Ministry for the Environment
Manatū Mō Te Taiao

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19-D-02239

s 9(2)(a)

Dear s 9(2)(a)

Thank you for your email of 29 October requesting the following under the Official Information Act 1982 (the Act):

> *All correspondence to the Minister for the Environment (including Nick Smith, Chris Finlayson, Amy Adams, David Parker) from the NZ EPA that would constitute technical advice concerning the development of freshwater national environment standards including relating to the following issues*
>
> - *Agrichemical (including pesticides, herbicides, insecticides) pollution in freshwater*
> - *Heavy (or trace) metal pollution in freshwater*
> - *Emerging organic contaminants / contaminants of emerging concern EOC/CEC in freshwater*
> - *Endocrine disruption and endpoints of endocrine disrupting compounds*
> - *Toxicity from 'cocktail' or mixture effects of environmental chemicals*
>
> *This would include information that might come via officials within the Ministry for the Environment as well as direct information from the NZ EPA.*
>
> *Please take this OIA Request to be dated from 1 January 2011 to the present date.*

The Ministry for the Environment and the Environmental Protection Authority searched our records for communications sent to the Minister for the Environment (Nick Smith, Chris Finlayson, Amy Adams, or David Parker), containing any of the key words in the issues in your request. We have identified one document in scope of your request: "EPA Briefing Note ENQ-215o1-75XK34 - Endocrine Disrupting Chemicals". This is released in full, except for its Appendix 2 which is a report publically available from the World Health Organisation website: https://www.who.int/ceh/publications/endocrine/en/.

Please note that due to the public interest in our work the Ministry for the Environment will publish responses to most of our requests for official information on our web site on our OIA responses page shortly after the response has been sent to you.

If you have any queries about this, please feel free to contact our Executive Relations team.

Yours sincerely

Katherine Meerman
Director Water

Environmental Protection Authority
Te Mana Rauhī Taiao

BRIEFING NOTE

Endocrine Disrupting Chemicals

To:	Hon Amy Adams Minister for the Environment		
		EPA Tracking Number:	ENQ-215o1-75XK34
Date Submitted:	4 March 2013	**EPA Priority:**	ROUTINE
Security Level:	IN CONFIDENCE	**Number of Attachments:**	1
Action Sought:	Nil, noting only	**Response/Signature Needed by:**	N/A

Environmental Protection Authority contacts

Position	Name	Telephone (cell)	Telephone (work)	1st Contact
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General Manager	Phil Parkes	0275143108	474 5452	✓

Executive summary

1. This briefing note responds to your request for information on endocrine disrupting chemicals following the February 2013 release of the UNEP/WHO report: "*State of the Science of Endocrine Disrupting Chemicals – 2012"* edited by Åke Bergman, Jerrold J. Heindel, Susan Jobling, Karen A. Kidd and R. Thomas Zoeller.

2. Endocrine disruption from exposure to chemicals has been known for some decades. What has been uncertain, and to a large extent continues to be uncertain, is the extent to which human health has been adversely affected by exposure to endocrine disrupting chemicals and which of the many thousands of chemicals in use can cause endocrine disruption.

3. Most of the debate around EDCs will be on the synthetic varieties that cause harm. However, endocrine disrupting chemicals (EDCs) occur naturally plants and synthetic EDCs, when used appropriately can have beneficial effects. The oral contraceptive is one such example.

4. Synthetic EDCs can be found in pesticides, pharmaceuticals (including items such as hormone replacement treatments and steroid drugs), personal care products and cosmetics, and additives in foods. They can also be present as additives in manufactured articles such as plastics, electronics, textiles and construction materials.

5. The report found that many endocrine-related diseases and disorders are on the rise. However, pinpointing underlying causation is not easy.

6. The report calls for more research to understand fully the associations between EDCs and specific diseases and disorders. With more comprehensive assessments and better testing methods, potential disease risks could be reduced.

