

Guide to calculations for ChemTRAC reporting:

Oilseed processing

Version 1.1

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Contents

How do I use this guide?

Part 1 of this guide will help you understand the ChemTRAC program, collect information about your facility, use the ChemTRAC calculator for Oilseed Processing, and report substances to ChemTRAC, if needed.

Part 2 of this guide will help you reduce your facility's environmental impact.

The Appendices provide additional information about emissions calculations.

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City of Toronto, 2012

For more information about ChemTRAC, call 3-1-1 or visit www.toronto.ca/chemtrac

DISCLAIMER: This guide is for educational and informational purposes only. The City of Toronto assumes no liability for the accuracy or completeness of these materials. Readers are responsible for ensuring compliance with Toronto's Environmental Reporting and Disclosure Bylaw (Municipal Code Chapter 423). These materials should not be relied upon as a substitute for legal or professional advice. Readers should seek their own legal or professional advice in regard to their use of the information contained in the guide.

Introduction to the ChemTRAC program

There are chemicals in Toronto's environment that can harm our health. These substances come from vehicle exhaust, homes, businesses and other sources.

Toronto Public Health identifies 25 of these chemicals as "priority substances" because they are found in our local environment at levels that are of concern for health. Evidence links these substances to short-term health effects like respiratory problems, and longer-term impacts such as cancer. In a business setting, these substances can come from process heating, cleaning with solvents, welding and other processes.

The list of 25 substances and the reporting thresholds are included in Table 5 on page 41.

ChemTRAC is a City of Toronto program that:

- tracks where businesses use and release these priority substances;
- helps businesses reduce or replace these substances with safer alternatives; and
- provides the public with information on priority substances in their community.

As part of ChemTRAC, Toronto's Environmental Reporting and Disclosure Bylaw (Municipal Code Chapter 423) requires many businesses to report to the City each year if they use or release a certain amount of priority substances to the environment. Oilseed processors are covered by this bylaw.

This guide is designed to help you:

- understand if your facility uses and releases any ChemTRAC priority substances;
- use ChemTRAC calculators to determine if you are required to report to the City of Toronto;
- use the ChemTRAC online reporting system to submit data to the City; and
- consider ways to reduce your environmental impact.

Additional information on the ChemTRAC program and the Environmental Reporting and Disclosure Bylaw is available by calling 3-1-1 or online at: <http://www.toronto.ca/chemtrac/>

The Oilseed Processing sector

The North American Industrial Classification System (NAICS) code 311224 is comprised of facilities that crush oilseeds and tree nuts to extract oils. Both edible and inedible products may be produced. It includes crushing mills that produce margarine and shortening as well as oils such as canola, linseed, olive, peanut oil, rapeseed, soybean and tree nut oils.

It excludes facilities that manufacture corn oil by wet corn milling, and that process or blend purchased vegetable oils.

Oilseed processors are required to report their data every year if they use or release above the reporting threshold. The report is due by June 30 each year. Annual data that is reported each June should cover the period from January 1 to December 31 of the previous year.

Identifying ChemTRAC substances in oilseed processors

Table 1 lists the typical substances and processes used in an oilseed processing facility. Most facilities will use solvents (usually hexane) for oil extraction. Most facilities will transfer, handle and process raw seeds, using processes that may include: cracking, hull grinding, bean condition, flaking, and cooling. Many facilities will also use natural gas-fired equipment for cooking or drying seeds.

Table 1 also shows the ChemTRAC priority substances that are released in a typical oilseed processing facility. The ChemTRAC calculator can help you estimate the levels of these substances in your facility.

Table 1. ChemTRAC substances released in an oilseed processing facility and their source of release

ChemTRAC priority substances	Manufacturing processes		
	Oil extraction using solvents	Transfer, handling and processing of raw seed	Natural gas cookers / dryers
Benzene			X
Cadmium and its compounds			X
Chromium (non-hexavalent) and its compounds			X
Formaldehyde			X
Lead and its compounds			X
Manganese and its compounds			X
Mercury and its compounds			X
Nickel and its compounds			X
Nitrogen Oxides			X
PM _{2.5}		X	X
PAHs			X
VOCs	X		X

Most of the substances listed in Table 1 are released in very small amounts. It is likely that only **VOCs**, **PM_{2.5}** and **NO_x** would be released in amounts that would appear as non-zero in the ChemTRAC calculator for oilseed processing.

Volatile Organic Substances (VOCs). VOCs are a group of organic chemicals that easily evaporate into the air. You can often smell them. They are released

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from solvents, paints, inks and cleaning products. They are also released in small quantities when natural gas is burned.

Particulate Matter 2.5 (PM_{2.5}). The term “particulate matter” describes solid and liquid particles found in the air we breathe. Particulate matter that is smaller than 0.0025 millimetres in diameter is called PM_{2.5} and may not be visible to the naked eye. In an oilseed processing facility, PM_{2.5} is released into the air from the transfer, handling and processing of raw seeds.

Combustion by-products from natural gas burners. Several substances are released when natural gas is burned (i.e. combusted) to heat ovens or sterilization equipment. Nitrogen oxides are released in significant quantities, and a number of other ChemTRAC priority substances are released in smaller quantities.

The health effects of PM_{2.5}, VOCs and NO_x

PM_{2.5}. Because of their small size, PM_{2.5} can lodge deeply into the lungs. Numerous studies have linked PM to aggravated cardiac and respiratory diseases such as asthma, bronchitis and emphysema, and to heart disease.

VOCs. Short-term health effects of exposure to VOCs may include eye, nose, and throat irritation, headaches, loss of coordination, and nausea. Over longer periods, VOCs can damage the liver, kidneys, and central nervous system.

NO_x. Long-term exposure to NO_x cause or worsen respiratory disease such as emphysema and bronchitis, and can aggravate existing heart disease.

For more information on the health effects of these substances, as well as other ChemTRAC priority substances, visit

<http://www.toronto.ca/health/chemtrac/substances.htm>.

Calculating emissions

To help Toronto businesses calculate their emissions and comply with the Environmental Reporting and Disclosure Bylaw, Toronto Public Health developed calculators that are specific to industrial sectors and processes. Access these calculators from the ChemTRAC website at <http://www.toronto.ca/health/chemtrac/tools.htm>.

These calculators help businesses do three things:

- Identify which ChemTRAC priority substances are used or released in their facility
- Calculate the amounts of ChemTRAC priority substances used or released
- Determine what they are required to report to the ChemTRAC program.

Appendix B describes how the calculators calculate estimates of the quantities of ChemTRAC priority substances that are released from your facility.

The release of ChemTRAC priority substances can be calculated using methods other than the ChemTRAC calculators. See <http://www.toronto.ca/health/chemtrac/tools.htm> for a list of alternative methods.

In the next section, we will work through worksheets to prepare you to use the ChemTRAC calculator for Oilseed Processing.

Worksheets for collecting information

The worksheets found on the next pages are intended to help you collect all the information needed to use the ChemTRAC calculator for Oilseed processing.

Two worksheets are provided:

- Oilseed handling and processing
- Natural gas equipment (ovens / cookers / dryers)

A printer-friendly version of the worksheets can be found as Appendix A. They can be printed and completed by hand so that you have all information available on-hand for entry into the ChemTRAC calculator.

Note: If your facility has more processes than are included in the ChemTRAC calculator for Oilseed Processing, you may need to use additional calculators to identify other emissions. You would then add these amounts to the numbers generated by the ChemTRAC calculator for Oilseed Processing. You can use ChemTRAC's "Calculation of Totals" calculator to combine the findings of multiple calculators and determine if you exceed ChemTRAC thresholds. See Appendix C for more details.

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Worksheet 1 – Oilseed handling and processing

This worksheet will help you collect information on your facility's oilseed handling and processing. By answering the questions below and filling out the [Worksheet 1 Tables](#) on the next page, you will have all the information you need to complete the first section of the ChemTRAC calculator. You should collect data on your facility for the period from January 1 to December 31 of a calendar year.

1. What is the total annual quantity of raw oilseed processed by your facility?

You can collect information on the quantity of oilseed processed in: metric tonnes, kilograms, pounds, US tons, or UK tons¹.

If it is helpful, you can start by estimating the quantity processed each week or month.

*Example: 10 tonnes per month * 12 months per year = 120 tonnes per year*

Enter this data into [Worksheet 1 Table 1](#) on the next page. You can enter information about different products in different rows, and add them in the row at the bottom.

