Property Rights and Hazardous Substances Policy

Rodney Hide & Peter Ackroyd
Centre for Resource Management
Lincoln College

Report to the Ministry for the Environment
17th February 1988
Table of contents

Introduction ................................................. 1
Existing institutional arrangement ......................... 1
Proposed reform .............................................. 2
Benefit of reform ............................................ 3
Indicator of failure .......................................... 4
Subsequent reform ........................................... 4
Conclusions ................................................... 5
Acknowledgements ............................................ 6
Appendix one: Statutes cited ................................. 7
Appendix two: Limiting the hazard .......................... 8
  Licensing and consent procedures ....................... 8
  Regulation ................................................... 12
  Liability rules .............................................. 15
Appendix three: Restricting the cost of hazards realised 23
  Information .................................................... 23
  Emergency services ......................................... 24
  Facility for review ......................................... 25
Appendix four: Liability rules and economic theory ...... 26
  Deterrence and cost internalisation ....................... 27
  Regulation v. liability ..................................... 29
  Strict liability v. negligence ............................. 31
Appendix Five: Specification of hazardous substances ... 34
  Environment Act 1986 ..................................... 34
  Explosives Act 1957 ....................................... 34
  Radiation Protection Act 1965 ......................... 34
  Dangerous Goods Act 1974 ............................... 35
  Toxic Substances Act 1979 .............................. 36
  Pesticides Act 1979 ...................................... 37
Introduction
This paper presents an analysis of New Zealand's law relating to hazardous substances. The analysis follows the method outlined in the Centre for Resource Management's publication "Property Rights and Natural Resource Policy". The existing law is described and a reasoned reform offered.

Existing institutional arrangement
The hazards associated with technical processes and their products are part and parcel of modern life; they cannot be outlawed. Nor can law prevent their occasional realisation; at the very least, accidents will always occur. The law can be expected, however, to limit the hazard and to restrict the cost of accidents, and to do so, moreover, without unnecessary constraint on technical innovation. It would be poor policy indeed to control hazardous substances simply by restricting technical progress.

Legislation to limit hazards has been continually introduced in New Zealand and amended in response both to new technologies and to increasing concerns for public safety. The law has thus evolved in piecemeal fashion, without overall design, and has embodied accumulated experience and understanding. Owing to its history, and the pervasiveness of hazardous substances, the resultant law is dispersed amongst many statutes administered by a variety of agencies. It provides rules appropriate to different substances (e.g. explosives & radioactive materials) and different activities (e.g. transportation & manufacture), and provides for control by specialists (e.g. Pesticides Board & Factory Inspectors) with expertise in specific products (e.g. pesticides) and specific activities (e.g. manufacture).¹

As it stands, the law provides considerable scope for comprehensive control of hazardous substances. This control is effected through statutory regulation, statutory provision for further regulation, and statutory requirement that licenses and consents (i.e. entitlements) be obtained before undertaking certain hazardous activities. These entitlements are variously granted by Ministers of the Crown (e.g. use

¹ More detail of existing law is appended, as is a review of the economic literature on liability.
and administration of radioactive materials), statutory boards (e.g. use of pesticides), civil servants (e.g. manufacture of explosives), and local authorities (e.g. storage of dangerous goods).

Rights of civil action with respect to hazardous substances are, however, limited. Under the Accident Compensation Act 1982 a person suffering personal injury by accident has no civil right of action against the injurer; the injurer is not liable for damages. Moreover, statutory authorisation of hazardous activities has circumscribed strict liability for property damage; licensees undertaking hazardous activities are liable for property damage only if judged negligent. Enterprises undertaking hazardous activities and dealing with hazardous substances are, therefore, directly liable only for property damage and then only if negligent. They thus carry the cost of the hazards to which they expose people only so far as their ACC levies reflect that hazard, and criminal sanctions must be relied upon to ensure adequate precautions against personal injury; there is no threat of civil action following injury caused through unsafe practice.

Proposed reform
The proposed reform to hazardous substance policy is to return the right of civil action with respect to personal injury. This would enable those suffering personal injury as a consequence of the negligence of others to claim recompense. This recompense would serve as an inducement for those injured to take action and, in turn, for those engaged in hazardous activities and dealing with hazardous substances to take reasonable care. Returning the right of civil action for personal injury would thus provide a complement to existing law limiting the hazard to which people are exposed.

The abrogation of the right of civil action with respect to personal injury is, however, a central plank of the Accident Compensation Act 1982, and it could only be returned through major reform of present policy of compensation for incapacity. Problems with present policy of compensation may themselves prompt such reform. In particular, if there is a community responsibility to provide for those who are incapacitated, that responsibility should be placed with all taxpayers. And, if the aim is to provide comprehensive entitlement, that cover should extend to include all incapacity, whether it be the result of
accident or of illness. The logical policy for community provision of comprehensive cover for incapacity is a taxpayer-funded minimum wage. Whether the community as a whole should be so generous as those upon whom the responsibility now falls is a moot point.

In analysing policies for hazardous substances and accident compensation it is necessary to distinguish compensation from deterrence. The reason for enabling those who suffer loss through the negligence of others to make a claim over and above a minimum level of support is not that they are more deserving than those who are incapacitated in other ways, nor that such claims provide a means of obtaining realistic compensation; rather, payment to victims of negligent acts or omissions is the price of enlisting their participation (and the participation of their lawyers) in a social mechanism serving to limit the hazards to which people and their property are exposed. Much confusion, and poor policy, have resulted from a failure to make this distinction.

**Benefit of reform**

The return of the right of civil action with respect to personal injury is conjectured to offer a number of advantages. The social cost of damages arising from negligent acts or omissions would rest with those responsible. The cost would be internalised. A pervasive influence to complement existing law would have been added. It would no longer be vital to regulate every potentially hazardous substance or activity as liability for damages resulting from negligent acts or omissions would serve to limit otherwise unregulated hazards. And the inducement to take reasonable care need not be diminished by liability insurance: premiums will in all probability reflect the insured's history, and those who are negligent are likely to have their premiums increased.

Liability for negligence would mean safety measures reduce production costs, rather than add to them. Production costs would be kept low by limiting the possibility of suit for damages. This would require undertaking all precautions justifiable in a court of law on the basis of their cost and efficacy, even those not required by existing regulation. Those responsible for hazards would thus be encouraged to have regard to safety measures generally, and decisions upon the level
of precaution necessary would extend to include the judicature as well as regulatory authorities.

Furthermore, the public would no longer rely solely upon regulatory agencies to protect their interests. They would be able to participate directly in the decision-making process through the courts and this in turn would encourage enhanced perception of the hazards concomitant with modern life, and hence greater assurance for the public that their interests were being protected.

**Indicator of failure**
The benefits of reform described above are conjectural; the reform may not work as expected. The right of civil action may fail to limit the hazard to which people and their property are exposed.

The success or otherwise of the reform could not, however, be assessed by the incidence of civil actions; even if no actions were brought the reform may nevertheless have a dramatic effect. The assessment would have to be based on the influence that the reform had on hazardous activities, that is, whether as a result more care was taken than at present. What would indicate that the reforms had failed would be no improvement in the behaviour of people undertaking hazardous activities and dealing with hazardous substances.

