Improving the Operation of the HSNO Act for New Organisms

November 2002: Response to the Ministry for the Environment Public Discussion Paper

In September 2002, the Minister for Environment commissioned a review of New Zealand's Hazardous Substances and New Organisms (HSNO) Act. The public's views on changes that might be made to the Act were sought. The Royal Society of New Zealand presents this response to the paper issued by the Ministry for discussion and response.

Guiding Principle

The view of the Royal Society of New Zealand is that the HSNO Act must be amended to ensure that the operational and compliance mechanisms for experiments performed in containment are in line with international practice, particularly with those of our major trading partners.

PART A: Legislative and Policy Proposals in Response to the Royal Commission on Genetic Modification

1. Introduction

1.1 The introduction of legislation was both necessary and desirable to ensure that the practice and application of *in vitro* genetic manipulation in New Zealand is regulated in a way that safeguards the environment, human, animal and plant health and is consistent with the principles of the Treaty of Waitangi. However, the Hazardous Substances and New Organisms (HSNO) Act is a flawed piece of legislation, for a number of reasons. The Royal Society of New Zealand was pleased that the Royal Commission highlighted many of the practical and operational difficulties that have emerged over the past two or three years and was delighted that the Government expressed an urgent desire to see these difficulties resolved through appropriate amendment to the legislation.

The Society is disappointed that the changes recommended by the Royal Commission and the proposals made in the discussion paper are largely designed to "patch up" the situation and do not address what we believe to be fundamental flaws in the legislation that require a much more rigorous revision of the Act. We will discuss this problem before proceeding to address the specific questions under this general heading.

1.2 In our view, it is unfortunate that, for reasons that are not fully clear, the drafters of the HSNO legislation decided on formulating an all-purpose Act to regulate the importation, storage, handling and release of both chemical substances and biological organisms. From both scientific and practical points of view, these represent quite distinct activities. The decision to combine them in one all-encompassing piece of legislation led to a huge Act that is unwieldy, internally inconsistent, and raises compliance difficulties that are seriously affecting the application of genetic modification technology to scientific research in New Zealand.

We recommended that the ideal solution to the problem (at least in the longer term) would be separation of the 'hazardous substances' and the 'new organisms' aspects of the HSNO legislation into two separate Acts. To stimulate thought along these lines, we tabled draft suggestions with the Commission to show how the division of the HSNO legislation into a "Hazardous Substances Management Act" and "Gene Technology and New Organisms Management Act" might be achieved. We were disappointed that this point was not picked up by the Royal Commission, although we appreciate that such drastic reorganisation of the legislation is probably neither possible nor (given the time that it would take to achieve) desirable in the first instance.

1.3 Although we will, in this submission be making suggestions for improvement to the Act, we have no difficulty in accepting that applications for the uncontained release of GMOs into the environment are most appropriately dealt with by ERMA on a case-by-case, organism-based, approach as endorsed by the Royal Commission. The submissions made to the Royal Commission, however, clearly showed wide public acceptance that the laboratory-based use of *in vitro* genetic modification technology can be adequately contained and that an approach based on consideration of the experimental details involved is acceptable.

We submit, however, that attempts to regulate this aspect of the use of the technology have resulted in a mechanism for handling applications for contained, laboratory-based research that is unnecessarily clumsy, is not in accordance with internationally-accepted practice, and introduces avoidable problems of enforcement and compliance. The problem arises from the fact that the legislation is organism based and we have concerns about the legality of using Regulations to circumvent problems that are raised by the wording of the Act itself.

1.4 We submit that the root cause of these difficulties is the fact that the drafters of the legislation made two significant decisions

- The introduction of a 'new organism' represents an environmental hazard.

- Any GMO—including those held in containment in New Zealand at the time of commencement of the Act—is a new organism and therefore constitutes an environmental hazard.

There are no scientific grounds to support any assertion that *in vitro genetic* modification of an organism automatically increases the environmental hazard presented by the unmodified organism. Yet the effect of these decisions was to include all GMOs held in secure containment in the same 'environmental risk category' as organisms proposed to be *released* in New Zealand for the first time.

1.5 Discussion of these issues is complicated by an apparent lack of appreciation on the part of the drafters of the legislation of the distinction between 'hazard' and 'risk'. For the purposes of this response to the discussion paper we will make the following distinction:
HAZARD: is a potential for harm
RISK: is the likelihood of the harm being realised.
The important point is that, *in New Zealand and internationally,* the experience of nearly thirty years has shown the efficacy of appropriate containment in *preventing* the accidental escape of GMOs from the laboratory. In that time, there has been no authenticated example of any escape leading to any environmental or health damage. In other words, while a *specific* GMO *might* present a hazard if released in the environment, the risk to the environment is extremely (and acceptably) low, provided that GMO is held in secure containment that is designed to prevent its escape.
Internationally, this fact has been recognised by the development of containment guidelines that are based on *phenotypic* rather than *genotypic* considerations. In formulating these guidelines for appropriate containment, use is therefore made of a knowledge of the biological properties of the host organism, the foreign DNA to be inserted, the vector(s), any specific experimental procedures that will be used, and any phenotypic changes in the host (increased virulence, expression of specific proteins etc.) that might result from the genetic manipulation. This approach to containment was, of course, used in constructing the containment guidelines that were administered informally in New Zealand by the ACNGT for 20 years before the advent of ERMA. It is, perhaps, fair to say that many of the apparent cases of non-compliance revealed during the review that was made a few years ago stemmed from a failure on the part of New Zealand scientists to appreciate the difference in approach between the old and the new regimes.