2. Which transfer, handling and processing methods and equipment are used by your facility?

Most oilseed processing facilities will “receive” raw products and “loadout” products after processing. However, not all facilities will use all of the other oilseed processing methods and equipment included in the ChemTRAC calculator. You should determine which of the following your facility uses:

- Cracking / dehulling (*e.g. with cracking rolls and dehulling aspirators*)
- Hull grinding (*after dehulling*)
- Bean conditioning (*heating cracked seeds to prepare them for flaking*)
- Flaking rolls (*cylindrical rolls that press particles into flakes*)
- White flake coolers (*after solvent extraction and desolventizing*)
- Meal coolers (*after solvent extraction, desolventizing and drying*)
- Meal dryers (*after solvent extraction and desolventizing*)
- Meal grinding / sizing (*of cooled, dried meal from solvent extraction*)

Use an “X” to indicate whether or not your facility uses each of the processes listed in [Worksheet 1 Table 2](#) on the next page.

Note: The ChemTRAC calculator assumes that all facilities have cyclone dust collectors to capture particulate matter from processing operations. For more information on dust collectors, see *Control Technologies for Reducing Emissions* on page 26 of this guide.

¹ The ChemTRAC calculator assumes that all oilseed processed is subject to solvent extraction using hexane.

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Worksheet 1 Table 1 – Total quantity of oilseed processed

Product	Quantity of oilseed processed	Units
Product 1: _____	_____	<input type="checkbox"/> tonnes <input type="checkbox"/> kilograms (kg) <input type="checkbox"/> pounds (lb) <input type="checkbox"/> tons - UK <input type="checkbox"/> tons - US
Product 2: _____	_____	_____
Product 3: _____	_____	_____
Product 4: _____	_____	_____
Total annual quantity of oilseed processed: _____		<input type="checkbox"/> tonnes <input type="checkbox"/> kilograms (kg) <input type="checkbox"/> pounds (lb) <input type="checkbox"/> tons - UK <input type="checkbox"/> tons - US

Worksheet 1 Table 2 – Transfer, handling and processing methods & equipment

Please indicate which processes are used in your facility	
Receiving?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Cracking / dehulling?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Hull grinding?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Bean conditioning?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Flaking rolls?	<input type="checkbox"/> Yes <input type="checkbox"/> No
White flake coolers?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Meal coolers?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Meal dryers?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Meal grinding / sizing?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Meal loadout?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Worksheet 2: Natural gas fired equipment (cookers, dryers)

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This worksheet will help you collect information on your facility's ovens, cookers and dryers. By answering the questions below and filling out the [Worksheet 2 Tables](#) on the next page, you will have all the information you need to complete the "natural gas fired equipment" section of the ChemTRAC calculator. You should collect data on your facility for the period from January 1 to December 31 of a calendar year.

Skip this worksheet if you do not use any natural gas fired equipment for manufacturing.

3. What control technologies are installed on your natural gas equipment?

You can find this information in the operating manuals for the heating equipment that your facility uses. Descriptions of control technologies can be found in Part 2 on page 25 of this guide. If you do not know which control technologies are in place, assume that none are. Use this information to fill out [Worksheet 2 Table 1](#) on the next page.

4. How much natural gas do ovens / cookers / dryers use?

This question can be answered using EITHER Option 4A or Option 4B. Use the Option that you have selected to complete [Worksheet 2 Table 2](#) on the next page.

Option 4A – What is the total amount of natural gas used for manufacturing equipment? You can get this information from your annual gas bills. Note that the gas bills might include gas used for other purposes, such as heating the facility itself. You should consider only gas used for manufacturing processes such as cooking and drying. One way to know how much gas is used for manufacturing is to compare winter and summer bills. Winter bills will likely include facility heating as well as gas used for manufacturing. Summer months will likely include only gas used for manufacturing.

OR

Option 4B – What is the thermal rating of your manufacturing equipment? This rating (in BTU/hr) would be found in your equipment's operating manual. You will also need to estimate the average number of hours per day, days per week, and weeks per year that this equipment is in operation.

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Worksheet 2 Table 1 – Control technologies information

Cookers / dryers are equipped with (add a checkmark):	
a. Low NO _x burners only	_____
b. Low NO _x burners with recirculated flue gas	_____
c. No control technologies	_____

Worksheet 2 Table 2 – Natural gas usage

Option A. Total natural gas used for the cookers / dryers
Add values in cubic metres OR cubic feet: _____ m ³ (cubic metres) or _____ ft ³ (cubic feet)

OR

Option B. Thermal rating of the cookers / dryers
Record value in British Thermal Units per hour _____ BTU/hr
Also estimate the average time that the equipment is in operation: _____ hours per day and _____ days per week and _____ weeks per year

Using the calculator

To calculate your use and release of ChemTRAC substances, you need to enter the information from the worksheets in this guide into the appropriate sections of the ChemTRAC calculator for Oilseed processing. The ChemTRAC calculator will then automatically calculate the quantities of ChemTRAC substances released from your facility. This section of the guide provides a step-by-step walkthrough of the use of the calculator.

Getting started

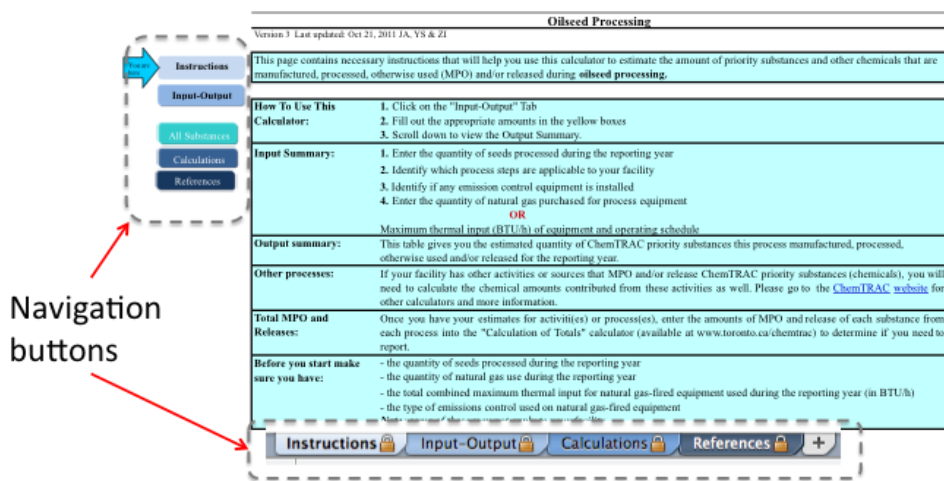
The ChemTRAC calculator for oilseed processors can be read with software such as Microsoft Excel or Open Office. To find a copy of the calculator, go to <http://www.toronto.ca/health/chemtrac/tools.htm> and click on the "Oilseed Processing" link found under the Food and Beverage Sector.

The calculator consists of five different screens:

- Instructions
- Input-Output
- All Substances
- Calculations
- References

You only have to enter information into the Input-Output screen. The other screens are provided in the calculator mainly for reference. No information needs to be entered in these screens.² These additional screens are discussed in Appendix C.

You can navigate between screens by clicking the buttons on the left side of each screen or by clicking on the tabs at the bottom of each screen:



² If you have site-specific emission factors for any ChemTRAC substance, they can be entered manually in the Calculator screen. See Appendix B for details.

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The Instructions screen

The calculator should open on the Instructions screen. This screen contains instructions on how to use the calculator to estimate the amount of ChemTRAC substances and other substances that are used and released by your facility. It also provides a brief overview of the contents of the calculator. **You do not need to enter any information on this screen.**

The Input-Output screen

The Input-Output screen is the screen where you will enter all information applicable to your facility. Information is typed in **yellow boxes** only. Any yellow cells that do not apply to your facility can be left blank. **Dropdown menus** are also used to input some information. The Input-Output screen can be filled out using the responses to the questions found within **Worksheets 1 and 2** of the guide.

Once you input your facility's information into the appropriate yellow boxes and dropdown menus, the calculator automatically calculates the quantities of ChemTRAC substances that are manufactured, processed, otherwise used and released to air from your facility.³ The values are displayed in the **Output Summary table** found at the bottom of the Input-Output screen. You should compare the values that are manufactured, processed or otherwise used to the ChemTRAC reporting thresholds to see if you are required to report ChemTRAC substances. See *Interpreting Results* on page 17 for more information.

The next pages will walk you through the Input-Output screen. The image on the next page illustrates the different areas of the Input-Output screen.

³ The definitions for 'Manufactured', 'Processed', 'Otherwise Used', and 'Released to Air' can be found on the References screen of the ChemTRAC calculator.

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Please complete the INPUT table below.