If the reform, for whatever reason, did not succeed, little would be lost. The existing statutory regulations for hazardous substances, and the existing level of protection, would remain, and the rationalisation of policy for incapacity may itself justify the associated reform. Indeed, the return of the right of civil action would best be made in concert with wider reform of social welfare legislation.

**Subsequent reform**
If, on the other hand, the reform proved successful it could be followed by the removal of superfluous regulations, in particular, those designed to guard against negligent acts or omissions. The focus for regulation could thus be directed upon those hazards for which actions for damages are unlikely to be successful and which are unlikely to be adequately controlled by the threat of civil action. For example, those hazards that are widely dispersed amongst the
community, those which may not be manifest for a long time, or those for which it is difficult to demonstrate causality. Regulations thus complement liability rules. Their rationalisation, however, would reduce the complexity of existing law and the cost of its enforcement.

Licensing and consent procedures could be similarly rationalised by being limited to those activities and substances which even when undertaken and used in a reasonable manner may prove unacceptable hazards. Rationalised licensing and consent procedures would provide a more certain commercial environment.

In light of experience, it might also be deemed desirable to adjust liability rules by statute. For example, it might be desirable to make ultra-hazardous activities strictly liable or to provide statutory guidelines on the adjudication of negligence and the award of damages.

Conclusions
The preceding analysis recommends liability for personal injury as a complement to regulation in hazardous substances policy. It suggests that increased protection need not involve increased regulation and, on the contrary, may involve a reassessment of the desired extent of regulation. An important decision in any reform of hazardous substances policy, therefore, is whether liability rules are to complement regulation and entitlement procedures. The analysis also demonstrates the interrelationship between hazardous substances policy and policy of compensating for incapacity.

Underpinning the analysis is the proposition that liability for negligent acts or omissions serves as an inducement to take reasonable care. This proposition is but a conjecture and might well be rebutted. However, its truth or otherwise can be assessed only by a critical examination of that data by which it can be refuted or affirmed; the extent to which the proposition is believed to be true or false is a poor guide to its validity.
Acknowledgements

Assistance in the preparation of this paper has been received from Ministry for the Environment staff, in particular, Dr Margaret Bailey, Mesdames Jenny Boshier, Paula Warren, Louise Prendergast, Jane Von Dadelszen, and Messrs. Tom Fookes, Chris Livesey, John Morgan, John O'Grady, Stephen Thornton.

Ms Joy Talbot, Mr Errol Costello (Centre for Resource Management) and Mr Andrew Wright (Farm Management and Rural Valuation Department, Lincoln College) reviewed a draft of the paper.

Mrs Cathrine Ackroyd provided editorial assistance.

Notwithstanding their generous assistance, the aforementioned people are not responsible for any errors of omission or fact contained herein, and responsibility for the analysis rests with the authors alone.
Appendix one: Statutes cited

Accident Compensation Act 1982
Agricultural Workers Act 1977
Animal Remedies Act 1967
Bush Workers Act 1945
Carriage by Air Act 1967
Carriage of Goods Act 1979
Civil Aviation Act 1964
Civil Defence Act 1983
Clean Air Act 1972
Coal Mines Act 1979
Construction Act 1959
Contributory Negligence Act 1947
Crimes Act 1961
Customs Act 1966
Dangerous Goods Act 1974
Explosives Act 1957
Factories and Commercial Premises Act 1981
Fair Trading Act 1986
Fire Service Act 1975
Food Act 1981
Gas Act 1982
Health Act 1956
Local Government Act 1974
Marine Pollution Act 1974
Medicines Act 1981
Mining Act 1971
New Zealand Railways Corporation Act 1981
Occupiers' Liability Act 1962
Pesticides Act 1979
Petroleum Act 1937
Petroleum Regulations 1978
Quarries and Tunnels Act 1982
Radiation Protection Act 1965
Sale of Goods Act 1908
Shipping and Seamen Act 1952
State-Owned Enterprises Act 1986
Town and Country Planning Act 1977

Toxic Substances Act 1979
Transport Act 1962
Water and Soil Act 1967
Appendix two: Limiting the hazard

The hazard to which people and their property are exposed is limited by the existing law in three ways:

1. Restricting who may use hazardous substances, i.e. by licensing and consent procedures;
2. Restricting what use may be made of hazardous substances, i.e. by regulation; and by,
3. Establishing penalties for those who expose people or their property to hazard, i.e. by liability rules.

Some of the detail of each of these mechanisms is reviewed in turn.

Licensing and consent procedures

There are five statutes each designed to deal with a specific class of hazardous substance: the Explosives Act 1957, the Radiation Protection Act 1965, the Dangerous Goods Act 1974, the Toxic Substances Act 1979, and the Pesticides Act 1979. Each Act defines and classifies a class of hazardous substance, establishes a combined regulatory and licensing system for its control, provides for inspectors, gives them power to enforce the regulatory and licensing structure, and details sanctions.

Manufacture of explosives requires application for a licence to the Chief Inspector of Explosives within the Department of Labour. The Chief Inspector may grant an application, grant it subject to such modifications of the proposals as he thinks fit, having regard to

2 The definition of each class of hazardous substance is detailed in Appendix Five.
3 Specific references to the statutes establishing this regulatory and licensing system follow in this and the following subsection.
4 Explosives Act 1957 ss. 6-8; Radiation Protection Act 1965 s. 24(1); Dangerous Goods Act 1974 ss. 5-8; Toxic Substances Act 1979 ss. 9-10; Pesticides Act 1979 ss. 9-11.
7 Explosives Act 1957 ss. 6, 16.
public safety or the safety of any particular persons or of adjacent buildings, or refuse the application if he thinks the interests of public safety so require.\(^8\) A licence is also required to sell explosives and to carry certain explosives,\(^9\) and except in certain circumstances, explosives can be stored only in a factory licensed to manufacture explosives, a storage place specified in a licence to sell explosives, a public magazine appointed by the Minister of Labour, or a private magazine licensed by the Chief Inspector.\(^10\)

Use and administration of radioactive materials requires a licence from the Director-General of Health;\(^11\) and an application may, as the Director-General sees fit, be granted, granted with conditions attached, or refused.\(^12\)

Storage of dangerous goods requires a licence from the local authority declared to be a local licensing authority by the Minister of Labour.\(^13\) Upon receiving an application, the authority may grant a licence, grant it subject to such modifications of the proposal as it thinks fit, having regard to public safety or the safety of any person or the protection of any property, or, if it thinks the interests of public safety so require, refuse to grant a licence.\(^14\)

Any toxic substance may be declared to be a deadly poison, a dangerous poison, a standard poison, or a harmful substance by the Governor-General, upon the advice of the Minister of Health and the Toxic Substances Board (comprising members nominated by specified ministers and interest groups).\(^15\)\(^16\) To pack and sell deadly, dangerous and standard poisons requires a licence from the District Medical Officer of Health;\(^17\) a licence is granted if the applicant fulfills the

---

8 Ibid. s. 18.
9 Ibid. ss. 23,40.
10 Ibid. ss. 26,30,31.
11 Radiation Protection Act 1965 ss. 13,16.
12 Ibid. ss. 16,17.
14 Ibid. s. 9.
15 Toxic Substances Act 1979 ss. 11-18.
16 Ibid. s. 7.
17 Ibid. ss. 20,67.
specified requirements and is considered a fit and proper person with suitable premises.18