The difficulties that the 'organism based' approach would raise in practice was pointed out during the drafting stages of the legislation. The objection was, however, countered with the response that any difficulties that these decisions might raise would readily be overcome in due course by introducing appropriate 'regulations' to govern the application of the Act. This, of course, is what has happened. We wish to restate our

argument that it is bad practice to try to repair the deficiencies of an Act by regulation. Furthermore, we are concerned that the amendments outlined in this Discussion Paper simply perpetuate and extend what we believe to be an undesirable solution to the problem.

For these reasons, before we discuss the revisions to the Act that are put forward in the Discussion Paper, we wish to revisit the definition of 'new organism' and put forward a proposal that, if accepted, will go a long way towards solving the problem and simplifying the implementation of the Act *without in any way compromising environmental safety*.

1.6 Our proposal has two key elements:

- That the Act be renamed 'The Hazardous Substances, New Organisms and Gene Technology Management Act', to allow the treatment of GMOs to be separated, where appropriate (and particularly in relation to "low risk" experiments) from the treatment of 'new organisms'. A change of title along these lines would to allow the regulation of other technologies (such as regeneration of a new organism by somatic nuclear cloning) to be included in the Act as the need arises.
- That the definition 'new organism' be applied to a GMO only when consideration is being given to releasing that GMO from approved secure containment. The effect of this would be to exclude from the definition any GMO already held in containment at the commencement of the Act, any GMO constructed in approved containment and held in containment since the introduction of the Act; and any GMO of an organism that is already in New Zealand for which approval for importation into containment has been given.

1.7 The main effect of these changes would be to allow the construction of a GMO in containment, or importation into approved containment of a genetically-modified version of an organism that is already in New Zealand, to be determined by Regulations that are based on phenotypic and practical considerations. The need for the biological description of the organisms concerned with the genotypic detail that is required for an organism that is the subject of an application for full (or partial) environmental release would be obviated.

1.8 An important issue, of course, is the definition of 'approved containment'. We argue in Section 4 (below) for a distinction to be made between a 'contained field test' and a 'partially-contained field test'. If a field test can, indeed, be *fully* contained, then a GMO in such a trial would not be a 'new' organism under our definition. We appreciate that this distinction, while desirable, may not be acceptable, at least in the current climate. In these circumstances, we would propose that the definition of 'approved containment' be restricted to 'containment in a laboratory, plant house or animal facility that is approved under the appropriate New Zealand or Australasian standard'.

1.9 From the practical point of view, change along these lines would have several advantages:

- It would give recognition to the fact that the essential factor in determining the containment of *laboratory based* experiments is **hazard/risk to health** (human, animal or plant) and not **environmental risk**.
- It would remove the need for the (largely arbitrary) distinction between "Low Risk" and "Not Low Risk" constructions that is at present made by the so-called "Low Risk" Regulations. Classification would now be on the grounds of hazard, given that experience has demonstrated that such hazards and the risk to human, animal or plant health can be managed by appropriate experimental practice.
- It would allow for the existing Regulations to be amended to recognise that many *in vitro*recombinant constructions have been shown by thirty years of international experience to pose no hazard to human health and can be safely confined to the laboratory by containment that is based simply on sound laboratory practice. In countries such as Australia and Great Britain, such experiments are exempt from any form of statutory regulation. We would hope that, at least in time, consideration will be given to introducing similar exemptions in New Zealand.
- It would allow the Regulations to be amended to permit adjudication of *all* laboratory-contained experiments to be delegated to IBSCs, with a requirement only for notification of decisions to ERMA. This makes scientific sense, since the expertise for such adjudication is at the workface. Existing ERMA and MAF auditing processes would still be there to provide assurance to the public that all work was being properly assessed, monitored and contained.

1.10 The suggestions that we make are not based on semantic arguments but on genuine practical considerations that have been shown internationally to be acceptable and effective. Their adoption would bring experimental, laboratory-based work in New Zealand to be brought into line with accepted international practice and would greatly simplify the operation of the HSNO legislation without in any way compromising environmental, health or cultural safety. GMOs constructed in, or imported into, containment would still be identified as *potentially* harmful. Experiments involving GMOs would still be subject to statutory control, appropriate containment, and rigid compliance requirements.

1.11 We see it as particularly important that these changes would allow New Zealand to bring its regulatory practices more in line with those of our major trading partners, especially those of Australia, where effective legislative and regulatory control has been introduced that is not complicated by the artificial constraints of the HSNO Act.

The need for this is emphasised in the discussion document, *New Zealand Biotechnology Strategy*, issued by the Ministry of Research, Science and Technology. It is appropriate that the present review should include the specific issues raised by that document, as well as by the MfE Discussion Paper.

We urge the Ministry for the Environment to consider these proposals carefully before any large-scale change to the existing legislation is contemplated.

We will refer back to these suggestions where appropriate as we now proceed to discuss the specific questions raised in the Discussion Paper.

