at p. 34.
- Marr-Laing, T, Severson-Baker, *Beyond Eco-terrorism*: *The Deeper Issues Affecting Alberta's Oilpatch* (Drayton Valley: Pembina Institute for Appropriate Development, February 1999) <http://www.pembina.org/>.
- Nikiforuk, Andrew, *Saboteurs: Wiebo Ludwig's War Against Big Oil* (Toronto: MacFarlane Walter & Ross, 2001), p. 84.
- Strosher, M, *Investigations of Flare Gas Emissions in Alberta* (Edmonton: Alberta Research Council, 1996).

Testing a well: hauling out

For information on truck emissions, see:
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at p. 18.

Testing a well: less damaging alternatives

For information on alternatives to flaring, see:
- Advisory Committee on Public Safety and Sour Gas: <http://www.publicsafetyandsourgas.org>.
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at p. 18, 26.
- Natural Gas Flaring During Well Testing Interim Guideline #OGC 001-01 February 18, 2000.

For comparisons of flaring volumes and the volume of gas needed to heat homes, see:
- Nikiforuk, Andrew, *Saboteurs: Wiebo Ludwig's War Against Big Oil* (Toronto: MacFarlane Walter & Ross, 2001), pp. 255-256.

Description of 'production'

For general descriptions of producing, see:

- Cullen, S., *Natural Gas in Canada and the United States: From Wellhead to Burner-tip (Study No. 52)*, (Calgary: Canadian Energy Research Institute, 1993) at pp. 1.59-1.63.

Operating a well: water use, fraccing, explosions and leaks

For information on water use by the oil and gas industry, see:

- CBC-TV, 'Troubled Water', on The National, May 14, 2001 (transcript available at www.bowdens.com).

For information on 'fraccing', see:

- Nikiforuk, Andrew, *Saboteurs: Wiebo Ludwig's War Against Big Oil* (Toronto: MacFarlane Walter & Ross, 2001), p. 121.

For information on explosions and leaks, see:

- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at pp. 21, 23.

For information on venting, see:

- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at p. 36.

Description of 'gathering and flow line'

For general information on gathering and flowlines, see:

- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at p. 28.
- Pipeline Regulation, B.C. Reg. 360/98: Definitions of 'gathering line' and 'flow line.'

Gathering and flow lines: environmental impacts

For information on gathering/flow lines and stream impacts, leaks/accidents, and soil impacts, see:

- Clark, John, Department of Justice representing Natural Resources Canada, Department of Fisheries and Oceans, Parks Canada, and Environment Canada at the National Energy Board Hearings regarding GSX pipeline. Available at http://www.neb.gc.ca/regupd/trnscrpt/gh401/020117.pdf).
- Marr-Laing, T, Severson-Baker, *Beyond Eco-terrorism*: *The Deeper Issues Affecting Alberta's Oilpatch* (Drayton Valley: Pembina Institute for Appropriate Development, February 1999) at p. 8, citing *Report 98-G, Pipeline Performance in Alberta 1980-1997*. Alberta Energy and Utilities Board, December 1998, and p. 31.

For environment ministry staff estimate of stream crossings, see:

- Parfitt, B., "Unnatural Gas: The high environmental cost of an ignored industry's 'clean' blue flame burns a few critics in the forgotten Peace," Georgia Straight, Volume 30, No. 1497, Aug 29 – Sept 5, 1996.

Gathering lines: less damaging alternatives

For information on gathering/flow lines and ecological forestry models, see:

- Schneider, R. The Oil and Gas Industry in Alberta: Practices, Regulations, and Environmental Impact, (2001), p. 21, <www.borealcentre.ca/reports/oil/oil.html>.

For information on the ARCO project in the Ecuadorian rainforest, see:

- International Petroleum Industry Environmental Conservation Association (IPIECA), *Biodiversity and the Petroleum Industry — A guide to the Biodiversity Negotiations, 3rd Edition* (London: IPIECA, 2001), Case Study <http://www.ipieca.org/publications/biodiversity.html>.
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- Sawchuk, W., 'The VILLANO Heliportable Oil Drilling and Flowline Project,' (unpublished report, May 27, 2000).

Description of 'compressor'

For general information about compressors, see:
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at p. 37.

Compressors: environmental impacts

For information on compressors and environmental impact, see:
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at p. 37.

Description of 'processing'

For general information about processing, see:
- Cullen, S., *Natural Gas in Canada and the United States: From Wellhead to Burner-tip (Study No. 52),* (Calgary: Canadian Energy Research Institute, 1993) at pp. 1.63-1.64.

Description of 'battery'

For information about batteries, see:
- Cullen, S., *Natural Gas in Canada and the United States: From Wellhead to Burner-tip (Study No. 52),* (Calgary: Canadian Energy Research Institute, 1993) at pp. 1.63.
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at p. 36.

Batteries: environmental impacts

For information on batteries, emissions and spills, and for information about the Alberta Energy Utilities Board inspection, see:
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at p. 37.

Description of 'gas processing'

For general information about gas processing plants, see:
- Cullen, S., *Natural Gas in Canada and the United States: From Wellhead to Burner-tip (Study No. 52),* (Calgary: Canadian Energy Research Institute, 1993) at pp. 1.63-1.64.
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at p. 34, 37, 39, 165.
- Petroleum Communication Foundation <http://www.pcf.ab.ca/>.

Gas processing: venting

For information on gas processing plants and venting, see:
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at p. 36.

Gas processing: acid gas injection

For information on gas processing and acid gas injection, see:
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at p. 38.

Gas processing: dehydration

For information on gas processing and the dehydration process, see:
- Environment Canada, 'Canada's Clean Air Picture: Prairies and North' <http://www.ec.gc./air/pnr_e.htm>.
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at p. 39.

For information on benzene and the National Pollutant Release Inventory, see:
- Canadian Environmental Law Association, Toxics Index <http://www.cela.ca/toxics/toxic_index.htm>.
- Jackson, John, *A Citizen's Guide to the National Pollutant Release Inventory*, (Toronto: Canadian Institute for Environmental Law and Policy, 2000). <http://www.ec.gc.ca/pdb/npri/documents/Citizen'sguide_e.pdf>.
- Environment Canada, CEPA Registry, Existing Substances Evaluation, 'First Priority Substances List (PSL1): Benzene' <http://www2.ec.gc.ca/substances/ese/eng/psap/PSL1_benzene.cfm>.
- Environment Canada, National Pollutant Release Inventory <http://www.ec.gc.ca/pdb/npri/npri_home_e.cfm>.

