



# Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014

## The Ocean2Earth compost order September 2023

### Introduction

This order, issued by the NSW Environment Protection Authority (EPA) under clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 (Waste Regulation), imposes the requirements that must be met by suppliers of Ocean2Earth compost or blended Ocean2Earth compost to which *'The Ocean2Earth compost exemption September 2023'* applies. The requirements in this order apply in relation to the supply of Ocean2Earth compost or blended Ocean2Earth compost for application to land as a soil amendment.

### 1. Waste to which this order applies

- 1.1. This order applies to Ocean2Earth compost and blended Ocean2Earth compost.
- 1.2. In this order, Ocean2Earth compost means compost made from any combination of seafood waste, new seafood waste, pine bark mulch, coal ash that is compliant with *The coal ash order 2014* and/or ash that is compliant with *The ash from burning biomass order 2014*, and that has undergone composting by Ocean2Earth at the Bega Valley Shire Council Merimbula Waste Depot, Sapphire Coast Drive, Merimbula NSW 2548 (Environment Protection Licence number 6044).
- 1.3. In this order, blended Ocean2Earth compost means Ocean2Earth compost that has been blended with any combination of:
  - 1.3.1. composted pine bark
  - 1.3.2. synthetic fertilisers
  - 1.3.3. manure that is compliant with *The manure order 2014*
  - 1.3.4. processed animal waste that is compliant with *The processed animal waste order 2014*
  - 1.3.5. coal ash that is compliant with *The coal ash order 2014*
  - 1.3.6. compost that is compliant with *The compost order 2016*, and
  - 1.3.7. ash that is compliant with *The ash from burning biomass order 2014*.

### 2. Persons to whom this order applies

- 2.1. The requirements in this order apply, as relevant, to any person who supplies Ocean2Earth compost or blended Ocean2Earth compost that has been generated, processed or recovered by the person.

- 2.2. This order does not apply to the supply of Ocean2Earth compost or blended Ocean2Earth compost to a consumer for land application at a premises for which the consumer holds a licence under the *Protection of the Environment Operations Act 1997* (POEO Act) that authorises the carrying out of the scheduled activities on the premises under clause 39 'waste disposal (application to land)' or clause 40 'waste disposal (thermal treatment)' of Schedule 1 of the POEO Act.

### 3. Duration

- 3.1. This order commences on 29 September 2023 and is valid until 29 September 2025 or until revoked by the EPA by notice in writing at an earlier date.

### 4. Processor requirements

The EPA imposes the following requirements on Pentarch Group Pty Ltd (ACN 607 144 196) who generates and supplies Ocean2Earth compost and blended Ocean2Earth compost.

#### General conditions

- 4.1. The processor must construct Ocean2Earth compost batches with a minimum volume of 150m<sup>3</sup> and a maximum volume of 180m<sup>3</sup>.
- 4.2. The processor must screen the Ocean2Earth compost to <40mm to remove any oversized materials, after composting has completed.
- 4.3. The processor must ensure that the Ocean2Earth compost and blended Ocean2Earth compost does not contain asbestos, engineered wood products and preservative treated or coated wood residues.
- 4.4. The processor must not mechanically size-reduce the Ocean2Earth compost through methods such as hammer milling, crushing or grinding:
  - 4.4.1. prior to obtaining the results from the collection and testing of samples and;
  - 4.4.2. where the testing of samples return concentrations of 'glass, metal and rigid plastics >2mm' and 'plastics – light flexible or film >5mm' above the absolute maximum concentrations set in Table 1.
- 4.5. The processor must ensure that the Ocean2Earth compost and blended Ocean2Earth compost is ready for land application prior to transport to a consumer.

#### Sampling requirements

- 4.6. On or before supplying or blending Ocean2Earth compost, the processor must follow the written sampling plan entitled: Sampling Analysis Quality Plan (SAQP) for characterisation of Marine Waste Compost for Reuse, JN19244\_SAQP\_O2E\_Compost\_FINAL\_v8, Elgin Associates Pty Ltd, 2 October 2023 (Elgin 2023). This document can be found as **Attachment 1** to this order.
- 4.7. The processor must undertake representative sampling and testing for each batch of Ocean2Earth compost as required under clauses 4.8 to 4.16 below. The sampling must be carried out in accordance with the written sampling plan.
- 4.8. The processor must undertake representative sampling of Ocean2Earth compost by collecting the number of discrete and composite samples in Column 2 of Table 1 and testing each sample for the corresponding attributes listed in Column 1 of Table 1.