2. Simplifying Approval Processes for Laboratory Research

Group approvals for low-risk GMOs:
2a: What other ways are there to group (and handle/process) approvals for low-risk work?
2b: Is this approach workable?

Question 2a*.* This is a good suggestion. It is certainly appropriate that the Regulations be amended along these lines. However, the argument that we have outlined above makes it clear that it is confusing and inappropriate to classify GMOs held in secure containment as "Low Risk" or "Not Low Risk". Properly defined and operated containment practice means that any GMO held in a laboratory will pose minimal, *and acceptable*, environmental risk. The issue to be considered is *hazard,*particularly to the health of the experimental personnel and the risk of escape. The re-definition of "new organism" to exclude GMOs constructed in, held in, or imported into defined containment would solve this problem. The role of the Regulations would be to ensure that the containment is appropriate to the experiments and to the phenotypic properties of the GMOs that are to be constructed in or imported into that containment facility.

Question 2b. The approach outlined under 2.2.2 is certainly workable. For reasons that we have given above, however, we believe that the present requirement for some experiments to be referred directly to ERMA is an arbitrary and unnecessary requirement. We believe that responsibility for all approvals for the construction of GMOs in approved containment should be delegated to the IBSC, with a requirement only for *reporting* to ERMA. We do, however, endorse the present requirements whereby the operation of containment facilities and the

procedures of IBSCs are subject to regular audit by MAF and ERMA, respectively.

How could the requirements for identifying organisms be simplified?

2c: Which option is more appropriate: 1: Retain only a requirement to describe "low-risk" projects. 2: as for 1, but add requirement to identify the GMO resulting from the work
2d: What level of identification is required for intermediate and for resulting organisms?
2e: When should the identification of the resulting organism occur?

Question 2c. We support Option 1. As we have outlined, the important considerations are the properties of the host, the vector, the genetic material concerned, and, where relevant, the nature of the experimental procedure that is used. We believe that the Regulations should permit a flexible approach to the classification of experiments that can accommodate small changes in these parameters that do not require an increase in the level of containment. Any change that requires an increase in containment level would have to be considered by an IBSC as a new application as an amendment to an existing application.

Question 2d. If a library has been constructed under appropriate containment, it makes no sense to require a single GMO isolated from that library to be treated differently from the library as a whole. There should therefore be no requirement for any more stringent identification of intermediate or resulting organisms that are held under approved containment, or that are transported under secure conditions to another approved containment facility.

Question 2e. Whether or not our proposal for the re-definition of a "new organism" is accepted, we recommend that the detailed description of a GMO as required by the HSNO Act should be required *only* when an application is made to release the GMO into the environment or to use it in a situation (such as a field test) where containment can no longer be assured.

Defining Low-Risk GMOs:
2f: Is it sufficient to base the criteria for a low-risk organism on the host organism, the nucleic material being inserted, and the vector, where present?
2g: Will these criteria limit the importation of organisms that are demonstrably low-risk but have been developed according to other possibly higher-risk procedures?
2h: What other criteria might be appropriate (e.g. the phenotype of the organism)?

2i: Are there other general approaches to characterising low-risk organisms that may be better? If so, what are they?

Question 2f. The criteria used for classifying a GMO for importation should be identical to those used for classifying the laboratory construction of that GMO. Option 1 is the logical approach that should be used.

Question 2g. The experimental procedures to be used to construct a GMO are important in determining the human health hazard/risk of a proposal as well as the risk of escape and thus the level of containment necessary to ensure protection of the personnel involved. Once the GMO has been constructed, however, the actual procedure used for its construction becomes irrelevant. The considerations governing the importation of a GMO should be based on the biological properties of the host, the vector, the inserted DNA, and the phenotype of the recombinant organism, to ensure that the GMO is held and used under appropriate secure containment.

Question 2h. Questions such as phenotype (e.g. whether the host is pathogenic; whether the inserted DNA is expressed; the properties of any expressed protein, etc.) are covered by the considerations already discussed under the answer to Question 2c (above). We are not able to identify any other criteria that need to be used.
Question 2i. We believe that the procedures discussed above are appropriate and workable.

3. *New Organisms Regenerated from Tissues*

GM in Human Cell Lines:
3a: Is it necessary to include genetic modification of human cell lines in the HSNO Act at this stage? If so, what do you think would be the best way of doing this

3b: Should consideration of the control of genetic modification of human cell lines be done as part of the Ministry of Health's wider consideration of all aspects of human cell and tissue research? Would guidelines be sufficient in the interim?

3c: What is the likely impact to existing practice of the changes outlined in the options given above?

Question 3a. We believe that Option 1 provides the most appropriate solution and support the suggestions made for the scope of this amendment. The exclusion of tissues derived from humans from the definition of 'organism' has always been an anomaly of the Act. This will most appropriately be done by changing the definition of 'organism' so

that, while a human being or a genetic structure derived from a human being is still excluded from the definition, a cell line derived from a human being is not.

Human cell lines are already listed in the "Low-Risk Genetic Modification" Regulations as approved hosts for genetic modification. Changing the definition of 'organism' in this way would subject the genetic modification of human cell lines to the same rules that apply to the modification of cell lines from other organisms,

Question 3b. The genetic modification of *human beings* is excluded from the HSNO Act and should be included in the Ministry of Health review. We believe that the genetic modification of *human cell lines* is properly included in the scope of the HSNO Act and of ERMA and should not be referred for inclusion in the terms of reference of the Ministry of Health review.