Amount of raw oilseed processed		tonnes/yr
Please indicate which processes are used		
Receiving	Select	
Cracking/Dehulling	Select	
Hull Grinding	Select	
Bean Conditioning	Select	
Flaking Rolls	Select	
White Flake Coolers	Select	
Meal Cooler	Select	
Meal Dryer	Select	
Meal Grinder/Sizing	Select	
Meal Loadout	Select	
Natural Gas Fired () Cooker/Dryer		
Identify emissions control installed:	None	
Please complete ONLY A or B		
A) the quantity of natural gas		
Total quantity of natural gas used:		m ³ /yr
OR		
B) the thermal input and operating schedule		
Total maximum thermal input for all natural gas fired cooking equipment:		BTU/h
Operating schedule:		hours/day
		days/week
		weeks/year

Unit Conversion Table		
1 pounds	=	0.000 tonnes
1 ounces	=	0.000 tonnes
1 grams	=	0.000 tonnes
1 tons (US)	=	0.907 tonnes
1 tons (UK)	=	1.016 tonnes
1 kilograms (metric)	=	0.001 tonnes
1 cubic feet (ft ³)	=	0.028 m ³

Use this box to convert quantity of raw seed into tonnes and volume of gas into cubic metres

Enter data from Worksheet 1 here

Enter data from Worksheet 2 here

OUTPUT to ChemTRAC (Only ChemTRAC priority substances)				
ChemTRAC Priority Substances	Quantity (kg/yr)			
	Manufactured ¹	Processed ¹	Otherwise Used ¹	Released to Air ¹
Nitrogen Oxides (NOx)	0	0	0	0
Formaldehyde	0	0	0	0
Benzene	0	0	0	0
Lead and its compounds	0	0	0	0
Manganese and its compounds	0	0	0	0
Mercury and its compounds	0	0	0	0
Nickel and its compounds	0	0	0	0
Cadmium and its compounds	0	0	0	0
Acetaldehyde	0	0	0	0
Chromium (non-hexavalent) and its compounds	0	0	0	0
Particulate Matter (PM2.5)	0	0	0	0
Total PAHs	0	0	0	0
Volatile Organic Compounds (VOCs)	0	0	0	0

The output values are calculated here

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Entering information from Worksheet 1: Oilseed handling and processing

The image below displays the area of the Input-Output screen where you enter information on oilseed handling and processing.

It shows an example of information from [Worksheet 1](#) entered into the appropriate areas of the screen.

Question 1: A user has indicated that the facility processed a total of **75** tonnes of raw oilseed over the year.

The input box requires data in metric tonnes. If you have collected information in other units (e.g. kilograms, pounds, US tons), you should use the **Unit Conversion Box** on the right side of the Input-Output screen to convert to tonnes. This is discussed on the next page.

Question 2: A user has indicated that their facility uses the following processes, by selecting “**Yes**” from the dropdown menu: receiving, cracking/dehulling, hull grinding, bean conditioning, flaking rolls, meal cooler, meal dryer and meal loadout. For the other processes, they selected “**No**”.

Amount of raw oilseed processed	75	tonnes/yr
Please indicate which processes are used		
Receiving	Yes	⬆️⬆️
Cracking/Dehulling	Yes	⬆️⬆️
Hull Grinding	Yes	⬆️⬆️
Bean Conditioning	Yes	⬆️⬆️
Flaking Rolls	Yes	⬆️⬆️
White Flake Coolers	No	⬆️⬆️
Meal Cooler	Yes	⬆️⬆️
Meal Dryer	Yes	⬆️⬆️
Meal Grinder/Sizing	No	⬆️⬆️
Meal Loadout	Yes	⬆️⬆️

Worksheet 1 Question 1

Worksheet 1 Question 2

Entering information from Worksheet 2: Natural gas fired equipment

The image on the next page displays the area of the Input-Output screen where you enter information on natural gas fired equipment.

It shows an example of information from [Worksheet 2](#) entered into the Input-Output screen. In this example, a user has indicated that the facility does not use any control technologies (“**None**” selected from the dropdown menu, Question 1). The user has opted for Option 2B (Question 2) and has indicated that the maximum thermal input for all heating equipment is 50,000 BTU/hr. The facility operates for 12 hours per day, 5 days per week, 50 weeks per year.

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If you are using Option 4A, the input box requires quantity of natural gas in cubic metres (m³). If you have collected information in cubic feet (ft³), you should use the **Unit Conversion Box** on the right side of the Input-Output screen to convert.

Natural Gas Fired Ovens/Cookers/Dryers		
Identify emissions control installed:	None	
Please complete ONLY A or B		
A) the quantity of natural gas		
Total quantity of natural gas used:		m ³ /yr
OR		
B) the thermal input and operating schedule		
Total maximum thermal input for all natural gas fired cooking equipment:	50,000	BTU/h
Operating schedule:	12	hours/day
	5	days/week
	50	weeks/year

Worksheet 2 Question 3

Worksheet 2 Question 4
Option 4A

Option 4B

Unit Conversion Table

The blue and yellow unit conversion box on the right side of the calculator allows you to convert:

- Quantity of oilseed processed into tonnes
- Quantity of natural gas used into cubic metres (m³).

Enter the value from Worksheet 1 or 2 in the appropriate yellow box at the left of the table (in pounds, US tons, kilograms, cubic feet, etc). The tool will automatically convert the quantity into tonnes or cubic metres in the blue column at the right of the table. This value can then be entered into the main areas of the input-output screen.

As an example in the illustration below, “**75,000**” kilograms is typed into the yellow box at the left. It is automatically converted to “**75.00**” tonnes, displayed in the blue box at the right of the table.

Unit Conversion Table			
1	pounds	=	0.000 tonnes
1	ounces	=	0.000 tonnes
1	grams	=	0.000 tonnes
1	tons (US)	=	0.907 tonnes
1	tons (UK)	=	1.016 tonnes
75000	kilograms (metric)	=	75.000 tonnes
1	cubic feet (ft ³)	=	0.028 m ³

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Reading the Output table

The Output table displays the quantities of ChemTRAC substances that are manufactured, processed, released, or otherwise used in your facility. These values are the results of all of the calculations based on the information entered in the Input-Output Screen. The Output table below is the result of the sample information entered in the sample screens above.

OUTPUT SUMMARY (Only ChemTRAC priority substances)				
ChemTRAC Priority Substances	Quantity (kg/yr)			
	Manufactured ¹	Processed ¹	Otherwise Used ¹	Released to Air ¹
Nitrogen Oxides (NOx)	7	0	0	7
Formaldehyde	0	0	0	0
Benzene	0	0	0	0
Lead and its compounds	0	0	0	0
Manganese and its compounds	0	0	0	0
Mercury and its compounds	0	0	0	0
Nickel and its compounds	0	0	0	0
Cadmium and its compounds	0	0	0	0
Acetaldehyde	0	0	0	0
Chromium (non-hexavalent) and its compounds	0	0	0	0
Particulate Matter (PM2.5)	21	0	0	21
Total PAHs	0	0	0	0
Volatile Organic Compounds (VOCs)	0	0	184	184

You should compare the values that are manufactured, processed or otherwise used to the ChemTRAC reporting thresholds to see if you are required to report ChemTRAC substances. See Interpreting Results on page 17 for more details.

Interpreting results

Compare results to thresholds. Once the amounts of ChemTRAC substances manufactured, processed, otherwise used and released to air have been calculated, you must compare these amounts to the ChemTRAC reporting thresholds listed in the Environmental Reporting and Disclosure Bylaw.⁴ These thresholds are also listed in Appendix C of this guide. Appendix C also identifies the different methods of comparing Group A, B and C ChemTRAC substances to thresholds.

Combining multiple calculation methods. Some facilities may need to add results of the ChemTRAC calculator for Oilseed processors with emissions from other processes that happen in the facility. This is discussed in Appendix C.

If there are no other processes and, therefore, the ChemTRAC calculator is the only tool used to estimate emissions, the values in the Output Summary table of the calculator can be compared directly to the ChemTRAC reporting thresholds. See an example in Table 3.

If results exceed thresholds you must report. The methods for comparing results to reporting thresholds are different for different groups of ChemTRAC substances.

- **Group C substances:** Volatile organic compounds (VOCs), particulate matter 2.5 (PM_{2.5}) and nitrogen oxides (NO_x) are Group C substances. Reporting is only required if the substances are **released to air** at or above thresholds.
- **Group B substances:** Only polycyclic aromatic hydrocarbons (PAHs) are Group B substances. Reporting is required if the sum of all PAHs released, disposed or transferred for recycling is at or above thresholds.
- **Group A substances:** All other ChemTRAC priority substances are Group A substances. Reporting is required if the sum of the substances manufactured, processed, and otherwise used is at or above thresholds.

Table 3 on the next page compares the Output Summary table from the *Using the Calculator* section to ChemTRAC thresholds.

⁴ The full by-law can be found at <http://www.toronto.ca/health/chemtrac/report.htm>.