Gas processing: energy use

For information on gas processing and energy use, see for example interview with Greenpeace Canada in:
- Parfitt, B., "Unnatural Gas: The high environmental cost of an ignored industry's 'clean' blue flame burns a few critics in the forgotten Peace," Georgia Straight, Volume 30, No. 1497, Aug 29 – Sept 5, 1996.

Gas processing: less damaging alternatives

For information on gas processing and less harmful alternatives, see:
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at pp. 35-36, 38.

Description of 'abandonment' and 'reclamation'

For general information on abandonment and reclamation, see:
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at pp. 41, 46.

Abandonment and reclamation: environmental impacts for wells and pipelines

For information on the environmental impacts of abandoning or reclaiming a well, see:
- Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, February 2001), at pp. 41, 45.

For information on the 1999 Alberta Environment report, see:
- Nikiforuk, Andrew, *Saboteurs: Wiebo Ludwig's War Against Big Oil* (Toronto: MacFarlane Walter & Ross, 2001) p. 175.

For information on the environmental impacts of abandoning or reclaiming a pipeline, see:
- Pipeline Abandonment Steering Committee (comprised of representatives from the Canadian Association of Petroleum Producers, the Canadian Energy Pipeline Association, the Alberta Energy and Utilities Board, and the National Energy Board), *Pipeline Abandonment: A Discussion Paper on Technical and Environmental Issues*, (Calgary: NEB, 1996) < http://www.neb.gc.ca/safety/aband_e.htm>.

Abandonment and reclamation: less damaging alternatives

For information on the Alberta industry's orphan well program, see:

- Alberta Energy and Utilities Board, 2000/01 Orphan Fund Annual Report (Calgary: EUB, 2002) <http://www.eub.gov.ab.ca/bbs/documents/reports/OrphanFundAnnual-2000-2001.pdf>.
- Nikiforuk, Andrew, *Saboteurs: Wiebo Ludwig's War Against Big Oil* (Toronto: MacFarlane Walter & Ross, 2001) p. 175.
- *Oil and Gas Conservation Act (Alberta)*, R.S.A. c. G-4, Part 11.

Description of 'transportation to downstream sector'

For general information on transportation of oil and gas resources to the downstream sector, see:

- Petroleum Communication Foundation < http://www.pcf.ab.ca/>.

Description: downstream oil and gas sector

For general information about the downstream sector, see:

- Petroleum Communication Foundation < http://www.pcf.ab.ca/>.
- "The refining, distribution and use of these materials constitute the downstream side of the industry." [CPA, at p. 2]

C. GLOSSARY

Acid gas

A mixture of gases, composed primarily of H2S and CO2, which is removed from natural gas.

References: Oil and Gas Waste Regulation (Waste Management Act), BC Reg. 208/96, s. 1.

Arbitrariness and Improper Purpose

One of the grounds a citizen may use to ask a court to review a government decision or require government to take action using a procedure known as 'judicial review'. Government bodies must exercise discretionary powers in accordance with the purposes of the legislation that gives them authority and in a manner that is not completely arbitrary or capricious. This means that powers must be exercised in good faith. It follows that government administrators, in making decisions, should not take into consideration facts or evidence irrelevant to statutory purpose and must not refuse to consider facts that are relevant to the statutory purposes.

References: Roncarelli v. *Duplessis,* [1959] S.C.R. 121 at 140. *Oakwood Development Ltd.* v. *St. Francois Xavier (Rural Municipality)* (1985), 61 N.R. 321 (S.C.C.). *Wimpey Western Limited* v. *Alberta (Director of Standards and Approvals of the Department of Environment)* (1983), 28 Alta. L.R. (2d) 193 (C.A.). Blake, Sara *Administrative Law in Canada.* (Toronto: Butterworths, 1992) at 89. See also *Aluminum Co. of Canada Ltd.* v. *Ontario (Ministry of the Environment)* (1986), 1 C.E.L.R. (N.S.) 1 (Ont. Div'l Ct.).

Benzene

Benzene is a simple organic compound that is a volatile, clear, flammable, colorless liquid at room temperature with an aromatic odor. In all media it is not persistent or bio-accumulative. Benzene has been classified as carcinogenic to humans. It is a non-threshold toxicant – a substance for which there is considered to be some probability of harm for critical effects at any level of exposure. Dehydrators are a significant source of benzene emissions. Dehyrdrators are used to remove water that is present in unprocessed natural gas, produced mainly in western Canada, so that it can be transported by pipeline. The substance, glycol, which is used to absorb the water from the natural gas, also absorbs benzene, which is present in small amounts in natural gas. Although many dehydrators emit no benzene, some can release over 30 tonnes of benzene per year.

References: CCME Backgrounder, Benzene Canada-wide Standard — Phase I (http://www.ccme.ca/assets/pdf/benzene_backgrounder_e.pdf). Backgrounder July 1995 Environment Canada News Release on accelerating action on regulations to limit benzene releases into the environment (http://www.ec.gc.ca/press/ben_bg_e.htm).

Bias

One of the grounds a citizen may use to ask a court to review a government decision or require government to take action using a procedure known as 'judicial review'. Decision makers must not be biased. They should not have any personal monetary interest in the

outcome of a decision. They also may be required to conduct themselves so as to not lead an impartial observer to think they were biased.

References: Mullan, *Essentials of Canadian Law: Administrative Law* (Toronto: Irwin Law, 2001) pp. 115-116.

Carbon Dioxide (CO_2)

Carbon dioxide (CO_2), is one of the gases in our atmosphere, and is uniformly distributed over the earth's surface. Commercially, companies use CO_2 as a refrigerant (dry ice is solid CO_2), in beverage carbonation, and in fire extinguishers. In the United States, 10.89 billion pounds of carbon dioxide were produced by the chemical industry in 1995, ranking it 22nd on the list of top chemicals produced. Because the concentration of carbon dioxide in the atmosphere is low, it is not practical to obtain the gas by extracting it from air. Most commercial carbon dioxide is recovered as a by-product of other processes, such as the production of ethanol by fermentation and the manufacture of ammonia. Some CO_2 is obtained from the combustion of coke or other carbon-containing fuels. Carbon dioxide is released into our atmosphere when carbon-containing fossil fuels such as oil, natural gas, and coal are burned in air. As a result of the tremendous world-wide consumption of such fossil fuels, the amount of CO_2 in the atmosphere has increased over the past century. In addition to being a component of the atmosphere, carbon dioxide also dissolves in the water of the oceans. A new use for liquid carbon dioxide currently under development is as a dry-cleaning solvent. Currently, most laundries use chlorinated hydrocarbons as dry-cleaning solvents. These chlorinated hydrocarbons are probable human carcinogens, so the search is on for replacements.

