Thermostat Recovery Program
Annual Report to the Director
2017 Calendar Year

Submitted to: Director, Extended Producer Responsibility Programs
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This annual report is issued by the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI) in accordance with the British Columbia Recycling Regulation (Reg. 449/2004). The 2017 annual report documents the Thermostat Recovery Program's activities and results in British Columbia from January 1 to December 31, 2017.

Any questions or comments about this report as well as the Thermostat Recovery Program operations should be directed to HRAI at:

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Table of Contents

1. **Executive Summary** 4
2. **Program Outline** 7
3. **Public Education Materials and Strategies** 8
4. **Collection System and Facilities** 12
5. **Product Environmental Impact Reduction, Reusability and Recyclability** 16
6. **Pollution Prevention Hierarchy and Product / Component Management** 17
7. **Product Sold and Collected and Recovery Rate** 20
8. **Summary of Deposits, Refunds, Revenues and Expenditures (N/A)** 21
9. **Plan Performance** 20

Appendices / Additional Information and Third Party Assurance 24

1. Executive Summary

Products within plan	Thermostats (electronic and mercury-containing)
Program website	www.hrai.ca/trp

Recycling Regulation Reference	Topic	Summary (5-bullet maximum)
Part 2, section 8(2)(a)	Public Education Materials and Strategies	• Outreach through HRAI, the Mechanical Contractors Association of Canada (MCAC) & Mechanical Service Contractors of Canada (MSCC) • Print ads and eblasts with the Municipal Leader, and the HPAC magazines; ads in regional district recycling calendars • Collaboration through Stewardship Agencies of BC (SABC) • Recycling Council of British Columbia (RCBC) hotline and Recyclepedia
Part 2, section 8(2)(b)	Collection System and Facilities	• 6 new collection points • 5 new drop-off locations • 377 total collection points • Collection points in 27 regional districts • 1 main collection facility (1 was fully phased out by end of 2017) • See Section 4 for details
Part 2, section 8(2)(c)	Product Environmental Impact Reduction, Reusability and Recyclability	• 4,438 mercury-containing vessels collected (there can be anywhere between 1 to 4 mercury vessels contained in each thermostat)** • 62.6 kilograms of metals recycled • 206.46 kilograms of plastics recycled • 0 new mercury-containing thermostats sold into the market • See Page 7 & Section 5 for details
Part 2, section 8(2)(d)	Pollution Prevention Hierarchy and Product / Component Management	• New thermostats do not contain mercury, and also help reduce energy consumption • Recovered thermostats are not suitable for re-use • Greater than 99% of plastic and metal components are recycled, with a high degree of certainty • Mercury vessels are sent for retort and mercury is either put into long-term storage or reused in CFL and fluorescent production (depending on market demand) • Since greater than 99% of all components are recycled, along with there being no better option in the pollution prevention hierarchy, no targets are in place

Recycling Regulation Reference	Topic	Summary (5-bullet maximum)
Part 2, section 8(2)(e)	Product Sold and Collected and Recovery Rate*	• Collected 2,737 mercury containing thermostats, 506 electronic thermostats, and 1,016 loose mercury vessels • Adjusted total: 3,463 mercury containing thermostats and 506 electronic thermostats, for a total of 3,969 collected • 2% decrease from 2016 collection results
Part 2, section 8(2)(e.1)		See **Section 9** for breakdown per regional district
Part 2, section 8(2)(f)	Summary of Deposits, Refunds, Revenues and Expenses	N/A

** As of summer 2016 the Switch the 'Stat (S.T.S.) program transitioned over to full management and delivery by HRAI from Scout Environmental. The name of the program changed from S.T.S. to the Thermostat Recovery Program (TRP); it was fully re-branded and the new program website is www.hrai.ca/trp. For the purposes of this report the program will be referred to by its new name Thermostat Recovery Program (TRP).*

**Thermostat Recovery Program does not report on Product Sold or Recovery Rate; see Section 7 for details.*

***The industry standard measurement of 1 – 4 switches per thermostat (or average 1.4 mercury switches per vessel) is substantiated by sampling of thermostats conducted by Veolia on behalf of the U.S.'s Thermostat Recycling Corporation, which is a statewide thermostat collection program. Based on their sampling they have concluded that the number of mercury switches per stat ranged from 1.41 to 1.46; therefore, averaging 1.44 (rounded off to 1.4) mercury switches per stat.*

Comparison of Key Performance Targets		
Part 2 section 8(2)(g); See full list of targets in Plan Performance		
Priority Stewardship Plan Targets* (as agreed with ministry file lead)	**Performance**	**Strategies for Improvement**
1. Mercury Thermostat Collection: 3,555 thermostats	3,463 mercury thermostats collected (adjusted total) (3% under target)	• Increase number of public drop-off locations • Increase number of collection points** • Improve communication with wholesalers so that all staff can effectively market the program at their location • Improve communication with contractors throughout BC to increase awareness of the program.

Comparison of Key Performance Targets		
Part 2 section 8(2)(g); See full list of targets in Plan Performance		
Priority Stewardship Plan Targets* (as agreed with ministry file lead)	**Performance**	**Strategies for Improvement**
2. Collection points/Participants: 420	377 participants (90% of target)	• Increase outreach to wholesaler locations, especially those with multiple locations in the province. • Continue face-to-face communication at trade shows • Explore new recruitment options (eg. new marketing plan, and increased targeted outreach in regions with poor coverage, increased utilization of municipality outreach) • Increase outreach to HVAC contractor training facilities/schools for participation to increase awareness & education with new technicians who will be responsible for old thermostat removal.

**targets are calculated based on the calendar year rather than the previously used program year in order to align it with the calendar year reporting. **see Section 4 for descriptions of drop-off locations versus collection points*

Tri-Arrow

As outlined in the information provided in the chart on Page 7; in 2017 Tri-Arrow Industrial Recovery (the secondary collection facility historically used for the TRP) collected: 10% (304) of the total number of mercury thermostats (3,041); 0% electronic thermostats; 18% (739 or 2.5 kg) of the total Hg vessels (4,161); 10% (22.2 kg) of total plastics collected (228.66 kg); 21% (16.4 kg) of metals collected (78.47 kg); and 20% (1.12 kg) of total glass collected (5.54 kg). However, since TRP did not contract with Tri-Arrow as an on-going attempt to phase them out (please refer to Section 4 for full details), all product collected from Tri-Arrow will not be calculated in the 2017 TRP Annual Report's Plan Performance, since the auditable information is not available. Therefore, all reporting on downstream, collections rates and targets excludes the collection numbers provided by Tri-Arrow.

Tri-Arrow's collection numbers in relation to the total numbers collected by Aevitas (the primary collection facility used for the program) are outlined in the chart below:

	Aevitas (Audited)	Tri-Arrow (Not Audited)	TOTAL	Materiality Non Assured
Hg Thermostats (Intact)	2,737	304	3,041	10%
Electronic Thermostats	506	-	506	
Total intact Thermostats (Hg and Electronic)	**3,243**	**304**	**3,547**	**9%**
Vessels (Part of Hg Thermostats)	3,422	739	4,161	18%
Loose vessels	1,016	247	1,263	20%
Total Vessels	**4,438**	**986**	**5,424**	**18%**
Total equivalent Hg thermostats (total vessels/1.4)	3,463	704	3,874	18%
Total equivalent thermostats (including electronic)	3,969	704	4,380	16%
Plastics (kg)	206.46	22.20	228.66	10%
Metals (kg)	62.6	16.40	78.47	21%
Glass	4.44	1.12	5.54	20%
Mercury	11.10	2.50	13.60	18.4%

2. Program Outline

The Thermostat Recovery Program is the designated program for managing thermostats in British Columbia, both electromechanical (mercury-containing) and electronic models. The British Columbia Stewardship Plan for Thermostats is the five year plan for recovering these products, and spans a timeline of July 1, 2015 to June 30, 2020.

- Electromechanical thermostats (also referred to as ”mercury-containing thermostats”), which contain internal mercury switches (mercury in a sealed glass bulb) or snap switches to control the flow of electrical current; and,
- Electronic thermostats, which use sensors instead of switches to detect temperature levels and electronically control the flow of electrical current.

Thermostat Recovery Program is funded by thermostat manufacturers who have sold thermostats into Canada and a complete list of manufacturers is available online at www.hrai.ca/trp. The program is

delivered and fully administered on behalf of the manufacturers by the Heating, Refrigeration, and Air Conditioning Institute of Canada (HRAI). Additionally, the program is supported by the Canadian Institute of Plumbing and Heating (CIPH).

In accordance with the program plan, the Thermostat Recovery Program collects thermostats in the province of British Columbia through one main collection channel (HVAC contractors/wholesalers & municipal/regional district collection) and two secondary collection channels (drop-off locations and a send-back option).

Based on estimates that 85 to 90 percent of thermostats sold in British Columbia are sold through contractors and wholesalers in the heating, ventilation and air-conditioning (HVAC) industry, this group logically makes up the primary channel through which to recover all types of thermostats. In order to support this channel and make the program more accessible to members of the public, any participating collection point can also register to be a drop-off location (typical drop-off locations are wholesalers, regional districts, and municipal locations). An up-to-date list of drop-off locations, searchable by postal code, is always available on the Thermostat Recovery Program website. Finally, the send-back option provides access to the program to individuals who are not close to a drop-off location. A small pail and a pre-paid waybill addressed to the collection facility are shipped to the individual's home (or desired location), making the program accessible to individuals in remote areas. Together these channels comprise all of the program participants, or "collection points" as they shall be identified throughout this report. See Section 3 below for a definition of "collection points" as distinct from "collection facilities."

As per the requirements under the British Columbia Recycling Regulation, this report has been prepared to summarize the program activities undertaken during the calendar year of 2017, and will be posted on the program website at www.hrai.ca/trp.

3. Public Education Materials and Strategies

Initiatives

Thermostat Recovery Program operates by collecting thermostats through existing businesses and infrastructure, referred to in the program plan as "collection channels." As described in Section 2, the program uses one main collection channel (HVAC contractors/wholesalers) and two secondary collection channels (drop-off locations and send-back option) to recover mercury-containing and electronic thermostats. In 2017 the focus of the program continued to be on increasing registrations, particularly in the contractor/wholesaler channel, also on increasing collection in order to meet the participation and collection targets, as well as ensuring that the program is as accessible as possible.