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Table 2. Comparison of results from the ChemTRAC calculator and reporting thresholds

Output Summary table from the ChemTRAC calculator					Comparison to ChemTRAC thresholds	
ChemTRAC Priority Substances	Manufactured (kg/yr))	Processed (kg/yr)	Otherwise used (kg/yr)	Released to Air (kg/yr)	Reporting threshold (kg/yr)	Is reporting required?
Nitrogen Oxides	7	0	0	7	200	No
Formaldehyde	0	0	0	0	100	No
Benzene	0	0	0	0	100	No
Lead and its compounds	0	0	0	0	10	No
Manganese and its compounds	0	0	0	0	10	No
Mercury and its compounds	0	0	0	0	1	No
Nickel and its compounds	0	0	0	0	100	No
Cadmium and its compounds	0	0	0	0	1	No
Acetaldehyde	0	0	0	0	100	No
Chromium (non-hexavalent) & compounds	0	0	0	0	100	No
PM _{2.5}	21	0	0	21	30	No
Total PAHs	0	0	0	0	10	No
VOC	0	0	184	184	100	YES

In the Table 2 example, VOCs are ***released to air*** above thresholds⁵.

Therefore, in this example, the release to air of VOCs would need to be reported to the ChemTRAC program.

⁵ Because VOCs are a “group C” ChemTRAC substance, VOCs need to be reported if the release to air exceeds thresholds.

Reporting to ChemTRAC

You are only required to report to ChemTRAC if you meet or exceed reporting thresholds for one or more priority substances.

Facilities that meet or exceed reporting thresholds for one or more substances must use the Online Reporting System to report to the ChemTRAC program. You can access the system from any computer with an internet connection. If your facility is exempt or below reporting thresholds, you can use the system to notify the City and volunteer environmental information.

You can find the online reporting system on the ChemTRAC webpage:
<http://www.toronto.ca/health/chemtrac/report.htm>.

You will need the following information to report to ChemTRAC

- Your First Time Access Code **OR** Registration ID
- Your facility name, address, number of employees and contact information
- Your NAICS code
- The names of substances you are reporting
- Quantities of priority substances (in kilograms).

The screenshot shows the City of Toronto website's navigation bar with links for HOME, CONTACT US, HOW DO I...?, and a search box. Below the navigation bar are four tabs: LIVING IN TORONTO, DOING BUSINESS, VISITING TORONTO, and ACCESSING CITY HALL. The 'DOING BUSINESS' tab is selected, leading to the 'ChemTRAC - 4 Steps to Reporting' page. The page title is 'Reporting to the Environmental Reporting and Disclosure Bylaw (Municipal Code Chapter 423)'. A red box highlights the link 'ChemTRAC Online Reporting System' under the heading 'Ready to report?'. A black arrow points from a text box 'Click here to access the system' to this link. The page also includes a sidebar with links like 'Public Health Home', 'A - Z Index', 'Contact us', 'ChemTRAC Background', 'Info for businesses', '4 steps to reporting', 'Info for communities', 'Links', and 'Contact ChemTRAC'. Below the main heading, there is a paragraph about the responsibility of facility owners and a section titled 'The following steps are provided as a guide to help you report:' which lists four steps: Step 1 (Determine if the Bylaw applies to you), Step 2 (Determine if you need to report in a year), Step 3 (Prepare your data for reporting), and Step 4 (Submit your data online by June 30th).

Part 1: Gathering data, using the calculator, and reporting to ChemTRAC

[Frequently asked questions](#)
[Contact us](#)
[Terms of use](#)
[User Guide](#)

ChemTRAC

You are in a secure site.



Welcome to the ChemTRAC data reporting system

This application will allow you to:

- Report the use and release of priority substances under Toronto's Environmental Reporting and Disclosure Bylaw (Municipal Code Chapter 423)
- Indicate if your facility is below reporting thresholds
- Indicate that the reporting requirements do not apply to your facility
- Provide information on your facility's environmental activities

To report online, you will need the **First Time Access Code** or your **Registration ID**.

To protect your privacy and security it is recommended that you close the browser after submitting your information.

To protect the secured exchange of information between you and this secure site, this transaction requires that your browser supports 128-bit data encryption. To continue, you may be asked to download and install the latest version of your browser.

As a security precaution, page sessions will end automatically as indicated at the top of each page.

To proceed with reporting information on chemical use and release you must read and consent to the [Terms of Use](#) and click the **I Agree** button below.

Note: Use of the browser Back button is not supported. Please use the reporting system's back/next button(if applicable) to navigate when necessary.

First Time Access Code for new users

If you are a first time user, you will need a “First Time Access Code” to use the system. The City sends most businesses their First Time Access Code by mail. If you did not receive or have lost your First Time Access Code, please call 3-1-1.

Registration ID for facilities already in the system

If you have already reported in the online system, you have been issued a Registration ID. This ID number is to be used for future visits to the ChemTRAC reporting system. If you have lost your Registration ID, please call 3-1-1.

Part 1: Gathering data, using the calculator, and reporting to ChemTRAC

The screenshot shows the ChemTRAC login interface. At the top, there is a section titled "First Time Signing In?" with a button labeled "Register with First Time Access Code". Below this is a section titled "Already Registered?" with a text input field for "Registration ID:". A message below the field states: "If you have lost or forgotten your Registration ID, please contact us at (416) 338-7600". At the bottom of this section is a "Sign In" button. The footer of the page includes the City of Toronto logo and the copyright notice "© City of Toronto 1998-2011".

Once you have entered the online reporting system

The online system has seven steps. You will see your progress at the top of the screen. In the screenshot below, Step 1 is complete and Step 2 is in progress.

The screenshot shows the ChemTRAC main dashboard. At the top left is the "Toronto" logo. Below it is a sidebar with links: "Frequently asked questions", "Contact us", "Terms of use", and "User Guide". The main header area says "ChemTRAC" and "You are in a secure site." Below this is a progress bar with seven steps: "Step 1 Facility Registration", "Step 2 Reporting Period", "Step 3 Chemical Selection", "Step 4 Use & Release (0 of 0)", "Step 5 Environmental Statement", "Step 6 Summary Notification", and "Step 7 Confirmation & Print". Step 1 is marked as complete with a green leaf icon, and Step 2 is marked as in progress with a green leaf icon. At the bottom left is a 15-minute countdown timer. A note at the bottom states: "Note: This registration session will automatically end fifteen minutes after this Web page has finished loading."

To move to the next step, you must enter all the required information on the screen and click the "Next" button at the bottom of the screen. You can use the "Back" button to change the information you provided in previous steps.

Please remember to have all your information ready before you enter the system. **You will only have fifteen minutes to complete each screen before the system logs you out.** If your session expires before you hit the "submit" button, you will need to re-enter all your information. If you are running out of time, you can reset the countdown without losing information by switching to a different page then returning to the page you were working on.

Step 1. Facility registration

In Step 1, you will enter your facility name, address, number of employees and company contact information. You will also enter your **NAICS code** in the section entitled "Type of facility". You must begin by selecting the 2-digit NAICS code from the dropdown menu. For oilseed processors, this will be "31 –

Part 1: Gathering data, using the calculator, and reporting to ChemTRAC

Manufacturing”. Then, you can select the appropriate 4-digit code (3112), and finally, the 6 digit code (311224).

NAICS 2-Digit:	31 – Manufacturing
NAICS 4-Digit:	3112 – Grain & Oilseed Milling
NAICS 6-Digit:	311224 – Oilseed Processing

Step 2. Reporting period

In Step 2, you will choose the calendar year from the dropdown menu and select “Yes” in response to the statement “I am ready to report for the year above”.

If your calculations showed you to be below the reporting threshold, you can enter “No” in response to the statement “I am ready to report for the year above” and then enter “I do not meet the threshold.”

Step 3. Chemical selection

In Step 3, you will identify the ChemTRAC substances that exceed reporting thresholds for your facility. The example below illustrates the selection of Volatile Organic Compounds (VOCs) for reporting.

<input type="checkbox"/>	Polycyclic Aromatic Hydrocarbons (PAHs)
<input type="checkbox"/>	11104-93-1 Nitrogen Oxides (NOx)
<input type="checkbox"/>	Particulate Matter 2.5 (PM 2.5)
<input checked="" type="checkbox"/>	Volatile Organic Compounds (VOCs) Total

Step 4. Use and release

In Step 4, you will enter information for each substance that you identified in Step 3. You will identify the appropriate row based on whether the substance was “manufactured”, “processed”, “otherwise used” and/or “released to air”. You will then enter the quantity of the substance that your facility released in kilograms, without decimal places.