References: Excerpted from Shakhashiri, B.Z., Wisconsin Initiative for Science Literacy 'Chemical of the Week' (University of Wisconsin-Madison) <http://scifun.chem.wisc.edu/chemweek/CO2/CO2.html>.

Carbon Monoxide (CO)

Also known as carbonic oxide, CO is a colourless, odourless, very toxic gas at standard conditions. CO is a product of imperfect combustion of fossil fuels. It is also an effective reducing agent in various metal-smelting operations and is also encountered for the production of several synthesis gases. CO is produced through the combustion of fossil fuels. Carbon monoxide interferes with the blood's ability to carry oxygen to the brain, heart and other tissues, and it is particularly dangerous for people with existing heart disease, and unborn or newborn children.

References: Environment Canada, Air Pollutant Emissions — Glossary
<http://www2.ec.gc.ca/pdb/ape/cape_gloss_e.cfm>
American Lung Association <http://www.lungusa.org/air/envcombusti.html>.

Failing to take account of relevant factors

One of the grounds (though an uncommon one) a citizen may use to ask a court to review a government decision or require government to take action using a procedure known as 'judicial review'. The strongest case exists when there is legislative direction to a decision-maker to 'have regard to all relevant circumstances,' it is worded in objective, not subjective

language, and the decision maker fails to take into account factors the court believes are relevant.

References: Mullan, *Essentials of Canadian Law: Administrative Law* (Toronto: Irwin Law, 2001) pp. 115-116.

Fettering of Discretion

One of the grounds a citizen may use to ask a court to review a government decision or require government to take action using a procedure known as 'judicial review'. Fettering of discretion occurs when a decision-maker fails to genuinely exercise his or her discretionary powers in an individual case; but rather made its decision on the basis of a pre-existing policy without considering alternatives.

References: Mullan, *Essentials of Canadian Law: Administrative Law* (Toronto: Irwin Law, 2001) pp. 115-116.

Hydrogen sulphide (H_2S)

"A poisonous gas that occurs naturally and comes to the surface in 'sour' gas wells. It also occurs in sewer gas. Most people can detect the characteristic 'rotten egg' smell at between 10 and 100 parts per billion. At 1 to 10 parts per million, people may experience nausea, tearing of the eyes, headaches or loss of sleep following prolonged exposure. Lung irritation and damage to eyes can occur at levels of 20 ppm, and olfactory paralysis (loss of the ability to smell the gas) occurs at levels of 100 ppm. Instantaneous death can occur at levels of 1,000 ppm. The Lodgepole blow-out inquiry report noted that health effects can occur at levels below 1 ppm, among sensitive individuals. Little research has been conducted on the health effects of long-term, low-level, chronic exposure to H2S although some preliminary work has indicated detrimental impacts on brain function and development. Pure H2S is slightly heavier than air, so it does not disperse rapidly in enclosed spaces and may collect in low-lying areas such as valleys. The average H2S content of sour gas produced in Alberta is 10 percent, although the concentration can range from trace amounts to more than 80 percent."

References: Description is reproduced from Griffiths, M., and Marr-Laing, T., *When the Oilpatch Comes to Your Backyard: A Citizens' Guide to Protecting Your Rights* (Drayton Valley: Pembina Institute for Appropriate Development, 2001). *When the Oilpatch Comes to Your Backyard* makes reference to the following two documents: Guidotti, T.L., "Hydrogen Sulphide", 46 *Occupational Medicine* No. 5 (1996), and Energy Resources and Conservation Board, *Lodgepole Blowout Inquiry*, December 1984. Environmental Epidemiology and Toxicology: Special Issue on the Health Hazards from Exposure to Hydrogen Sulphide (Volume 1, Numbers 3-4, December 1999) <http://www.stockton-press.co.uk>. See also Alberta Advisory Committee on Public Safety and Sour Gas <http://www.publicsafetyandsourgas.org/>.

Improper notice

One of the grounds a citizen may use to ask a court to review a government decision or require government to take action using a procedure known as 'judicial review'. An individual may have a right to be given notice of a pending decision. For example, regulations may say that a notice of a permit application must be published in a local newspaper. The common law says that a person has the right to notice where their direct interests are directly affected by a decision. If notice is not given, or it is insufficient, a person

can ask a court to quash the decision. Relief may be temporary, however, as the government can then give proper notice and come to the same decision.

References: Mullan, *Essentials of Canadian Law: Administrative Law* (Toronto: Irwin Law, 2001) pp. 115-116.

Invert Cuttings

A mixture of hydrocarbon-based drilling fluid and rock or other solid material removed from the inside of a well bore.

References: See section 1 of the Oil and Gas Waste Regulation (B.C. Reg. 208/96).

Natural Gas

"The 'natural gas' used by consumers in their appliances and for heating their home is different from the 'gas' found naturally underground. In the ground, natural gas is usually a mixture of hydrocarbon and non-hydrocarbon gases and is called 'raw natural gas'. 'Hydrocarbon refers to a family of substances which contain carbon and hydrogen molecules. What consumers and the general public consider as 'natural gas' is primarily only one component of this family — methane … Methane is actually found in many places on earth: it is in the air we breathe, in our intestines, and in much of the earth's crust.

Raw natural gas is actually a mixture containing methane plus some or all of the following: ethane, propane, butane, pentanes, condensates, nitrogen, carbon dioxide, hydrogen sulfide, helium, hydrogen, water vapour and minor impurities. Raw natural gas is sometimes categorized by the amount of these substances which are present. 'Wet gas' has a relatively high concentration of natural gas liquids (ethane, propane, butane, pentanes and condensates). 'Dry gas' has a relatively low concentration of these substances. 'Sour gas' contains a relatively large amount of sulphur compounds such as hydrogen sulfide, while 'sweet gas' contains a comparatively small amount of these compounds."

References: Description is reproduced from Cullen, S., *Natural Gas in Canada and the United States: From Wellhead to Burner-tip (Study No. 52),* (Calgary: Canadian Energy Research Institute, 1993) at p. 1.1.

Nitrogen Oxides (NOx)

Nitrogen dioxide (NO_2) and related nitrogen oxides (NOx) are produced when fuel is burned, especially in power plants and motor vehicles. These oxides of nitrogen compounds contribute to ozone formation, and are a health problem themselves. NO_2 also changes in the atmosphere to form acidic particles and liquid nitric acid. Both NO_2 and NOx may threaten human health.