In 2017, the program continued to build on the foundation laid in previous years to broaden the audience that is reached by Thermostat Recovery Program messaging. Key areas of focus in 2017 were:

- Increased communication with participants (to keep them engaged and informed)

- Increased marketing and outreach efforts to non-participants (particularly contractors and wholesalers)
- Increased public outreach (info about the program and how to participate)

To achieve these goals, the following initiatives were undertaken:

Initiative	Details	Audience/ Channel Reached	Type of Outreach
Ongoing outreach with HRAI national office	• Information about the program and a call to register were included in the HRAI Spring & Fall review newsletters, sent to all HRAI members. • Information about the Thermostat Recovery Program (TRP) and accomplishments was included in the HRAI Accomplishment List, accompanying renewal letters sent to all HRAI members	Contractors/wholesalers	• Industry outreach (print)
Ongoing outreach with Canadian Institute for Plumbing and Heating (CIPH) national office • CIPHEX West Roadshow	• CIPH provided TRP with a free booth at the CIPH Exhibition (CIPHEX) Roadshow in Vancouver. This is an important industry event that attracts attendees from BC and nearby provinces.	CIPH	• Contractors/ wholesalers
Partnership with Mechanical Contractors Association of Canada (MCAC) & Mechanical Service Contractors of Canada (MSCC)	• MSCC has offered its full support to the TRP program and has promoted the program to its members • TRP promoted on the MCAC website.	Contractors	• Industry outreach
BC Stewards/Stewardship Agencies of BC (SABC)	• Formalized association of all BC stewardship associations allows all stewards to present a united front, and to collaborate on communicating to various stakeholder groups	General Public	• Print media • Online

	• Website (bcstewards.com) provides an overview of each of the programs (including Thermostat Recovery Program) • Recycling Handbook provides an overview of each of the programs (including Thermostat Recovery Program) • Action Plan developed by SABC to ensure the success of all programs, investigate potential gaps, and address feedback from BC Ministry of the Environment.		
Regional District waste calendars/brochures: • Invermere Regional District • District of Mission on the Fraser • Penticton Regional District • Peace River Regional District	• Program ad and link to drop off locations in calendar	General Public	• Print media

Recycling Council of British Columbia (RCBC)	• Info about the program (materials accepted at nearest drop-off locations) made available to the public through a hotline, website and online tool (the Recyclepedia)
	  ○ 76 hotline inquiries
	  ○ 738 website searches
	  ○ 239 Recyclepedia searches
		General Public; BC waste management industry	• Online
			• Phone

Sustainable Building & Design Magazine	• Key TRP program info, logo and URL posted on magazine's website.	Contractors/General Public	• Online
HPAC/Canadian Contractor ads & eblasts	• Print ads appeared in all 7 issues of HPAC magazine (with a readership of approximately 20,000)	Contractors/wholesalers	• Business-to-business print media

	• Eblasts to BC, MB, and ON subscribers of HPAC in Aug. had a reach of 8,240 viewers		
Google TRP Ads	• TRP ads appear every time an individual enters the word "thermostat(s)"into their phone or computer Google search engine.	General Public	• Online

In addition to the efforts listed above, the program was promoted through numerous voluntary channels. See examples in Appendix B.

Resources

To support these initiatives, a variety of educational and marketing materials were used. These materials are described below.

1. **Program Website:** The program's website www.hrai.ca/trp is the primary educational tool, and features content directed at educating contractors and wholesalers as well as the general public. This site provides a comprehensive overview of the program, the benefits of participation, education about mercury and the dangers it presents. It has a list of drop-off locations that is searchable by postal code and it is updated in real time as participants join the program. The site has a convenient online registration form, which is particularly useful for residents who want to return a thermostat using the send-back option. The site is also kept up-to-date with cumulative totals of thermostats and mercury vessels that have been collected and the weight in kilograms of the mercury that has been recovered.
2. **Introduction letters:** Each collection kit issued to a newly registered collection point contains an outreach letter that includes educational information about the program and about mercury. They act as important educational tools that help develop commitment from newly recruited participants. These letters also help new participants with their future outreach to the public, by providing them with information about the importance of recycling mercury-containing and electronic thermostats.
3. **Posters:** Promotional posters are continually available for participants to use in displays on-site at the collection locations. They are quite eye-catching to increase their effectiveness as a tool for drop-off locations.
4. **Brochures:** There are two different program brochures available; separate industry-facing and public-facing versions with tailored messaging. A stack of printed brochures was provided to participating collection points for distribution to their customers (in the case of contractors/wholesalers) or at public events, throughout 2017. These brochures include facts about mercury and information about the Thermostat Recovery Program that is used to educate customers and the public.

5. **Monthly Newsletter:** In order to remain in communication with existing participants, an e-newsletter on program milestones, collection sweeps and other news is published and sent to participants monthly. The goal of the newsletter is to keep participants up to date with program happenings; to keep the program on participants' minds; to keep participant satisfaction high; and ultimately to increase collection results. As of December 31, 2017, the newsletter had 804 subscribers nationally, approximately 28% of who are in BC.
6. **Collection sweep postcards:** As part of our bi-annual collection sweep, reminder postcards were sent to all active collection points in May and September. Participants were asked to return their pail if it was at least half full, and given the opportunity to request new program materials.
7. **Print ads and eblasts:** Print ads were published in all 7 issues of HPAC magazine, which has a readership of approximately 20,000 HVAC and plumbing contractors. As part of a marketing strategy, an e-blast was sent to HPAC's online base of 2,600 subscribers in BC during the month of August 201. Ads were also developed for the District of Mission on the Fraser, Invermere Regional District, Penticton Regional District, and Peace River Regional District recycling calendars.
8. **Banner stands:** To support in-person events such as trade shows, banner stands are used to be versatile and eye catching. These banners support site-specific signage, and were used throughout 2017.

4. Collection System and Facilities

Collection System Overview

The Thermostat Recovery Program collection system is comprised of the following:

1. Collection points (participants)
    - made up of the 3 collection channels described above
    - use collection containers to collect thermostats and send them to the collection facility
2. Collection facilities
    - Aevitas Inc. (the primary facility) receives the collection containers from various collection points and process the thermostats (count, dismantle).
    - The use of Tri-Arrow Industrial Recovery (the secondary facility) began to be phased out in 2016 and was fully phased out by end of 2017 (See *"Collection Facilities" section below)*.
3. Consolidation points
    - In previous years Tri-Arrow Industrial Recovery was contracted as a secondary consolidation point for the program; however, in 2016 and 2017, Aevitas Inc. was contracted as the sole consolidation point (See *"Collection Facilities" section below)*.
    - All vessels are shipped to a retort facility at least once a year
4. Retort facility

- Final processing of Hg vessels

The relationship between these facilities is demonstrated in the flow chart below:

**Notes:*

-thermostats can contain 1 to 4 Hg vessels, and participants occasionally include loose vessels that they have removed from thermostats in the collection pails, so we track both total number of thermostats and total number of Hg vessels.

-Tri-Arrow's downstream processors' information was not available to be audited (See Section 1).

Collection Facilities

As described above, historically the Thermostat Recovery Program has used two collection facilities: Aevitas Inc. located in Ayr, Ontario and Tri-Arrow Industrial Recovery located in Surrey, BC. However, in order to tighten up processes, such as processor reporting, and streamline program operations, the program has been transitioning to use only Aevitas (who has always been the primary collection facility used). In 2016, TRP set out to use Aevitas as the sole collection facility for the program. Unfortunately, due to the issue of participants still possessing old Tri-Arrow shipping waybills sent to them in the past for shipping their collection containers, some BC participants continued to use them throughout 2016 and up until the end of 2017 (See Section 1 for full Tri-Arrow 2017 collection details).

Aevitas receives collection containers full of intact thermostats directly from all collection points in BC, and begin processing the thermostats. Aevitas acted as the primary consolidation point for the thermostat vessels from BC, as well they operate the only approved mercury retort in Canada (Aevitas' website: http://aevitasweb.wixsite.com/aevitas1/mercury-recovery). However, since the TRP did not

have a formal contract with Tri-Arrow in 2017, they consolidated the small volume of thermostat vessels they collected for the program in-house.

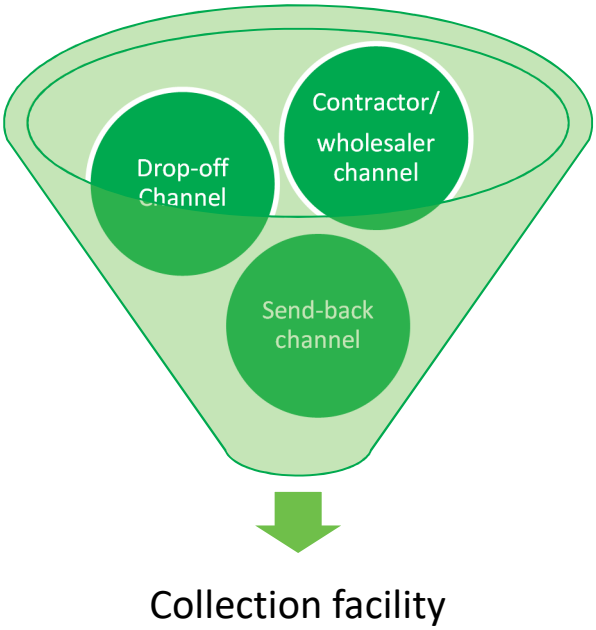
The shipper of each pail is recorded in a monthly tracking sheet by Aevitas and Tri-Arrow, as are the number of thermostats per pail (in total, and broken down by brand), the number of mercury vessels contained, the weight of the plastic and metal components, and any off-spec materials included in the collection containers (See Section 1 regarding Tri-Arrow's 2017 collection details).

Collection Points

As described in section 3 above, Thermostat Recovery Program uses 3 main collection channels: the contractor/wholesaler channel, public drop-off locations, and the send-back channel. The individual participants in each of the collection channels are referred to as "collection points" or "participants."

These collection points are a key part of the collection system, as they recover end-of-life thermostats and send them to the collection facility.