Next, you will need to **enter the total quantity of the substances that your facility manufactured and released, in kilograms and without decimals**. For example, 17.2 kg would be rounded to 17 kg and 17.6 kg rounded to 18 kg.

Finally, you will select an estimation method from the dropdown menu.

Select “ChemTRAC calculator” if you have used the ChemTRAC calculator.

Part 1: Gathering data, using the calculator, and reporting to ChemTRAC

The example on the next page illustrates how to complete Step 4 for VOCs using sample emissions data from Table 2 of this guide. In the example shown, the user has indicated that 184 kg of VOCs are “released to air”.

Volatile Organic Compounds (VOCs) Total (Reporting Threshold = 100.0 kg)		
	Quantity (kg)	Estimation Method
If you used more than one method to estimate data, please choose the main one		
Manufactured:	<input type="text"/>	- Select Estimation Method From List -
Processed:	<input type="text"/>	- Select Estimation Method From List -
Otherwise Used:	<input type="text" value="184"/>	ChemTRAC calculator
Total Use:	184	
Release to Air:	<input type="text" value="184"/>	ChemTRAC calculator
Release to Land:	<input type="text"/>	- Select Estimation Method From List -
Release to Surface Water:	<input type="text"/>	- Select Estimation Method From List -
Total Release:	184	

Step 5. Environmental statement

In Step 5, you have the option of entering information about your environmental activities including: if you have completed environmental training courses, created a Pollution Prevention Plan, or adopted an Environmental Management System. Pollution Prevention Plans are discussed briefly in Part 2 of this guide. You will also specify if you report to the National Pollutant Release Inventory or to the Toronto Sewer Use Bylaw.

Steps 6 and 7. Summary notification, confirmation and printing

In Steps 6 and 7, you will not enter any new information. You will review the information you provided, submit your report, and receive a printable record.

Optional reporting for facilities below threshold levels of priority chemicals

For those businesses or facilities that do not meet or exceed ChemTRAC thresholds, the online reporting system allows you to identify yourself as a “non-reporter”. This will allow you to stay informed on ChemTRAC program initiatives. It will also help Toronto Public Health assess trends over time and gauge the effectiveness of the ChemTRAC program.

Part 2: Reducing the environmental impact of your facility

This section of the guide provides information about reducing the environmental impact of your facility.

- *It provides an overview of pollution prevention strategies*
- *It identifies relevant control technologies for reducing emissions*
- *It provides guidance on getting started with pollution prevention.*

Pollution prevention strategies

The ChemTRAC program requires facilities to report on substances that are manufactured, processes or otherwise used in quantities that are equal to or greater than ChemTRAC reporting thresholds. Although it is not required as part of the ChemTRAC program, it is good business practice for facilities to also take action to reduce the creation, use and release of ChemTRAC priority substances.

Minimizing the use and release of harmful substances at the source is called pollution prevention (or P2) and is widely recognized as good business practice. Collecting data for ChemTRAC gives you the information you need to consider P2 options in your facility.

How can a business benefit from pollution prevention (P2)?

- P2 can reduce operating costs from the use of chemicals and energy
- P2 can reduce the costs of waste management and the risk of liability
- P2 can improve worker health and safety
- P2 can improve community relations and build a business' reputation as socially and environmentally responsible
- P2 can improve a business' ability to respond to consumer demands for "greener" products

Pollution prevention strategies

Businesses have many options for reducing the use of harmful substances in their facilities. Not all of the options will be relevant to all businesses. Three types of strategies and examples are presented below.

1. **Use low-cost, good operating practices.** Simple changes to normal practices can reduce the use and release of harmful chemicals at no cost to business owners.

For example: Keep gas burners in good operating condition. Well-maintained equipment uses less gas, saves money, and reduces NO_x emissions.

2. **Install control technologies or equipment.** New control technologies and equipment can reduce the release of harmful chemicals and save money by improving operating efficiency.

For example: Install low NO_x burners on gas-fired equipment. These burners cut nitrogen oxide emissions in half.

3. **Modify products or inputs.** Traditional products and processes can be replaced with alternatives that use and release less harmful chemicals.

For example: Switch to water-based biodegradable cleaners. Though not discussed in the guide, caustic or acidic cleaners emit VOCs.

Control technologies for reducing emissions

Control technologies can reduce, but not eliminate, the quantity of ChemTRAC substances that are released from oilseed processors. Control technologies can be used to help reduce emissions of ChemTRAC substances.

Control technologies for particulate matter

Recall that particulate matter 2.5 ($PM_{2.5}$) is released into the air from oilseed transfer, handling and processing.

Dust collectors. A dust collector (such as a cyclone or fabric filter) is a control technology that can help reduce emissions of $PM_{2.5}$. A dust collector takes in air with a high abundance of $PM_{2.5}$, collects much of the $PM_{2.5}$ within filter bags, and releases the air with a reduced amount of $PM_{2.5}$.

Control technologies for volatile organic compounds

Recall that volatile organic compounds are released into the air from the use of solvents such as hexane.

VOC control equipment. VOC emissions control equipment can dramatically reduce VOC emissions. For example, catalytic oxidizers can achieve 95% VOC destruction at low temperatures. They are compact, lightweight systems that have low operating costs and low capital costs. Regenerative thermal oxidizers are higher capacity systems that can achieve 99% VOC destruction efficiency.

Control technologies for NO_x emissions from natural gas equipment

There are two common control technologies that can help decrease the amount of combustion by-products released from natural gas fired manufacturing equipment: low NO_x burners and recirculated flue gas. Both technologies specifically reduce the amount of NO_x that is released from combustion.

Low NO_x burners. When natural gas is used to create heat, the gas passes over a flame, gets combusted, and produces combustion by-products, including NO_x . A low NO_x burner combusts the gas in several stages. This allows the flame to burn at a cooler temperature, which reduces the amount of NO_x that is created as a by-product. A low NO_x burner can reduce NO_x creation by about 50%.

The ChemTRAC calculator can be used to estimate a control technology's emission reduction potential.

Without changing any other values entered in the Input-Output screen, select "low NO_x burner" as a control for natural gas heating equipment. Check the new level of NO_x in the output table. It should be half the original number.

Part 2: Reducing your facility's environmental impact

Recirculated flue gas. When natural gas gets combusted to produce heat, the resulting air containing the combustion by-products is called flue gas. If the flue gas is mixed back into the natural gas being fed to the flame (i.e. recirculated), this changes the combustion process and results in less NO_x being produced. Recirculated flue gas is often used with low NO_x burners. Recirculated flue gas with low NO_x burners can reduce NO_x emissions by about 70%.

The table below summarizes control technologies in Oilseed Processing facilities.

Table 3. Control technologies found in Oilseed processing facilities

Manufacturing process	Control technology	ChemTRAC substance being controlled	Reduction ability of the control technology
Oil extraction using solvents	VOC control technologies (e.g. catalytic oxidizers)	Volatile organic compounds (VOCs)	Reduces VOC emissions by 95% or more
Oilseed transfer, handling and processing	Dust collector (e.g. cyclone, fabric filter)	Particulate matter 2.5 (PM _{2.5})	Can reduce the release of PM _{2.5} to 1 particle per 3 cubic metres of air
Natural gas fired cookers / dryers	Low NO _x burners	Nitrogen oxides (NO _x)	Reduces NO _x creation by about 50%
	Recirculated flue gas with low NO _x burners	Nitrogen oxides (NO _x)	Reduces NO _x creation by about 70%

More ways to reduce costs and improve performance

Minimizing the use and release of harmful substances is one aspect of improving environmental performance. Facilities can also take other steps to improve their economic and environmental sustainability.

1. **Reduce energy use.** By reducing energy use, manufacturers can save money on energy bills and reduce their environmental impact. Many energy-efficiency technologies have very short payback periods. Utilities also offer incentives for energy efficiency measures.

To reduce energy use, low-cost, good operating procedures can be adopted, and new technology or equipment can be installed. This includes:

- Undergoing an energy audit to identify opportunities for savings
- Encouraging employees to turn off lights and equipment when not in use
- Replacing old motors and heating units with more efficient equipment
- Installing a programmable thermostat to control heating and cooling
- Purchasing a heat exchanger system to recycle wasted burner heat.

2. **Reduce water use.** Working to reduce water use can save money and provide environmental benefits. Manufacturers can do a number of things to reduce water use.

To reduce energy use, low-cost, good operating procedures can be adopted, and new technology or equipment can be installed. This includes:

- Sweeping floors and machines instead of hosing them down with water
- Posting signs near sinks and hoses to encourage employees to use less water
- Purchasing high pressure, low volume cleaning equipment.
- Purchasing water sprayers with automatic shut-off nozzles.

Getting started with pollution prevention

The good news is that you've already started by calculating emissions of ChemTRAC priority substances.