Question 3c. Clearly this amendment will have the effect of regulating experiments that are not at present under statutory control but, given the cultural sensitivity of work involving human genetic material, this would not necessarily be a bad thing. The most serious effect would be the hindrance that it would place on the importation of genetically-modified human cell lines. This effect would be considerably lessened if the amendment to allow IBSCs to adjudicate on importation of GMOs into containment were approved.

New organisms regenerated from tissues:

3d: How should the HSNO Act be changed to best cover new organisms produced using cloning technologies?

3e: What other ways might there be to regulate these organisms?

Question 3d. The handling of the issue of regeneration of a new organism from somatic tissues would be simplified if our suggestion to rename the HSNO Act to 'The Hazardous Substances, New Organisms and Gene Technology Management Act' is accepted (see Section 1.6, above). This would allow a new definition of 'genetic technology' to be added and the regeneration of an organism that is not present in New Zealand to be included in this definition. The addition of 'an organism, whether genetically modified or not, that is not present in New Zealand and that has been regenerated from somatic cell nuclear material' to the definition of 'new organism' would bring cases of this sort within the scope of the HSNO Act.

At what stage in the process should the HSNO assessment be carried out?

3f: At what stage do you think a regenerated new organism should be assessed under the HSNO Act.

Question 3f. Regulations will need to be drawn up to cover the regeneration from somatic tissue of an organism not presently in New Zealand. While it is likely that ERMA would wish to adjudicate on proposals concerning animals, the applications for the regeneration of plants or fungi or other eukaryotic micro-organisms to be held in containment for experimental purposes should be delegated to IBSCs. Any proposal for release of such a regenerated organism from containment would, of course, be handled by ERMA under the normal requirements of the HSNO Act.

4. Conditional Release

4a: In what situations should controls be used to manage organisms after release?
4b: Are there any purposes outlined in the preceding section for which conditional release should not be used?
4c: Are there any additional purposes that conditional release could be used for?
4d: Should agencies other than ERM A be able to decide where GMOs are permitted? If so, on what basis?
4e: Are there other ways in which location controls could be managed in practice?
4f: How could purposes for the conditional release category be defined?
4g: How tightly should ERMA's setting of controls be defined in the HSNO Act?
4h: What would be the advantages and disadvantages of a separate approval process for conditional release?
4i: How would you see the application process working?
4j: How should the controls on conditional release approvals be reviewed?
4k: Are the existing reassessment provisions in the HSNO Act sufficient for this purpose. If so why?
4l: What alternatives would you propose and why?
4m: To what lengths should authorities go to check compliance with controls on release of new organisms?
4n: What other mechanisms could be used to achieve a high level of compliance with controls placed on organisms under conditional release?

4o: What would be the most appropriate way to assign responsibility for ensuring compliance with and enforcement of conditional release controls?
4p: Are there other models that could be effective?
4q: Is full/partial cost recovery appropriate for conditional release applications?
4r: Who should bear the costs of compliance checking and enforcement of controls under conditional release?
4s: After reading section 4, what do you believe the potential advantages and disadvantages of conditional release to be?
4t: Should all releases continue to be made without controls (should the status quo remain)?

Question 4a. In our submission to the Royal Commission, we pointed out that the biological behaviour of many organisms growing in the open is frequently different from their behaviour when they are propagated under more confined or artificial conditions. We argued a case for the recognition of four situations: (a) contained laboratory experiments, (b) contained field test, (c) partially contained field test, and (d) full-scale environmental release.

Our addition of (c), partially-contained field test, was made to overcome the "all or nothing" approach of the existing legislation and to recognise the fact that there is a need for a class of field test that is between a fully-contained test and a general release. That is, one in which every effort is made to ensure containment, but where there is significant risk of escape from containment. The risk of an environmental hazard resulting from such a test is probably negligible if the test involves large domestic animals (see Discussion Paper Section 11.9), but is certainly greater for plants and even more so for bacteria, viruses, insects and other more mobile organisms. We, further, submitted that the process of assessing permits for full-scale release would be enhanced if the legislation were made more flexible to allow ERMA to set conditions on environmental releases, where this was appropriate.

Apart from increasing the flexibility of research, such an extension of the Act would allow a new organism to be fully evaluated and realistic assessments of risk-benefit issues to be made before full-scale release. We strongly support the proposals made in this section of the Discussion Paper. We are, however, concerned that the compliance cost of such conditions could be very high. Proper design of field tests should minimise the need for controls and care must be taken to ensure that any monitoring or other conditions imposed by ERMA are truly necessary and are based on hazard/risk considerations that can be substantiated scientifically. The use of controls in cases where commercial or other releases are proposed must, similarly, be subject to careful consideration on a case-by-case basis.

Question 4d. At this time, it is appropriate that all determinations regarding the release of GMOs should be made by a single agency (ERMA), consulting with other agencies (e.g. MAF) as appropriate.