References: American Lung Association <http://www.lungusa.org/air/envcombusti.html>.

Solution gas

Gas that comes to the surface as oil is being extracted from the ground.

Sour gas

Natural gas that contains a relatively large amount of sulphur compounds such as hydrogen sulphide.

Sulphur Dioxide (SO_2)

SO_2 is produced by combustion of fossil fuels containing sulphur and through the combustion of sour natural gas. Sour gas plants emit thousands of tonnes of sulphur dioxide every year from their incinerator stacks. Health effects of acute exposure to SO2 include irritation of the upper respiratory tract and increased susceptibility to respiratory infections. Asthmatics are particularly susceptible to sulphur dioxide pollution. Sulphur dioxide is also responsible for acid deposition, with accompanying degradation of forests and water bodies. Long-term exposure can increase the risk of developing chronic respiratory failure.

References: Advisory Group on the Medical Aspects of Air Pollution Episodes, Second Report: Sulphur Dioxide, Acid Aerosols and Particulates http://www.doh.gov.uk/hef/airpol/airpol3.html; Schindler, D. 1998, A dim future for boreal waters and landscapes. BioScience 48:157-164).

Ultra vires

A latin phrase meaning "outside the power". One of the grounds a citizen may use to ask a court to review a government decision or require government to take action using a procedure known as 'judicial review'. There must be a constitutionally proper statutory source for all exercises of public power. A government decision-maker cannot act beyond this power. If a decision maker attempts to do something that he or she is not authorized to do, the decision is void and of no force and effect.

References: Mullan, *Essentials of Canadian Law: Administrative Law* (Toronto: Irwin Law, 2001) pp. 115-116.

Volatile Organic Compounds (VOCs)

VOCs are organic chemicals. All organic compounds contain carbon, and organic chemicals are the basic chemicals found in all living things and in all products derived from living things. Many organic compounds we use do not occur in nature, but were synthesized by chemists in laboratories. Volatile chemicals produce vapors easily. At room temperature vapors readily escape from volatile liquid chemicals. VOCs include gasoline, industrial chemicals such as benzene, solvents such as toluene and xylene, and perchloroethylene (principal dry cleaning solvent). VOCs are released from burning fuel, such as gasoline, wood, coal, natural gas and from solvents, paints, glues, and other products used at home or work. Vehicle emissions are an important source of VOCs. Many VOCs are hazardous air pollutants; for example, benzene causes cancer.

References: US National Safety Council, Air Pollution Fact Sheet <http://www.nsc.org/ehc/mobile/airpollu.htm>.

D. ENVIRONMENTAL ASSESSMENT OF OIL AND GAS PROJECTS

BC ENVIRONMENTAL ASSESSMENT ACT

In 2002, the Provincial Government made considerable changes to provincial environmental assessment legislation. Given the new legislation, it will be difficult to predict even for oil and gas projects on the list whether an assessment will take place, and what opportunities there may be (if any) for public input.

Under the former legislation, projects described in a regulation automatically underwent environmental assessment according to procedures set out in the Act and regulations. Few oil and gas projects are on this list — only the construction and modification of larger gas processing plants, larger transmission pipelines, and offshore oil and gas platforms.

Under the new legislation, the Executive Director of the Environmental Assessment Office (EAO) can waive the requirement. To do so, she must believe the project will not have 'a significant adverse environmental effect, taking into account practical means of preventing or reducing to an acceptable level any potential adverse effects of the project' [s. 10].

The Minister of Sustainable Resource Management, however, has power to require non-listed projects to undergo assessment — if the project is not 'substantially started' [s. 6].

The Minister can also order the EAO to assess a government policy, enactment, plan, practice or procedure [s. 49].

The Executive Director of the EAO can authorize a class assessment of oil and gas projects in BC [s. 20].

In addition, the new Act

- Gives the Executive Director or the Minister the power to determine the scope, procedures, and methods of the assessment;
- Requires each assessment to reflect government policy as defined by the government agency or organization for the identified policy area;
- Removes the independent principles used to guide the assessment process;
- Makes public access to assessment documents entirely discretionary;
- Removes formal role for First Nations and local governments in the assessment process; and
- Imposes time limits that will make it difficult for meaningful assessment to occur.

Contact the Environmental Assessment Office to inquire (250-356-7479).

CANADIAN ENVIRONMENTAL ASSESSMENT ACT (CEAA)

CEAA requires federal government decision-makers to consider the environmental implications of their decisions before making them. The Act only applies to 'projects' (as defined) and only when the federal role in the project is sufficient to 'trigger' the project. The level of scrutiny a project will undergo ranges from the preparation of a summary document to a full public hearing.

Project?

An oil and gas 'undertaking' that is 'in relation to a physical work' is automatically a 'project' under CEAA unless specifically excluded by regulation. As a result, the construction of a road, bridge, well, pipeline, or processing facility are all be considered projects under CEAA (and would be assessed if there is a federal 'trigger' — see below).

The federal Cabinet can exclude this kind of project by regulation if they are satisfied the project will cause only 'insignificant' environmental effects. Oil and gas projects excluded by this regulation called the 'Exclusion List' include (in some circumstances) the addition or installation of many pipeline components (e.g., piping, compressors) and the relocation of a pipeline.

If not 'an undertaking in relation to a physical work', a physical activity is only a project under CEAA if it is specifically listed on a regulation called the 'Inclusion List'. The oil and gas activities specifically included as 'projects' by regulation are:

- Activities related to federally-regulated pipelines (pipelines that cross provincial and territorial boundaries and are regulated by the National Energy Board),
- Exploration and production on federal land (and hence regulated by the federal government under the *Canada Oil and Gas Operations Act*,
- Establishing or relocating a temporary road for use in winter,
- Dumping any substance for which a permit is required under the *Canadian Environmental Protection Act*,
- The remediation of contaminated land in Canada,
- The destruction of fish, or the harmful alteration, disruption, or destruction of fish habitat (that requires an authorization under the *Fisheries Act*),
- The deposit of a 'deleterious substance' (that requires an authorization under the *Fisheries Act*),
- Hunting or disturbing a bird or nest in a migratory bird sanctuary (note: there are no migratory bird sanctuaries in BC's northeast under the *Migratory Bird Sanctuary Regulations*),
- Exploration on Indian lands (that requires a licence under the *Indian Oil and Gas Regulations*), and

- 'Land-based' seismic surveying, if during the survey more than 50 kg of chemical explosive would be detonated in a single blast.