7. The report makes no recommendation for any specific regulatory action on any chemicals but does include a general conclusion for there to be continuing regulatory work using the current mechanisms for restricting exposure to EDCs.

8. Current chemicals management regimes around the world identify and can be used to manage adverse effects arising from endocrine disruption. Much of the instigation, development and application of international chemicals control initiatives and programmes (such as Stockholm Convention, SAICM—the Strategic Approach to International Chemicals Management) have been driven by concerns about endocrine disruption and other adverse effects from some chemicals.

9. In New Zealand, medicine and pharmaceutical products are regulated by the Medicines Act. All other hazardous chemicals must be approved under HSNO, either through an individual approval or through a group standard. In addition to regulation under HSNO, uses of chemicals that result in endocrine disrupting chemicals being found in food are also regulated under food safety and agricultural chemical rules.

Endocrine Disrupting Chemicals (EDCs)

10. Human health depends on a well-functioning endocrine system to regulate the release of certain hormones essential for metabolism, growth and development, sleep and mood. Endocrine disrupting chemicals can change the functioning of this hormonal system interfering with the developmental processes of humans and animals. The endocrine system can also be disrupted by things other than chemicals, such as sleep deprivation, poor nutrition, ill-health and stress.

11. The definitions used for endocrine disrupting chemicals in the UNEP/WHO report are:

- *"An endocrine disruptor is an exogenous substance or mixture that alters function(s) of the endocrine system and consequently causes adverse health effects in an intact organism, or its progeny, or (sub) populations."*

- *"A potential endocrine disruptor is an exogenous substance or mixture that possesses properties that might be expected to lead to endocrine disruption in an intact organism, or its progeny, or (sub) populations."*

12. EDCs include a wide range of chemicals and uses. The ones that are likely to be prominent in public debate are listed below.

Persistent and bioaccumulative halogenated chemicals

- Persistent Organic Pollutants (POPs)– chemicals currently banned or severely restricted by the Stockholm Convention, examples include DDT, PCB.
- Other Persistent and Bioaccumulative Chemicals – chemicals being examined internationally for severe restriction. Many are already restricted. Examples include HBCDD, PFOA.

Less persistent and less bioaccumulative chemicals

- Plasticizers and Other Additives in Materials and Goods – mainly used in plastics. Examples include phthalate esters.
- Polycyclic Aromatic, Halogenated Phenolic Chemicals and Non-halogenated Phenolic Chemicals - examples include pentachlorophenol (a banned timber treatment chemical) and bisphenols (used to make polycarbonate polymers and epoxy resins).

Pesticides, pharmaceuticals and personal care product ingredients

- Some pharmaceuticals induce hormonal changes, for example oral contraceptives, hormone replacements and steroids.
- Cosmetics and other personal care products (shampoos and other hair products, toothpaste, soaps, lotions) can contain EDCs as fragrances (e.g. galaxolide), solvents (e.g. cyclic methyl siloxanes), preservatives (e.g. parabens), plasticizers(e.g. phthalates), antimicrobials (e.g. triclosan) and chemical stabilizing agents (e.g. phthalates). Note, the use of parabens, phthalates, triclosan, some cyclic methyl siloxanes and numerous other ingredients are banned or severely restricted by rules applying to cosmetics in many countries, including New Zealand.
- Current-use Pesticides e.g. 2,4-D, Atrazine.

Metals and Organometallic Chemicals

- Includes elements (Arsenic, Cadmium, Lead, Mercury) and organic compounds containing these, These can occur naturally or be synthetic chemicals.

Natural Hormones

- Naturally occurring hormones such as estrone and testosterone.

Phytoestrogens

- Naturally occurring chemicals in plants, also found in some food.

13. EDCs can enter the environment mainly through industrial and urban discharges, agricultural run-off and the burning and release of wastes. These chemicals are also subjected to biological and environmental transformations that may form other EDCs. EDCs in wastes can be discharged to the environment in sewage and animal wastes and through the disposal of trade and other wastes.