Question 4g. We believe that references to controls in the Act should be general. All proposals should be adjudicated on a case-by-case basis. Any attempt to specify controls in the Act could have the effect of unnecessarily increasing the cost of compliance. It is essential that the Act should allow ERMA complete flexibility in setting such controls as it deems necessary after full consideration of the scientific evidence.

Question 4h. As we have stated above, we see "conditional" release issue as one that encompasses experimental tests as well as environmental release for commercial or other purposes. We believe that this option should be available to ERMA as it considers applications on a case-by-case basis. In our submission to the Royal Commission, we proposed that a fast-track procedure that did not involve such extensive public consultation could be introduced for *fully-contained* field tests. Applications for partially-contained field tests would still clearly have to be adjudicated on a case-by-case basis. However, applications for environmental release that is not part of an experimental process should be treated flexibly. We see both Options 1 and 2 as viable. An applicant should be able to apply for 'conditional' release if that is desired, but ERMA should be able to downgrade applications for 'unconditional' release if that is the most appropriate outcome. It is important that the Act be sufficiently flexible to allow these options to be used without the need for re-hearing applications simply because not all possible options were specified in the original application.

Question 4i. See above.

Question 4j. We support Option 2 as the first step, but with Option 1 still possible. Conditional release will only work if the conditions are monitored regularly. Clearly the first onus for monitoring must fall on the applicant, but it is essential that there should also be an independent review made by MAF and reported to ERMA. ERMA should have power to review and revise the conditions as it wishes. However, there should also be provision for an applicant to be able to apply to ERMA for such review and revision if desired.

Question 4m. There is no point in setting controls without monitoring the effectiveness of those controls and the compliance on the part of the user. However, it is important that, whatever approach is used for monitoring adherence to conditions, that it be workable from the points of view both of the user and the enforcement agencies and that the cost of compliance is no higher than is necessary. The important issue is not to make the legislation prescriptive but to keep it flexible enough to allow solutions to

be tailored to suit specific cases. We favour Option 2 as the mechanism for granting approval for conditional release. This would ensure that ERMA is aware of where and when new organisms are used and assess the impacts of their use in particular locations or circumstances.

Question 4o. Option 2 would provide the greatest flexibility and would allow greater community involvement in cases where there is a specific local concern. Enforcement could be targeted to the agencies with responsibility for the environments in which conditional release occurs. The advantages of devolving decision-making and enforcement to the local level were discussed in Part B of the RSNZ Submission to the RCGM. Option 2 would facilitate this while sustaining ERMA's overall responsibility for compliance.

Question 4q. The answer to the question of cost recovery depends upon the purpose of the application. Where the applicant is a commercial organisation that is seeking approval for a release for commercial purposes, it is appropriate the majority of the costs should be borne by the applicant. In the case of a commercial organisation that is seeking approval for release of a GMO for reasons that are largely associated with the public good, then it is appropriate that a significant proportion of the costs should be borne by public funds.

Question 4r. See above.

Question 4s. See answer to Question 4a, above.

Question 4t. No, we believe that the category of 'conditional' release would fill an important gap in the legislation and allow a much more flexible approach to using the benefits of genetic manipulation for New Zealand.

5. Assessment of GMO Medicines

5a: Do you think medicines that are or contain new organisms (including GMOs) should be subject to a streamlined approval process for release? Why?
5b: If yes, which of the options described above do you prefer? Are there any alternatives that you can think of that reduce compliance costs but also adequately consider environmental issues and public consultation?
5c: Do you think that conducting an environmental risk assessment that does not include some of the areas currently covered in the HSNO Act (e.g. economic or cultural considerations) would be an appropriate way of streamlining the approval process for these medicines? Why?
5d: Options 3 and 4 above propose to streamline the process by requiring only one formal application to the lead agency. Do you

have a preference for which agency should lead the approval process: Medsafe or ERMA? Why?
5e: What level of public participation and consultation should there be in the approval process for new organism medicines?
5f: Do you think veterinary medicines that are or contain new organisms (including GMOs) should also be subject to a streamlined approval process for release? Why? If not, why not?
5g: If yes, which of the options described above do you prefer? Are there any alternatives that you can think of that reduce compliance costs but also adequately consider environmental issues and public consultation?
5h: Do you think that conducting an environmental risk assessment that omits some of the areas currently covered in the HSNO Act (e.g. economic or cultural considerations) would be an appropriate way of streamlining the approval process for these veterinary medicines? Why?
5i: Options 3 and 4 above propose streamlining the process by requiring only one formal application to the lead agency. Do you have a preference for which agency should lead the approval process: ACVM Group or ERMA? Why?
5j: What level of public participation and consultation should there be in the approval process for such veterinary medicines?
5k: Do you believe that human new organism medicines that have veterinary applications should be restricted to use in humans only?

Question 5a. Given that medicines containing GMOs will have passed extensive clinical tests before the proposal to release, there is a good case for streamlining the process for their approval and an appropriate mechanism should be devised. We do, however, see cultural and consumer issues as important and believe that there should still be public consultation.
Question 5b. We support Option 4. Under this option Medsafe would first assesses a medicine on the basis of its impact upon individuals and its public health impacts. Medsafe should have a right of veto at this stage, so that if a medicine does not meet their approval there is no need for ERMA to carry out a further assessment. If Medsafe approves the medicine, then ERMA can carry out an environmental risk assessment of the medicine. Assessment is then broadened out from the individual, to the public, to the environment, and this change in investigatory focus is mirrored in the parallel shift in responsibility of the nominated regulatory bodies and their relevant areas of expertise.