Trigger?

The triggering events in CEAA are when a federal department is the proponent of a project, disposes of an interest in land, or issues certain licences or permits to enable the project to be carried out. The licences and permits that trigger CEAA are set out in a regulation called the 'Law List'. An assessment for an oil and gas project is triggered if the project requires specified approvals under the:

- *Canada Oil and Gas Operations Act* (exploration, drilling, production, conservation, processing and transportation of oil and gas in the Northwest Territories, Nunavut and Sable Island),

- *Fisheries Act* (destruction of fish, harmful alteration, disruption, or destruction of fish habitat, or deposit of a 'deleterious substance'),

- *National Energy Board Act* (construction, operation, diversion, abandoning of federally-regulated pipelines — pipelines that cross provincial and territorial boundaries — and related facilities (storage tanks, compressors, etc.)),

- *Navigable Waters Protection Act* (building a 'work' in, on, over, under, or through a 'navigable water'),

- *Indian Oil and Gas Regulations* (exploration, acquiring surface rights, production of oil, on Indian lands),

- *Migratory Birds/Migratory Bird Sanctuary Regulations* (depositing into water oil, oil waste or other substance harmful to migratory birds, hunting or disturbing a migratory bird/nest in a migratory bird sanctuary), and

- *Wildlife Area Regulations* (disturb or destroy wildlife area).

Level of scrutiny?

Most assessments involve the preparation of a summary document called a screening report for which public participation in the assessment is at the discretion of the government department. Full public review panels are the exception.

An assessment called a 'comprehensive study' sets out some middle ground — public comment is mandatory, the process requirements are more onerous than for a screening, but the assessment stops short of a full public review. Oil and gas projects that will require a comprehensive study include the construction of an offshore platform, an oil sands facility, a 35% expansion of a sour gas processing facility (under some conditions), and a pipeline that is more than 75km in length.

Few assessments in practice

A search of all oil and gas projects assessed under CEAA since 1995 produces very few examples of BC 'upstream' oil and gas projects that have been assessed under CEAA (http://www.ceaa-acee.gc.ca/0008/index_e.htm). There are many examples of the National Energy Board assessing cross-border projects that occur in part in BC territory. There are also many examples of assessments in Canada's north (federal land), and in Saskatchewan (federal agricultural land).

The few BC upstream assessments have been conducted by the Department of Fisheries and Oceans (DFO). Examples of these projects are construction of gas plant/pipeline, and the 'physical activity' of 'harmfully altering fish habitat' (Inclusion List). The triggers have been authorizations required under the *Fisheries Act*.

The small volume of CEAA assessments is puzzling. There should be hundreds of examples of upstream oil and gas undertakings that would constitute a project under CEAA: e.g., the construction, modification, or operation of a road, bridge, well, pipeline, or processing facility; and the 'physical activity' of harmfully altering fish habitat.

The *Fisheries Act* and the *Navigable Waters Protection Act*, however, are likely the only triggers that would arise with any frequency — as companies propose seismic lines, roads, and pipelines that will cross fish bearing streams and navigable waterways. A partial explanation for the low number of assessments under the *Fisheries Act* lies in a DFO policy not to require an authorization if impacts to fish habitat can be fully mitigated. An authorization is required in order for the Act to trigger a CEAA assessment. If impacts can be fully mitigated, DFO issues instead a 'letter of advice' specifying the mitigation measures.

E. GREENHOUSE GAS EMISSIONS FROM UPSTREAM OIL AND GAS SECTOR

For background information on climate change and the oil and gas sector, see Rolfe, C., *Climate Change Primer* (Vancouver: West Coast Environmental Law Association, 2002). For background information about climate change generally see Rolfe, C., *Turning Down the Heat* (Vancouver: West Coast Environmental Law, 1998) http://www.wcel.org/wcelpub/1998/12248.html.

For a statistical summary of the upstream oil and gas sector's GHG emissions, see *Canada's Greenhouse Gas Inventory, 1997 Emissions and Removals with Trends* (Ottawa: Environment Canada, 1997) http://www.ec.gc.ca/pdb/ghg/ghg_docs/gh_eng.pdf. See in particular, pp. 30-33. See also *2001: Canada's Third National Report on Climate Change* (Ottawa: Environment Canada, 2001), http://www.climatechange.gc.ca/english/3nr/3NRChap2-Eng.pdf

For information on Canada's greenhouse gas emission trends, see Environment Canada, *General Trends for Year 2000 Green House Gas Emissions Data*, <http://www.ec.gc.ca/climate/whatsnew/020501_b_e.htm>.

For information on environmental impacts that have already occurred in BC because of climate change, see *Indicators of Climate Change* (Victoria: Ministry of Water, Land and Air Protection, 2002) http://wlapwww.gov.bc.ca/air/climate/indicat/pdf/indcc.pdf, and Bohn, G., "B.C. forests, fish habitat damaged by climate change, report says", Vancouver Sun, Friday March 15, 2002, p. A1.

For oil and gas industry information on greenhouse gas emissions, see Canadian Association of Geophysical Contractors et al., *Oil and Gas Industry Foundation Paper: Background Information on the Ability of the Industry to Contribute to Greenhouse Gas Emission Reductions*, September 1998.

F. COMMON LAW OPTIONS IN OIL AND GAS DISPUTES

There are very few examples of citizens successfully suing oil and gas companies for health and property damage caused by oil and gas activities. One reason is that landowners often obtain compensation through the Mediation and Arbitration Board or settle privately with a company (and agree not to disclose the settlement). Establishing a link between harm suffered by a landowner and an oil and gas company's activities is also difficult.

Set out below is a summary of the leading cases.

NEGLIGENCE AND NUISANCE

The leading BC case is likely one where a Chetwynd BC family was not able to convince a court that an oil and gas spill had caused chemical sensitivities in the family. In 1993, a vacuum truck dumped the contents of a septic tank on property adjacent to the family's driveway. Mixed in with the sewage was some oil and gas waste from a previous job that had not been thoroughly removed from the tank. The family was unable to establish that the company had spilled significant amounts of hydrocarbon and toxic H2S. The court found

- none of the medical experts had sufficient expertise in the area of known effects of hydrocarbons on humans,
- toxins found in early blood tests were a result of the testing procedure and not the spill, and
- 'overwhelming evidence' that exposure to the spill was the least likely explanation for the families illnesses.

As a result, even when the court applied 'the most relaxed view' of causation, it failed to find more than a possibility of a causal link between the spill and the families illnesses.