Participants use the collection containers provided by the Thermostat Recovery Program to collect end-of-life thermostats, and when the container is full, they use their pre-paid Purolator waybill to return the thermostats to the collection facility. All new Purolator waybills are only addressed to Aevitas, continuing TRP's efforts to phase out returns to Tri-Arrow as participants use their older waybills. At the collection facility, the thermostats are processed. This process is illustrated below.



According to the stewardship plan, the goal was to have 420*registered collection points in 2017. Through outreach initiatives described above, 6 new businesses registered as collection points for end-

of-life thermostats in 2017, 5 of which elected to act as drop-off locations and 1 of which registered as a send back participant (see description in Section 2).

The following chart provides information regarding the businesses registered, including the types of businesses registered, if they have opted to be a drop-off location and the city where the business is located.

Company Name	Type	Drop Off	City
EMCO HVAC #841 - Port Kells	Wholesaler	Yes	Surrey
Winmar Property Restoration Specialists	Contractor	Yes	Prince George
Blue Moon Plumbing & Heating Ltd.	Contractor	Yes	Surrey
Emterra Environmental – Coquitlam	Recyling Center	Yes	Coquitlam
Emterra Environmental - North Vancouver	Recyling Center	Yes	North Vancouver
Araxie Vyse	Send Back	No	North Vancouver

**targets are calculated based on the calendar year rather than the previously used program year in order to align it with the calendar year reporting. See explanation in Section 9, below.*

Coverage in Regional Districts

In 2017 there were no changes to any existing collection points.

Combining the new participants with existing collection points as of December 31, 2017 there were 377 collection points in British Columbia.

These collection points are located in the following regional districts:

Region	Number of Collection Points
Alberni–Clayoquot Regional District	2
Capital Regional District	38
Cariboo Regional District	5
Columbia–Shuswap Regional District	19
Comox Valley Regional District	11
Cowichan Valley Regional District	9
Fraser Valley Regional District	35
Metro Vancouver (Greater Vancouver Regional District)	128
Northern Rockies Regional District	1
Peace River Regional District	12
Powell River Regional District	3
Regional District of Bulkley–Nechako	6
Regional District of Central Kootenay	5
Regional District of Central Okanagan	17
Regional District of East Kootenay	6
Regional District of Fraser – Fort George	10
Regional District of Kitimat–Stikine	8

Regional District of Kootenay Boundary	5
Regional District of Mount Waddington	2
Regional District of Nanaimo	11
Regional District of North Okanagan	9
Regional District of Okanagan–Similkameen	6
Skeena – Queen Charlotte Regional District	3
Squamish–Lillooet Regional District	5
Strathcona Regional District	5
Sunshine Coast Regional District	6
Thompson–Nicola Regional District	10

As this list demonstrates, there are collection points in 27 of British Columbia's 29 regions. The regions in which we do not yet have participants are as follows:

- Central Coast Regional District
- Stikine Region

Throughout 2017, we will continue to make efforts to register participants in the remaining 2 regional districts. However, please note that all people throughout the entire province of BC can participate in the program by taking advantage of our free send-back channel even if there is not a registered collection point in their region.

5. Product Environmental Impact Reduction, Reusability and Recyclability

Through the Thermostat Recovery Program, all components of the recovered thermostats are sent for recycling, including the plastics, metals, glass, mercury and any electronics associated with the thermostat. Taking into account that occasional commingling of the materials may occur greater than 99% of materials are recycled. In 2017, the breakdown of materials recovered and recycled from the province of British Columbia included:

- 2,737 mercury-containing vessels (there can be anywhere between 1 to 4 mercury vessels contained in each thermostat)
- 11.10 Kg of mercury (calculated based on 2.5 grams of Hg per vessel)
- 4.44 Kg of glass (calculated based on 1 gram of glass per vessel)
- 62.6 kilograms of metals
- 206.46 kilograms of plastics

The recyclability of mercury-containing thermostats cannot be improved, nor can the reusability of these products because they are obsolete. As compared to older set-back models, new programmable thermostats are more environmentally responsible as they do not contain mercury and are much more energy efficient. Further, it is dangerous to attempt to reuse mercury-containing thermostats due to potential incompatibility with newer HVAC systems, thus replacing them with newer thermostats and recycling the older models is the best choice for reducing the environmental impact of these products.

Because the Thermostat Recovery Program is already able to recycle greater than 99% of materials recovered through the program with a high level of certainty, efforts to continually reduce environmental impacts have centered on improving the program's collection processes. One area of focus has been the reduction of non-thermostat materials which are sometimes sent back in collection pails. Efforts have included communications with participants, and the development of new pail stickers including the wording "thermostats only" (as described in Section 3) for the sides of the collection pails to act as a reminder for participants.

As the program expands and matures, additional reductions in environmental impact will continue to be sought in order to ensure the program is effective in having a positive outcome for the environment and the citizens of British Columbia.

6. Pollution Prevention Hierarchy and Product / Component Management

As per the stewardship plan for thermostats, pollution prevention efforts have focused on recycling, rather than reduce/redesign or reuse. The breakdown as to why recycling is the preferred management technique out of the four "*Rs*" is provided below.

Reduce/redesign: The main environmental concern with thermostats is the mercury contained in many older models. While many of these thermostats may still be in use, they are no longer made by the major manufacturers and are no longer sold in Canada. New thermostats have been redesigned to eliminate mercury and to be more energy efficient, therefore reducing energy consumption.

Reuse: The plan does not encourage the reuse of old thermostats collected through this program for the reasons outlined below:

- Our primary goal is to collect old mercury-containing thermostats and ensure that the mercury and other component parts are properly managed, not to see them in continued use.
- Old non-mercury-containing thermostats may not meet the technical/safety specifications of new HVAC systems and do not have the same ability to reduce energy use that new programmable thermostats do, and therefore we recommend that these be recycled rather than reused.

Recycle: As per the program plan, the thermostats recovered from the province of British Columbia are counted, documented, dismantled and recycled. The components from the thermostats are separated for recycling as follows:

- The plastic components recovered are of mixed types; these are consolidated, at the collection facility, with other plastics from the facility and then sent to the downstream recycler. Currently, Aevitas sends them to Durham Shred and Recycle. Once at the recyclers the plastics are baled and then sold as a commodity.
- The metals collected are a mix of iron, nickel and aluminum which all have high reuse/recycling value. The metals are consolidated with other metals at the collection facility and the sent to

the downstream processor. Aevitas sends them to Triple M Metals (a.k.a. M Metals). Once at the processors the metals are shredded, baled and then sold as a commodity.

- The glass vials containing the mercury are consolidated at the collection facility Aevitas (See Section 4 regarding Tri-Arrow details) until a large volume has been collected. Aevitas acts as the primary consolidation point for all glass vials collected for the program.

  At Aevitas these vessels are consolidated with vessels collected across Canada and then sent to an appropriate retort facility; in 2017 they were sent to Veolia. Since TRP did not have a contract with Tri-Arrow in 2017, the vials they collected for the program were not shipped to Aevitas as they have been in the past, but were instead consolidated and sent to their own downstream processors, whose information was not available to be audited (See Section 1 and Section 4 for details). However, in November 2017 an agreement was reached with Tri-Arrow confirming that as of December 2017; going forward Tri-Arrow will no longer process any TRP thermostats in-house. Instead they will automatically ship any TRP thermostats they receive directly to Aevitas for full processing, etc.

  During the retort process at Veolia, the glass vials are crushed and glass and mercury are separated. The mercury is triple distilled and sent for resale/reuse in products and processes or put into long term storage (sequestered), depending on market demand. The glass is crushed, distilled and sent for recycling in fibreglass applications. The latest shipment representing 54% of the mercury-containing vessels collected was sent to Veolia on December 28, 2017. Appendix C contains the manifest for this shipment.

The following table describes the acceptable end fates for each of the components of a thermostat:

Component	Reuse	Recycle	Energy Recovery	Landfill	Other
Plastics	X	Preferred	X	X	NA
Metals	X	Preferred	X	X	NA
Mercury Vessels (glass)	X	Preferred	X	X	NA
Mercury Vessels (mercury)	Optional	X	X	X	Retort process and then long-term storage

For plastics, metals, and the glass components, greater than 99% of the materials collected by the program are recyclable and were managed in accordance with the program plan and the principles of pollution prevention. The percentage of mercury that is sold for re-use versus how much is put into long-term storage varies greatly depending on market demand in the US (their mercury export ban, enacted in January 2014 prohibits any mercury from being exported; since the US market for mercury is

relatively small, increasingly large percentages are being put into long-term storage, though specific percentages are not available).

The following table describes processing pathways and criteria used to assess product end fate by product component:

	Nature of Processing					
	Transfer to direct processor (BC or ON)	Transfer to direct processor elsewhere in North America	Transfer to direct processor outside of North America	Multi-step processing (BC or ON)	Multi-step processing elsewhere in North America	Multi-step processing outside of North America
Basis of evidence for product treatment	• Due diligence in process for supplier selection (including detailed qualification of downstream suppliers by Aevitas) • Detailed contracts with collection facility • Monthly reporting from collection facilities					
	• Annual site visit to review processes				• Official shipping manifest with product weights • Certificate of Destruction/Recycling provided by retort facility	
Component (% of component sold/transferred for processing that is treated under each processing pathway)						
Plastics	>99%	0%	0%	0%	0%	0%
Metals	>99%	0%	0%	0%	0%	0%
Mercury Vessels (glass and mercury)	0%	0%	0%	0%	100%	0%

7. Product Sold and Collected and Recovery Rate

The amount of product sold is not currently tracked as mercury-containing thermostats are no longer sold into Canada, thus there are no sales to report. As for newer programmable models, the sales of these devices are not currently tracked by the manufacturers with sufficient detail to produce reporting at the provincial level as sales are currently only tracked at the national level. It is also worth noting that thermostats can have a life span of 20-30 years, though renovations can reduce that life span to 7-10 years. These timelines are long enough to make any direct correlation between product sold into the market and product available for recovery per year quite difficult, even if sales data were available.

Given the above, the Thermostat Recovery Program does not use a recovery rate as a measure of program performance, but instead measures the total amount of product collected measured against targets set out in the approved program plan. Collection totals and progress against targets will be discussed in Section 9, below.

8. Summary of Deposits, Refunds, Revenues and Expenditures (N/A)

As the Thermostat Recovery Program does not charge deposits, this section is not applicable.