Pesticides may be declared controlled by the Governor-General on the advice of the Minister and the Pesticides Board (comprising members nominated by specified ministers and interest groups19), or directly by the Minister on the recommendation of the Board;20 a licence from the Board is required to use controlled pesticides.21

In each of the above cases, applicants have rights of appeal to the judicature,22 the exception being licenses to use and administer radioactive materials, where any person may appeal, and for which the Minister of Health constitutes a special Board.23

Further consents are additional to these licence requirements. Only explosives authorised by the Governor-General may be manufactured or imported,24 and each consignment requires an entry permit from an inspector of explosives.25 To import, manufacture, sell, store, and transport radioactive materials, requires the Minister of Health's consent,26 the Minister being advised by the Radiation Protection Advisory Authority - a panel of experts.27 Only pesticides registered by the Pesticides Board may be sold,28 and an application to register a pesticide may be refused on the grounds that it, or the circumstances of its use, are likely to harm human beings, agricultural produce, or the environment.29 The Board may, having regard to the relative toxicity of the pesticide, its environmental effects, and such other matters as the Board thinks fit, restrict the use of a registered pesticide, and it has the power to revoke registration.30

18 Ibid. 1979 s. 36.
19 Pesticides Act 1979 s. 12.
20 Ibid. s. 43.
21 Ibid. ss. 12-13,44.
22 Explosives Act 1957 s. 55; Dangerous Goods Act 1974 s. 14; Toxic Substances Act 1979 s. 67; Pesticides Act 1979 s. 70.
23 Radiation Protection Act 1965 s. 23.
24 Explosives Act 1957 s. 11.
25 Ibid. s. 12.
26 Radiation Protection Act 1965 s. 12.
27 Ibid. ss. 5-11.
28 Pesticides Act 1979 s. 21.
29 Ibid. s. 27.
30 Ibid. ss. 28,29.
As well as the above Acts dealing with a specific class of hazardous substance, the Animal Remedies Act 1967 and the Medicines Act 1981 establish licensing arrangements for certain potentially hazardous products. The Animal Remedies Board, nominated by a variety of interests, for example, can deny a licence to import or manufacture an animal remedy on the grounds that it represents a danger to animal or public health. The Minister of Health's consent is required to sell or supply a new medicine, a consent which may be refused if he considers that the risk of the medicine injuriously affecting the health of any person outweighs its likely therapeutic value, and the Minister may revoke or suspend his consent if a medicine is considered unsafe, ineffective, or in any way unsatisfactory. To manufacture, pack, and wholesale medicines requires a licence, and importers or manufacturers may be required by the Director-General of Health to satisfy his concerns over the safety of their products, his concerns may be referred to an appropriate committee, and the Minister may prohibit or impose conditions upon the importation and manufacture of medicines.

As appropriate to the purposes and objectives of district planning, District Schemes are required to have regard to the avoidance or reduction of danger, damage, or nuisance caused by the storage, transport, and disposal of hazardous substances. Control is effected through District Schemes zoning land for different classes of use and development, and specifying uses requiring planning consent, such consents are able to be granted, granted with attached conditions, or refused, with appeal rights to the Planning Tribunal.

Licensing requirements also exist under Acts designed to deal with pollution. Specified air-polluting processes require a license; the

31 Animal Remedies Act 1967 s. 5.
32 Ibid. ss. 18, 21.
33 Medicines Act 1981 s. 22.
34 Ibid. s. 35.
35 Ibid. s. 17.
36 Ibid. s. 36.
37 Town and Country Planning Act 1977 s. 36(1), Second Schedule.
38 Ibid. s. 36(4).
39 Ibid. s. 67.
40 Ibid. s. 69.
41 Clean Air Act 1972 ss. 23-41.
discharge of waste into natural water requires a water right;\textsuperscript{42} and a permit is required from the Minister of Transport to discharge or incinerate wastes at sea.\textsuperscript{43}

\textbf{Regulation.}

As well as the licensing and consent arrangements described above, the five Acts designed to deal with a specific class of hazardous substance use statutory regulation, and statutory provisions for additional regulation, to limit the hazard. Statutory regulations apply to the storage of both poisons and harmful substances,\textsuperscript{44} to the packaging of explosives, dangerous goods, poisons and harmful substances, and pesticides,\textsuperscript{45} and to the disposal of explosives.\textsuperscript{46} As well, the Governor-General has powers under each Act to make regulations by Order in Council for a number of specific purposes,\textsuperscript{47} and for quite general purposes.\textsuperscript{48}

In addition, the Minister of Health may, on the recommendation of the Toxic Substances Board, prohibit the importation or manufacture of any toxic substance.\textsuperscript{49}

There are also statutory regulations relating to the general safety of medicines, animal remedies, and food, and in each case, provision exists for the Governor-General by Order in Council to make further regulations.\textsuperscript{50}

Local authorities have delegated powers to make bylaws with respect to conserving public health, well-being, safety, and convenience.\textsuperscript{51}

\textsuperscript{42} Water and Soil Act 1967 s. 21.
\textsuperscript{43} Marine Pollution Act 1974 s. 22.
\textsuperscript{44} Toxic Substances Act 1979 s. 29.
\textsuperscript{45} Explosives Act 1957 s. 43; Dangerous Goods Act 1974 s. 28; Toxic Substances Act 1979 ss. 26,30; Pesticides Act 1979 s. 38.
\textsuperscript{46} Explosives Act 1957 ss. 48,49.
\textsuperscript{47} Explosives Act 1957 s. 62; Radiation Protection Act 1965 s. 31; Dangerous Goods Act 1974 s. 35; Toxic Substances Act 1979 s. 82; Pesticides Act 1979 ss. 53,76.
\textsuperscript{48} Explosives Act 1957 s. 62(2)(p); Radiation Protection Act 1965 s. 31(v); Dangerous Goods Act 1974 s. 35(p); Toxic Substances Act 1979 s. 82(u); Pesticides Act 1979 ss. 53(n),76(p).
\textsuperscript{49} Toxic Substances Act 1979 ss. 29,33.
\textsuperscript{50} Medicines Act 1981; Animal Remedies Act 1967; Food Act 1981.
\textsuperscript{51} Local Government Act 1974 s. 684(8).
There are also statutes concerned with particular activities. Under the Customs Act 1966, for example, certain goods may be declared prohibited imports.\(^{52}\) Further, the Governor-General may by Order in Council prohibit importations of any goods where necessary in the public interest, for the prevention of communicable diseases, or where the sale of such goods would be against the law.\(^{53}\) Conditional prohibition may allow the importation of goods under the authority of a licence or permit and subject to any prescribed conditions.\(^{54}\)

Inspectors of factories have the power to deal immediately with serious dangers and can serve notice on the occupier of a factory to take forthwith such steps as required, including the cessation of any specified process or activity or to restrict operations until specified goods or substances have been removed and stored in a specified manner.\(^{55}\)

Statutory regulations apply to the carriage of goods in ships\(^{56}\) and specified dangerous goods must be stowed, packaged, marked, labelled and documented in accordance to the requirements and standards in the Code published by the Inter-Governmental Maritime Consultative Organisation.\(^{57}\) In addition, dangerous goods are not to be sent by ship unless clearly marked and written notice given to the master or owner of ship before goods are taken on board.\(^{58}\) With respect to civil aviation, the Governor-General by Order in Council may make regulations for carrying out the Convention on International Civil Aviation,\(^{59}\) and may make regulations for adoption of recommended practices and procedures and generally regulate civil aviation.\(^{60}\) The carriage of dangerous goods by civil aircraft must accord with IATA Restricted