- 4.9. The processor must store Ocean2Earth compost appropriately until the representative sampling results are validated as compliant with the absolute maximum concentration set out in Column 3 of Table 1.

### **Compost piles constructed with new seafood waste materials**

- 4.10. Where the processor makes Ocean2Earth compost batches that include new seafood waste materials that have not previously been composted by the processor, the processor must first:
- 4.10.1. Construct an Ocean2Earth compost batch, where one of the new seafood waste materials being introduced (i.e., either mussels, oysters, abalone, crabs, lobsters, prawns or algae) comprises of at least one-third of the total volume of seafood waste added to that batch<sup>1</sup>;
  - 4.10.2. Record the total volume of new seafood waste material added to the Ocean2Earth compost batch;
  - 4.10.3. Carry out the sampling and testing requirements set in clauses 4.6 to 4.9 for the Ocean2Earth compost batch;
- 4.11. In addition to clause 4.10.3, the processor must also undertake representative sampling of Ocean2Earth compost by collecting the number of discrete samples in Column 2 of Table 1 and testing each sample for attributes 20 and 21 listed in Column 1 of Table 1.
- 4.12. Testing for attributes 20 and 21 is not required for Ocean2Earth compost batches that are made from seafood waste materials that have been previously composted and supplied under the order.

### **Chemical and other material requirements**

- 4.13. The processor must not supply Ocean2Earth compost to any person if, in relation to any of the attributes listed in Column 1 of Table 1 of Ocean2Earth compost the attribute concentration of any representative sample exceeds the absolute maximum concentration or other value listed in Column 3 of Table 1.
- 4.14. The absolute maximum concentration in any Ocean2Earth compost supplied under this order must not exceed the absolute maximum concentration or other value listed in Column 3 of Table 1.

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<sup>1</sup> The remaining two-third of the seafood waste should be comprised of any seafood waste that has been previously composted. This includes fish and sea urchins, and any new seafood waste that has already been subject to the initial compost batch and met all the requirements of *The Ocean2Earth compost order September 2023*.

**Table 1**

Column 1	Column 2	Column 3
Attributes	Minimum number of samples per batch	Absolute maximum concentration (mg/kg 'dry weight' unless otherwise specified)
1. Mercury	1 composite sample	1
2. Cadmium		1
3. Lead		150
4. Arsenic		20
5. Chromium (total)		100
6. Copper		100
7. Nickel		60
8. Zinc		200
9. Sodium	2 composite samples	1%
10. pH		5.0 – 8.0
11. Electrical Conductivity		4 dS/m
12. Glass, metal and rigid plastics >2 mm		0.5%
13. Plastics – light, flexible or film >5 mm		0.05%
14. <i>Salmonella spp.</i>	4 discrete samples	Absent in 50g <sup>1</sup>
15. <i>Escherichia Coli (E. Coli)</i>		<100 MPN/g <sup>2</sup>
16. <i>Thermotolerant Coliforms</i>		<1000 MPN/g <sup>2</sup>
17. <i>Vibrio parahaemolyticus</i>		Absent in 50g
18. <i>Bacillus cereus</i>		Not applicable <sup>3</sup>
19. <i>Clostridium perfringens</i>		Not applicable <sup>3</sup>
20. Individual organochlorine pesticides (OCPs)	4 discrete samples – see clauses 4.11 and 4.12	Not applicable <sup>3</sup>
21. Individual polychlorinated biphenyls (PCBs)		Not applicable <sup>3</sup>

**Notes**

<sup>1</sup> 50g laboratory subsample collected from the grab sample that is submitted for microbiology analysis, as per AS5013.10-2009.

<sup>2</sup> MPN = most probable number

<sup>3</sup> While an absolute maximum concentration limit is not included for attribute 18, 19, 20 and 21, it must be tested for in each sample and records kept of the results.

**Test methods**

4.15. The processor must ensure that any testing of samples required by this order is undertaken by analytical laboratories accredited by the National Association of Testing Authorities (NATA), or equivalent.