Next steps can include:

1. Evaluating actions to reduce use and release of energy, water and ChemTRAC substances.
2. Identifying funding for upgrades to facilities and equipment.
3. Implementing all cost-effective upgrades.
4. Tracking changes in the use and release of energy, water and substances.

To help in these steps, ChemTRAC is offering **free technical assistance visits**, **free training workshops** and additional resources to help businesses create an inventory of chemicals used at their facility, comply with the ChemTRAC program, and identify opportunities to improve their facilities' environmental performance.

For more information, visit:

http://www.toronto.ca/health/chemtrac/assistance_program.htm and
<http://www.toronto.ca/health/chemtrac/gogreen.htm>.

Additional resources on reducing the environmental impact of oilseed processors include:

- Dalhousie University. 2008. Fact Sheet: Eco-Efficiency in the Food Processing Industry. http://eco-efficiency.management.dal.ca/Files/Business_Fact_Sheets/food_processing_fs.pdf
- New York State Department of Environmental Conservation. March 2001. Environmental Self-Assessment for the Food Processing Industry. <http://www.fpeac.org/poultry/EnvironmentalSelfAssessmentforFoodProcessingIndustry.pdf>
- Toronto Public Health, ChemTRAC. December 2010. Resource for Greening Food and Beverage Manufacturing: Pollution Prevention Information. www.toronto.ca/health/chemtrac/pdf/GreenFoodBev.pdf
- UNIDO. Pollution from food processing factories and environmental protection. http://www.unido.org/fileadmin/import/32129_25PollutionfromFoodProcessing.7.pdf
- US EPA. 2002. Practical Guide to Environmental Management for Small Businesses. http://www.smallbiz-enviroweb.org/Resources/smallbizfiles/EM_Guide0902.pdf

Appendices

The remaining pages of this guide offer additional material for your reference:

Appendix A. Printer-friendly versions of the four worksheets.

Appendix B. Additional material related to the ChemTRAC calculator.

- *Descriptions of the remaining calculator screen*
- *How the calculator uses emission factors to calculate quantities of ChemTRAC substances*
- *How emission factors can be changed to site-specific values.*

Appendix C. Combining the ChemTRAC calculator with other sources:

How to combine the ChemTRAC calculator for Oilseed processors with emissions data from other sources.

Appendix A. Printer-friendly worksheets

These worksheets can be printed and completed by hand so that all information can be readily available for entry into the ChemTRAC calculator.

Worksheet 1 – Oilseed handling and processing

1. **What is the total annual quantity of raw oilseed processed by your facility?**

Worksheet 1 Table 1 – Total quantity of oilseed processed

Product	Quantity of oilseed processed	Units
Product 1: _____	_____	<input type="checkbox"/> tonnes <input type="checkbox"/> kilograms (kg) <input type="checkbox"/> pounds (lb) <input type="checkbox"/> tons - UK <input type="checkbox"/> tons - US
Product 2: _____	_____	_____
Product 3: _____	_____	_____
Product 4: _____	_____	_____
Total annual quantity of oilseed processed: _____		<input type="checkbox"/> tonnes <input type="checkbox"/> kilograms (kg) <input type="checkbox"/> pounds (lb) <input type="checkbox"/> tons - UK <input type="checkbox"/> tons - US

Additional Material

2. Which transfer, handling and processing methods and equipment are used by your facility?

Worksheet 1 Table 2 – Transfer, handling and processing methods & equipment

Please indicate which processes are used in your facility	
Receiving?	<input type="checkbox"/> Yes
	<input type="checkbox"/> No
Cracking / dehulling?	<input type="checkbox"/> Yes
	<input type="checkbox"/> No
Hull grinding?	<input type="checkbox"/> Yes
	<input type="checkbox"/> No
Bean conditioning?	<input type="checkbox"/> Yes
	<input type="checkbox"/> No
Flaking rolls?	<input type="checkbox"/> Yes
	<input type="checkbox"/> No
White flake coolers?	<input type="checkbox"/> Yes
	<input type="checkbox"/> No
Meal coolers?	<input type="checkbox"/> Yes
	<input type="checkbox"/> No
Meal dryers?	<input type="checkbox"/> Yes
	<input type="checkbox"/> No
Meal grinding / sizing?	<input type="checkbox"/> Yes
	<input type="checkbox"/> No
Meal loadout?	<input type="checkbox"/> Yes
	<input type="checkbox"/> No

Additional Material

Worksheet 2: Natural gas fired equipment (cookers, dryers)

Skip this worksheet if you do not use any natural gas fired equipment for manufacturing.

3. What control technologies are installed on your natural gas equipment?

Worksheet 2 Table 1 – Control technologies information

Cookers / dryers are equipped with (add a checkmark):	
d. Low NO _x burners only	_____
e. Low NO _x burners with recirculated flue gas	_____
f. No control technologies	_____

4. How much natural gas do ovens / cookers / dryers use?

This question can be answered using EITHER Option 4A or Option 4B. Use the Option that you have selected to complete [Worksheet 2 Table 2](#) on the next page.

Option 4A – What is the total amount of natural gas used for manufacturing equipment?

OR

Option 4B – What is the thermal rating of your manufacturing equipment?

Worksheet 2 Table 2 – Natural gas usage

Option A. Total natural gas used for the cookers / dryers
Add values in cubic metres OR cubic feet: _____ m ³ (cubic metres) or _____ ft ³ (cubic feet)

OR

Option B. Thermal rating of the cookers / dryers
Record value in British Thermal Units per hour _____ BTU/hr
Also estimate the average time that the equipment is in operation: _____ hours per day and _____ days per week and _____ weeks per year

Appendix B. Additional material related to the ChemTRAC calculator

This appendix describes the remaining screens of the ChemTRAC calculator. You do not need to enter any information into these screens. However, if site-specific emission factors are known, they can be entered manually in the Calculations screen.

This appendix also describes emission factors and how the ChemTRAC calculator makes use of them.

The ChemTRAC calculator All Substances screen

The All Substances screen provides a summary of the estimated quantities in kilograms per year of all ChemTRAC priority substances used and/or released by your facility that have been calculated by the ChemTRAC calculator. It also provides a summary of other substances used and/or released by your facility. You do not need to enter any information on this screen.

Refer to Table 1 of this guide to see which processes are responsible for the release of each substance.

Note that the CAS# refers to a unique identifier for the substance as given by the Chemical Abstracts Society. The CAS# is provided for reference only.

This page provides a summary of the estimated quantities of all ChemTRAC priority substances manufactured, processed, otherwise used and/or released.

ChemTRAC Priority Substances	CAS #	Quantity (kg/yr)			
		Manufactured	Processed	Otherwise Used	Released to Air
Benzene	71-43-2	0.0	0	0	0
Cadmium, and its compounds	n/a	0.0	0	0	0
Chromium (non-hexavalent), and its compounds	n/a	0.0	0	0	0
Formaldehyde	50-00-0	0.3	0	0	0
Lead, and its compounds	n/a	0.0	0	0	0
Manganese, and its compounds	n/a	0.0	0	0	0
Mercury, and its compounds	n/a	0.0	0	0	0
Nickel, and its compounds	n/a	0.0	0	0	0
Nitrogen Oxides (NOx)	11104-93-1	200.1	0	0	200
Particulate Matter (PM2.5)	n/a	7.6	0	0	8
Total PAHs	n/a	0.0	0	0	0
Total VOCs	n/a	22.0	0	0	22
Other Substances					
2-Methylnaphthalene	91-57-6	0.0	0	0	0
3-Methylchloranthrene	56-49-5	0.0	0	0	0
7,12-Dimethylbenz(a)anthracene	57-97-6	0.0	0	0	0
Acenaphthene	83-32-9	0.0	0	0	0
Acenaphthylene	208-96-8	0.0	0	0	0
Anthracene	120-12-7	0.0	0	0	0

↓
Etc.

Additional Material

The ChemTRAC calculator Calculations screen

The Calculations screen includes the formulas used to calculate emissions using the information entered in the Input-Output screen. It also lists the emission factors used to calculate the release of substances.

While you do not need to enter any information on this screen, emissions factors can be modified if site-specific information is available (see illustration below).

You can modify the VOC emission factors for oil extraction using hexane, or you can modify the PM_{2.5} emission factors for any of the transfer, handling and processing methods. You can also modify the emission factors for the substances associated with natural gas combustion and listed in the Contaminant table, for uncontrolled, low NO_x or low NO_x with recirculated flue gas scenarios. If emission factors are modified, be sure that they are entered in the appropriate units.

