Phase Two of the Contaminants in Fertilisers Project and the Role of FIFA and its Members

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Background to the Contaminants in Fertiliser (CiF) project

- Reports in the Sydney Morning Herald, The Australian and Sunday Telegraph newspapers in 2002 highlighted the use of contaminated industrial wastes in fertilisers
- Raised concerns about human and environmental impacts
CiF project structure and timeline

- Feb 04: Project Brief
- Mar 04: CSIRO employed
- Sept 04 – April 05: Modified project brief
- Sept 04 – April 05: Phase I – Scoping Study

The CSIRO Scoping Report

The Scoping Report is available on the Centre for Environmental Contaminant Research (CECR) website:

Project structure and timeline

Feb 04
Project Brief

Mar 04
CSIRO employed

Modified project brief

Sept 04 – April 05
Phase I – Scoping Study

Phase II – List of prohibited Substances and Guideline Limits for Low Hazard Chemicals

1 Sept 07 – 1 Sept 08
Phase III – Guideline Limits for High Hazard Chemicals

Aims of Phase II of the CiF project

- To establish a list of prohibited substances that must not be added to, or used as, fertilisers (the negative list);

- To establish a list of contaminants permitted in fertilisers with the provision that their concentrations, or annual loadings per unit area, do not exceed guideline limits (the positive list); and

- To establish transparent and traceable procedures for achieving aims 1 and 2 and for future assessments.
### Scope of Phase II CiF project

- Only chemical fertilisers will be examined (i.e. organic fertilisers such as composts will not be examined).

- The following contaminants will be investigated:
  - Inorganics: Essential elements, metals, metalloids, radionuclides, rare earth elements, and anionic elements. Specifically As, B, Cd, Cr, Cu, F, Hg, Ni, Pb, Se, and Zn;
  - Organics: Pesticides, persistent organic pollutants, flocculants, coagulants, surfactants, pharmaceutical and personal care products and endocrine disruptors.

### Scope of Phase II CiF project

- The following sources of contaminants will be examined:
  - raw materials of mineral fertilisers;
  - mining and smelting by-products;
  - energy wastes; and
  - other industrial wastes.
Adverse effects to be considered

- Increased release or bioavailability of contaminants leading to negative effects on soil ecosystems, aquatic ecosystems or plants, in the short or long term;
- Accumulation in the food chain producing unacceptable contaminant levels from a trade or human health perspective;
- Potential for contaminant off-site migration at concentrations sufficient to cause negative impacts to off-site ecosystems; and
- Toxic to domestic animals, livestock and wildlife.

Agricultural systems to be considered

- Horticulture – includes vegetables and flowers, and “recreational horticulture” (e.g. turf farms, golf courses and sports grounds);
- Sugarcane and rotational crops; and
- Dairy production.
• All assessments will be based on protecting ecosystems from adverse effects of contaminants for 100 years.

• Those chemicals that pose a low or acceptable hazard will have guideline values derived as part of Phase II. Those chemicals that pose a high hazard will require further analysis in Phase III.

Methodology of Phase II

There are four main components
(1) sourcing and collation of data;

(2) determining the list of chemicals, substances and materials (CSMs) that should not be permitted in fertilisers;

(3) preliminary screening; and

(4) hazard assessment.
Sourcing and collation of data - I

- searches of relevant databases (e.g. Agricola, CAB, ISI, Google Scholar);
- searching appropriate scientific journals that are not covered by the above databases and search engines;
- directly contacting known experts in the field (from academia, regulatory authorities and industry) for information, unpublished reports etc; and
- Liaising with FIFA and member companies of FIFA.

Sourcing and collation of data - II

The following will be collected:
- current levels on CSMs in fertilisers and soil additives;
- recommended rates and frequencies of application;
- international information to place the Australian information in a global context;
- data on both raw materials and for finished products;
- background concentrations of the contaminants of concern in Australian agricultural soils;
- physicochemical, environmental fate and toxicity data for the contaminants of concern; and
- soil, water and food quality guidelines of regional, state and national regulatory authorities.
## Sourcing and collation of data - III

- The preceding data will only be sought for those CSMs that are specified in the “Scope of Phase II”

- By collating the above information we will identify existing information gaps for the contaminants of concern, and suggest a process to address these.

## Determining the negative list - I

- The first step is to determine a list of potentially beneficial effects that any material could have on plants, soil chemistry, structure or physical properties or in the efficacy of the fertilisers.
Determining the negative list - II

List of CSMs

Does each CSM have any of the listed beneficial effects?

- No
- Unknown
- Yes

CSM is added to the negative list

CSM is added to the positive list

Proponent provides evidence that a CSM has a listed beneficial effect

The Negative List

- It is not possible to state all chemicals that will be on the negative list.

- Rather the negative list will consist of all chemicals that are not specifically mentioned by name in the positive list.
Preliminary screening - I

Hazard quotients (HQ) will be calculated for each CSM using the following formula:

\[ HQ = \frac{\text{highest measured fertilizer conc}}{\text{lowest background value}} \]

Preliminary screening - II

Conduct HQ analysis

- HQ < 1: CSM added to negative list
- HQ ≥ 1: CSM proceeds to Hazard Assessment

Max Permissible Conc = background or highest conc in fertiliser (whichever is lowest)
Hazard assessment - I

Hazard quotients (HQ) will be calculated for each CSM by:

\[ HQ = \frac{\text{highest estimated environ conc (HEEC)}}{\text{lowest threshold value (LTV)}} \]

**HEEC** = CSM conc in soil from fertiliser (where CSM is at highest conc) applied at max recommended frequency for 100 years and assuming no loss

**LTV** = lowest toxicity value for CSM or lowest regulatory limit for the CSM.

Role of FIFA, AFSA & member companies

The role is to provide
- Information
- Feedback

**Information sought**
- data on the concs of all CSMs in all chemical fertilisers used in Australia;
- recommended and typical application rates (mass/ha and frequency of application) for all chemical fertilisers used in Australia.

**Feedback sought**
- On the Preliminary Report and Discussion Paper; and
- At the 1st and 2nd Workshops.
Thank you.