---

52 Customs Act 1966 s. 48(1).
53 Ibid. s. 48(3).
54 Ibid. s. 48(5).
56 Shipping and Seamen Act 1952 s. 307(1).
57 Ibid. s. 307(1A); Shipping (Dangerous Goods) Rules 1979.
58 Ibid. s. 303.
59 Civil Aviation Act 1964 s. 29(1).
60 Ibid. 29(1)(a,b).
Articles Regulations. 61 A Standard Code of Practice sets out requirements for the safe transport of hazardous substances on land. 62 Substances declared hazardous by the Railways Corporation, or its Act, may not be brought upon a Corporation service without marking the nature of the contents and providing written notice, and the Corporation may refuse to accept any hazardous substance or dangerous good. 63 The Governor-General by Order in Council may make regulations declaring certain goods to be dangerous and regulating or prohibiting the transport of such goods on any Corporation service. 64

The Governor-General also has wide powers to make regulations prescribing, for the safety of the public or of any person, matters in relation to the design and construction of motor vehicles or any specified classes of motor vehicles, and generally regulating the use of vehicles. 65

The Governor-General by Order in Council can prescribe a product safety standard for the purpose of preventing or reducing the risk of injury to any person. Such standards relate to the goods themselves, to the testing of goods during or after manufacturing or processing, or to the form and content of markings, warnings or instructions to accompany the goods. 66 Action by the Minister may also result in goods being declared unsafe or recalled. 67

Several Acts regulate the use of explosives, 68 and the Mining Act 1971 provides for the regulation of cyanide and concentrating plants in or about mines, 69 the Petroleum Act 1937 for the storage, transportation and use of petroleum and petroleum products produced in New Zealand. 70

---

61 Civil Aviation Regulations 1953 31(1,2); Civil Aviation Safety Order No. 13.
63 New Zealand Railways Corporation Act 1981 s. 18(1).
64 Ibid. s. 110(1).
65 Transport Act 1962 s. 77(1)(ee,w).
66 Fair Trading Act 1986 s. 29(1).
67 Ibid. ss. 31,32.
68 Petroleum Regulations 1978 s. 23; Construction Act 1959 s. 16; Coal Mines Act 1979 s. 265(11); Quarries and Tunnels Act 1982 s 43(e); Mining Act 1971 s. 232(11).
69 Mining Act 1971 s. 232(10).
70 Petroleum Act 1937 s. 47(m)(12).

The Clean Air Act 1972 provides for the making of clean air zones within which the use of certain fuels and fuel-burning equipment may be prohibited, provides for the promulgation of regulations governing design and performance standards for such things as motor cars, and enables the Governor-General by Order in Council to make regulations for a wide range of purposes.

Liability rules

Liability rules are another important feature of the existing institutional arrangement. Those who transgress the law establishing licensing and regulatory structures for hazardous substances are criminally liable and punishable by the state. And those who harm others, even though they may not have broken this law, can be liable for damages if they have committed a tort. A tort was defined by the eminent New Zealand jurist Sir John Salmond as:

[A] civil wrong for which the remedy is common law action for unliquidated damages, and which is not exclusively the breach of a contract or the breach of a trust or other merely equitable obligation.... In general, a tort consists in some act done by the defendant whereby he has without just cause or excuse caused some form of harm to the plaintiff. The law of tort exists for the purpose of preventing men from hurting one another, whether in respect of their property, their persons, their reputations, or anything else which is theirs. The fundamental principle of the branch of law is ... to hurt nobody by word or deed. An action of tort, therefore, is usually a claim for pecuniary compensation in respect of damage so suffered...

71 Petroleum Regulations 1978 s. 66.
72 Gas Act 1982 s. 61.
73 Clean Air Act 1972 ss. 12-18.
74 Ibid. s. 19(5).
75 Ibid. s. 55.
76 For the relationship of liability rules and property rights generally, see Calabresi & Melamed, Property Rules, Liability Rules, and Inalienability: One View of the Cathedral 85 HARV. L. REV. 1089 (1972); for the relationship with respect to natural resource policy in particular, see Bromley, Property Rules, Liability Rules, and Environmental Economics 12 J. E. I. 43 (1978); and for the position of liability with respect to jurisprudence, see P.J. FITZGERALD, SALMOND ON JURISPRUDENCE (12th ed. 1966).
77 HEUSTON, SALMOND ON TORTS 13 (17th ed. 1977).
The specific torts relevant to hazardous substances are nuisance, negligence, breach of statutory duty, and the rule enunciated in *Rylands v. Fletcher* (i.e. strict liability).78 The tort of nuisance is divided into public nuisance and private nuisance. A public nuisance occurs when a person performs some act which constitutes a source of annoyance to the public at large, for example, allows rubbish or filth to be deposited on his land so as to be injurious to the inhabitants of the neighbourhood. The proper remedy is either criminal proceedings or an information by the Attorney-General on the part of the public, asking for an injunction to restrain the continuance of the public nuisance. It is only when there is some special injury to an individual that it is an action for damages. A private nuisance, on the other hand, is an act which interferes with a person's enjoyment of his land or property. Liability for nuisance is independent of negligence, that is to say, it is no defence that reasonable care was taken to prevent the act complained of being a nuisance. In judging what constitutes a nuisance:

A balance has to be maintained between the right of the occupier to do what he likes with his own and the right of his neighbour not to be interfered with. It is impossible to give any precise or universal formula, but it may broadly be said that a useful test is what is reasonable according to the ordinary usages of mankind living in society or more correctly in a particular society.79

Economists are less timid. In deciding whether A should be allowed to harm B, or whether B should be able to harm A, they seek to avoid the most serious harm. The solution depends essentially upon which party most values the right to harm the other.80

Negligence, in contrast to nuisance, is the omission to do something which a prudent and reasonable man would do, or the doing of something which a prudent and reasonable man would not do, and is actionable

---


whenever, as between plaintiff and the defendant, there is a duty cast upon the latter not to be negligent, and a breach of this duty which causes damage to the plaintiff. Before the plaintiff can succeed in an action in negligence, he must establish that the damage was caused by some act or omission of the defendant, that the act or omission was one of which a reasonable man behaving with ordinary prudence would not have been guilty, and that, in the circumstances of the case, the defendant owed the plaintiff a duty of care, of which that act or omission was a breach. The legal concept of the duty of care is that a defendant owes a duty of care to those persons whom he could reasonably have foreseen would be injured by his actions. A manufacturer, for example, aware that the absence of reasonable care in the manufacture of his product will result in injury to the user’s or consumer’s person or property, owes a duty to the user to take that reasonable care.

Negligence is judged by the standard of prudence of an ordinary reasonable man, and if a person does something which one of ordinary intelligence and prudence would not do or omits some precaution which one of ordinary intelligence and prudence would take, he is negligent. At common law, a plaintiff partly at fault could recover no damages at all, but the Contributory Negligence Act 1947 enables the Court to award suitably reduced damages. Whether the act or omission in question is one which a reasonable man would recognise as posing an unreasonable risk is determined by balancing the magnitude of the risk, in the light of the likelihood of an accident happening and the possible seriousness of its consequences, against the difficulty, expense, or any other disadvantage of desisting from the venture or taking a particular precaution.