Process	Control	Emission Factor			User Response	User Input (tonne/yr)	Quantity Released		Data Quality
		TPM (lb/ton)	TPM (kg/tonne)	PM 2.5 (kg/tonne)			PM 2.5 (kg/yr)	TPM (kg/yr)	
Receiving	None	0.15	0.075	0.03	3	75.00	0	0	E
Cracking/Dehulling	Cyclone	0.36	0.18	0.072	3	75.00	0	0	E
Hull Grinding	Cyclone	0.2	0.1	0.04	3	75.00	0	0	E
Bean Conditioning	Cyclone	0.01	0.005	0.002	3	75.00	0	0	E
Flaking Rolls	Cyclone	0.037	0.0185	0.0074	3	75.00	0	0	E
White Flake Coolers	Cyclone	0.95	0.475	0.19	3	75.00	0	0	E
Meal Cooler	Cyclone	0.19	0.095	0.038	2	75.00	2.85	7.125	E
Meal Dryer	Cyclone	0.18	0.09	0.036	2	75.00	2.7	6.75	E
Meal Grinder/Sizing	Cyclone	0.34	0.17	0.068	3	75.00	0	0	E
Meal Loadout	None	0.27	0.135	0.054	2	75.00	4.05	10.125	E
TOTAL							9.6	24	

Compounds	CAS #	Emission Factor		User Input (tonne)	Quantity Released (kg/yr)	Data Quality
		(lb/ton)	(kg/tonne)			
Hexane	110-54-3	4.9	2.45	75.00	183.75	D

Consumption :

0 m³/yr
0 ft³/yr OR 3,000,000 BTU/h
8,823,529 ft³/yr

Contaminant	CAS #	Emission Factor (lb/1000000 ft ³)			Emission Rate (kg/yr)	Data Quality	Comments
		Uncontrolled (None)	Low NO _x	Low NO _x Recirc.			
Sulphur Dioxide	7446-09-5	0.6	0.6	0.6	2.4	A	
Nitrogen Oxides	11104-93-1	100	50	32	200.1	C	
Carbon Monoxide	630-08-0	84	84	84	336.2	B	
Nitrous Oxide	10024-97-2	2.2	2.2	0.64	8.8	E	
Particulate Matter (PM2.5)	n/a	1.9	1.9	1.9	7.6	D	
Carbon Dioxide	124-38-9	120,000	120,000	120,000	480,282.4	A	
TOC	n/a	11	11	11	44.0	B	
Lead	7439-92-1	0.0005	0.0005	0.0005	0.0	D	
Methane	74-82-8	2.3	2.3	2.3	9.2	B	
VOC	n/a	5.5	5.5	5.5	22.0	C	
2-Methylnaphthalene	91-57-6	0.000024	0.000024	0.000024	9.61E-05	D	
3-Methylchloranthrene	56-49-5	< 0.0000018	< 0.0000018	< 0.0000018	7.20E-06	E	PAH
7,12-Dimethylbenz(a)anthracene	57-97-6	< 0.000016	< 0.000016	< 0.000016	6.40E-05	E	PAH
Acenaphthene	83-32-9	< 0.0000018	< 0.0000018	< 0.0000018	7.20E-06	E	PAH
Acenaphthylene	208-96-8	< 0.0000018	< 0.0000018	< 0.0000018	7.20E-06	E	PAH
Anthracene	120-12-7	< 0.0000024	< 0.0000024	< 0.0000024	9.61E-06	E	
Benzo(a)anthracene	56-55-3	< 0.0000018	< 0.0000018	< 0.0000018	7.20E-06	E	PAH

↓ Etc.

Emission factors in these columns can be modified by the user

Other than to enter site-specific emission factors, all data, sample calculations and information presented in the Calculations screen are for reference only. They should not be modified in any way.

Additional Material

The ChemTRAC calculator References screen

The Reference screen describes from where the emission factors and assumptions used on the Calculations screen were taken. Source documents can be viewed by clicking on the links. The Reference screen also provides the definitions for 'Manufactured', 'Processed', 'Otherwise Used', and 'Released to Air'. No information needs to be entered on this screen.

Note that this tool is provided solely as an aid, and the City of Toronto makes no representation or warranty as to its applicability to your facility or to your obligation to comply with the Environmental Reporting and Disclosure Bylaw (Municipal Code Chapter 423). It is the responsibility of each facility owner or operator to take the necessary steps to ensure compliance with the bylaw.

The References screen is illustrated below.

CHEMTRAC

References

Instructions

Input-Output

All Substances

Calculations

You are here **References**

This page provides all the reference information for the emission factors and assumptions used in the Calculations spreadsheet. Click on the links below to view the source documents.

Emission factors and an assessment of their data quality are provided in and the US EPA AP-42 "Vegetable Oil Processing", Section 9.11.1, November 1995
<http://www.epa.gov/ttn/chief/ap42/ch09/final/c9s11-1.pdf>

US EPA AP-42 "Natural Gas Combustion", Section 1.4, 1998
<http://www.epa.gov/ttn/chief/ap42/ch01/final/c01s04.pdf>

Particulate matter size fractions are estimated using South Coast Air Quality Management District "Final –Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds", 2006
http://www.aqmd.gov/ceqa/handbook/PM2_5/finalAppA.doc

Definitions¹

Manufacture - To produce, prepare or compound a priority substance and includes the coincidental production of a priority substance as a by-product.

Process - The preparation of a priority substance, after its manufacture, for commercial distribution and includes the preparation of a substance in the same physical state or chemical form as that received by the facility, or preparation which produces a change in physical state or chemical form.

Otherwise Use - Any use, disposal or release of a priority substance at a facility that does not fall under the definitions of "manufacture" or "process." This includes the use of the priority substance as a chemical processing aid, manufacturing aid or some other use.

Release - The emission or discharge of a priority substance, whether intentional, accidental or coincidental, from a facility into the environment.

¹For details refer to the Environmental Reporting and Disclosure Bylaw available at the [ChemTRAC website](#)

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Emission factors for Oilseed Processing

The ChemTRAC calculators are all based on published estimates of the emissions associated with different industrial processes. These estimates are called “emission factors”. Emission factors indicate the amount of a specific substance (e.g. nitrogen oxides) emitted by a specific activity (e.g. burning one cubic metre of natural gas).

The ChemTRAC calculator uses the emission factors listed in Table 4 to estimate emissions from oilseed processors. If site-specific emission factors are available for the facility or processes, they can be entered in the Calculations sheet of the calculator. This is detailed in the discussion of the calculator’s Calculations screen.

Table 4. Emission factors used in the Oilseed Processing ChemTRAC calculator

Source	Substance	Emission Factor
Use of hexane for extraction	Volatile organic compounds	2.45 kg / tonne of oilseed processed
Receiving	Particulate matter 2.5	0.03 kg / tonne processed
Cracking/Dehulling	Particulate matter 2.5	0.072 kg / tonne processed
Hull Grinding	Particulate matter 2.5	0.04 kg / tonne processed
Bean Conditioning	Particulate matter 2.5	0.002 kg / tonne processed
Flaking Rolls	Particulate matter 2.5	0.0074 kg / tonne processed
White Flake Coolers	Particulate matter 2.5	0.19 kg / tonne processed
Meal Cooler	Particulate matter 2.5	0.038 kg / tonne processed
Meal Dryer	Particulate matter 2.5	0.036 kg / tonne processed
Meal Grinder/Sizing	Particulate matter 2.5	0.068 kg / tonne processed
Meal Loadout	Particulate matter 2.5	0.054 kg / tonne processed
Natural gas equipment – no control	Nitrogen oxides	160.18 kg / 100,000 m ³
Natural gas equipment – low NOx burner	Nitrogen oxides	80.09 kg / 100,000 m ³
Natural gas equipment – low NOx burner & recirc. flue gas	Nitrogen oxides	51.26 kg / 100,000 m ³

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Example: Using emission factors to estimate NO_x emissions from natural gas fired manufacturing equipment

Table 4 shows that 160.18 kg of NO_x is emitted for every 100,000 m³ of natural gas burned without any control technologies.

Assume a facility uses 1,000,000 m³ of natural gas for manufacturing in 2011.

Total emissions of NO_x for 2011 from natural gas-fired equipment

= Emissions per unit of natural gas * Volume of natural gas used in 2011

= 160.18 kg / 100,000 m³ * 1,000,000 m³

= 1601.80 kg of NO_x

Appendix C. Combining the Oilseed Processing Calculator with other sources

Depending on your business, you may need to use more than one calculator to calculate the use and release from all processes at your facility. The "Calculation of Totals" calculator can be used to compile your data.⁶ In this calculator, you can enter the values for each process at your facility. The calculator returns the total manufactured, processed or otherwise used amounts for the facility, by substance, and then compares it to the corresponding reporting threshold.