See *Nichols et al. v. Koch Oil Co.* [B.S.S.C., August 14, 1998, Docket No. C931751].

The opposite conclusion was reached in a recent Alberta case, but the case is one upon which legal practitioners aren't currently willing to place much reliance. In the year 2000, an Alberta rancher successfully sued Mobil Oil in both negligence and nuisance for loss of herd productivity and fertility, the death of cattle and the loss of reputation as a successful purebred breeder. He was awarded almost $180,000.

The Rancher suspected his herd had been contaminated at four sites over a ten-year period. Drilling had been conducted on all four sites, and three of the sites had wells on them. One of the sites had a battery and a flare pit or dugout that was excavated to permit the flaring of solution gas, runoff and by-product disposal. A company that Mobil had since joined in a merger had buried the flare pit by covering it with dirt.

Negligence

To succeed in negligence, the Rancher needed to establish that:

- Mobil owed him a duty of care,

- The duty was breached, and
- Damage occurred as a result of that breach of duty.

Mobil conceded at the beginning of the trial that it owed the Rancher a duty of care, but argued that it neither breached that duty nor caused any damage to the Rancher's cattle. The court therefore had to decide whether that duty of care was breached. To do this it needed to decide what standard of care should be imposed on Mobil in the circumstances, and determine whether Mobil was in breach of that standard.

The negligence discussion focussed on two issues: fencing to keep cattle out of the well sites, and the contaminated flare pit that was buried by the company that Mobil subsequently merged with.

With respect to the flare pit, the court held that Mobil is responsible for any liabilities occasioned by the acts of the company it merged with and that Mobil is presumed to have the knowledge of that company. However, the court appears to set the standard of care at 'general industry practice,' and because burying was the accepted standard in the industry at the time, it did not find Mobil in breach of that duty.

For fencing, on the other hand, the court said the standard of care for Mobil should be higher than general industry practice because Mobil was aware through its employees of the harmful effects of contaminants on livestock, and because Mobil's employees received many complaints from the Rancher on this subject. The court therefore set the standard of care at 'effectively prevent access by cattle' to the well sites. Using this standard, the court found that Mobil was in breach of its duty, given the notice it had of the problem and that it had erected more effective fencing at a reasonable cost at other locations in the area.

Nuisance

To succeed in nuisance, the Rancher needed to establish that Mobil wrongfully interfered with his use of property by allowing a noxious substance to escape onto land owned, leased or occupied by the Rancher, leading to damage to his land or property.

The court found that Mobil had wrongfully interfered with the Rancher's use of his property because contamination from the flare pit spread through the soil and ground water.

Although Mobil exercised reasonable diligence in correcting the problem when it had been discovered, the court held that the issue of any misconduct or negligence by Mobil was not relevant in this situation because Mobil, through it's predecessor, created the condition on the land that led to the nuisance. In legal terms this is known as 'strict liability.'

Even if it was relevant to consider whether Mobil had done all it reasonably could to avoid the nuisance, the court held that Mobil would still be liable in nuisance. In nuisance, the court held, the standard of care should be higher than the standard applied in negligence actions. Although Mobil's use of the property benefits the community as a whole, the court found that the natural resource industry is a steward of the lands in Alberta and 'should bear the highest standard of care where there is the possibility of injury arising from nuisance.' Mobil had not met this standard of care, the court concluded, because despite following

industry practice when burying the flare pit, Mobil must have been able to reasonably foresee *even then* that this course of action could cause environmental problems.

There is case law that suggests Mobil could be responsible to the Rancher for damages resulting from the escape of the use of 'non-natural or dangerous substances' — even when reasonable care is taken to prevent the escape (the rule in *Rylands v. Fletcher*). Although the Rancher wanted the court to consider this argument, the court decided it wasn't necessary because the court had already determined Mobil was strictly liable in nuisance for other reasons. [Note: If commonly accepted, a dangerous use or practice may not attract liability under the *Rylands v. Fletcher* doctrine; and a harmful activity that is carried out for the public good and not for the private good or profit may not attract liability (*Danku v. Fort Frances (Town)* (1976), 14 O.R. (2d) 285, 37 D.L.R. (3d) 377 (Dist. Ct.))].

Damages

Having established Mobil's negligence and nuisance, the Rancher needed to prove there was injury to his cattle and that Mobil's negligence and nuisance caused the injury.

He proved injury to his cattle by showing a 'cull' rate that was higher than reasonable, and that his calf death loss was very high compared to the average rancher's loss.

The Rancher did not have to prove conclusively that exposure to contaminants or ingestion of them led to the symptoms suffered by the herd: the test is 'on a balance of probabilities did Mobil's negligence or nuisance cause or materially contribute to the failure of his herd?' The court summarized the applicable law of causation as follows:

- As long as Mobil's actions or failure to act are part of the cause of the failure, Mobil may be liable even if there were other contributing causes. It is not necessary for Mobil to establish that the negligence of the defendant is the sole cause of the injury

- Causation need not be determined with scientific precision, and it is essentially a question of fact that can be answered by the application of ordinary common sense.

- In the absence of evidence to the contrary put forward by Mobil, an *inference* of causation may be drawn, even in the absence of positive or scientific proof of causation. There must be more than conjecture for an inference to be drawn in the absence of exact proof. Such inference must be reasonable. However, the inability of the experts to give a firm diagnosis, or to agree on a diagnosis, is not fatal to such an inference.

The Rancher kept extensive records, and as a result was able to give the court considerable data on birth dates and weights of individual animals at certain stages of development. He also and took many photographs of the fencing at various stages, the spillage and the deposits on the fence. He was persistent in his complaints, in his requests for testing and in his use of the facilities available to him to help him to determine the problem. This enabled the court to conclude the Rancher's herd was exposed from time to time to noxious substances, either because of inadequate fencing or because of the contamination to soil and water caused by the buried flare pit.

Mobil argued there were at least two substantive possibilities of alternate causes (selenium deficiency and the BVD virus). But the court decided it could be reasonably inferred that the

chronic poor performance of the Rancher's cattle was caused by or materially contributed to by exposure to and ingestion of oil and gas contaminants. As a result, the court found it is more likely than not that Mobil's negligence and nuisance caused the damage to the Rancher's herd.

Despite no well established method of calculating loss in these circumstances, the court held that the Rancher was entitled to damages of $137,700 for direct loss of cattle, $9,100 for direct costs, $30,000 in general damages and interest.