Plan Performance

The following table describes progress made towards the approved targets set out in the stewardship plan for the Thermostat Recovery Program:

Plan Target	2017 Results	Strategies for Improvement in 2018
*Performance Targets**		
1. Mercury Thermostat Collection: 3,555	Adjusted total: 3,463 thermostats collected (3% under target)	• Increase number of public drop-off locations • Increase number of collection points through targeted outreach in areas of low coverage • Continue to improve communication with wholesalers so that they can effectively market the program at their locations
2. Participants: 420	377 participants (90% of target)	• Increase outreach to wholesaler locations, especially those with multiple locations in the province. • Improved face-to-face communication at trade shows • Explore new recruitment options (eg. new marketing plan, new outreach events)
Communication Targets		
3. Program website: monthly updates	• Website is updated in real time with any new drop-off locations • Quarterly updates are made to ensure that all information is as up to date as possible • There were 1,258 visits to www.hrai.ca/trp from BC in 2017	

Plan Target	2017 Results	Strategies for Improvement in 2018
4. Printed brochures: a minimum of 500 brochures will be printed and distributed on an annual basis	Approximately 1194 brochures distributed. 25 brochures are distributed to each new participant (225); brochures have been sent to participants upon request (719); and approx. 250 distributed at Regional District of Nanaimo BC's Earth Day event.	• Increase registration numbers (each new participant receives 25 brochures for distribution to their clients/stakeholders) • More public outreach (using program brochures as a tool to spread the word about the program)
5. Printed posters will be distributed to all new drop-off locations to be displayed on site.	30 posters distributed to new (5) and existing (25) drop-off locations and as requested by participants	• Regularly follow-up throughout the year to ensure participants always have posters to promote themselves as TRP drop-off locations.
6. Industry facing advertising - a minimum of 5 ads per year will target industry	Print ads appeared in all 7 issues of HPAC magazine	• HPAC magazine is an industry publication with a readership of approximately 20,000.
	In addition to the targeted communications described above, as outlined in Section 3 the TRP engaged in public facing advertising in 4 regional district calendars; as well the program was promoted through the SABC "British Columbia's Recycling Handbook", which provides a simple guide to what can be recycled under BC stewardship programs. A total of 5,000 handbooks were distributed to various stakeholders, including regional districts, community centers and libraries, school districts, and other relevant groups. A digital version is available at www.bcstewards.com.	

**targets are calculated based on the calendar year rather than the previously used program year in order to align it with the calendar year reporting.*

Progress Toward Collection Targets

The following table provides further information regarding the amount of product collected by the Thermostat Recovery Program during the period of January 1 to December 31, 2017, measured against the targets outlined in the official stewardship plan, as well as the program growth as compared to the same period in 2015 and demonstrates the program's commitment to continuous improvement.

Collection of Mercury-Containing Thermostats: Progress Against Targets and Program Growth				
	Targets (January 1 to December 31, 2017)*	**Results Achieved from January 1 to December 31, 2017**	**Results Achieved from January 1 to December 31, 2016**	**Percentage difference in 2017**
Number of Mercury Thermostats Collected	3,555 mercury thermostats	2,737 intact mercury thermostats; 1,016 loose vessels (1,016/1.4 = 726 equivalent mercury thermostats); Adjusted Total: 3,463	3,280 mercury thermostats; 467 loose vessels (467/1.4 = 334 equivalent mercury thermostats); Total: 3,614	4% decrease

**targets are calculated based on the calendar year rather than the previously used program year in order to align it with the calendar year reporting.*

***Although all participating collection points are encouraged to return only intact thermostats, loose vessels (which have been clipped out of thermostats) are occasionally returned as well. However, as you will see above even though there was communication outreach with the participants, etc., the number of loose vessels collected has increased compared to 2016. Therefore, TRP will continue to ramp up communication outreach to participants in 2018. Using the industry-accepted standard of 1.4 vessels per thermostat, the number of loose vessels returned in 2017 is equivalent to 726 mercury thermostats. The adjusted total number of thermostats collected in 2017 is then 3,463.*

Amount Collected by Regional District

The following chart presents the number of thermostats collected in each regional district.

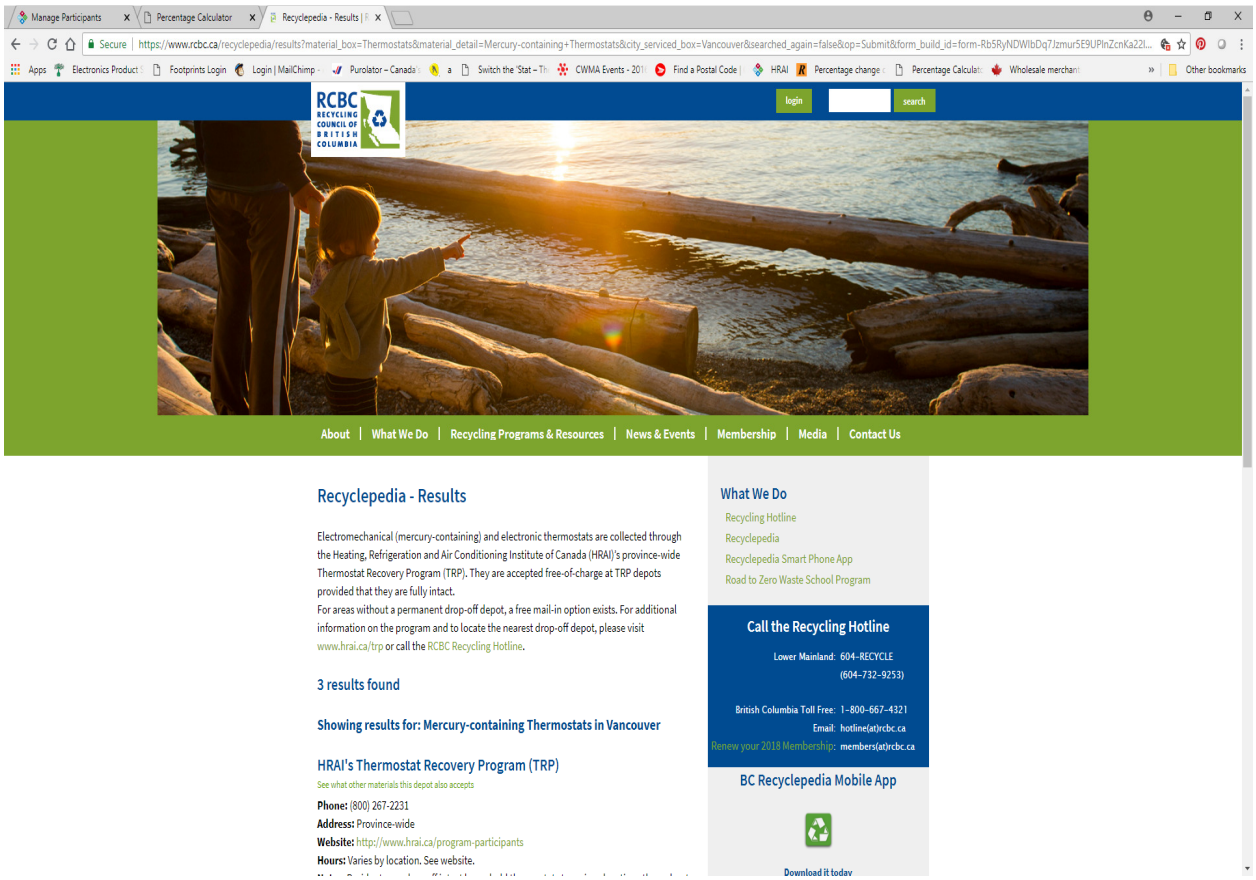
Region	Number of Mercury Thermostats Collected	Number of Electronic Thermostats Collected	Number of Loose Vessels Collected
Capital Regional District	90	0	248
Cariboo Regional District	6	5	0
Columbia Shuswap Regional District	61	1	0
Comox Valley Regional District	87	42	0
Cowichan Regional District	75	36	34
Fraser Valley Regional District	433	43	371
Greater Vancouver Regional District	1,457	249	513

Peace River Regional District	131	40	16
Powell River Regional District	30	3	0
Regional District of Central Kootenay	21	0	0
Regional District of Central Okanagan	423	35	75
Regional District of Fraser-Fort George	40	0	0
Regional District of Kitimat-Stikine	46	1	1
Regional District of Kootenay Boundary	12	21	0
Regional District of Mount Waddington	7	18	0
Regional District of Nanaimo	58	7	0
Regional District of North Okanagan	21	5	6
Squamish Lillooet Regional District	20	0	0
Thompson Nicola Regional District	23	1	0
TOTAL	**3,041**	**506**	**1,263**

Appendices / Additional Information and Third Party Assurance

Appendix A – Earned Media

RCBC Recyclepedia



HPAC Magazine

From PennBarry comes an expanded offering of its Direct Drive Dynamo centrifugal fans, including models up to 24-in. wheel diameter and Gplus (Green Plus) EC motor options up to 2HP. The fans are SWSI, Class I, Arrangement 4 general purpose air moving devices designed for supply or exhaust applications in commercial, institutional and industrial systems. The fans have standard options including a tool-free, quick-release motor cover. Other options include integration with building management systems and compatibility with PennBarry's Intelligent Pressure Control Module (iQ-IPCM) and Multi-Speed Controller (iQ-MS). www.pennbarry.com

Johnson Controls has added a dashboard for chiller plant operators to its Smart Connected Chillers program. The dashboard provides access to chiller trend data and predictive analytics and is enabled by the Smart Connected Chillers Internet of Things (IoT) program, connecting chillers to a cloud-based Microsoft Azure computing platform. The program's capabilities reduce the risk of unplanned downtime and emergency repairs. www.johnsoncontrols.com

Bramec introduces its equipment pad, a 30 in. x 30 in. x 3 in. pad that weighs nine lbs. It is constructed of a high-density polyethylene. The top of the grey pad is textured to prevent slipping, while the corners have tabs that help to keep pads stacked. https://bramec.com

SpeedClean's CoilShot-HD coil cleaner tablets are pre-measured for use with the CoilShot condenser cleaning tool. The CoilShot attaches to a garden hose and the tablet dissolves to create a foaming coil cleaner. Once cleaning is complete, turn the dial to rinse and remove the remaining soap and residue. The tablets have a dissolve time of seven to nine minutes at the maximum foam setting on the CoilShot and offer degreasing and brightening performance for heavy-duty residential and commercial applications. www.speedclean.com

TRP
THERMOSTAT RECOVERY PROGRAM
EASY. SAFE. FREE.
THERMOSTAT RECYCLING

We recycle all elements of the thermostat; plastic, metal, electronics and mercury (which is particularly hazardous).

