Non-agricultural source material (NASM) is material from non-agricultural sources that are applied to agricultural land under the *Nutrient Management Act, 2002* (NMA), and Ontario Regulation 267/03. Providing valuable nutrients for crop production, NASM includes leaf and yard waste, fruit and vegetable peels, food processing waste, pulp and paper biosolids (Figure 1) and sewage biosolids. For more than 30 years, NASM has been safely applied to Ontario farmland. This Factsheet looks at the three methods used to classify NASM into odour categories.

**NASM ODOUR CATEGORIES**

One of the most common complaints from the public about the land application program stems from odour impacts. The odour of a NASM is affected by a number of factors, including the age of the material, the method and duration of storage, and land-application practices.

![Figure 1. Field storage of pulp and paper biosolids.](Photo credit: Ontario Ministry of the Environment)

<table>
<thead>
<tr>
<th>Odour Category</th>
<th>Odour Detection Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>OC1</td>
<td>Less than 500 odour units (OU) (OC1 &lt; 500 OU)</td>
</tr>
<tr>
<td>OC2</td>
<td>More than or equal to 500 odour units but less than 1,500 odour units (500 OU ≤ OC2 &lt; 1,500 OU)</td>
</tr>
<tr>
<td>OC3</td>
<td>More than or equal to 1,500 odour units but less than 4,500 odour units (1,500 OU ≤ OC3 &lt; 4,500 OU)</td>
</tr>
</tbody>
</table>

**NOTE:** One odour unit (OU) equals the number of unit volumes of odourless gas required to dilute one unit volume of odorous gas to reach the odour panel’s detection threshold.

To address potential odour issues associated with the beneficial use of NASM, Ont. Reg. 267/03 classifies material into three odour categories (OC1, OC2 and OC3), based on the detection threshold of the material. OC1 materials are less odorous than OC2 and OC3 materials. Materials that exceed the OC3 level cannot be applied to agricultural land under the NMA.

Table 1 shows the three odour categories and their corresponding ranges of odour detection thresholds.

The odour detection threshold (odour potential) of the material determines the odour category. Given the complexity of the human sense of smell to odours, categories are defined using both a standardized method using dynamic olfactometry and a panel of human assessors.
The detection threshold represents the dilution required for the material to have a 50% probability of detection by an evaluation panel. At greater detection thresholds, the odour potential increases for the material. Figure 2 shows a panel member assessing the odour of a NASM.

The odour category affects land application standards, such as separation distances to neighbouring properties and the method of application. In general, greater setback distances and incorporation are required for more odorous materials.

OC3 materials also have special storage and transfer requirements (Ont. Reg. 267/03, part VI, land application standards 47). Figure 3 shows the injection method for applying OC3 material into a field.

There are three ways to determine the odour category of a NASM. These methods are outlined in the NASM Odour Guide (Ontario Regulation 267/03) associated with the NMA:

- basic method: odour category table
- odour category assignment and reassessment method (director’s assignment)
- odour assessment test method

**Basic Method: Odour Category Table**

A table of common NASMs and their corresponding odour categories helps regulators determine odour categories and the correct regulatory requirements. The assignment of NASM to categories is carried out using comparative and empirical assessment, the professional judgment of ministry staff and a review of odour regulations and standards in other jurisdictions.

The simplest method for odour assignment is to check the NASM Odour Category Table *(Nutrient Management Tables, September 14, 2009)* to determine if the NASM is among the list of materials assigned to odour category OC1, OC2 or OC3.

Consider any mixtures that might be land applied and how the mixture could affect the odour level and corresponding odour category requirements. When mixing different types of NASM together, assign the mixture the odour category of the most odorous material in the mixture. For example, if leaf and yard waste (OC1) are mixed with onion peels (OC2), consider the resulting NASM to be OC2.

Use one of the other methods for assigning an odour categorization if:

- the NASM has not been assigned to an odour category in the NASM Odour Category Table, or
- there is reason for disagreement with the assigned category

**Odour Category Assignment and Reassessment Method (Director’s Assignment)**

The OMAFRA Director (Director) can assign an odour category before or at the time of a NASM plan submission. The Director assigns an odour category based on knowledge of the NASM and/or similar types of NASM.