This option also means that the public can be appropriately involved in the process under ERMA regulations. This would allow an adequate opportunity for the expression of any relevant broadly based cultural concerns around the medicines. The level of public participation and

consultation surround the approval process should remain high as much of this medicine has still to be defined and described and its social effects may be highly significant.

Question 5c. The environmental risk assessment should be appropriate for the organism that is involved and the Act should be flexible enough to permit this so that compliance costs are reduced. We believe, however, that cultural concerns are important and should be evaluated.
Question 5d. Given that ERMA must make the final assessment with respect to environmental risk, it makes sense for that Agency to lead the approval process, but refer all applications to Medsafe for approval for clinical use, before embarking on its assessment.
Question 5e. We believe that public participation is important, and that the opportunity to make submissions and appear at public hearings will be an important part of ensuring involvement by the community in decision-making. We suggest that this be reviewed after a period of three years in the light of the compliance costs involved and the levels of engagement by people in this process.
Question 5f. Option 4 would also be appropriate for veterinary medicine. In a case where a medicine containing a GMO has been approved for human use and subsequent to this there is a desire to use the medicine on animals, then the following should occur. The Agricultural Components and Veterinary Medicines Group must first approve the medicine for animal use, and then ERMA must assess the environmental impact of the medicine for its new use. That is, the medicine may now enter the food chain and so must be subjected to a separate assessment by ERMA. ERMA would be able to call on the information used to gain approval for human use and this may speed up the application process.
Question 5g. We believe that Option 4 is the most appropriate approach.
Question 5h. We submit that economic and cultural considerations are just as important for veterinary medicines as for human medicines, but there may be other ways in which the process can be streamlined.
Question 5i. For the reasons given in our answer to Question 5d (above) we believe that ACVM should be the Agency that must first approve the medicine for animal use. This would be followed by a separate assessment of its environmental impact by ERMA
Question 5j. We believe that public participation is important, and that the opportunity to make submissions and appear at public hearings will be an important part of ensuring involvement by the community in decision-making. We suggest that this be reviewed after a period of three years in the light of the compliance costs involved and the levels of engagement by people in this process.
Question 5k. No, there are no scientific grounds for such a restriction. There may, however, be cultural or other issues that have to be considered before releasing a human medicine for veterinary use.

6. Confidential Information

(No comment on this component of the discussion document)

7. Grounds for Ministerial Call-In

7a: Do you agree or disagree with the proposal to include significant cultural, ethical or spiritual effects as grounds for call-in for Ministerial decision?
Question 7a*.* We favour the inclusion of reference to 'significant cultural, or ethical, or spiritual effects' in section 68. We also agree with the Government's decision to focus on 'cultural, ethical and spiritual effects' rather than 'issues'. However, while ethical and spiritual matters are 'cultural', we have some concerns about the use of the term 'cultural' as a generic term to cover 'ethical and/or spiritual' in section 2. Economic activity and the construction of 'health' as a social good are also 'cultural'. In this context 'cultural' refers to cultural differences and the need to attend to the effects on different cultural groups in Aotearoa/New Zealand.

There are some advantages in distinguishing the grounds for call-in associated with effects on different cultural groups from ethical and spiritual effects. The sets of issues and areas of expertise relevant to consideration of ethical effects of new organisms and their potential use are best signalled by explicit reference to ethical effects. Similarly the areas of expertise associated with assessing spiritual effects may be quite distinct from those associated with issues relating to cultural difference.

Part B of the RSNZ Submission to the RCGM made a strong case for the need to attend to Māori cultural positions on the use of genetic modification, particularly the possibilities of 'cultural risk' posed by particular biotechnologies. The inclusion of reference to 'significant cultural, or ethical or spiritual effects' in section 68 would be consistent with that submission.

8. Liability Issues

8a: For the purposes of considering liability issues, are GMOs and their effects significantly different from other activities or technologies?
8b: Where a GMO has been approved for release and the conditions for release have been complied with, how much weight do you think should be placed on this in considering whether the existing liability rules are adequate?
8c: Do you consider that existing liability rules will be effective in encouraging precaution in relation to harm that might be caused by GMOs?

8d: Do you consider that existing liability rules will be effective in providing compensation in relation to harm that might be caused by GMOs?

8e: Are the factors that limit the effectiveness of liability regimes significant in relation to GMOs?

8f: In the context of GMOs, is an appropriate level of precaution most likely to be achieved through:

- ***the current mix of regulation under HSNO and existing liability rules?***
- ***extended liability rules?***
- ***new regulatory mechanisms?***
- ***some combination of these approaches?***

8g: What are the costs and benefits of any extension of the liability rules or regulatory regime to achieve the appropriate level of precaution?

8h: If you consider that extended liability rules are desirable, what liability rules should apply and who should be liable?

8i: If you consider that further regulatory mechanisms are desirable, what should they include and how would they be enforced?

8j: Should any extended liability rules or regulatory mechanisms only apply in certain situations, such as:

- ***where a GMO has not been approved for release?***
- ***where it has been approved for release but the conditions have not been complied with?***
- ***where the operator has been negligent?***

8k: Should those extended liability rules or regulatory mechanisms apply where the harm is caused by the actions of a third party?