---

81 Davis, supra note 78, at 117.
82 Ibid. at 117-118.
84 Donoghue case, supra; Grant v. Australian Knitting Mills, Ltd. [1936] A.C. 85.
85 Vaughan v. Menlove 3 Bing. N.C. 468, 475.
Statutes also create duties whose breach may make the defendant criminally liable, liable under the law of torts, or both.\(^87\) Statutory duties imposed under the Civil Aviation Act 1964 and the Civil Aviation Regulations 1953 are important, for example, in respect to liability for crop damage arising from aerial application of pesticides.\(^88\) The Occupiers' Liability Act 1962 lays down a common duty of care to all visitors, and it is a duty to take such care as in all the circumstances of the case is reasonable to see that the visitor will be reasonably safe in using the premises for the purpose of which he is permitted by the occupier to be there.\(^89\) As well, the Factories and Commercial Premises Act 1981 requires factory managers to ensure that every container holding material that is explosive, corrosive, irritant, radioactive, toxic, or otherwise hazardous, is safely and securely stored and clearly labelled.\(^90\) Managers must also ensure that workers are instructed as to the dangers and precautions in connection with work, that there is sufficient knowledge and experience of that work and that there is adequate supervision;\(^91\) and all practicable steps must be taken to protect workers from steam, fume, dust or other impurity that is likely to be injurious or offensive.\(^92\) Specific duties apply with respect to explosive and flammable substances.\(^93\) The Bush Workers Act 1945, the Construction Act 1959, and the Agricultural Workers Act 1977 establish general duties aimed at ensuring the safety and health of workers.\(^94\) State enterprises are required to operate personnel policies which include provisions with respect to safe working conditions.\(^95\) The Clean Air Act 1972 imposes a general duty upon the occupiers of all premises to adopt the best practicable means to minimise the emission of air pollutants, and to render any air pollutants harmless and inoffensive.\(^96\) Further, the Crimes Act 1961

\(^{87}\) Davis, supra note 78, at 165-173; see also Buckley, Liability in Tort for Breach of Statutory Duty, 100 L.Q.R. 204 (1984).

\(^{88}\) See D.A.R. WILLIAMS, ENVIRONMENTAL LAW IN NEW ZEALAND 222-233 (1980).

\(^{89}\) Occupiers' Liability Act 1962 s.4.

\(^{90}\) Factories and Commercial Premises Act 1981 s. 22.

\(^{91}\) Ibid. s. 20.

\(^{92}\) Ibid. s. 36.

\(^{93}\) Ibid. s. 31.

\(^{94}\) Bush Workers Act 1945 s. 11A; Agricultural Workers Act 1977 s. 56; Construction Act 1959 s. 17.

\(^{95}\) State-Owned Enterprises Act 1986 s. 4(2)(a).

\(^{96}\) Clean Air Act 1972 s. 7(1).
also imposes duties upon persons doing dangerous acts and in charge of
dangerous things.97

Also important is the leading case of Rylands v. Fletcher.98 The
principle enunciated by Blackburn J., that a "person who for his own
purposes brings on his lands and collects and keeps there anything
likely to do mischief if it escapes, must keep it in at his peril, and,
if he does not do so, is prima facie answerable for all the damage
which is the natural consequence of its escape,"99 created a new law by
extending the incidence of strict liability to the general category of
all inherently dangerous substances and making the occupier from whose
land they escape responsible, even if he had used the utmost care and
diligence in devising means for preventing their escape.

The onus of strict liability and nuisance has in large measure been
withdrawn from undertakings carried out under statutory authority.
Legislative authorisation has been interpreted as not only legalising
the enterprise itself and thereby removing the spectre of having it
enjoined as a nuisance, but also of conferring immunity for any harmful

97 Section 145 of the Crimes Act 1961 provides:
"(1) Every one commits criminal nuisance who does any unlawful act
or omits to discharge any legal duty, such act or omission being
one which he knew would endanger the lives, safety, or health of
the public, or the life, safety, or health of any individual.
"(2) Every one who commits criminal nuisance is liable to
imprisonment for a term not exceeding one year."

Section 155 provides:
"Every one who undertakes (except in case of necessity) to
administer surgical or medical treatment, or to do any other lawful
act the doing of which is or may be dangerous to life, is under a
legal duty to have and to use reasonable knowledge, skill, and care
in doing any such act, and is criminally responsible for the
consequences of omitting without lawful excuse to discharge that
duty."

Section 156 provides:
"Every one who has in his charge or under his control anything
whatever, whether animate or inanimate, or maintains anything
whatever, which in the absence of precaution or care, may endanger
human life is under legal duty to take reasonable precautions
against and to use reasonable care to avoid such danger, and is
criminally responsible for the consequences of omitting without
lawful excuse to discharge that duty.

98 (1866) L.R. 1 Ex. 265, affd. (1868) L.R. 3 H.L. 330.
99 L.R. 1 Ex. 265, 279-280.
consequences which occur, without negligence, in its normal operation. Whether an Act is merely permissive, or is one which expressly authorises the doing of a thing, whether it be a nuisance or not, is a question of construction: but generally when the thing to be done must necessarily cause injury to some one, the Act will be construed as authorising the doing of it: if the thing to be done will not necessarily cause injury, but will only do so if done in certain places or in a certain way, the Act will be construed as permissive only. The statutory immunity is lost if the grantee fails in his duty of care to avoid all necessary harm.

Such a defence against strict liability for aerial sprayers has been suggested in New Zealand. The argument would be one where the aerial spraying was carried out by a pilot holding a chemical rating granted to him pursuant to the Civil Aviation Regulations 1953 and otherwise authorised by the Agricultural Chemicals Regulations 1968.

Under the Accident Compensation Act 1982, a consolidation of earlier legislation, the tort system with respect to personal injury for accidents has been replaced. The argument in favour of the Act was constructed upon by two fundamental principles:

1. no satisfactory system of injury insurance can be organised except on a basis of community responsibility;
2. wisdom, logic, and justice all require that every citizen who is injured must be included, and equal losses must be given equal treatment. There must be comprehensive entitlement.

Both the legal doctrine, and the structure and operation of the system are well documented. The main features of the scheme are that compensation is available to all accident victims, regardless of fault,

100 Fleming, supra note 78, at 318-319, 407-408.
101 Davis, supra note 78, at 18-19.
102 Williams, supra note 88, at 232-233.
103 For the history of this legislation, see G.W.R. PALMER, COMPENSATION FOR INCAPACITY (1979).
104 REPORT OF THE ROYAL COMMISSION OF INQUIRY, COMPENSATION FOR PERSONAL INJURY IN NEW ZEALAND 20 (1967).
from the Accident Compensation Corporation, and tort liability for injuries covered by the scheme is abolished. Revenue is derived from three sources and recorded in three separate funds:

1. Levies on employers and the self-employed.
2. Levies on motor vehicles.
3. A supplementary fund created from general government revenues to provide benefits in respect of injuries not covered by either of the other two funds.

Levies paid are set by the Governor-General by Order in Council, and may vary across different classes of industries and occupations. As well, the Corporation may, after having regard to the accident experience of an employer or self-employed person, impose a penalty or provide a safety-incentive bonus.