The total combined release of substances (whether from the ChemTRAC Oilseed processing calculator only, or from other substance quantification methods as well) should be compared to the mass reporting thresholds listed in Schedule A of the Environmental Reporting and Disclosure Bylaw and provided in Table 5 on the last page of the guide.

⁶ The Calculation of Totals calculator can be found under the Totals bullet at <http://www.toronto.ca/health/chemtrac/tools.htm>.

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Calculation of Totals

Last Update: October 21, 2011 by YS, SA, & ZI

- * This page gathers information to help you determine your facility-wide substance manufacture, process, otherwise use (MPO) and release estimates.
- * For each source of priority substances, enter the process name and then provide the quantity of each substance manufactured, processed, otherwise used and released.
- * In the "MPO" column, identify whether the priority substance was Manufactured, Processed or Otherwise used. To do this you may consult the "Guide to Reporting" available at www.toronto.ca/chemtrac. The definitions are provided in the Examples tab.
- * At the end of each row, you will find the facility-wide totals that need to be compared with the Miss Reporting Thresholds.
- * The last 4 columns indicate the amount of each substance that you must report to the City of Toronto

The total quantities of ChemTRAC substances that would have to be reported are listed here

Group	Chemical Name	Quantity (kg/yr)				Quantity (kg/yr)				Status to be compared with a threshold (kg/yr)	Mass Reporting Threshold (kg/yr)	Reportable?	To be reported			
		Manufactured	Processed	Otherwise Used	Released to Air	Manufactured	Processed	Otherwise Used	Released to Air				Total Manufactured	Total Processed	Total Otherwise Used	Total Released to Air
		Process#1:				Process#2:							(kg/yr)	(kg/yr)	(kg/yr)	(kg/yr)
A	Acetaldehyde*									0	100	No	***	***	***	***
	Acrolein*									0	100	No	***	***	***	***
	Benzene*									0	100	No	***	***	***	***
	1,3-Butadiene*									0	100	No	***	***	***	***
	Carbon tetrachloride*									0	100	No	***	***	***	***
	Chloroform (Trichloromethane)*									0	100	No	***	***	***	***
	Chromium (non-hexavalent) ¹									0	100	No	***	***	***	***
	1,2-Dibromoethane (Ethylene dibromide)									0	100	No	***	***	***	***
	1,4-Dichlorobenzene*									0	100	No	***	***	***	***
	1,2-Dichloroethane (Ethylene dichloride)*									0	100	No	***	***	***	***
	Dichloromethane (Methylene chloride)									0	100	No	***	***	***	***
	Formaldehyde*									0	100	No	***	***	***	***
	Manganese ²									0	10	No	***	***	***	***
	Nickel ¹									0	100	No	***	***	***	***
	Tetrachloroethylene (Perchloroethylene)									0	100	No	***	***	***	***
Trichloroethylene*									0	100	No	***	***	***	***	
Vinyl chloride									0	100	No	***	***	***	***	
Cadmium ¹									0	1	No	***	***	***	***	
Chromium (hexavalent) ¹									0	10	No	***	***	***	***	
Lead ¹									0	10	No	***	***	***	***	
Mercury ¹									0	1	No	***	***	***	***	
B	Total polycyclic aromatic hydrocarbons (PAHs)*									0	10	No	***	***	***	***
	Nitrogen oxides (NOx)									0	200	No	***	***	***	***
C	Particulate matter 2.5 (PM2.5)									0	50	No	***	***	***	***
	Total Volatile organic compounds (VOCs) ³									0	100	No	***	***	***	***

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Table 5. ChemTRAC priority substances and their reporting thresholds (adapted from Schedule A of the Environmental Reporting and Disclosure bylaw)

ChemTRAC substance	ChemTRAC Mass reporting threshold (kg/yr)	Concentration threshold ^c % w/w
Group A: report if sum of quantity manufactured, processed and otherwise used exceeds thresholds		
Acetaldehyde	100	1
Acrolein	100	1
Benzene	100	1
1,3-Butadiene	100	1
Cadmium and its compounds	1	0.1
Carbon tetrachloride	100	1
Chloroform (Trichloromethane)	100	1
Chromium, Hexavalent and its compounds	10	0.1
Chromium, Non-hexavalent and its compounds	100	1
1,2-Dibromo ethane (Ethylene dibromide)	100	1
1,4-Dichlorobenzene	100	1
1,2-Dichloroethane (Ethylene dichloride)	100	1
Dichloromethane (Methylene chloride)	100	1
Formaldehyde	100	1
Lead and its compounds	10	0.1
Manganese and its compounds	10	1
Mercury and its compounds	1	0
Nickel and its compounds	100	1
Tetrachloroethylene (Perchloroethylene)	100	1
Trichloroethylene	100	1
Vinyl chloride	100	1
Group B: report if sum of quantity released, disposed and transferred exceeds thresholds		
Polycyclic Aromatic Hydrocarbons (PAHs)	10	N/A ^b
Group C: report if quantity released to air exceeds thresholds		
Nitrogen Oxides (NO _x)	200	N/A
Particulate Matter 2.5 (PM _{2.5})	30	N/A
Volatile Organic Compounds (VOCs) total	100	N/A

Notes:

- N/A = not applicable
- The concentration threshold % w/w is not relevant to the emissions quantified using the ChemTRAC calculator for Oilseed Processing

Appendix D. Reporting Checklist

Environmental Reporting and Disclosure Bylaw (Municipal Code Chapter 423)

Checklist for Facilities in Toronto

Make sure the data you submit in your reports are accurate. Here is a checklist to help you.

- Enter complete facility and contact information. If you are a consultant, identify yourself as the technical contact.
- Submit a **separate** report for **each** facility in Toronto.
- Complete the statement of certification.
- Report **all** of the priority substances (chemicals) that meet or exceed (equal to or greater than) the reporting thresholds.
- Report **both use and release** amounts of all priority substances that meet or exceed the reporting thresholds.
- Estimate use and release for **all** sources and processes in your facility.
 - This includes process such as heating by natural gas combustion, welding, equipment cleaning, drilling, grinding, crushing, sanding, and blending.
- Review the exemptions in the bylaw, such as building heating, and do not include these in your calculations.
- Compare current year estimates with that of previous years (if available) and explain any differences if present.
- If you report to NPRI and there is a difference between the amount of a substance reported to ChemTRAC and NPRI, explain the reason for the difference.
- You may need to make your records available for audit purposes. Securely store the records you based your report on and document:
 - Assumptions and parameters used for calculation and estimation of emissions
 - Procedures and methods used to measure emissions
 - Calibration records of any equipment used to measure emissions

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Use and Release Calculations

- There are many sources of information that can help you identify the priority substances in your facility. Be sure to check all of them, including:

purchase records	year-end inventory	Material Safety Data Sheets (MSDS)
raw materials	Certificate of Approval or Environmental Compliance Approval	correspondence with supplier

- Use the best available method for use and release estimation. Use (if any) the most appropriate and most recent ChemTRAC calculator (available at toronto.ca/health/chemtrac/tools.htm).
- Enter all the reportable data in kilograms (kg).
- Calculate the **total** amount of a substance used and released in **all** processes.
 - For example, process 1 used 90 kg VOC and released 75 kg. Process 2 used 60 kg VOC and released 56 kg. The total amount of use would be $90+60=150$ kg and release $75+56=131$ kg.
 - To help with these calculations you can use the free online ChemTRAC totals calculator.
- Double check that **decimal places** are entered in the correct place (e.g. 3.47 vs. 347)
- Check that the **total release** amount (release to land+water+air) is equal to or less than **total use** amount (manufactured+processed+otherwise used).
- Use the **average value** for use and release estimation if the substance content is listed in a range (e.g. 10-12% VOCs) on Material Data Safety Sheets or on other sources of substance data.
- The following priority substances are VOCs. Be sure to report them separately **and also include** them in your VOC estimation:

Acetaldehyde	Acrolein	Benzene
1,3-butadiene	Carbon Tetrachloride	Chloroform
1,4-Dichlorobenzene	1,2-Dichloroethane	Formaldehyde
Trichloroethylene	Vinyl chloride	Polycyclic Aromatic Hydrocarbons (PAHs)

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- Consider the effects of pollution control devices (e.g. filter) in the emission calculations.
- Consider the amount of waste transferred off-site (if any) in emission calculations.

Disclaimer: This checklist is for information only. The City of Toronto assumes no liability for accuracy or completeness. Readers are responsible for ensuring compliance with Toronto's Environmental Reporting and Disclosure Bylaw (Municipal Code Chapter 423). This information should not be relied upon as a substitute for legal or professional advice. Readers should seek their own legal or professional advice in regard to their use of the information contained in it.