8l: In relation to questions 8j and 8k, what would be the risks, costs and benefits of these approaches?

8m: Are existing liability rules likely to result in an appropriate level of compensation for harm that might be caused by GMOs?

If not:

8n: What is an appropriate level of compensation in this context?

8o: Are extended liability rules likely to be an effective mechanism for achieving an appropriate level of compensation?

8p: Are other compensation mechanisms likely to be more effective in achieving an appropriate level of compensation?

8q: How effective will liability rules or other compensation mechanisms be in ensuring funding for action to remedy or contain GMO-related harm?

8r: Where action is taken by a government agency to remedy or contain GMO-related harm, should the costs of that action be recoverable by the government from persons who caused the harm, and/or from a levy on a specified class of persons such as users of GMOs?

8s: What do you see as the costs and benefits of any extension of the liability regime to achieve the appropriate level of compensation?
8t: To what extent is insurance for GMO-related liabilities currently available in New Zealand or overseas? On what terms?
8u: How is the market for such insurance likely to evolve over the next five to 10 years?
8v: Which, if any, of these options do you think should be adopted?
8w: Should any of these options not be adopted?
8x: Are there any other options you think should be considered?
Question 8a*.* The release of living organisms is significantly different from other activities and technologies in terms of effects on the environment. In the context of a situation in which there is unlikely to be any immediate change to the existing liability regime, we favour attention to a robust approval process for all environmental releases of living organisms, as well as commitment of resources for enforcement and monitoring of the effects of the use of GMOs. The information arising out of an effective enforcement and monitoring process can be used in the pursuit of liability claims on the basis of personal injury, property and environmental damage, and financial or economic loss.

Liability issues were addressed in Part B of the RSNZ submission to the RCGM. The argument was made that the principle of 'internalisation' should apply to the effects of GMOs, where the costs of the effects of product development are borne by the developers, not the community. While this may discourage some commercial interests from applying to release GM products in New Zealand, this must be weighed against the potential risks of unintended outcomes following product release. The submission argued for consideration of the establishment of an indemnity fund to which companies releasing genetically modified products would contribute.

Part B: Improving the Operation of the HSNO act for New Organisms

9. Zoo and Circus Animals

We make no comment under this section.

10. Enforcement Agency for New Organisms

10a: Do you agree with the proposal to formalise MAF as an enforcement agency for new organisms in containment?
10b: If not, what alternatives do you suggest?

Question 10a. We strongly support the proposal that MAF's enforcement role be formalised. MAF already has responsibility for much of this area and has effective working mechanisms in place. From the points of view of both efficiency and compliance, it is important that the number of agencies involved is kept at a minimum and there seems to be no reason to add OSH to the list of enforcement agencies.

11. *Issues Arising from Operation of the HSNO Act*

11a: Do you agree that the time to release a decision be extended to 30 days?
11b: Do you agree that there is a need to provide for organisms that arrive by natural means or as accidental hitchhikers? Can you provide examples of where a HSNO approval has been considered necessary for such organisms?
11c: What mechanism would you favour: by an Order-in-Council or by ERMA after consultation with other agencies? What alternative mechanism do you suggest?
11d: What criteria do you consider?
11e: Is the risk species process adequate to deal with organisms at a level below the species level? How could it be improved?
11f: Do you see any problems with the inclusion of the phrase 'any subspecies, infraspecies, variety, strain or cultivar' in the definition of new organism?
11g: What other mechanisms might be used to address the above issues?
11h: What other examples are there in addition to orchids where it might be appropriate to have approvals at a level above the species level?
11i: What other mechanisms might be used to address this issue?

Question 11a. There is no point in specifying a time limit that is unworkable. On the other hand, it is important that there should be a requirement for ERMA to notify decisions promptly. We agree with the suggestion that the time period be extended to 'not later than 30 working days'.

Question 11b. It makes sense for organisms that have arrived accidentally and have become established to be recognised. The problem is to define 'have become established'. Clearly an organism such as the painted apple moth can not yet be considered as having become established and perhaps it is still possible that the Varroa mite, which is much more widespread, can be eradicated. Each will have to be decided on a case-by-case basis.

Question 11c. Given that ERMA is responsible for adjudicating on 'new' organisms, it would seem important that they should be responsible for making this decision after appropriate consultation.

Question 11d. This will have to depend, at least, upon the degree to which it has become established, and what attempts have been made to eradicate it.

Question 11e*.* With the exception of micro-organisms for release as bio-control agents (which, clearly must be adjudicated by ERMA), most applications for the importation of pathogens will be for importation into containment for research purposes. The possession and study of pathogenic micro-organisms Zealand is regulated by legislation administered by MAF and the Department of Health and, provided the micro-organism that is the subject of a particular application is not on a proscribed list, the concept of 'risk species', using sub-species phenotypic descriptors such as pathogenicity rather than strain names should be completely adequate for setting appropriate containment requirements.

Question 11f. The possibility of describing plants at a level lower than species would raise serious difficulties in the case of bananas, which are usually triploid or tetraploid and are quite unstable genetically. Under the HSNO Act, the banana fruit is an 'organism'. It is clearly quite impracticable to require each importation of banana fruit to be adjudicated for importation on the basis of description at a level below species.