All cases of personal injury by accident are covered by the plan, including occupational diseases. Most other disabilities from disease or illness are excluded.

The benefits (including medical care, earnings related compensation, and lump sums for permanent disability) depend on the nature and derivation of the injury, its financial significance, and the losses suffered by the claimant. In fatal cases the main benefits are earnings related compensation and lump sums for a dependent spouse and dependent children.

Injuries sustained in industry, on military service, or as a result of crime are now included in the comprehensive plan rather than being covered by separate systems.

An extensive literature has developed subsequent to the implementation of the Accident Compensation Act. Authors have examined the jurisdiction of the ACC in light of the abolition of civil actions for

107 Accident Compensation Act s 39.
personal injury, and the reform of New Zealand law for compensating incapacitated people, and more latterly the comparison of the New Zealand scheme to other liability systems. The scheme has also come in for recent review.


Appendix three: Restricting the cost of hazards realised

The costs of hazards realised are restricted by the existing law in three ways:

1. Providing for the collection of information on the use and whereabouts of hazardous substances;
2. Providing for emergency services; and by,
3. Providing for the review of existing institutional arrangements.

Some of the detail of these mechanisms is reviewed in turn.

Information

The costs of hazards realised are restricted by knowing what substances are used where. Records of the sale of explosives, irradiating apparatus, and deadly and dangerous poisons must be kept. The Director-General of Health must maintain a register of those licensed to use and administer radioactive materials, and District Medical Officers of Health must maintain registers of those licensed to sell and pack poisons. The Pesticide Board must maintain registers of pesticides used in New Zealand and of licensed pesticide operators. Licensing arrangements for explosives enable authorities to know of their importation, manufacture, sale, storage, and transportation. Licensing requirements similarly enable local authorities to know where and how dangerous goods are stored within their districts. Town and country planning consent procedures also enable local authorities to know where and how hazardous substances are stored, transported, and disposed of.

---

112 Explosives Act 1957 s. 24.
113 Radiation Protection Act 1965 s. 14(2).
114 Toxic Substances Act 1979 s. 27.
115 Radiation Protection Act 1965 s. 19.
117 Pesticides Act 1979 s. 33.
118 Ibid. s. 51.
119 Explosives Act 1957 ss. 11, 16, 23, 40.
120 Dangerous Goods Act 1974 s. 9.
121 Town and Country Planning Act 1977 ss. 36(1,4), 67, 69, Second Schedule.
Infectious diseases specified in the schedule to the Health Act 1956 are monitored by the Department of Health. 122

Also provided for is the collection of information on accidents. Details of accidents with explosives and dangerous goods must be given to the Chief Inspector of Explosives. 123 The proper authorities must be notified of any containers leaking toxic substances on arrival in New Zealand, 124 and the Medical Officer of Health must be informed of cases of poisoning admitted to hospitals under the control of a Hospital Board. 125 A register of all accidents in factories and forests must be kept, 126 as must all claims made under the Accident Compensation Act 1982. 127 Several Acts dealing with specific activities or functions have provisions under which serious accidents must be notified to an Inspector, or other responsible person acting under the authority of the Act concerned, with the Minister responsible for the administration of that Act able to direct a formal investigation into the cause of the accident. 128 For some activities the initiation of a formal inquiry subsequent to notification of the accident remains the responsibility of the Inspector. 129 Provision for notification of serious accidents or incidents, and the initiation of formal inquiries, is also built into the major transport legislation. 130

**Emergency services**

Emergency services are provided for under the Fire Service Act 1975 and the Civil Defence Act 1983.

122 Health Act 1956 ss. 70-87A.
123 Explosives Act 1957 s. 51; Dangerous Goods Act 1974 ss. 33, 34.
124 Toxic Substances Act 1979 s. 44.
125 Ibid. s. 76.
126 Factories and commercial Premises Act 1981 s. 53; Bush Workers Act 1945 s. 8.
127 Accident Compensation Act 1982 s. 93(1), 94(1-2).
128 Mining Act 1971 ss. 206, 210; Coal Mines Act 1979 ss. 177, 181; Construction Act 1959 ss. 19, 20; Quarries and Tunnels Act 1982 ss. 71, 75.
129 Petroleum Act 1937 s. 47B; Factories and Commercial Premises Act 1981 ss. 54(2,4); Bush Workers Act 1945 s. 14.
130 Transport Act 1962 ss. 81, 82; Civil Aviation Act 1964 s. 19; Shipping and Seamen Act 1952 ss. 324, 325.
Facility for review

The law provides considerable scope for its own review in the light of experience. The five main statutes dealing directly with hazardous substances, for example, enable licenses and consents to be revoked and contain provision for revising regulation. Other statutes also provide for review. The Fire Service Commission, for example, may make recommendations as to alterations of statutory responsibilities and function in respect of fire safety and in respect of the packing, marking, handling, carriage, storage and use of hazardous materials. The Ministry for the Environment has, among another things, to provide the Government, its agencies, and other public authorities, with advice both on the application, operation and effectiveness of a number of statutes, and on the control of hazardous substances.

131 Explosives Act 1957 ss. 53,54; Radiation Protection Act 1965 s. 20; Dangerous Goods Act 1974 s. 13; Toxic Substances Act 1979 s. 64; Pesticides Act 1979 ss. 28,29,52.
132 Explosives Act 1957 s. 62; Radiation Protection Act 1965 s. 31; Dangerous Goods Act 1974 s. 35; Toxic Substances Act 1979 s. 82; Pesticides Act 1979 ss. 53,76.
133 Fire Service Act 1975 ss. 21(3),21(4)(c).
134 Environment Act 1986 ss. 31(c)(i,v).
Appendix four: Liability rules and economic theory

Applying economic theory to deduce the consequences of different legal rules is a well developed field of inquiry. The literature applying to accident law alone is considerable, and what follows below is but a brief (and uncritical) review. In this literature:

A specification of how the cost of an accident is to be shared among the parties to the accident ... is called a liability rule. Rules that allow a party to escape liability completely by spending a sufficient amount of resources on accident avoidance are called negligence rules; the specified accident avoidance level is called the legal standard of negligence or the standard of care, and a person who fails to meet this standard is termed negligent. The consequences of alternative liability rules are explored under the premise that the potential parties to an accident know the liability rule and that each person chooses an accident avoidance expenditure to maximise his own welfare given similar behaviour on the part of others. The goal is to identify liability rules that entail proper accident avoidance expenditures, that is, those that minimise the sum of the costs of avoiding accidents and the expected costs of the accidents themselves.

135 The intellectual history of applying economic theory to the law was reviewed by Posner, The Economic Approach to the Law, 53 TEX. L. REV. 757 (1975).