14. Human exposure can occur via the ingestion of food, dust (including household dust) and water, inhalation of gases and particles in the air, and skin contact. Many known and potential EDCs are circulated globally by natural processes. This means that human and wildlife populations all over the world are exposed to some EDCs.

15. Pinpointing exact causes and effects from exposure is extremely difficult due to wide gaps in knowledge. Environmental and non-genetic factors such as age and nutrition could be among the reasons for any observed changes in disease and disorders.

WHO/UNEP Report

Background to UNEP/WHO report: "State of the Science of Endocrine Disrupting Chemicals – 2012"

16. In 2002 the UN produced a report in 2002 entitled "Global Assessment of the State of the Science of Endocrine Disruptors" which concluded:

> "*although it is clear that certain environmental chemicals can interfere with normal hormonal processes, there is weak evidence that human health has been adversely affected by exposure to endocrine-active chemicals. However, there is sufficient evidence to conclude that adverse endocrine - mediated effects have occurred in some wildlife species. Laboratory studies support these conclusions."*

17. The 2002 report concluded that there was a need for broad, collaborative and international research initiatives and presented a list of research needs. Since 2002, intensive scientific work has improved the understanding of the impacts of EDCs on human and wildlife health. This improved understanding has, in part, resulted in some of the international regulatory developments mentioned below and in Appendix One.

State of the Science of Endocrine Disrupting Chemicals – 2012

18. The report (published February 2013) substantially updates and expands on the 2002 report. It outlines many negative effects of EDCs and outlines many problems that have been encountered. It is accompanied by a Summary for Decision-Makers which is attached to this briefing as Appendix Two.

19. It needs to be noted that many of the examples outlined are historic and have been addressed by effective regulation. For example, exposures to DDT, lead, PCB (polychlorinated biphenyls) and many other EDCs have been greatly reduced by regulatory action in New Zealand and the rest of the world. Also the levels of exposure illustrated in the report are often historic.

20. The report highlights some associations between exposure to EDCs and health problems including the potential for such chemicals to contribute to the development of non-descended testes in young males, breast cancer in women, prostate cancer in men, developmental effects on the nervous system in children, attention deficit /hyperactivity in children and thyroid cancer.

21. Sensitivity to endocrine disruption is highest during tissue development therefore effects in children and the unborn will occur at lower doses than are required for effects in adults. The report states that the disease risks due to EDCs may be significantly underestimated.

22. The report notes that there has been:

- An increase in the instance of human endocrine cancers.
- A significant decrease in human fertility rates in some parts of the world, which occurred during one generation. There is also a notable rise in the use of assisted reproductive services.

The report also states that pinpointing the exact causes is extremely difficult due to wide gaps in knowledge. However, it notes that the speed with which the increases in disease incidence have occurred in recent decades rules out genetic factors as the sole plausible explanation. Environmental and other non-genetic factors, including nutrition, age of mother, viral diseases and chemical exposures, are also at play, but are difficult to identify.

23. The report highlights that additional work is needed on endocrine disruptors. Work in the last few years has identified an increasing number of chemicals which interfere with human hormone synthesis, action or metabolism. The report states that close to 800 chemicals are known or suspected to be capable of interfering with hormone receptors, hormone synthesis or hormone conversion. These 800 are not listed in the report.

24. All people in industrialized areas are exposed to these to some extent. Experimental animal studies or studies with cells grown in culture have also shown that many of these chemicals can interfere with the development and function of mammalian endocrine systems.

25. The report also concludes that EDCs have been shown to negatively affect wildlife. Some of the best evidence that EDCs affect wildlife populations comes from long-term monitoring of populations where steps have been taken to reduce exposure to the chemical. For example, numbers of birds and molluscs are clearly increasing in regions where exposures to chemicals such as the pesticide DDT and the antifouling paint tributyltin, have been reduced. The current body burdens of POPs such as PCBs, organochlorine pesticides (including DDT) and methylmercury in some fish-eating birds and marine mammal populations are at levels known to cause effects on breeding and on the immune system. The report notes that EDCs commonly in medicine can cause changes in aquatic organisms when sewage and other wastes are discharged to water.