Furthermore, in contrast to the argument put forward in the Discussion Document, we believe that it would be a retrograde step to attempt to require the description at a level below species of micro-organisms, such as bacteria or fungi, that are being imported into containment. The problem is that each isolate of a bacterium tends to be regarded as a new strain and it is virtually impossible to decide whether a new 'strain' is already present in New Zealand or not.

Question 11g. The important issue from the point of view of containment of micro-organisms is the phenotype and it is this, rather than the name of the strain itself, that should be the deciding factor as long as adequate containment is ensured.

Question 11h. Interspecific hybridisation is very unusual in animals and, in general, the identification at the species level of organisms in this kingdom raises few problems. Plants, on the other hand are much more prone to hybridisation (sometimes among several species). In some cases parental species of some of these hybrids maybe present in New Zealand, in others the parents are either unknown or absent. The proposal to permit the description at a higher level of taxonomic classification (genus) than species of plants that cannot be accurately described at the species level, in conjunction with the risk provisions in the HSNO Act, makes a

great deal of sense and should be pursued. This would, for example, facilitate the importation of some commercially important genera and hybrids (e.g. of Rhododendrons and Roses) while still allowing the importation of some significant pest plants within those genera (e.g. *Rhododendron ponticum, Rosa canina*) to be regulated.
As a further complication, the concept of 'species' is tending to break down in the cases of some bacteria. In many cases, description at the level of genus (e.g. *Nostoc* spp.), in conjunction with any unusual phenotypic characteristics (e.g. pathogenicity) will be sufficient to fix the level of containment into which the isolate is to be imported. It is therefore important to extend the concept of describing organisms at a higher level than species to micro-organisms as well as to plants.
Question 11i. See above answers.

Prions:
11j: Should the HSNO Act definition of 'organism' include prions?
11k: Do you see any negative implications for such an amendment? What are they?

11l: Do you agree or disagree with this proposal?
Question 11j . It is desirable that the importation of prions that are dangerous to human or animal health should be regulated and their containment assured but, scientifically, it is impossible to see how a prion can be called an 'organism'.

Question 11k. Prions are not organisms and it does not make scientific sense to include them in that definition. The Discussion Paper gives the impression that this issue is based on the premise that prions are proteins that are infectious only to animals. This position is outdated. There are now at least three well-established examples of prions in fungi and yeast-like fungi and it seems likely that further research will extend the "prion phenomenon" to other organisms. It is also likely that many prion-like proteins will pose no threat to animal or human health and, indeed, that some may have biotechnological value. From the point of view of the HSNO Act*,* the most scientifically acceptable way of handling this problem would be to include prions *that are infectious to humans and animals*under the definition of 'hazardous substances' and regulate their handling accordingly. It will not be anomalous that prions are defined as 'organisms' under the Biosecurity Act. Adjudication on the importation of any prion that is not already in New Zealand is already controlled by MAF under that legislation.

Question 11l. This is the same problem as discussed under Question 11a (above). If the present time limit is unworkable, it should be changed.
Last day for notice of appeal

11m Do you agree or disagree with this option (to delete the requirement that the compliance order state a last day for appeal)?
Question 11m. If there is no advantage in setting a time limit, then it should be removed.
Prosecutions:
11n: Do you consider that there should be a change in the:
(a) starting time from 'time of knowledge' to 'time of offence'?
(b) period of 120 working days in which to lay information?
11o: Should these times be aligned with those in the Health and Safety in Employment Act or the Biosecurity Act?
11p: Do you consider it necessary to differentiate between offences for hazardous substances and for new organisms?
Prohibited Organisms
11q: Do you agree or disagree with the proposed changes? Please give your reasons.
11r: Are there other changes you consider should be made?

No response is made to the above questions

Large scale fermentation
11s: Do you agree or disagree with the proposal (to develop alternate criteria to the 10-litre rule)?
11t: What other mechanisms might be used?

Question 11s. The '10-litre rule' is a hangover from the containment precautions introduced in the US and Britain in the 1970s. It arose because, at that time, 10 litres was the largest volume that could centrifuged as a single batch and, presumably, it was considered safer to limit the number of centrifugings permitted in a single experiment. The rule was incorporated into the old ACNGT guidelines. When the IAG was set up, fermentations greater than 10 litres were considered 'field trials' simply because they were not permitted under the ACNGT guidelines and this classification persisted into the HSNO legislation. Times have changed and it is important that the rule be relaxed to allow large fermentations of "low risk" organisms to be made for experimental purposes under contained conditions.

Question 11t. The easiest way to handle this issue will be to remove large-scale fermentations from the definition of "field test" in the HSNO Act and to develop criteria and regulations for large scale fermentation in containment.

Take an integrated view in weighing up the potential benefits of the work against risk of adverse effects of any escape.
11u: Do you agree or disagree with this proposal?
Question 11u.

This issue is largely tied up with the argument that we have put forward in sections 1.4–1.8 and our response to Question 4a (above) and we would urge that those proposals also be considered under Section 11.9 of the Discussion Paper. Please see, also, our answer to Question 4a, above. Common sense must prevail and we support the suggestion that Section 45 of the HSNO Act be amended to make this possible