Do your part and join the more than 1,500 contractors already participating in the program.

FOR MORE INFORMATION
1(800) 267-2231, x 224
Email pthompson@hrai.ca

Administered & delivered by: HRAI
Supported by:

The Sensi Touch Wi-Fi Thermostat from Emerson combines smart home technology with a colour touchscreen display. It has illuminated terminals, while additional menu options let users customize information on the home screen display and choose a continuous back glow. The Sensi Touch Wi-Fi Thermostat, along with an updated Sensi Wi-Fi Thermostat, is compatible with Apple HomeKit. Users can set up and pair Sensi thermostats with their iPhone or iPad, add it to their home set-up, integrate with other HomeKit accessories and control temperature with the Apple Home app, Siri or Control Center. Both thermostats offer instructions and video tutorials in the Sensi smartphone app. The thermostats are compatible with Amazon Alexa and Wink. https://sensicomfort.com

continued on p78

Copy of Penticton Regional District Calendar Ad

B.C. Product Stewardship Programs 2017-2018

PRODUCT	STEWARD	PROGRAM	For more details and depot locations
Paint, Pesticides, Gasoline and Flammable Liquids	ReGeneration	Take paint, pesticides, gasoline and flammable liquids to your local **ReGeneration collection site** for safe recycling. Ensure they are properly sealed and labelled in their original container.	**www.ReGeneration.ca** or **1-888-772-9772.**
Medications	HEALTH PRODUCTS STEWARDSHIP ASSOCIATION	Return unused and expired prescription medications, over-the-counter drugs and natural health products through the British Columbia Medications Return Program (BCMRP) to your nearest pharmacy.	**www.healthsteward.ca** or call the Recycling Council of B.C. Hotline at **1-800-667-4321.**
Small Appliances and Power Tools	ElectroRecycle	Recycle your small appliances and other household products that are electrical, use batteries or plug in to 120V or 12V power sources. This includes items such as kitchen countertop appliances, electric personal care items, small power tools and more.	**www.ElectroRecycle.ca** or call the Recycling Council of B.C. Hotline at **1-800-667-4321.**
Lights, Bulbs and Fixtures	LightRecycle	Bring your residential light fixtures and bulbs/ tubes to your nearest drop-off depot for safe recycling. Includes lamps, ceiling & wall fixtures, light strings, fluorescent tubes & CFL bulbs, and most household bulbs.	**www.LightRecycle.ca** or call the Recycling Council of B.C. Hotline at **1-800-667-4321.**
Batteries and Cellphones	call2recycle	Bring your household single-use and rechargeable batteries and cellphones for safe recycling and disposal. Includes cell phones and batteries under 5kg (alkaline, NiCd, lithium, etc); batteries from cell- and cordless phones, power tools, laptops, etc. Excludes car batteries.	**www.call2recycle.ca/ british-columbia** or **1-888-224-9764.**
Smoke or Carbon Monoxide Alarms	AlarmRecycle	Bring your smoke or carbon monoxide alarms to your nearest depot for safe recycling.	**www.ReGeneration.ca** **1-888-772-9772** or call the Recycling Council of B.C. Hotline at **1-800-667-4321.**
Thermostats	TRP THERMOSTAT RECOVERY PROGRAM	Bring your thermostat in for safe recycling and disposal to keep all its components, especially mercury, out of the waste stream. Includes all mercury-containing, electronic and mechanical thermostats.	**www.hrai.ca/trp**

7

Copy of Peace River Regional District Calendar Ad

Be Winter-Green!

10 Easy Ways to Go Green This Winter

It's the time of year when the snow starts to fly and we start to worry about the rising cost of keeping warm. Here are 10 easy steps you can take to make your home warmer, healthier and greener this winter without breaking the bank:

1. **Turn down the heat** on your home's water heater (50 C or 120 F) & wrap your heater in an insulative blanket.
2. **Get an Energy Audit** – Find where you might be lacking insulation or leaking energy.
3. **Use a programmable thermostat.** Set home temperatures to 20°C when you are home and 16-18°C when you are away or sleeping.
4. **Use weather stripping and caulking** – prevent heat from escaping through drafty doors and windows.
5. **Let the sun in** – open your drapes during the day to let the sun in and close them at night to keep the cold out.
6. **Regular Furnace Maintenance** - replace filters every 6 months.
7. **Turn it off** – make sure lights are off when you aren't in the room. This goes for electronic gadgets too!
8. **Save water** – shorter showers, washing clothes in cold water, turning water off when brushing teeth and while doing dishes are all ways to save on your energy bill.
9. **Shop Local** – support local business and make a real impact on the environment.
10. **Winterize your water lines** – bring in any hoses and shut off outdoor taps so they don't freeze over the winter.

TRP

EASY. SAFE. FREE.
THERMOSTAT RECYCLING

We recycle all elements of the thermostat;
plastic, metal, electronics and mercury (which is particularly hazardous).

Do your part and join the more than 1,500 contractors already participating in the program.

FOR MORE INFORMATION
1(800) 267-2231, x 224
Email: pthompson@hrai.ca

Administered & delivered by: HRAI
Supported by:

November 2017

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			1	2	3	4 Pumpkin Plunge
5	6	7	8	9	10	11 Remembrance Day
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

11

Appendix C – Retort Manifest Copies

Front View

MOVEMENT DOCUMENT / MANIFEST
DOCUMENT DE MOUVEMENT / MANIFESTE

This Movement document/manifest conforms to all federal and provincial transport and environmental legislation.
Ce document de mouvement/manifeste est conforme aux législations fédérale et provinciale sur l'environnement et le transport.

CZ79173-7

Movement Document / Manifest Reference No. / N° de référence du document de mouvement/manifeste

A Generator / consignor / Producteur / expéditeur

Registration No. / Provincial ID No. / N° d'immatriculation - d'id. provincial: ON2002102

Company name / Nom de l'entreprise: AEVITAS INC

Mailing address / Adresse postale: same as below

City / Ville: Province: Postal code / Code postal:

E-mail / Courrier électronique: Tel. No. / N° de tél.: (519 740-1333

Shipping site address / Adresse du lieu de l'expédition: 75 WANLESS CRT

City / Ville: AYR Province: ON Postal code / Code postal: N0B1E0

Intended Receiver / consignee / Réceptionnaire / destinataire prévu: VEOLIA ES CANADA INDUSTRIAL SERVICES INC

Registration No. / Provincial ID No. / N° d'immatriculation - d'id. provincial: 5750-8XPJ26

Mailing address / Adresse postale: same as below

City / Ville: Province: Postal code / Code postal:

E-mail / Courrier électronique: Tel. No. / N° de tél.: (800 461-3267

Receiving site address / Adresse du lieu de l'expédition: 820 MCKAY ROAD

City / Ville: PICKERING Province: ON Postal code / Code postal: L1W2Y4

B Carrier / Transporteur

Registration No. / Provincial ID No. / N° d'immatriculation - d'id. provincial: A6C0427

Company name / Nom de l'entreprise: VEOLIA ES CANADA INDUSTRIAL SERVICES INC

Mailing address / Adresse postale: 4140 BELGREEN DRIVE OTTAWA City / Ville: Province: ON Postal code / Code postal: K1G3N2

E-mail / Courrier électronique: Tel. No. / N° de tél.: (613 739-1449

Vehicle / Véhicule: Registration No. / N° d'immatriculation: 149-62F Prov.: ONT

Trailer - Rail car No. 1 / 1re remorque - wagon

Trailer - Rail car No. 2 / 2e remorque - wagon

Port of entry / Point d'entrée: International use only

Port of exit / Point de sortie: International use only

Carrier Certification : I certify that I have received waste or recyclable material from the generator / consignor for delivery to the receiver / consignee as set out in Part A and that the information contained in Part B is complete and correct.
Attestation du transporteur : J'atteste avoir reçu les déchets ou matières recyclables du producteur / expéditeur en vue de leur livraison au réceptionnaire / destinataire, tels qu'ils figurent à la partie A et que les renseignements inscrits à la partie B sont exacts et complets.

Name of authorized person (print): / Nom de l'agent autorisé (caractères d'imprimerie): MIKE MIRLOS Tel. No. / N° de tél.: 800-461-3267

Year / Année: 17 Month / Mois: 12 Day / Jour: 28 Signature:

C Receiver / consignee / Réceptionnaire / destinataire

Reference Nos. of other movement document(s)/manifest(s) used / N° de référence des autres documents de mouvement/manifestes utilisés

Registration No. / Provincial ID No. / N° d'immatriculation - d'id. provincial: 5750-8XPJ26

Receiver / consignee information same as in Part A / Les renseignements du réceptionnaire / destinataire est la même qu'à la Partie A: ☐ Yes / Oui ☐ No, complete the box below / Non, remplir la case ci-dessous

Company name / Nom de l'entreprise

Mailing address / Adresse postale

City / Ville Province Postal code / Code postal

E-mail / Courrier électronique Tel. No. / N° de tél. ( )

Receiving site address / Adresse du lieu de destination

Date received / Date de réception: Year / Année 17 Month / Mois 12 Day / Jour 28 Time / Heure 1500 ☐ A.M. ☒ P.M.