Report Conclusions on Further Work

26. The report makes no call for any specific regulatory action on any specific chemicals but does include a general conclusion for continuing regulatory work using mechanisms that we currently use:

    "An important focus should be on reducing exposures by a variety of mechanisms. Government actions to reduce exposures, while limited, have proven to be effective in specific cases (e.g. bans and restrictions on lead, chlorpyrifos, tributyltin, PCBs and some other POPs)."

27. The report calls for more research to understand fully the associations between endocrine disrupting chemicals and specific diseases and disorders. The report notes that with more comprehensive assessments and better testing methods, potential disease risks could be reduced, with substantial savings to public health. There needs to be a focus on investigating linkages between developmental exposures to disease outcomes later in life.

28. The report recommends work in the following areas:

    - Testing: known EDCs are only the 'tip of the iceberg' and more comprehensive testing methods are required to identify other possible endocrine disruptors, their sources, and routes of exposure.
    - Research: more scientific evidence is needed to identify the effects of mixtures of EDCs on humans and wildlife (mainly from industrial by-products) and on the routes of human and environmental exposure to these chemicals.
    - Reporting: many sources of EDCs are not known because of insufficient reporting and information on chemicals in products, materials and goods.
    - Collaboration: more data sharing between scientists and between countries can fill gaps in data, primarily in developing countries and emerging economies.

Regulation of EDCs

29. Current chemicals management regimes around the world identify and can be used to manage adverse effects arising from endocrine disruption. Much of the instigation, development and application of international chemicals control initiatives and programmes (such as Stockholm Convention, SAICM, OECD chemical programme) have been driven by concerns about endocrine disruption and other adverse effects from some chemicals. In addition, many are working on identifying exposures and adverse effects from EDCs.

30. In New Zealand, medicine and pharmaceutical products are regulated by the Medicines Act. All other hazardous chemicals must be approved under HSNO, either through an individual approval or through a group standard. In addition to regulation under HSNO, uses of chemicals that result in endocrine disrupting chemicals being found in food are also regulated under food safety and agricultural chemical rules.

31. Appendix One gives information of the regulation of EDCs both New Zealand and internationally. It also presents a table of commonly known EDCs grouped into eleven groups with information on how these are regulated in New Zealand.

32. There is some monitoring of many EDCs in people and the environment in New Zealand. A recent example is the Ministry of Health's survey on chemicals in human breast milk last done in 2008. This showed significant drops in the levels of chemicals such as organo-chlorine pesticides (eg DDT) from those found in the survey ten years earlier. The range of chemicals tested was extended for this survey. This and other work helps to determine the extent to which human health has been adversely affected by exposure to endocrine disrupting chemicals

33. In addition to the reductions in levels of organo-chlorine pesticides there are other examples of effective regulation in New Zealand to reduce human exposure to EDCs. These include the removal of lead from petrol and from paint (implemented by HSNO) and the banning of certain pesticides under HSNO. Leaded petrol and paint were the source of the bulk of lead found in the general population. Lead is still able to be used where exposure is minimal, for example in batteries, though care is needed in the recovery of used batteries.

Conclusion

34. The WHO/UNEP report is a very good summary of the situation and it updates an earlier 2002 report. It highlights recent findings but it needs to be noted that the chemicals known to have caused much of the harm are now subject to restriction, including prohibitions on production and use, in New Zealand and internationally.

35. New Zealand is already acting on new information as it becomes available. We have recently regulated to end use a number of EDCs that are under the Stockholm Convention. We are also reassessing a number of others under HSNO to better manage risks.

36. The regulators of medicines, food safety/agricultural and veterinary medicines are also reviewing aspects of the regulatory controls as understanding and information becomes available.