137 Graham & Peirce, Contingent Damages for Products Liability, 1984 J. LEGAL. STUD. 441, 442-443. An alternative view is that of tort law based upon the concept of corrective justice: that is, upon the notion that when a man harms another the victim has the moral right to demand, and the injurer a moral duty to pay him, compensation for the harm; see Epstein, A Theory of Strict Liability, 2 J. LEG. STUD. 151 (1973); Epstein, Defenses and Subsequent Pleas in a System of Strict Liability, 3 J. LEG. STUD. 165 (1974); Epstein, Intentional Harms, 4 J. LEG. STUD. 391 (1975); Epstein, Nuisance Law and its Utilitarian Constraints, 8 J. LEG. STUD. 49 (1979); see also, Borgo, Causal Paradigms in Tort Law, 8 J. LEG. STUD. 419 (1979); Posner, Epstein's Tort Theory: A Critique, J. LEG. STUD. 457 (1979); Epstein, Causation and Corrective Justice: A Reply to
Deterrence and cost internalisation

Deterrence is concerned with trying to prevent individuals from committing torts; cost internalisation with trying to make individuals, through the marketplace, pay for the cost they impose on others. Sir John Salmond recognised that the low of tort exists for the purpose of preventing men from hurting one another, i.e. that cost internalisation has a deterrent effect. In the 1960s, Guido Calabresi (Yale University Law School) employed price theory to conclude that accident costs are minimised by placing liability upon the party or combination of parties that can avoid accident costs most cheaply. In such analysis, damages paid over to the plaintiff are viewed as the price of enlisting their participation in the operation of a social mechanism designed to bring about, at least approximately, a cost-justified level of accidents and safety.

Liability insurance does not necessarily compromise the deterrent effect of tort law. Although the tortfeasor will not personally have to pay any damages awarded against him, his insurer will have to do so; and the insurer may in return increase the insured's premiums. It has even been suggested that tort law backed by liability insurance may be a greater incentive to safety than tort law alone. This is because the threat of having to pay substantial damages may be quite

two Critics, 8 J. LEG. STUD. 477 (1979).
138 Atiyah, American Tort Law in Crisis, 7 OXFORD J. LEG. STUD. 279,279 (1987).
139 Heuston, supra note 77, at 13.
140 Calabresi, Some Thoughts on Risk Distribution and the Law of Torts, 70 YALE L.J. 499 (1961), and Calabresi, The Decision for Accidents: An Approach to Nonfault Allocation of Costs, 78 HARV. L. REV. 713 (1965); see also Calabresi, Right Approach, Wrong Implications: A Critique of McKean on Products Liability, 38 U. CHI. L. REV. 74 (1970); for a formal presentation and some extension to Calabresi's work, see Diamond, Single Activity Accidents, 3 J. LEG. STUD. 107 (1974). An application of the Calabresian strategy is to establish a rule that all firms handling hazardous waste, from the generator to the final disposer, are jointly and severally liable for its ultimate disposal costs, see Anon., Allocating the Costs of Hazardous Wastes Disposal, 94 HARV. L. REV. 584, 588 (1980); for an application to products liability, see Stapleton, Products Liability Reform: Real or Illusory, 6 OXFORD J. LEG. STUD. 392 (1986).
142 Atiyah, Accident Prevention and Variable Premium Rates for Work-Connected Accidents - I, 4 INDUST. L. J. 1,1 (1975)
meaningless to a tortfeasor who has not got the assets to meet them; the threat of increased premiums, by contrast, may be more real because they will, indeed, have to be paid. An analysis of insurance for work related accidents has favoured premiums assessed upon a combination of classified rating (i.e. variation which takes in the risk of different industries) and experience rating (i.e. variation according to the accident record of particular employers).144

The attractiveness of tort law as a mechanism of providing both deterrence and compensation diminishes, however, as the number of injured parties increases, as the source of these injuries becomes more difficult to isolate and identify, and the manifestation of injury is delayed in time.145 Alternative private and government mechanisms for the provision of both compensation and deterrence have been suggested in response to the increasing number of actions of this type.146

The economic implications of changing product liability rules has also been analysed, but no general conclusions reached to guide the choice between caveat emptor and caveat vendor, and the possible intermediate liability rules.147 It has been conjectured, however, that placing the liability of accidents upon the general taxpayer, rather than upon the producer or consumer, would increase production of hazardous products and would require extensive government regulations, safety standards

146 See, for example, Epstein, The Legal and Insurance Dynamics of Mass Tort Litigation, 13 J. LEG. STUD. 475 (1984); see also Boden, Comment on Epstein, 13 J. LEG. STUD. 507 (1984).
and product warnings to counter the problem. Indeed, that the Accident Compensation Act introduced in New Zealand in 1972 had dispersed the cost of defective products was an argument employed in support of consumer protection law, an argument which culminated in the Fair Trading Act 1986.

One method of determining damages to be paid is to estimate personal injury loss. A more sophisticated method is a two part rule of damages: (1) a compensatory award, paid to the victim, determined by the amount of insurance he would chosen to buy given the price of the defendant's liability insurance; (2) a 'deterrence surcharge' or fine on the defendant, paid to the state, determined by potential victims' willingness to pay for injury prevention and by the uninsured cost of suit to the defendant.

Regulation v. Liability
Liability in tort and the regulation of safety represent two very different methods for controlling the use of hazardous substances. Tort liability is private in nature and operates indirectly through the deterrent effect of actions for damages that may be brought once harm occurs. Standards, prohibitions, and other forms of safety regulation, in contrast, are public in character and modify behaviour directly through requirements imposed independent of the actual occurrence of harm.

Steven Shavell (Harvard Law School) analysed four determinants of the relative desirability of liability and regulation:

1. Difference in knowledge of hazardous activities. Where private parties have superior knowledge of the benefits of activities, the costs of reducing the hazard, or the probability or severity of accident, it would be better for them to decide about the control of risks, indicating an advantage of liability rules, all things being equal.

2. Private parties might be incapable of paying for the full magnitude of the harm done. Where this is the case, liability would not furnish adequate incentives to control risk, because private parties would treat losses caused that exceed their assets as imposing liabilities only equal to their assets. But under regulation inability to pay for harm done would be irrelevant, assuming that parties would be made to take steps to reduce risk as a precondition for engaging in their activities.153

3. Possibility that parties would not face the threat of suit for harm done. Like inability to pay for harm, such a possibility results in a dilution of the incentives to reduce risk created by liability, but is of no import under regulation. Reasons why a defendant might escape tort liability are that the harms he generates are widely dispersed, a long period of time passes before the harm manifests itself, or that it is difficult to attribute harm to the parties who are in fact responsible for producing it.

4. Magnitude of the administrative costs incurred by private parties and by the public in using the tort system or direct regulation. A consideration of costs favours liability for most of its administrative costs are incurred only if harm occurs.154

153 The problem of insolvency has, however often been overstated, see Landes & Posner, Tort Law as a Regulatory Regime for Catastrophic Injuries, 13 J. LEG. STUD. 417 (1984); Oi, Tort Law as a Regulatory Regime: A Comment on Landes and Posner, 13 J. LEG. STUD. 435 (1984).

Shavell concludes that a complete solution to the control of hazards should involve the joint use of liability and regulation, with the balance between them reflecting the importance of the determinants. An opposing view is that of Peter Huber (Massachusetts Institute of Technology). He argued that the judicature is too conservative in its decisions, and that decisions on the control of public risks should be made by expert administrative agencies as experts are best able to assess the benefits of accepting greater public risks.

**Strict liability v. negligence**

Calabresi reasoned that the prices of goods should reflect their full cost to society to achieve a cost-justified level of accidents and safety. This in turn requires that the cost of injuries be borne by the activities which caused them, whether or not fault is involved, because, either way, the injury is a real cost of those activities. He thus favoured strict liability.