If waste or recyclable material to be transferred, specify intended company name/ Si les dechets ou matières recyclables doivent être transférée, préciser le nom du destinataire

Registration No./Provincial ID No. / N° d'immatriculation/d'id provincial

Prov. code / Code prov.	Shipping name / Appellation réglementaire	Class / Classe Sub. class(es) / Classe(s) sub.	UN No. / N° NU	Packing / risk gr. / Gr. d'emballage/ de risque	Quantity shipped / Quantité expédiée	Units L or / ou Kg Unités	Packaging/Contenant No. / N°	Codes Int.–est.	Phys. state / État phys.	Quantity received / Quantité reçue	Units L or / ou Kg Unités	Comments / Commentaires	Handling Code / Code de manutention	Shipment / Envoi Accepted / Accepté	Shipment / Envoi Refused / Refusé	Decont. Pack. / Cont.	Decont. Veh. / Véh.
(i) 148C	MERCURY CONTAINED IN MANUFACTURED ARTICLES (THERMOSTAT VESSELS)	8 (6.1)	UN2806	N/A	223	Kg	1	01	S	235	kg		07	✓			
(ii)																	
(iii)																	
(iv)																	

Notice No. / N° de notification	Notice Line No / N° de ligne de la notification	Shipment / Envoi	Of / De	D or R code / Code E ou R	C code / Code C	Basel Annex VIII or OECD Code / Annexe VIII de Bâle ou Code OCDE	H code / Code H	Y code / Code Y	National code in country of / Code du pays: Export / Exportation	Import / Importation	Customs code(s) / Code(s) de douanes
(i)											
(ii)											
(iii)											
(iv)											

International use only

If handling code "Other" (specify) / Si code de manutention « autre » (spécifier)

Receiver / consignee certification : I certify that the information contained in Part C is correct and complete. / Attestation du réceptionnaire / destinataire : J'atteste que tous les renseignements à la partie C sont exacts et complets.

Name of authorized person (print) / Nom de l'agent autorisé (caractère d'imprimerie): LISA PODZYHUN

Signature: Tel. No. / N° de tél.: (800) 461-3261

Special handling / Manutention spéciale: ☐ Attached / Ci-joint ☐ As follows / Ci-contre: 24-HOUR NO. 1-877-818-0087

Generator / consignor certification: I certify that the information contained in Part A is correct and complete.
Attestation du producteur / expéditeur: J'atteste que tous les renseignements à la partie A sont exacts et complets.

Name of authorized person (print) / Nom de l'agent autorisé (caractère d'imprimerie): Chris Tam Signature: Tel. No. / N° de tél.: 519 740-1333

Date shipped / Date d'expédition: Year / Année 17 Month / Mois 12 Day / Jour 28 Time / Heure ☐ A.M. ☐ P.M. 1115

Scheduled arrival date / Date d'arrivée prévue: Year / Année 17 Month / Mois 12 Day / Jour 28

MOE 04-1917 (07/07)

Instructions for completion and distribution on reverse / Instructions pour compléter et distribuer au verso

Copy / Copie 3 (yellow / jaune)

Back View

APPROPRIATE AUTHORITIES / AUTORITÉS RESPONSABLES *EMERGENCY NUMBER / *NUMÉRO D'URGENCE

International Shipments/ Expéditions internationales

Waste Reduction and Management Division
Environment Canada
Place Vincent Massey
351 St. Joseph Blvd.
GATINEAU QC K1A 0H3
(819) 938-4508
Fax (819) 938-4553

Division de la Réduction et de la Gestion des Déchets
Environnement Canada
Place Vincent Massey
351, boul. St-Joseph
GATINEAU (Québec) K1A 0H3
(819) 938-4508
Fax (819) 938-4553

Provincial Authorities / Autorités provinciales

Alberta
***1-800-222-6514**
Alberta Environment and Parks
10th Floor, Oxbridge Place
9820 - 106 Street
Edmonton, AB T5K 2J6
(780) 427-3081

British Columbia
***1-800-663-3456**
Colombie-Britannique
Ministry of the Environment
Environmental Protection Division
Hazardous Waste Program
P.O. Box 9377, Stn Prov Gov't
Victoria BC V8W 9M1
(250) 356-5044

Manitoba
***204-944-4888**
Manitoba Sustainable Development
Environmental Approvals Branch
Hazardous Waste Program
1007 Century Street
Winnipeg, MB R3H 0W4
(204) 945-7086
Fax (204) 945-2338

Newfoundland and Labrador
***709-729-1771**
Terre-Neuve et Labrador
Department of Environment and Conservation
Pollution Prevention Division
Confederation Building, West Block
P.O. Box 8700
St. John's NF A1B 4J6
(709) 729-2556
Fax (709) 729-6969

New Brunswick
***1-800-565-1633**
Nouveau-Brunswick
Department of the Environment and Local Government
Impact Management Branch
P.O. Box 6000
Fredericton NB E3B 5H1
(506) 453-7945

Northwest Territories
Territoires du Nord-Ouest
***867-920-8130**
Environment Division
Department of Environment and Natural Resources
P.O. Box 1320
Yellowknife NT X1A 2L9
(867) 873-7654

Nova Scotia
***1-800-565-1633**
Nouvelle-Écosse
Nova Scotia Environment
1903 Barrington Street
Halifax, NS B3J 2P8
(902) 424-3600

Ontario
***1-800-268-6060**
Ministry of the Environment and Climate Change
Environmental Monitoring & Reporting Branch
"Area M"
135 St. Clair Avenue West
Toronto ON M4V 1P5
1-866-494-6663

Prince Edward Island
***1-800-565-1633**
Île-du-Prince-Édouard
Department of Communities, Land & Environment
P.O. Box 2000
Charlottetown PEI C1A 7N8
(902) 368-5024

Québec
***1-866-694-5454**
Ministère du Développement durable, de l'Environnement et des Parcs
Urgence environnement
5199 Sherbrooke est, Bureau 3860
Montréal QC H1T 3X9
(514) 873-3636

Saskatchewan
*** 1-800-667-7525**
Environmental Protection Branch
Saskatchewan Environment and Resource Management
3211 Albert Street
Regina SK S4S 5W6
(306) 787-0016

Yukon Environment
***867-667-7244**
Environment Yukon
Environmental Programs Branch (V-8)
Box 2703
Whitehorse, YT
Y1A 2C6
(867)667-5683

Nunavut
867-920-8130
Environmental Protection Division
Department of Environment
P.O. Box 1000, Stn. 1320
Iqaluit, Nunavut, X0A 0H0
(867) 975-5900

Each Party shall ensure that the information on all copies is legible and indelibly printed.
1. Generator / consignor completes Part A and has the carrier complete Part B.
2. Generator / consignor detaches Copy 1 and sends Copy 1 or a copy of Copy 1 to the appropriate authority of the province or territory of origin and of the province or territory of destination, and Environment Canada for international shipments.
3. Generator / consignor retains Copy 2.
4. Carrier carries the remaining four copies (Copies 3, 4, 5, 6) along with the shipment.
5. Upon delivery of the shipment to the receiver / consignee, the carrier gives the four copies to the receiver / consignee's authorized representative.
6. Receiver / consignee completes Part C and sends Copy 3 or a copy of Copy 3 to the appropriate authority of the province or territory of origin and of the province or territory of destination and Environment Canada for international shipments. He also distributes Copies 4 and 6 to the carrier and generator / consignor, and keeps Copy 5.
7. If more than four hazardous wastes from the same generator / consignor are to be shipped to the same intended receiver / consignee in the same shipment, additional movement documents / manifests are to be completed. The first movement document / manifest reference number must be indicated on the additional movement document / manifest form(s) by the person completing the additional form(s).
8. If more than one carrier is utilized additional movement documents / manifests may need to be completed. Check with appropriate jurisdictions to determine if additional movement documents / manifest are required.

All domestic shipments must comply with applicable provincial/territorial legislation and regulations.
International shipments must comply with the Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations.

Les parties doivent s'assurer que les renseignements contenus sur toutes les copies soient lisibles et imprimée de façon indélébile.
1. Le producteur ou l'expéditeur remplit la partie A et fait remplir la partie B par le transporteur.
2. Le producteur ou l'expéditeur détache la copie 1 et envoie la copie 1, ou une copie de celle-ci, à 1) l'autorité responsable de la province ou du territoire d'origine, 2) l'autorité responsable de la province ou du territoire de destination, et 3) Environnement Canada pour les envois internationaux.
3. Le producteur ou l'expéditeur conserve la copie 2.
4. Le transporteur conserve les quatre autres copies (Copies 3, 4, 5, 6) et les transporte avec l'envoi.
5. Sur livraison de l'envoi au réceptionnaire ou destinataire, le transporteur remet les quatre copies au représentant autorisé du réceptionnaire ou destinataire.
6. Le réceptionnaire ou le destinataire remplit la partie C et envoie la copie 3, ou une copie de celle-ci, à 1) l'autorité responsable de la province ou du territoire d'origine, 2) l'autorité responsable de la province ou du territoire de destination et 3) Environnement Canada pour les envois internationaux. Il distribue également les copies 4 et 6 au transporteur ainsi qu'au producteur ou à l'expéditeur, et conserve la copie 5.
7. Lorsque plus de quatre déchets dangereux du même producteur ou expéditeur sont envoyés au même réceptionnaire ou destinataire visé dans le même envoi, il y a lieu de remplir des documents de mouvement/manifestes supplémentaires. La personne qui remplit les formulaires supplémentaires doit indiquer le numéro de référence du premier document de mouvement /manifeste.
8. Lorsque plus d'un transporteur est utilisé, il est possible de devoir remplir des documents de mouvement /manifestes supplémentaires. Vérifiez auprès des juridictions appropriées si vous devez remplir des documents de mouvements/manifestes additionnels.

Tous les envois nationaux doivent respecter la législation et les règlements provinciaux et territoriaux applicables.
Les envois internationaux doivent se conformer au Règlement sur l'exportation et l'importation de déchets dangereux et de matières recyclables dangereuses.

INSTRUCTIONS FOR COMPLETING EACH PART ON THE MOVEMENT DOCUMENT or MANIFEST

Part A.
Box 1: **Identify** company name, registration no. / provincial ID no., mailing address, email address, telephone number and shipping site address.
Box 2: **Identify** intended receiver / consignee's company name, registration no. / provincial ID no., mailing address, email address, telephone number and receiving site address.
Box 3: **Identify** provincial code, if applicable.
Boxes 4, 5, 6 and 7: **List** in accordance with TDGR, the proper shipping name or description, the primary class and subsidiary class or classes, the UN number and the packing group code (I great danger; II medium danger; III minor danger) or the risk group.
Box 8: **Identify** the quantity shipped and units in kg or L.
Box 9: **Identify** the number and type of packaging (Int. Ext. Code) (**01** drum; **02** tank; **03** bulk; **04** carton; **05** bag; **06** roll off or lugger; **07** other).
Box 10: **Identify** the physical state. For **international shipments**, identify the LSPG Code.
Boxes 11 to 19: For **international codes**, please refer to EIHWHRMR User Guide (Section 9), http://www.ec.gc.ca/gdd-mw/default.asp?lang=En&n=5D5BE79E-1.
Box 21: **Identify** time and date shipped and the scheduled arrival date.
Box 22: **Identify** special handling and emergency instructions.
Box 20: The generator / consignor's authorized representative shall print his/her name and telephone number, and sign the form certifying that the information given is correct and complete.

