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Quarantine and Biosecurity Review
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Submission to the Quarantine and Biosecurity Review

I wish to express my views on the above review for consideration by the committee.

The introductory sentence to the terms of reference states “Australia’s biosecurity and quarantine systems operate on a science-based policy of managed risk”. The very next point that is made is that this involves “an Appropriate Level of Protection (ALOP) of very low but not zero risk”. There is a fundamental problem here. What level of risk does “very low” equate to? What is the quantitative scale that is used as the foundation for this “science-based policy”? Without knowing what “very low” means in quantitative terms it is a pure assumption to believe that an ALOP of “very low” is the correct standard for managing quarantine risk. No Quarantine and Biosecurity review can be credible unless the soundness of the ALOP is confirmed. There are very strong reasons for believing that the chosen ALOP of “very low” is inadequate, and in addition, that the methodology being applied is incorrect.

A little background on risk assessment will shed some light on my concerns. To begin, like any form of risk assessment, Quarantine Risk Assessment (QRA) is dependent on the same processes and includes a quantification method of the possible likelihood and consequences. Table 1 below sets out a fairly common project risk management matrix (Tables 2 to 4 define the terms used in Table 1). The critical point to note is that in isolation a project will rate Catastrophic risks (i.e. those situations or risk events that have a Rare chance of occurrence but Severe consequences) as only being a Medium risk. This is precisely because the project is looked at in isolation from all other projects. Like a house that is insured against fire any one house will only have (using the table below) a Medium chance of being destroyed by fire, but the chance of at least some houses of the total number of houses that exist being destroyed by fire is Almost Certain.

To extend this analogy to quarantine, the chance that any one shipment will introduce a Catastrophic quarantine risk is Medium, but the chance that in total all shipments over 50 to 100 years will breach quarantine is Almost Certain. This means that the likelihood rating for a QRA must be much lower than a Rare rating (the table must be extended at the bottom) to the point that the likelihood of it eventuating can be said to be so low that it is safe to assume it will never occur. This distinction in point of view is the difference between an insurer looking at a house in isolation and rating the risk and charging a premium for the insurance and looking at the entire pool of houses and estimating the actual consequent liability exposure it will have over a period of time. Although this is a basic point it is by no means certain that risk managers in Australia’s quarantine authorities actually understand it.

Table 1 Standard Defence Risk Management Matrix

| Likelihood | Consequence | | | | |
|----------------|---------------|--------|----------|--------|---------|
| | Insignificant | Minor | Moderate | Major | Severe |
| Almost Certain | Medium | Medium | High | High | Extreme |
| Likely | Medium | Medium | Medium | High | Extreme |
| Possible | Low | Medium | Medium | High | High |
| Unlikely | Low | Low | Medium | Medium | High |
| Rare | Low | Low | Low | Medium | Medium |

Table 2 Standard Defence Likelihood Ratings

| Rating | Description |
|----------------|---|
| Almost certain | Expected to occur in most circumstances |
| Likely | Will probably occur in most circumstances |
| Possible | Could occur at some time |
| Unlikely | Not expected to occur |
| Rare | Exceptional circumstances only |

Table 3 Defence Examples of Three Semi-Quantitative Likelihood Scales

| Rating | General Scale of Probability | System Failure Rate Scale | Accident/ Incident Scale |
|----------------|------------------------------|--------------------------------------|---|
| Almost certain | Probability over 0.8 | System fails once every hour | Accident expected to occur frequently in life of Mission System |
| Likely | Probability 0.4 – 0.8 | System fails once every 10 hours | Accident may occur frequently in life of Mission System |
| Possible | Probability 0.2 – 0.4 | System fails once every 100 hours | Accident may occur once a year in life of Mission System |
| Unlikely | Probability 0.1 – 0.2 | System fails once every 1,000 hours | Accident may occur once in life of Mission System |
| Rare | Probability less than 0.1 | System fails once every 10,000 hours | Accident not expected in life of Mission System |

Table 4 Standard Defence Generic Consequence Ratings

| Rating | Description |
|---------------|--|
| Severe | Would stop achievement of functional goals/objectives |
| Major | Would threaten functional objectives |
| Moderate | Would necessitate significant adjustment to overall function |
| Minor | Would threaten an element of the function |
| Insignificant | Would have lower consequences |

A QRA should pay particular attention to those risks that are assessed as potentially Catastrophic because the Rare likelihood of Catastrophic risks often means that careful consideration of these risks is not undertaken, but the potentially Severe consequences makes it critical that the required analysis is done.

As indicated above, while standard consequence and likelihood rating tables are defined for standard project risk assessments, the rating tables should be refined for a QRA. Because a QRA includes risk events that have a Rare chance of occurrence but Severe consequences, a more detailed measure of likelihood (or frequency) is required. An example would be Table 5 which has nine different frequency ratings. This Table enables a more detailed assessment of the frequency of particular events to be undertaken, which is particularly important at the lower end of the likelihood scale, at or below Rare on the standard scale (for a QRA the Rare rating is divided into three further levels). The Table below provides a qualitative and quantitative description for each of the ratings. It is useful as a guide to enable movement from a qualitative to quantitative assessment, enabling determination of a nominal probability from an initial qualitative assessment.

Table 5 Example of a refined Likelihood (or Frequency) Scale

| QRA Frequency Rating | Description | |
|----------------------------|---|--|
| | Qualitative | Quantitative |
| Continuous | Will occur almost continuously | 100 or more times per year |
| Very Frequent | Will occur very frequently | 10 to 100 times per year <i>(Nominally: 50 times per year)</i> |
| Frequent | Will occur frequently | 1 to 10 times per year <i>(Nominally: 5 times per year)</i> |
| Likely | Will occur periodically | One time every 1 to 10 years <i>(Nominally: 0.5 times per year)</i> |
| Possible | Will occur a few times | Once every 10 years to 50% chance over a 50-year period <i>(Nominally: 0.05 times per year)</i> |
| Unlikely | Unlikely, but reasonably expected to occur | 5% to 50% chance over a 50-year period <i>(Nominally: 0.005 times per year)</i> |
| Very Rare | Very unlikely, but credible | 0.5% to 5% chance over a 50-year period <i>(Nominally: 0.0005 times per year)</i> |
| Remote | Extremely unlikely, but not physically impossible | 0.005% to 0.5% chance over a 50-year period <i>(Nominally: 0.00005 times per year)</i> |
| Incredible | Impossible or virtually impossible | Less than 0.005% chance over a 50-year period |

As can be seen from Table 5, in matters of quarantine the likelihood rating for a risk with Severe consequences should preferably have a rating of Incredible, in other words, so low that it is safe to assume that it will never occur. I have very strong doubts that an ALOP of Very Low meets this requirement.

I respectfully ask the Committee as part of its review to investigate the connection between an inadequately defined, understood or perhaps incorrect ALOP with the efficiency and effectiveness of Australia's quarantine authorities. Failure to do this will mean that the review's conclusion may be based on false premises.

Yours sincerely,

Mr Chris Hilder