But as pointed out by Richard Posner (University of Chicago), the case against a negligence standard of liability is not clear cut; if negligence is assessed upon an economic criterion (i.e. by whether the product of the probability of the accident and the gravity of the accident exceeds the burdens of taking precautions, with marginal, not

---


158 Certainly strict liability for hazardous activities cannot be justified on the grounds that those engaged in such activities are the superior risk-bearers, they need not be, see Morris, *Hazardous Enterprises and Risk Bearing Capacity*, 61 YALE L.J. 1172 (1952). Note too that liability should not be confined to those hazards which are foreseeable, see Morris, *Enterprise Liability and the Actuarial Process - The Insignificance of Foresight*, 70 YALE L.J. 554 (1961); but see Schwartz, *Products Liability, Corporate Structure, and Bankruptcy: Toxic Substances and the Remote Risk Relationship*, 14 J. LEG. STUD. 689 (1985); Cooter, *Defective Warnings, Remote Causes, and Bankruptcy: Comment on Schwartz*, 14 J. LEG. STUD. 737 (1985).
total, costs and benefits compared\textsuperscript{159}, a negligence standard is broadly consistent with an optimal investment in accident prevention by the enterprises subject to the standard.\textsuperscript{160} Moreover, a negligence rule has the advantage that it encourages all parties to consider how they might reduce the hazard and thus is more likely to achieve a desirable result,\textsuperscript{161} and it avoids the crushing liability which can result if injurers are made to pay for most or all accidents in which they are involved and which would have occurred in their absence.\textsuperscript{162} However, for activities which are ultrahazardous, i.e. where unavoidable accident costs are great (e.g. blasting), Posner favoured strict liability as a means of compelling those responsible to take into account the cost of unavoidable accidents and to consider less hazardous means of achieving the same result (e.g. digging instead of blasting).\textsuperscript{163} Under a negligence rule, however, the courts must grapple with elusive concepts in order to judge what is negligent,\textsuperscript{164} and once conduct is described as reasonable no legal sanction attaches to it.\textsuperscript{165}


\textsuperscript{163} Posner, supra note 160, at 76.


\textsuperscript{165} Epstein, A Theory of Strict Liability, 2 J. LEG. STUD. 151,157 (1973).
Whether strict liability means more court cases than a negligence rule is not clear.¹⁶⁶ On the one hand, dispensing with the negligence requirement enhances an injured party's incentive to sue and could lead to more court decisions; but, on the other hand, with negligence no longer an issue, the proportion of claims settled out of court could increase. The actual result will depend upon which effect is the strongest.

Appendix Five: Specification of hazardous substances

Environment Act 1986

"Hazardous substance" means dangerous goods as defined by the Dangerous Goods Act 1974, toxic substances as defined by Toxic Substances Act 1979, and any other inflammable, toxic, explosive, infectious, radioactive, or other substance which may impair human, plant, or animal health.

Explosives Act 1957

"Explosive" means any substance or mixture or combination of substances which in its normal state is capable either of decomposition at such a rapid rate as to result in an explosion or of producing a pyrotechnic effect; and, without limiting the foregoing provisions of this definition, includes -

(a) Gunpowder, nitroglycerine, dynamite, guncotton, blasting powder, fulminate of mercury or of other metals, coloured fires, fog signals, fireworks, fuses, rockets, percussion caps, detonators, cartridges, and ammunition of all descriptions;

(b) Any device, contrivance, or article which utilises an explosive as an integral part of it for the purposes of producing an explosive, ballistic, or pyrotechnic effect;

(c) Any preparation or adaptation of an explosive as hereinbefore defined; -

but does not include an explosive substance or explosive mixture or combination of substances that has been effectively rendered inert by a suitable form of treatment, whether by way of solution, dilution, admixture with other materials, or any other effective method, nor an explosive substance or mixture or combination of substances that has been declared not to be an explosive by the Minister by notice published in the Gazette.

Radiation Protection Act 1965

"Radioactive material" means any article containing a radioactive substance giving it a specific radioactivity exceeding 100
kilobecquerels per kilogram and total radioactivity exceeding 3 kilobecquerels.

Dangerous Goods Act 1974

"Dangerous goods" means goods of any of the kinds specified in the Schedule to this Act; and a reference in this Act to a specified class or to a specified subclass of dangerous goods shall mean a reference to all the dangerous goods in that class or, as the case may be, in that subclass, as set out in the Schedule to this Act:

SCHEDULE

Section 2 "Dangerous Goods"


Class 2

Gases, being -

(a) Gases (other than those included under any other paragraph of this Class) when compressed, liquefied, or dissolved under pressure.

(b) Ethane, ethylene, hydrogen, methane, and any other flammable gas (other than that included under any succeeding paragraph of this class).

(c) Acetylene, compressed or dissolved, and contained within a porous substance.

(d) Liquefied petroleum gas, and any other liquefied flammable gas.

(e) Chlorine.

(f) Anhydrous ammonia.

(g) Liquid ammonia.

Class 3

Flammable liquids, mixtures of liquids, liquids containing solids in solution or suspension, and nitrocellulose, being -

(a) Liquids, mixtures of liquids, and liquids containing solids in solution or suspension, which in each case has a flash point lower than 23 degrees Celsius, and nitrocellulose having a nitrogen content of not more than 12.6 percent by weight and wetted, gelatinised, or blended with an industrial solvent or
other material approved as to kind and quantity by the Chief Inspector.

(b) Liquids, mixtures of liquids, and liquids containing solids in solution or suspension, which in each case has a flash point of 61 degrees Celsius or lower, but not lower than 23 degrees Celsius.

(c) Fuel oil.

Class 4

Flammable solids, being -

(a) Calcium carbide.

(b) Phosphorous (white or yellow).

Class 5

Oxidising substances, being -

(a) Chromates and dichromates, chlorates, inorganic peroxides, nitrates, perchlorates, permanganates, and hydrogen peroxide solutions containing more than 8 percent hydrogen peroxide.

(b) Organic peroxides.

Class 8

Corrosives, being hydrochloric acid, hydrofluoric acid, nitric acid, sulphuric acid, potassium hydroxide in solution, sodium hydroxide in solution, and aqueous ammonia.

Toxic Substances Act 1979

"Toxic substance" includes -

(a) Any poison or harmful substance:

(b) Any acaricide, insecticide, fungicide, larvicide, nematocide, pesticide, or herbicide:

(c) Any tobacco prepared for smoking, chewing, or snuffing:

(d) Any other substance (not being -

(i) A food within the meaning of the Food and Drug Act 1969; or

(ii) Except in Part V of this Act, a restricted drug within the meaning of the Restricted Drugs Act 1960, or a radioactive material within the meaning of the Radiation Protection Act 1965, or a controlled drug
within the meaning of the Misuse of Drugs Act 1975) -
that, when swallowed, inhaled, or injected into or otherwise absorbed by the human body, is likely, by reason of its toxic properties, to destroy life or to be injurious to health:
(e) Any other substance that, by reason of its chemical or biochemical properties, may directly or indirectly adversely affect the environment.

Pesticides Act 1979

"Pesticide" means any substance or mixture of substances represented by the proprietor as suitable for the eradication or control of any pest, whether by way of modification of behaviour or development or otherwise; and includes any substance or mixture of substances represented by the proprietor as suitable for use as a plant growth regulator, or a defoliant, or a desiccant; and also includes any substance or organism from time to time declared under section 7 of this Act; but does not include a fertiliser, or an animal remedy within the meaning of the Animal Remedies Act 1967.