The process is as follows:

**Proponent submits a written request for an odour category assignment**

The request includes (as a minimum):

- a description of the material for land application
• a description of the process to generate the material — any treatment done to the materials prior to land application; storage method and duration before the material is land applied

It is helpful to include any additional supporting information. Examples can include:

• Certificates of Approval from previously approved land application of the NASM
• results of previous odour testing of the NASM
• results from past reviews of the NASM conducted by the Biosolids Utilization Committee (BUC)
• other supporting literature or research that substantiates the requested odour category

The Director works in consultation with the proponent when assigning the odour category. However, the Director has discretion to assign a NASM to a higher odour category where it is considered necessary to control odour impacts that may result from the land application or storage of the NASM. For example, the Director can assign a different odour category in response to complaints or other information that becomes available, to minimize potential for impacts.

**Director assigns a category or requests a test**

The Director’s response is either:

• an assigned Odour Category based on the information provided by the client, historical data, comparative review and empirical assessment, and the professional judgment of ministry staff, or
• a request for an odour assessment test

**Odour Assessment Test Method**

If there is disagreement with the default category (Basic Method) or the Director-assigned category, seek reclassification from OMAFRA using the Odour Assessment Test Method, in accordance with the NASM Odour Guide. The Director can request a new odour assessment test. The intent of the odour assessment test is to determine the odour of the material when applied to the field. All odour assessment tests are conducted at the maximum possible application rate for the NASM and using a representative sample of the NASM that will be land applied.

The process for this method is as follows:

**Recommended:**

*Proponent has pre-consultation with OMAFRA*

Contact the OMAFRA Air Quality Engineer.

**Required:**

*Proponent submits written odour classification methodology to the Director*

An odour assessment test, carried out without first discussing the methodology with the Director, will not be accepted by the Director as part of a NASM plan approval.

**Electronic submissions:**

NutrientManagement.ONeSourceForms@ontario.ca

**Paper submissions:**

Attn: Manager, Innovation Engineering & Program Delivery (East)
1 Stone Rd. W.
Guelph, Ontario N1G 4Y2

*Proponent analyzes NASM samples for odour*

Once the methodology for testing/analysis is approved by the Director, collect the NASM samples and have them analyzed for odour by a qualified laboratory in accordance with the approved methodology.

**Proponent submits report**

Submit a report of the applied methodology, analytical results and recommended classification to the Director for approval.

**Electronic submissions:**

NutrientManagement.ONeSourceForms@ontario.ca

**Paper submissions:**

Attn: Manager, Innovation Engineering & Program Delivery (East)
1 Stone Rd. W.
Guelph, Ontario N1G 4Y2

*Director assigns draft odour category*

The Director assigns an odour category based on the supplied testing results, historical data, comparative review and empirical assessment, and the professional judgment of ministry staff. The proponent receives a draft odour category assignment for review and comment within 10 business days.
The Director has the discretion to assign a NASM to a higher category, where necessary, to control odour impact that may result from land application or storage of the NASM.

The NASM odour category assignment is applicable to the NASM under the conditions tested during the odour assessment test. If the generation, processing, handling or storage of the NASM changes prior to land application of the material, the NASM odour category will have to be re-evaluated.

HOW TO USE THE ODOR CATEGORY ASSIGNMENT

The Director assignment of an odour category for NASM is separate and distinct from a NASM Plan Approval. A certified NASM consultant applies the odour category in the evaluation and preparation of NASM Plan(s) for the referenced NASM.

Continue to apply best practices to minimize the potential for nuisance odours from land application of NASM. Develop a contingency plan for dealing with any unanticipated odours.

ADDITIONAL INFORMATION

For more information about NASM Odour Category Assignment, see the OMAFRA website at www.ontario.ca/nasm-omafra. The site contains copies of the NASM Odour Guide, the Nutrient Management Tables and the corresponding legislation.

REFERENCES


Nutrient Management Tables for Ontario Regulation 267/03. Made under the Nutrient Management Act, 2002.

This Factsheet was written by Amadou Thiam, P.Eng., Air Quality, OMAFRA, Alfred, and Benoit Lebeau, P.Eng., Non-Agricultural Source Materials, OMAFRA, Kemptville.

Do you know about Ontario’s Nutrient Management Act?

The provincial Nutrient Management Act (NMA) and the Regulation 267/03, as amended, regulates the storage, handling and application of nutrients that could be applied to agricultural crop land. The objective is to protect Ontario’s surface and groundwater resources.

Please consult the regulation and protocols for the specific legal details. This Factsheet is not meant to provide legal advice. Consult your lawyer if you have questions about your legal obligations.

For more information on the NMA, call the Nutrient Management Information Line at 1-866-242-4460, e-mail nman.omafra@ontario.ca or visit www.ontario.ca/omafra.

Factsheets are continually being updated so please ensure that you have the most recent version.