Part B.
Box 23: **Identify** company name, registration no. / provincial ID no., mailing address, email address and the telephone number.
Box 24: **Identify** vehicle trailer license number and province or territory of registration.
Box 25: **Identify** port of entry into or exit out of Canada.
Box 26: The carrier's authorized representative shall print his/her name and telephone number and sign the form certifying that the hazardous wastes or hazardous recyclable materials have been received from the generator/consignor for delivery to the intended receiver / consignee and the information given in Part B is complete and correct.

Part C.
Box 28: **Identify** company name, registration no. / provincial ID no., business address, email address, telephone number and receiving site address.
Box 29: **Identify** date and time shipment received.
Box 30: If transferred to another receiver / consignee, **identify** company name and provincial ID no.
Box 31: **Identify** the quantity received and the units in kg or L.
Box 32: **Identify** any shipment discrepancy problems.
Boxes 33 and 36: **Identify** the final handling method (**01** storage, **02** thermal treatment, **03** chemical treatment, **04** physical treatment, **05** biological treatment, **06** secure landfill, **07** recycling, **08** solidification, **09** other [specify])
Box 34: **Indicate** whether or not the shipment was accepted or refused.
Box 35: **Identify** whether decontamination of packaging or the vehicle has been carried out by checking the appropriate box.
Box 37: The receiver / consignee's authorized representative shall print his/her name and telephone number and sign the form certifying that the information given in Part C is correct and complete.

DIRECTIVES POUR REMPLIR CHAQUE PARTIE DU DOCUMENT DE MOUVEMENT ou DU MANIFESTE

Partie A.
Encadré 1: **Indiquez** le nom de la compagnie, le no d'immatriculation/d'id provincial, l'adresse postale, le courrier électronique, le numéro de téléphone et l'adresse du lieu de l'expédition.
Encadré 2 : **Indiquez** le nom de compagnie du réceptionnaire ou destinataire visé, le no d'immatriculation/d'id provincial, l'adresse postale, le courrier électronique, le numéro de téléphone et le lieu de destination.
Encadré 3 : **Indiquez** le code provincial, s'il y a lieu.
Encadrés 4, 5, 6 et 7: Indiquez, conformément au RTMD, le nom et la description exacts de l'envoi, la classe primaire et la classe ou les classes subsidiaires, le numéro de l'UN et le code du groupe d'emballage (I un niveau de danger élevé; II un niveau de danger moyen; III un niveau de danger faible) ou du groupe de risques.
Encadré 8 : **Indiquez** la quantité envoyée et les unités en kg ou en L.
Encadré 9 : **Indiquez** le numéro et le type d'emballage (Code int.-ext.) (**01** baril; **02** citerne; **03** vrac; **04** caisse de carton; **05** sac; **06** conteneur sur châssis ou godet; **07** autre).
Encadré 10 : **Indiquez** l'état physique. Pour les **envois internationaux**, indiquez le Code LSPG.
Encadré 11 à 19 : Pour les **codes internationaux**, veuillez vous reporter au Guide de l'utilisateur REIDDMRD (Section 9), http://www.ec.gc.ca/gdd-mw/default.asp?lang=Fr&n=5D5BE79E-1.
Encadré 21 : **Indiquez** l'heure et la date de l'envoi et la date prévue d'arrivée.
Encadré 22 : **Indiquez** s'il y a manutention spéciale et les directives en cas d'urgence.
Encadré 20 : Le représentant autorisé doit écrire son nom en lettres moulées et son numéro de téléphone et signer le formulaire attestant que les renseignements fournis sont exacts et complets.

Partie B.
Encadré 23 : **Indiquez** le nom de la compagnie, le no d'immatriculation/d'id provincial, l'adresse postale, le courrier électronique et le numéro de téléphone.
Encadré 24 : **Indiquez** le numéro d'immatriculation de la remorque du véhicule et de la province ou du territoire d'enregistrement.
Encadré 25 : **Indiquez** le point d'entrée au Canada et de sortie du Canada.
Encadré 26 : Le représentant autorisé du transporteur doit écrire son nom en lettres moulées et son numéro de téléphone et signer le formulaire attestant d'avoir reçu les déchets dangereux ou les matières recyclables dangereuses du producteur ou expéditeur en vue de leur livraison au réceptionnaire ou au destinataire et que les renseignements contenus dans la Partie B sont exacts et complets.

Partie C.
Encadré 28 : **Indiquez** le nom de la compagnie, le no d'immatriculation/d'id provincial, l'adresse commerciale, le courrier électronique, le numéro de téléphone et l'adresse du lieu de destination.
Encadré 29 : **Indiquez** la date et l'heure de réception de l'envoi.
Encadré 30 : Lorsque l'envoi est transféré à un autre réceptionnaire ou destinataire, **indiquez** le nom de la compagnie et le no d'immatriculation/d'id provincial.
Encadré 31 : **Indiquez** la quantité reçue et les unités en kg ou L.
Encadré 32 : **Indiquez** tout problème de divergence dans la livraison.
Encadrés 33 et 36 : **Indiquez** la méthode finale de manutention (**01** entreposage, **02** traitement thermique, **03** traitement chimique **04** traitement physique, **05** traitement biologique, **06** lieu d'enfouissement sécuritaire, **07** recyclage, **08** solidification, **09** autre [spécifiez])
Encadré 34 : **Indiquez** si l'envoi a effectivement été accepté ou refusé;
Encadré 35 : **Indiquez** si la décontamination de l'emballage ou du véhicule a été effectuée en cochant la case correspondante
Encadré 37 : Le représentant autorisé du réceptionnaire ou destinataire doit écrire son nom en lettres moulées et son numéro de téléphone, et signer le formulaire attestant que les renseignements donnés dans la partie C sont exacts et complets.

- ***Please note highlighted portion in "yellow"; indicates the Handling Code ("01" under Section C, Box 33) for TRP purposes is defined as "storage".***

Please see comments provided re: Manifest on Page 30

VEOLIA

CAR.#: A860427
REC.#: 5750-8XPJ26

CARRIER
VEOLIA ES CANADA INDUSTRIAL SERVICES INC
4140 BELGREEN DRIVE
OTTAWA, ON K1B 3N2
TEL: (613)739-1449

BILLING
AEVITAS INC
75 WAKLESS CRT
AYR, ON N0B 1E0
616780
DATE: 12/22/2017

AEVITAS INC
75 WAKLESS CRT
AYR, ON N0B 1E0
TEL: (519)740-1333

DAN POWER

TIME/START						
9 15	10 45		T			
10 45	11 15		LH			
11 15	12 45		T			
		TOTAL				

WORK /DESCRIPTION/OTHER INFORMATION
PICK UP ONE DRUM OF MERCURY ARTICLES.

MERCURY THERMOSTAT VESSELS 10E	Size/Type: 55IA2 /DM	Qty: 203.00	Unit Price:	426.75	85,965.25
STOP FEE ZONE 1	UOM: Tears:	Qty: 1.00	Unit Price:	$125.00	$125.00
ENERGY & SECURITY SURCHARGE	UOM: Tears:	Qty: 1.00	Unit Price:	$.10	$.10

DRIVER'S SIGNATURE/DATE DISC 2 /1

		Packaging No	type	Quantity	Kg	
1	UN3506, MERCURY CONTAINED IN MANUFACTURED ARTICLES (THERMOSTAT VESSELS), 8 (6.1)	1	DM	235	Kg	1ARC

Emergency 24 HR Number: 1877810 2007

VEOLIA ES CANADA INDUSTRIAL SERVICES INC
800 MCKAY ROAD
PICKERING, ON L1W 2Y4

2/ /7

NAME (PRINT NAME) Dec 28/17

SIGNATURE (THE CUSTOMER HEREBY RECOGNIZES HAVING CONDITIONS POSTED ON BACK)

SR29G8273000

*** Amount displayed on both manifest copies includes other materials, beyond what was collected for TRP as follows:**

- **1 drum of mercury vessels in the amount of 235 kg total weight.**

Appendix D – Third Party Assurance

June 28, 2018

Independent Reasonable Assurance Report

To: The Directors of the Heating, Refrigeration and Air Conditioning Institute of Canada on selected non-financial information included in the HRAI 2017 Annual Report

Scope
We have been engaged by the Heating, Refrigeration and Air Conditioning Institute of Canada ("HRAI") to perform a reasonable assurance engagement in respect of the following information (the "Selected Information") detailed in Appendix A, and also included within HRAI's Annual Report to the Director of Extended Producer Responsibility Programs ("Director") at the Ministry of the Environment, Government of British Columbia ("MOE") for the year ended December 31, 2017:

- the location of collection facilities, and any changes in the number and location of collection facilities from the prior year in accordance with Section 8(2)(b) of the British Columbia Regulation 449/2004 Recycling Regulation ("Recycling Regulation");
- the description of how recovered product was managed in accordance with the pollution prevention hierarchy in accordance with 8(2)(d) of the Recycling Regulation;
- the total amount of the producers' product collected for the year ended December 31, 2017 in accordance with 8(2)(e) of the Recycling Regulation; and
- the description of performance for the year in relation to targets in the approved stewardship plan under Section 8(2)(e), in accordance with Section 8(2)(g) of the Recycling Regulation.

Responsibilities

PricewaterhouseCoopers LLP
Our responsibility is to carry out an independent reasonable assurance engagement and to express an opinion on the Selected Information based on the procedures we have performed and the evidence we have obtained. We conducted our reasonable assurance engagement in accordance with the International Standard on Assurance Engagements 3000 Revised (ISAE 3000 Revised), *Assurance Engagements other than Audits or Reviews of Historical Financial Information,* published by the International Auditing and Assurance Standards Board (IAASB), and the *Guide to Third Party Assurance for Non-Financial Information in Annual Reports – 2017 Reporting Year,* dated October, 2017 ("Assurance Requirements"), published by the MOE.