Recommended action

We recommend that you

a.	**note** the contents of this briefing note	**Yes / No**

Phil Parkes
General Manager, Policy and Legal

March 2013

Hon Amy Adams
Minister for the Environment

Date

Minister Adams' feedback:	**1**	**2**	**3**	**4**	**5**

1 = Was not satisfactory **2** = Fell short of my expectations in some respects **3** = Met my expectations
4 = Met and sometimes exceeded my expectations **5** = Greatly exceeded my expectations

Appendix One – Regulation of Endocrine Disrupting Chemicals in New Zealand

HSNO regulation of chemicals

A number of the endocrine disruptor chemicals are banned in New Zealand under HSNO

1. Endocrine disruption leads to toxic effects which are regulated under the HSNO regime. Any substance exhibiting endocrine disrupting characteristics will have class 6 (toxic) properties. Where hazardous substances are approved for use there are controls on the use, and these controls are intended to manage risks and minimise harm. The controls can include restrictions on availability, rules concerning use and measures to avoid contact. In cases where effective risk management is not possible then prohibiting use needs to be considered. The HSNO Act requires the decision-maker to balance the beneficial effects of use of a substance against the adverse effects. Decisions are based on evidence and scientific assessment and the Act allows for the decision-maker to decline approval where there is insufficient information to determine adverse effects.

2. Among the EDC substances banned are chemicals such as DDT and chlordane which are listed under the Stockholm Convention as persistent organic pollutants. A large number of the chemicals listed under the Stockholm Convention were banned in New Zealand prior to New Zealand becoming a party to the convention. Banning occurred through routine assessments and reassessments under HSNO and earlier legislation, for example endosulfan was banned under HSNO after reassessment in 2009.

3. Where EDCs are in use in New Zealand, the HSNO Act provides for reassessments when new information comes to light. This allows for approvals and the existing rules concerning the use of chemicals to be reviewed. These reassessments usually result in changes to approvals and controls. A current reassessment of organophosphate and carbamate pesticides includes substances that are known endocrine disruptors. The EPA is currently publicly consulting on a proposal that could ban some of these, and restrict the use of three substances that are EDCs – Malathion, Chlorpyrifos and Fenitrothion (which may be banned after 3 years). A decision on this is due in June 2013.

Regulation to ensure that harmful waste substances are properly treated

4. Exporting hazardous waste requires a permit from the EPA under the Imports and Exports (Restrictions) Act. Hazardous wastes can only be exported to places where they will be properly managed. Permits can only be granted in compliance with the Stockholm Convention.

5. The recycling of material containing some EDCs is restricted by the Stockholm Convention. An example is the flame retardant BDE found in e-waste plastics which was listed in the Convention in 2010. Recycling leads to dispersal of the EDC into other products and increases human exposure and risks to the environment. The EPA has recently produced guidance for processors and exporters of e-waste on this matter and MfE are currently preparing more general guidance for hazardous wastes containing the Stockholm listed BDEs.

6. The HSNO Act has regulations that control the disposal of hazardous substances that requires the safe disposal of toxic substances, including EDCs. Safe disposal includes treatment or destruction of the hazardous substances, discharge where dispersal results in substance levels below exposure limits (where these are set) or the export of the waste for recovery, treatment or destruction.

7. The RMA also has a role in regulating some EDCs discharge of waste into the environment. The ban on burning plastics to avoid production of dioxin is implemented under the RMA. Discharges from sewage plants are also regulated under the RMA and any treatment of EDCs in human wastes could be regulated through discharges consents and rules, although we know of no consents with conditions on this at present.

Some EDCs, such as additives in plastics, are not regulated by HSNO at present

8. Some EDCs are included in components in manufactured goods, these are not currently regulated under HSNO. Moves to regulate these components are only likely to be effective if done in concert with the countries producing them (as we do with Stockholm Convention chemicals).

Medicines and Agricultural Compounds

9. The Medicines Act manages endocrine disruptors in medicines and pharmaceuticals. Many of these are intended to affect the endocrine system and alter the hormone balance within the patient. Disposal of waste medicine needs to be managed with care.