See *Jones v. Mobil Oil* [2000] 1 W.W.R. 479 (Alta.Q.B.). See also *Girletz v. Bailey Selburn Oil and Gas Ltd.* (1975) 6 D.L.R. (3d) 533.

TRESPASS

In 1985, a farmer successfully sued Norcen Energy Resources in trespass because for 26 months the company continued to extract oil and interfere with the farmer's operations after the surface lease had expired. The court awarded the farmer $5,000 in compensatory damages, $15,000 in punitive damages, and additional amounts to cover damage to her herd and farm. [see *Fletcher v. Norcen Energy Resources Ltd.*, (1985) 41 Alta. L.R. (2d) 213 (Alta.Q.B.)].

CHALLENGES TO GOVERNMENT DECISIONS

Licence to cut struck down

In 1995, a guide outfitter challenged a 'well authorization' and a 'licence to cut' that the Province had issued to Imperial Oil. The guide outfitter was licensed to lead hunting parties in the area in which Imperial Oil wanted to drill a well and build a 25 km road. On judicial review, the court upheld the well authorization and struck down the licence to cut. For the well authorization, the court held that permission to construct the well site and access road in the face of environmental concerns was not patently unreasonable. There was, therefore, no basis for judicial intervention and the court deferred to the decision.

For the licence to cut, the court concluded the Ministry of Forestry (MOF) official issuing the licence erroneously believed his ministry was bound by a decision made by the Ministry of Energy, Mines and Petroleum Resources (MEMPR) to allow the road access. He had therefore fettered his discretion, and fallen into jurisdictional error. [see *Koopman* v. *Ostergaard* (1995), 12 B.C.L.R. (3d) 154 (S.C.)].

Non-profit groups obtain injunction

Imperial Oil applied again for a Licence to Cut and MOF again issued the approval giving reasons for their decision.

Two non-profit societies then temporarily stopped the company from building the roads by obtaining an interim injunction from the BC Supreme Court. The two organizations challenged the MOF decision on the grounds that (again) the decision was not made independently of the MEMP decision. To be successful, the two groups needed to show that:

- They had a 'right' to challenge the decision ('standing'),

- There was a 'fair question' to be tried, and
- The 'balance of convenience' favours an injunction.

Public Interest Standing

Imperial Oil argued the non-profit groups did not have a 'right' to challenge the decisions in court. Although neither had a private interest in the dispute, the court granted them 'public interest standing' because they could show there was a serious and 'justiciable' issue. They could also show they had a genuine interest in the issue, and there was no other reasonably effective manner in which the issue may be brought before the court. The purpose of public interest status is to challenge the unlawful use of governmental authority not to pursue a claim against a private individual or group

Fair question to be tried

The court was satisfied that the groups had raised a serious and justiciable issue — that the ministries had improperly exercised their discretionary power.

Balance of convenience

The court concluded that the seriousness of the potential environmental damage outweighed the considerable financial losses that will be incurred by Imperial Oil. As a result, the court held that the 'balance of convenience' favoured 'freezing' the permits (imposing a 'stay') or granting a temporary injunction.

[See *Chetwynd Environmental Society v. BC* (1995), B.C.J. No. 2080].

Non-profits lose trial on the merits

Although the two non-profit groups successfully obtained a temporary injunction, they did not succeed at trial when the issues were debated on their merits.

When re-issuing the licence to cut, MOF had disregarded any objections to the project itself, and focused instead on the narrow issue of cutting timber, but the court concluded MOF exercised its discretion properly. MEMP had the overall legislative authority to approve the project. Prior to approval, MOF's concerns were taken into account and weighed with all other social, economic and policy concerns.

The court held it is not for MOF to then apply its discretion to have the effect of a veto of the prior granted right which was made following an integrated economic and environmental study approach to the project. The relevant environmental considerations in respect to the licence to cut decision related to the harvest of trees from the access road right of way. MOF did not issue the Licence "automatically" or upon any preconceived premise that a Licence to Cut must be issued. It considered and gave weight to MEMP's prior granted permission. The weight applied to those proper factors was properly for MOF's discretion.

Note: A termporary Crown land use permit issued 'automatically' by the Province was struck down, but the court found the company didn't need one.

[See *Chetwynd Environmental Society v. BC* (1995), 13 B.C.L.R. (3d).].

G. THE BC OIL AND GAS COMMISSION

The *Oil and Gas Commission Act* establishes the BC Oil and Gas Commission and authorizes it to issue the essential permits and approvals necessary for 'upstream' oil and gas activities (geophysical exploration, well drilling, pipelines, and gas processing). Various government ministries previously issued these permits and approvals. The *OGCA* also establishes the Commission as an agent of the government to allow the Commission to play a role in discussions with First Nations.

The legislated purpose of the Commission is to regulate oil and gas activities and pipelines in BC. It must regulate, however, in a manner that (among other things) provides for the sound development of the oil and gas sector, by fostering a healthy environment, a sound economy and social well being, and conserves oil and gas resources in BC.

The Commission was originally designed to have financial and administrative flexibility and a considerable degree of independence from ministerial control. It was created as a corporation with only two directors (Commissioner and Deputy Commissioner), both independent of government. The province retained certain controls through the power to appoint the directors, policy setting, and general regulation powers. As a result, public interest groups found some comfort transferring environmental approvals from the environment ministry to the Commission because it was perceived as neutral — at least relative to the Ministry of Energy and Mines.

Through Bill 36, the current Provincial Government changes the relationship by appointing the Deputy Minister of Energy and Mines as a director and chair of the Commission. The Deputy is also given the casting vote in case of a tie [s. 17 of the Bill, amending s. 2 of the *OGCA*]. Although the exercise of Commission authority to issue environmental approvals is still subject 'in all respects' to the Act that contains the environmental approval [s. 17(2) *OGCA*], the Deputy's casting vote is still cause for concern. Environmental approvals previously issued by the environmental ministry and then by a 'neutral' Commission, could now be decided by the Deputy Minister of Energy and Mines. The Deputy Minister works for a Ministry whose first objective is to 'increase investment in energy and mineral resource development in BC' [see Ministry of Energy and Mines Service Plan 2002/03-2004/05]. This at least apparent conflict would extend to the protection of agricultural land if the Commission is delegated decision making responsibility over non-farm and subdivision use within the agricultural land reserve.

Bill 36 also gives the newly constituted Commission power to pass resolutions it considers 'necessary or advisable to direct its affairs, exercise its power or perform its duties' [s. 19 of the Bill, amending s. 5 of the *OGCA*]. Although this power could likely be used to shape the Commission and its decision-making processes, it is not clear that it could be used to influence specific decisions.