4.16. The processor must ensure that the attributes (listed in Column 1 of Table 1) in the Ocean2Earth compost it supplies are tested in accordance with the test methods specified below or other equivalent analytical methods. Where an

equivalent analytical method is used the detection limit must be equal to or less than that nominated for the given method below:

- 4.16.1. Test method for measuring mercury:
  - 4.16.1.1. Analysis using USEPA SW-846 Method 7471B Mercury in solid or semisolid waste (manual cold vapour technique), or an equivalent analytical method with a detection limit < 10% of the stated absolute maximum concentration in Table 1, Column 3 (i.e., < 0.1 mg/kg dry weight).
  - 4.16.1.2. Report as mg/kg dry weight.
- 4.16.2. Test methods for measuring parameters 2 – 7 of Table 1:
  - 4.16.2.1. Sample preparation by digestion using USEPA SW-846 Method 3051A Microwave assisted acid digestion of sediments, sludges, soils, and oils (or an equivalent analytical method).
  - 4.16.2.2. Analysis using USEPA SW-846 Method 6010C Inductively coupled plasma - atomic emission spectrometry, or an equivalent analytical method with a detection limit <10% of the stated absolute maximum concentration in Table 1, Column 3 (i.e., <0.1 mg/kg dry weight for cadmium).
  - 4.16.2.3. Report as mg/kg dry weight.
- 4.16.3. Test method for measuring sodium:
  - 4.16.3.1. Australian Standard AS4454-2012 Composts, soil conditioners and mulches, “Appendix D - Method for determination of total content of nutrients, contaminant metals and other elements, and for the determination of organic contaminants and pathogen indicators”. This test must be conducted under bright and direct light.
  - 4.16.3.2. Report as percent.
- 4.16.4. Test method for measuring pH:
  - 4.16.4.1. Prepare sample by mixing one part of Ocean2Earth compost with 5 parts of water using analysis method 4A1 pH of 1:5 soil/water suspension from SOIL CHEMICAL METHODS – Australasia, Rayment and Lyons 2011, or an equivalent analytical method.
  - 4.16.4.2. Report as pH on an air-dry basis.
- 4.16.5. Test method for measuring electrical conductivity:
  - 4.16.5.1. Analysis using Method 3A1 Electrical Conductivity (EC) from SOIL CHEMICAL METHODS – Australasia, Rayment and Lyons 2011, using a 1:5 Ocean2Earth compost:water extract.
  - 4.16.5.2. Report deciSiemens per metre (dS/m) on an air-dry basis.
- 4.16.6. Test method for measuring physical contaminants 12 and 13:
  - 4.16.6.1. Australian Standard AS4454-2012 Composts, soil conditioners and mulches, “Appendix I - Method For Determination Of Moisture Content And Level Of Visible Contamination”. This test must be conducted under bright and direct light.
  - 4.16.6.2. Results must be reported as % contamination dry weight.