10. The Agricultural Compounds and Veterinary Medicines Act (ACVM) provides for the registration and regulation of hazardous chemicals used in agriculture. The purpose is to ensure that food is safe and free of dangerous residues. Agricultural and veterinary chemicals are also subject to HSNO regulation.

International Regulation of EDCs

11. There are many areas of activity where the international community is addressing harm from EDCs. The EPA and other regulators are watching international developments and participating in international work to extend our knowledge and incorporate this into regulatory decisions:

    - The 2001 Stockholm Convention on Persistent Organic Pollutants (POPs) seeks to eliminate or severely restrict production and use of POPs. These include a number of the more hazardous EDCs. New Zealand is a party to the Convention and the restrictions are implemented through HSNO and regulations under the RMA. While we have implemented changes to legislation to implement the restrictions on the most recently added Stockholm chemicals we are still to notify the Convention of acceptance of them. A Principal Scientist in the EPA is on the technical advisory group of the Stockholm Convention and in that capacity he has led work on assessing chemicals that are proposed for addition to the Convention.
    - The Basel Convention on the Transboundary Movement of Hazardous Wastes regulates trade in hazardous wastes and seeks to ensure that wastes are managed in an environmentally sound way.

Under the Convention, wastes which can generate hazardous substances if poorly managed (for example ordinary burning of PVC plastic produces dioxins, an EDC), are hazardous.

- A draft convention on mercury seeks to protect health and the environment from mercury. Mercury, in the form of methylmercury, is an EDC. This convention is scheduled to be finalised at a diplomatic conference in Japan in October this year. Much of the work for this convention was lead by Dr Donald Hannah, who recently retired from the EPA, and still acts as a consultant for MFAT on these issues.

12. Considerable work is underway on the assessment of, and research into possible EDCs. The OECD is heavily involved with activities such as the development of chemicals test guidelines, and the EPA sits on the OECD's Joint Working Party on Pesticides and OECD's Chemicals Committee. Work in OECD countries conforms to agreed quality standards that enable the transfer of data between countries. This enables us to access new information from Europe, Japan and North America as it is developed. UNEP has, through its Strategic Approach to International Chemicals Management (SAICM) process, identified EDCs as an emerging policy issue in its work programme.

Table of endocrine disrupting chemicals

Excerpt from page 190 of the full UNEP/WHO report. The right hand column on the New Zealand regulatory system has been added.

Table 1. Endocrine disrupting chemicals (EDCs) can be grouped in multiple ways. In this table known or potential EDCs are grouped into 11 categories with examples of individual EDCs.

Classification	Specific Examples of EDCs	Note – NZ regulatory system
Persistent and bioaccumulative halogenated chemicals		
Persistent Organic Pollutants (POPs) (Stockholm Convention)	PCDDs/PCDFs, PCBs, HCB, PFOS, PBDEs, PBBs, Chlordane, Mirex, Toxaphene, DDT/DDE, Lindane, Endosulfan	All are banned or restricted under the HSNO Act. NZ is using a limited exemption for Lindane until 2015. Some added in 2010 need formal NZ ratification (although they are already banned in NZ as the necessary amendments have been made to HSNO).
Other Persistent and Bioaccumulative Chemicals	HBCDD, SCCP, PFCAs (e.g. PFOA), Octachlorostyrene, PCB methyl sulfones	Some are candidate chemicals for listing under the Stockholm Convention. Work being done internationally on the science and when clear will be presented to the Convention. If added NZ would need to amend the list in HSNO to ban or restrict use in NZ.