The *OGCA* sets out specific powers ("specified enactments") that the Commission can exercise under the *Forest Act*, *Forest Practices Code of BC Act*, the *Heritage Conservation Act*, the *Land Act*, the *Waste Management Act*, and the *Water Act* [s.1]. Recent amendments tabled as part of the *Energy and Mines Statutes Amendment Act* authorizes the Commission to exercise powers under 'a prescribed regulation' under those Acts [s. 16 of Bill 36[.

As consequential amendments the Commission was broadly inserted into both the *Petroleum and Natural Gas Act*, and the *Pipeline Act*, and given authority to issue key permits and approvals under those statutes. The Commission does not, however, have any authority with respect to disposing of subsurface oil and gas rights.

The Commission must exercise its powers under the specified enactments (e.g. *Forest Act*, *Forest Practices Code of BC Act*, *Heritage Conservation Act*, *Land Act*, *Waste Management Act*, and *Water Act*) in accordance with the governing statute. Each statute continues to apply after the Commission has issued an approval (e.g., decisions under the *Waste Management Act* or *Water Act* can be appealed to the Environmental Appeal Board).

The Commission and the line ministries are each responsible for enforcement of the specified enactments. Enforcement of the *Forest Practices Code* originally remained with the Ministry of Forests, but Bill 36 has transferred this power to the Commission.

The *OGCA* imposes a duty on the Commission to encourage alternative dispute resolution (ADR), and authorizes the Commission to send a dispute out to ADR before making a decision. Examples of disputes that could be referred to ADR are conflicts with First Nations, correlative rights issues, overlapping seismic applications, complaints from environmental organizations, and issues with guide outfitters. The *OGCA* also establishes an advisory committee to support the Commission, and authorizes the advisory committee to in many cases (e.g., mostly *PNG* and *Pipeline Act* decisions) ask the Commission to reconsider a decision by sending it out for ADR. The Commissioner has refused the only request for consideration by an advisory committee to date.

To provide some level of financial independence, the *OGCA* funds the Commission with revenues from levies on production and fees for approvals.

The Commission has legal obligations to First Nations by virtue of a statutory recognition of s. 35 of the *Constitution Act, 1982* [s. 4], and a statutory duty to encourage the participation of First Nations and aboriginal persons in processes affecting them [s. 3(c)]. It also has legal obligations under *Memoranda of Understanding* the Province has entered into with First Nations. As a result, the Commission's overall obligations may be stronger than they would be at common law. Click here for more information on the Province's and the Commission's obligations to First Nations.

The *OGCA* also transferred to the Commission authority that was previously held by the British Columbia Utility Commission (BCUC) to declare common carriers, common purchasers, or common processors. BCUC still has the authority to determine conditions under which a common carrier, purchaser, or processor must provide service.

Under the *Land Act*, the Commission issues leases of Crown lands, right-of-ways or easements, and licences to occupy Crown land in connection an oil or gas project. Under the *Waste Management Act*, the Commission issues special waste storage and disposal permits. The Commission is not required to consult with MWLAP or MSRM officials. If, however, an application involves a federally regulated pipeline (i.e., one that crosses provincial or international borders), provincial 'environment' officials are consulted by the National Energy Board.

The Commission has authority to issue cutting licences and road use permits under the *Forest Act*. Before issuing a road use permit, the Commission must consult with the Ministry of Forests (many roads are owned by the ministry).

Both the Commission and the Minister [of MEM] have authority to enter a location for inspection.

Consequential changes to the *Petroleum and Natural Gas Act* authorize the Commission to issue certificates of restoration, and cancel or suspend well authorizations. The Commission can use any means to prevent waste or escape of oil, gas, or water from a well, or to control hazardous conditions and contain or eliminate spillage. The Commission is also authorized to enforce any order it makes.

Consequential changes to the *Pipeline Act* authorize the Commission to administer the maintenance and enforcement provisions of the *Pipeline Act*, including authority to contain and eliminate spillage.

Through Bill 36 (2002), the Province has also empowered the Commission to issue 'approval in principle' for oil and gas activities in a specific area. The amendment authorizes the Commission to issue a 'general development permit' (GDP) as approval in principle for oil and gas activities and pipelines in an area of BC. The Province says the GDP is to allow the Commission to (among other things) prevent a proliferation of roads and pipelines by reviewing at one time multiple projects by multiple companies in the same area. Environmental or land use terms and conditions for the permit are to be established through discussions with the company, First Nations, and the Commission. When the company applies for subsequent environmental protection-related permits, the Commission would limit its review to environmental and land use issues not already addressed in the general approval. Although it doesn't appear to replace the need for approvals under the *PNGA*, *Pipeline Act*, *Waste Management Act*, *Water Act*, or *Forest Act*, the GDP process could result in less site-specific environmental scrutiny of approvals under these Acts.

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H. MUSKWA-KECHIKA MANAGEMENT AREA

The Muskwa-Kechika Management Area (MKMA) is located in northeastern BC in the heart of the 'Northern Rockies'. Residents agreed through a land use plan that the area is unique and should be managed as a 'special management area.' In the special management area, residents agreed to allow resource development 'while recognizing, accommodating and protecting important wildlife and environmental values.'

Within the MKMA neither the provincial government nor the Oil and Gas Commission can issue oil and gas rights or approvals unless a 'pre-tenure plan' is in place [s. 8 MKMAA, s. 3.3.2 MKMP]. The only exception is some geophysical exploration that can be done under licence [s. 8 MKMAA s. 3.4 MKMP].

A pre-tenure plan identifies objectives and strategies (including environmental objectives and strategies) for development activities in the area and provides guidance on where and how oil and gas activities are to be conducted.

Once a pre-tenure plan is in place, neither the government nor the Oil and Gas Commission can issue rights or approvals that are inconsistent with the pre-tenure plan [s. 7 MKMAA, s. 4.1.2 MKMP]. All pre-tenure planning must be conducted in accordance with the Muskwa-Kechika Management Plan (MKMP) [s. 4 MKMAA]. The MKRMP's long-term objective is to 'return the lands to their natural state as much as possible after development is completed.' The Ministry of Sustainable Resource Management (MSRM) is responsible for leading the development of the plans.

Oil and gas activities are not allowed in areas within the MKRMP described as 'protected areas.'

The Muskwa-Kechika legislation prevails if there is a conflict or inconsistency between it and the *Oil and Gas Commission Act* [*OGCA* s. 3.1].

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J. COALBED METHANE

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