- 4.16.7. Test method for measuring *Salmonella spp*:
  - 4.16.7.1. Australian Standard AS5013.10-2009 Food microbiology - Microbiology of food and animal feeding stuffs - Horizontal method for the detection of *Salmonella spp.*, or an equivalent analytical method.
  - 4.16.7.2. Report as absent or present in 50 grams.
- 4.16.8. Test method for measuring *Escherichia coli*:
  - 4.16.8.1. Australian Standard AS5013.15-2006 Food microbiology - Microbiology of food and animal feeding stuffs - Horizontal method for the detection and enumeration of presumptive *Escherichia coli* - Most probable number (MPN) technique, or an equivalent analytical method.
  - 4.16.8.2. Report as MPN / g.
- 4.16.9. Test method for measuring *Vibrio parahaemolyticus*:
  - 4.16.9.1. Australian Standard AS 5013.18-2010 Food microbiology - Method 18: Examination for specific organisms - *Vibrio parahaemolyticus*, or an equivalent analytical method.
  - 4.16.9.2. Report as absent or present in 50g.
- 4.16.10. Test method for measuring *Bacillus cereus*:
  - 4.16.10.1. Australian Standard AS 5013.2-2007 Food microbiology - Microbiology of food and animal feeding stuffs - Horizontal method for the enumeration of *Bacillus cereus* - Colony-count technique at 30C - colony forming units (CFU) technique, or an equivalent analytical method.
  - 4.16.10.2. Report as CFU / g.
- 4.16.11. Test method for measuring *Clostridium perfringens*:
  - 4.16.11.1. Australian Standard AS 5013.16-2006 Food microbiology – Microbiology of food and animal feeding stuffs - Horizontal method for the enumeration of *Clostridium perfringens* — Colony-count technique – colony forming units (CFU) technique, or an equivalent analytical method.
  - 4.16.11.2. Report as CFU / g.
- 4.16.12. Test method for measuring individual organochlorine pesticides:
  - 4.16.12.1. Analysis using USEPA SW-846 Method 8081B Organochlorine pesticides by gas chromatography, or an equivalent analytical method.
  - 4.16.12.2. Individual organochlorine pesticide analysis must include Aldrin, Dieldrin, Dichlorodiphenyltrichloroethane (DDT), Chlordane, Endrin, Heptachlor and Hexachlorobenzene (HCB).
  - 4.16.12.3. Report as mg/kg dry weight.
- 4.16.13. Test method for measuring individual polychlorinated biphenyls:
  - 4.16.13.1. Analysis using USEPA SW-846 Method 8082A Polychlorinated Biphenyls (PCBs) by gas chromatography (or an equivalent analytical method).
  - 4.16.13.2. Measure the following individual PCBs: Aroclor 1016 (CAS

Registry No. 12674-11-2), Aroclor 1221 (CAS Registry No. 11104-28-2), Aroclor 1232 (CAS Registry No. 11141-16-5), Aroclor 1242 (CAS Registry No. 53469-21-9), Aroclor 1248 (CAS Registry No. 12672-29-6), Aroclor 1254 (CAS Registry No. 11097-69- 1), Aroclor 1260 (CAS Registry No. 11096-82-5).

4.16.13.3. Report individual listed PCBs as mg/kg dry weight.

### **Reprocessing and disposing of Ocean2Earth compost**

- 4.17. If the test results of Ocean2Earth compost do not meet the absolute maximum concentrations set in Table 1 for microbiological parameters (attributes 14 to 19), the processor must either:
- 4.17.1. dispose of the Ocean2Earth compost at a facility that can lawfully receive it, or
  - 4.17.2. reprocess the Ocean2Earth compost by subjecting the Ocean2Earth compost to additional pasteurisation stage/s, where the internal temperature of the whole mass reaches a minimum of 55°C for 3 consecutive days per stage. The processor must then resample by collecting a further 4 discrete samples from the entire batch and test the samples for attributes 14 to 19 listed in Table 1. The processor may only supply the reprocessed Ocean2Earth compost if all 4 discrete samples meet the absolute maximum concentrations for attributes 14 to 19 set in Table 1.

### **Screening and further processing of Ocean2Earth compost**

- 4.18. Once the processor produces Ocean2Earth compost that has met the absolute maximum concentrations set in Table 1, the processor may proceed to screen and further process the Ocean2Earth compost in accordance with clauses 4.18.1 to 4.18.3 below:
- 4.18.1. The processor may size separate Ocean2Earth compost by screening.
  - 4.18.2. The processor may mechanically size-reduce the Ocean2Earth compost through methods such as hammer milling, crushing or grinding. The processor must thoroughly clean the size-reducing equipment between batches of Ocean2Earth compost.

### **Blending of Ocean2Earth compost**

- 4.19. The EPA imposes the following requirements on the processor who blends Ocean2Earth compost.
- 4.20. The processor must ensure that the composted pine bark does not contain asbestos, engineered wood products and preservative treated or coated wood residues.
- 4.21. The processor must ensure that any blending of processed animal waste that contains oyster meal into Ocean2Earth compost is restricted so that the final blended Ocean2Earth compost does not contain more than 20% (by mass) oyster meal, to ensure that no adverse impacts from chloride concentrations within the oyster meal impact the blended Ocean2Earth compost.