Less persistent and less bioaccumulative chemicals		
Plasticizers and Other Additives in Materials and Goods	Phthalate esters (DEHP, BBP, DBP, DiNP), Triphenyl phosphate, Bis(2-ethylhexyl) adipate, n-Butylbenzene, Triclocarban, Butylated hydroxyanisole	In New Zealand these are mostly in manufactured articles. Manufactured articles are not usually regulated by HSNO controls. Moves to regulate components of articles are likely to only be effective if done in concert with the countries producing the articles (as we do with cosmetics and with Stockholm listed chemicals).
Polycyclic Aromatic Chemicals (PACs) including PAHs	Benzo(a)pyrene, Benzo(a)anthracene, Pyrene, Anthracene	Regulated under HSNO and are banned as chemicals. However, some may be a component chemical in imported articles..
Halogenated Phenolic Chemicals (HPCs)	2,4-Dichlorophenol , Pentachlorophenol, Hydroxy-PCBs, Hydroxy-PBDEs, Tetrabromobisphenol A, 2,4,6-Tribromophenol, Triclosan	Chemicals regulated under HSNO. Pentachlorophenol, 2,4,6-Tribromophenol, for example, is banned under HSNO. Others, for example 2,4-Dichlorophenol Tetrabromobisphenol A and Triclosan.
Non-halogenated Phenolic Chemicals (Non-HPCs)	Bisphenol A, Bisphenol F, Bisphenol S, Nonylphenol, Octylphenol, Resorcinol	Regulated as chemicals under HSNO. Some are components of manufactured items and are not usually regulated by HSNO.
Pesticides, pharmaceuticals and personal care product ingredients		
Current-use Pesticides	2,4-D, Atrazine, Carbaryl, Malathion, Mancozeb, Vinclozolin, Procloraz, Procymidone, Chlorpyrifos, Fenitrothion, Linuron	Three, Malathion, Chlorpyrifos and Fenitrothion, are being re-assessed as part of the organo-phosphate and carbamate reassessment. Use of the others is restricted under HSNO.
Pharmaceuticals, Growth Promoters, and Personal Care Product Ingredients	Endocrine active (e.g. Diethylstilbestrol, Ethinylestradiol, Tamoxifen, Levonorgestrel), Selective serotonin reuptake inhibitors (SSRIs; e.g. Fluoxetine), Flutamide, 4-Methylbenzylidene camphor, Octyl-methoxycinnamate,	Pharmaceuticals are largely regulated under Medicines Act – a range of treatments including oral contraceptives, hormone replacement therapy and steroids. Personal care products are

	Parabens, Cyclic methyl siloxanes (D4, D5, D6), Galaxolide, 3-Benzylidene camphor	managed under HSNO. The relevant group standards (eg the Cosmetic Products Group Standard) are reviewed regularly against international developments and conditions are updated. The Cosmetic Group Standard was reviewed in 2012 and contains a large number of restrictions and prohibitions on the use of hazardous substances including EDCs in the cosmetic products. We drew on European rules and information in updating the Group Standard. Examples of chemicals severely restricted in cosmetics are parabens, phthalates, triclosan, some cyclic methyl siloxanes.
Other chemicals		
Metals and Organometallic Chemicals	Arsenic, Cadmium, Lead, Mercury, Methylmercury, Tributyltin, Triphenyltin	Tributyltin and triphenyltin were used as antifouling substances but have been banned for some time. Arsenic, Cadmium, Lead and Mercury are elements and in addition to some uses there are natural sources in New Zealand. Human production and use is regulated by HSNO and other legislation to reduce exposure – eg lead is no longer in petrol and banned in paint (HSNO. Mercury and methylmercury (a substance that forms naturally when mercury is released into the environment) – new UN convention will deal with these and UNEP plan this to be finalised at diplomatic conference in 2013.
Natural Hormones	17β-Estradiol, Estrone, Testosterone	Naturally occurring hormones. Some released to the environment through discharges of sewage and some through

		animal wastes.
Phytoestrogens	Isoflavones (e.g. Genistein, Daidzein), Coumestans (e.g. Coumestrol), Mycotoxins (e.g. Zearalenone), Prenylflavonoids (e.g. 8-prenylnaringenin)	Naturally occurring from plants. Pathway to humans through some foods.

Appendix Two — WHO / UNEP Report

State of the Science of Endocrine Disrupting Chemicals 2012

Summary for Decision Makers