### **Packaging of bagged retail products**

- 4.22. The processor must only supply Ocean2Earth compost or blended



Ocean2Earth compost to any person who applies or intends to apply Ocean2Earth compost to land if the following information is clearly and simply presented on the packaging of the Ocean2Earth compost:

- 4.22.1. Instructions that explain that the person must incorporate a maximum of 1L of Ocean2Earth compost for every 1m<sup>2</sup> of topsoil at the time of land application (as per clause 6.3 of *The Ocean2Earth compost exemption September 2023*).
- 4.22.2. Instructions that explain that the person must not allow Ocean2Earth compost or blended Ocean2Earth compost to be fed to, or come into contact with, pigs or ruminants as per clause 6.6 of *The Ocean2Earth compost exemption September 2023*.

## Notification

- 4.23. On or before each transaction, the processor must either:
  - 4.23.1. provide the following to each person who applies or intends to apply Ocean2Earth compost or blended Ocean2Earth compost to land to whom the processor supplied Ocean2Earth compost or blended Ocean2Earth compost; or
  - 4.23.2. label the Ocean2Earth compost or blended Ocean2Earth compost packaging with instructions how the person can access electronically:
    - a written statement of compliance certifying that all the requirements set out in this order have been met
    - a copy of '*The Ocean2Earth compost exemption September 2023*'; and
    - a copy of '*The Ocean2Earth compost order September 2023*'.

## Record keeping and reporting

- 4.24. The processor must keep a written record of the following for a period of six years:
  - the sampling plan required by clause 4.6;
  - all test results in relation to the Ocean2Earth compost supplied or blended
  - documentation of the composting process; and
  - the quantity of any Ocean2Earth compost or blended Ocean2Earth compost supplied.
- 4.25. The processor must make information available to the consumer of Ocean2Earth compost or blended Ocean2Earth compost, or to the EPA, on request by that party, on the test results for the Ocean2Earth compost.
- 4.26. The processor must notify the EPA within seven days of becoming aware that it has not complied with any requirement in clause 4.1 to 4.25.

## 5. Definitions

In this order:

**application or apply to land** means applying to land by:

- spraying, spreading or depositing on the land; or
- ploughing, injecting or mixing into the land; or
- filling, raising, reclaiming or contouring the land.

**composting** means a process of managed biological transformation:



- (a) to achieve pasteurisation, and
- (b) for a period of not less than a total of 6 weeks of composting and curing at an adequate moisture level (>40 % by weight), and/or until an equivalent level of biological stability can be demonstrated.

Composting does not include drying or dehydration processes.

**composted pine bark** means raw bark sourced from a timber mill that is ground, screened and composted.

**consumer** means a person who applies, or intends to apply, Ocean2Earth compost or blended Ocean2Earth compost to land.

**engineered wood products** means engineered, painted, treated or composite wood products such as particleboard, oriented strand board, plywood, laminated veneer lumber, glulam or fibreboard that are manufactured with glues, resins, water repellents, fire retardants, fungal inhibitors and/or other chemicals.

**forestry and sawmill residues** are untreated and uncontaminated plant materials from forestry operations such as logging, silviculture and sawmilling. Forestry and sawmill residues include materials such as bark, woodchip, sawdust and wood fibre that are collected as a source separated material stream for processing.

**mulch** means plant material that by virtue of the nature and source of the material poses minimal risk of the presence of plant propagules, pathogens and other contaminants. Such materials may be shredded and/or screened to a preferred particle size grading for particular applications. Mulch only includes:

- (a) horticultural barks, leaf mulch and wood chip mulch produced from forestry and sawmill residues, and urban wood residues; and
- (b) branches, tree stumps and bark that are absent of leaves, flowers, fruit and plant propagules.

**new seafood waste** means any seafood waste materials that have not been previously composted by Ocean2Earth. This could include mussels, oysters, abalone, crabs, lobsters, prawns and algae collected from dedicated Ocean2Earth waste bins at boat ramps and from commercial and aquaculture fish processing facilities.

**pasteurisation** means a process to significantly reduce the numbers of plant and animal pathogens and plant propagules. Pasteurisation requires that the entire mass of organic material be subjected to either of the following:

- (a) Appropriate turning of outer material to the inside of the windrow so that the whole mass is subjected to a minimum of 3 turns with the internal temperature reaching a minimum of 55°C for 3 consecutive days before each turn. Where materials with a higher risk of containing pathogens are present, including but not limited to manure and food waste, the core temperature of the material mass should be maintained at 55°C or higher for 15 days or longer, and during this period the windrow should be turned a minimum of 5 times.
- (b) An alternative process that guarantees the same level of pathogen reduction, and the reduction of plant propagules as in (a). Any such alternative process must be clearly defined in writing and validated by a suitably qualified person prior to claiming compliance with this exemption. A written record of the validation report must be kept for a minimum period of six years.

**pine bark mulch** means screened mulch sourced from the Eden log export yard that meets conditions of '*The mulch order 2016*'.

**preservative treated or coated wood residues** means wood residues that are

preservative treated with chemicals such as copper chrome arsenate (CCA), high temperature creosote (HTC), pigmented emulsified creosote (PEC) and light organic solvent preservative (LOSP) and/or coated with substances such as varnish or paint.

**processor** means a person who processes, mixes, blends, or otherwise incorporates Ocean2Earth compost into a material in its final form for supply to a consumer. The processor in this order is Pentarch Group Pty Ltd (ACN 607 144 196).

**ruminant** means an animal that has a rumen including, but not limited to, alpacas, camels, cattle, deer, goats and sheep as defined in Clause 3(1) Part 1 of the *Biosecurity Regulation 2017*.

**seafood waste** means any combination of fish, sea urchins, mussels, oysters, abalone, crabs, lobsters, prawns and algae collected from dedicated Ocean2Earth waste bins at boat ramps and from commercial and aquaculture fish processing facilities.

**transaction** means:

- in the case of a one-off supply, the supply of a batch, truckload or stockpile of Ocean2Earth compost or blended Ocean2Earth compost that is not repeated,
- in the case where the supplier has an arrangement with the recipient for more than one supply of Ocean2Earth compost or blended Ocean2Earth compost, the first supply of Ocean2Earth compost or blended Ocean2Earth compost as required under the arrangement.

**urban wood residues** means untreated, unpainted, and uncontaminated urban derived timber and wood material that is collected as a separate material stream for processing. Urban wood residues include materials such as off-cuts, saw dust, wood shavings, packaging crates and pallets.



29/09/2023

**Karen Marler**

**Director - Technical (Chemical, Land and Radiation)**

**Regulatory Practice and Environmental Services**

## Notes

The EPA may amend or revoke this order at any time. It is the responsibility of each of the processor and processor to ensure it complies with all relevant requirements of the most current order.

In gazetting or otherwise issuing this order, the EPA is not in any way endorsing the supply or use of this substance or guaranteeing that the substance will confer benefit.

The conditions set out in this order are designed to minimise the risk of potential harm to the environment, human health or agriculture, although neither this order nor the accompanying exemption guarantee that the environment, human health or agriculture will not be harmed.

Any person or entity which supplies Ocean2Earth compost or blended Ocean2Earth compost should assess whether the material is fit for the purpose the material is proposed to be used for, and whether this use may cause harm. The supplier may need to seek expert engineering or technical advice.

Regardless of any exemption or order provided by the EPA, the person who causes or permits the application of the substance to land must ensure that the action is lawful and consistent with any other legislative requirements including, if applicable, any development consent(s) for managing operations on the site(s).

The supply of Ocean2Earth compost or blended Ocean2Earth compost remains subject to other relevant environmental regulations in the POEO Act and Waste Regulation. For example, a person who pollutes land (s. 142A) or water (s. 120), or causes air pollution through the emission of odours (s. 126), or does not meet the special requirements for asbestos waste (Part 7 of the Waste Regulation), regardless of this order, is guilty of an offence and subject to prosecution.

Ocean2Earth compost or blended Ocean2Earth compost that meets the conditions of this order should be applied to land by the consumer within 2 weeks of being received. Where there are extenuating circumstances the Ocean2Earth compost or blended Ocean2Earth compost should be land applied within 4 weeks. The EPA considers that 6 weeks would be the absolute limit in all circumstances.

This order does not alter the requirements of any other relevant legislation that must be met in supplying this material, including for example, the need to prepare a Safety Data Sheet. Failure to comply with the conditions of this order constitutes an offence under clause 93 of the Waste Regulation.

## **Attachment 1 - Sampling Analysis Quality Plan (SAQP)**