HRAI
HRAI is responsible for the preparation and fair presentation of the Selected Information in accordance with the evaluation criteria as listed in Appendix A.

PricewaterhouseCoopers LLP
PwC Tower, 18 York Street, Suite 2600, Toronto, Ontario, Canada M5J 0B2
T: +1 416 863 1133, F: +1 416 365 8215, www.pwc.com/ca

"PwC" refers to PricewaterhouseCoopers LLP, an Ontario limited liability partnership.

Management is also responsible for such internal control as management determines is necessary to enable the preparation of the Selected Information such that it is free from material misstatement. Furthermore management is responsible for preparation of suitable evaluation criteria in accordance with the Assurance Requirements as specified by the Director under section 8(2)(h) of the Recycling Regulation.

HRAI is responsible for providing us with information about any frauds (including alleged and/or suspected instances of fraud) or illegal (or possibly illegal) acts communicated by employees, former employees, or contractors and all related known facts known by management that may relate to the Selected Information. HRAI is also responsible for demonstrating adherence to the Recycling Regulation as outlined within Section 1 of the Annual Report to the Director.

Our independence and quality control
We have complied with the relevant rules of professional conduct / code of ethics applicable to the practice of public accounting and related to assurance engagements, issued by various professional accounting bodies, which are founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour.

Our firm applies the International Standard on Quality Control 1, and accordingly maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Methodology and assurance procedures
We conducted our reasonable assurance engagement in accordance with ISAE 3000 Revised. This standard requires that we comply with independence requirements and plan and perform the engagement to obtain reasonable assurance about whether the Selected Information is free of material misstatement.

A reasonable assurance engagement includes examining, on a test basis, evidence supporting the amounts and disclosures within the Selected Information. The procedures selected depend on our judgment, including the assessment of the risks of material misstatement in the Selected Information due to omissions, misrepresentation and errors. In making those risk assessments, we consider internal control relevant to the entity's preparation and fair presentation of the Selected Information in order to design assurance procedures that are appropriate in the circumstances, but not for the purpose of expressing a conclusion on the effectiveness of the entity's internal control. A reasonable assurance engagement also includes assessing the evaluation criteria used and significant estimates made by management, as well as evaluating the overall presentation of the Selected Information.

The main elements of our work included:

- obtaining an understanding of the management systems, processes, and controls used to generate, aggregate and report the data;
- testing relevant controls, documents and records on a sample basis;
- testing and re-calculating quantitative information related to the Selected Information on a sample basis; and

- reviewing the consistency of the Selected Information with the related disclosures in the Annual Report to the Director.

We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our conclusion.

Inherent limitations
Non-financial performance information is subject to more inherent limitations than financial information, given the characteristics of the Selected Information and the methods used for determining and calculating such information. Qualitative interpretations of relevance, materiality and the accuracy of data are subject to individual assumptions and judgements. Furthermore, the nature and methods used to determine such information, as well the evaluation criteria and the precision thereof, may change over time. It is important to read our report in the context of the evaluation criteria.

Conclusion
In our opinion, the Selected Information for the year ended December 31, 2017 presents fairly, in all material respects, in accordance with the evaluation criteria listed in Appendix A:

- the location of collection facilities, and any changes in the number and location of collection facilities from the prior year in accordance with Section 8(2)(b) of the British Columbia Regulation 449/2004 Recycling Regulation ("Recycling Regulation");
- the description of how recovered product was managed in accordance with the pollution prevention hierarchy in accordance with Section 8(2)(d) of the Recycling Regulation;
- the total amount of the producers' product collected for the year ended December 31, 2017 in accordance with Section 8(2)(e) of the Recycling Regulation; and
- the description of performance for the year in relation to targets in the approved stewardship plan under Section 8(2)(e), in accordance with Section 8(2)(g) of the Recycling Regulation.

Emphasis of matter
Without qualifying our opinion, we draw your attention to Appendix B which describes why certain items required by the Assurance Requirements have been excluded. Our opinion is not qualified in respect of these matters.

Other matters
Our report has been prepared solely for the purposes of HRAI's compliance with the reporting requirements relating to Sections 8(2)(b), (d), (e) and (g) of the Recycling Regulation and is not intended to be and should not be used for any other purpose. Our duties in relation to this report are owed solely to HRAI, and accordingly, we do not accept any responsibility for loss occasioned to any other party acting or refraining from acting based on this report.

Our opinion does not constitute a legal determination on HRAI's compliance with the Recycling Regulation.

HRAI is responsible for their website and we do not accept responsibility for any changes that may have occurred to the reported subject matter information or criteria since they were initially presented on the website.

PricewaterhouseCoopers LLP

Chartered Professional Accountants, Licensed Public Accountants
June 28, 2018

Appendix A - Results and evaluation criteria

1. The location of collection facilities, and any changes in the number and location of collection facilities from the previous report as presented on page 4 and 13 of HRAI's 2017 Annual Report to the Director.

Result:

There is one main collection facility by December 31, 2017.

Reference: page 4 and 13 of HRAI's 2017 Annual Report to the Director.

Method of reporting:

- Reporting Period: January 1 to December 31.
- HRAI considers Aevitas Inc. to be the only Collection Facility, because "Collection Points" are more of a mechanism of recovery that increases access to the public similar to the function of a Canada Post or Courier outlet.
- The number of Collection Facilities is reported on the basis of the number of Collection Facilities who have a signed contract with HRAI to collect, process, ship, and report on collected program products during the reporting period. While Aevitas Inc. had a contract with HRAI for the reporting year, Tri-Arrow's contract terminated on December 31, 2015.
- The changes in number and location of Collection Facilities are calculated by tracking the additions and removals of Collection Facilities throughout a given reporting year. This information is further compared with the equivalent data from the end of the prior year.

Definitions:

- "Program Products" are all products included in the program as listed in the currently approved product stewardship plan dated February 3, 2010, Section 1.3.
- "Collection Facilities" are considered to be locations with a signed contract with HRAI for the purpose of collecting, processing, shipping, and reporting on Program Products at any point during the reporting year.
- "Collection Points" are mechanisms for collection. This term was new to the program as of the 2012 reporting year. In prior years, the collection points were considered the collection facilities. Collection Points may include the following types of businesses (also known as 'participants') and have either signed a formal document or a had a verbal discussion outlining their agreement with the Agency to take part in the program:
    - Contractors
    - Wholesalers
    - Local or regional government recycling centers or transfer stations
    - Direct send-back

2. The description of how recovered product was managed in accordance with the pollution prevention hierarchy in accordance with 8(2)(d) of the Recycling Regulation as presented on pages 4, 5, 16, 17 and 18 of HRAI's 2017 Annual Report to the Director.

In 2017, the breakdown of materials recovered and recycled from the province of British Columbia included:

- 2,737 mercury-containing vessels collected (there can be anywhere between 1 to 4 mercury vessels contained in each thermostat)
- 11.10 kg of mercury (calculated based on 2.5 grams of Hg per vessel)
- 4.44 kg of glass (calculated based on 1 gram of glass per vessel)
- 62.6 kg of metals
- 206.46 kg of plastics

The descriptions of how components (i.e. plastic, metals, glass vials containing mercury) are processed, is presented in a list on pages 17-18 of the 2017 Annual Report for Aevitas Inc.

The acceptable end fates for each of the components of a thermostat, is presented within the table on page 18 of the 2017 Annual Report.

Component	Reuse	Recycle	Energy Recovery	Landfill	Other
Plastics	X	Preferred	X	X	NA
Metals	X	Preferred	X	X	NA
Mercury Vessels (glass)	X	Preferred	X	X	NA
Mercury Vessels (mercury)	Optional	X	X	X	Retort process and then long-term storage

NOTE: *The selected information represent Aevitas' totals and do not include materials received by Tri-Arrow. As described in page 6 of the 2017 Annual Report, the collection figures provided by Tri-Arrow were not auditable because their contract ended with HRAI on December 31, 2015.*

Reference: pages 4, 5, 16, 17 and 18 of HRAI's 2017 Annual Report to the Director.

Processor due diligence:

- HRAI satisfies itself with the sufficiency of all downstream processors of Program Products, up to and including end of fate, based on an established due diligence process including qualification by primary processors and/or annual site visits).

- The due diligence process is administered or overseen by HRAI and considers the qualifications and capabilities of the processors, in line with the goals of the Program as set out in the approved product stewardship plan dated February 3, 2010, prior to selection and on a periodic basis subsequent to selection.
- If the due diligence process is administered by the processors (i.e., a primary processor assessing a secondary processor), the results of the due diligence are assessed by HRAI for sufficiency.
- The rigour of the due diligence process is tailored using a risk-based approach to assess the likelihood that, and impact of, the associated Program Products/materials will enter a waste stream.
- Processors are responsible for designing and maintaining their own system of internal control over the Program Product reporting process, as well as assessing the system of internal control of the downstream processors as part of the selection and ongoing due diligence process.

Processor reporting:

- The Primary Processors are responsible for maintaining the records for Program Products processed, for each separately identifiable commodity of Program Products, and reporting the results, including those from downstream processors, up to and including end of fate, on a consistent and timely basis to HRAI. Reporting includes both quantitative and qualitative end of fate data for Program Products. Since Tri-Arrow's contract with HRAI ended December 31, 2015, they were not obligated to participate in the audit process. Therefore, PwC was unable to verify their data.

Method of reporting:

- Reporting Period: January 1 to December 31.
- Program Products collected are reported by end of fate both by commodity and by process on the Pollution Prevention Hierarchy:
  - Reuse: N/A – No Program Products are reused per the approved product stewardship plan dated February 3, 2010.
  - Recycle: Products are reported by each separately identifiable end of fate commodity (e.g. plastics, metals, glass, etc.) either based on the number of units for the mercury vessels; or based on weight in Kgs for the plastics, metals, mercury and glass:
    - The weight in kg of glass is calculated by multiplying the total number of mercury vessels by the industry standard of 1 gram of glass per vessel
    - The weight in kg of mercury is calculated by multiplying the total number of mercury vessels by the industry standard of 2.5 grams of mercury per vessel
  - Recovery: N/A - No Program Products are recovered.

Waste: N/A – all Program Products collected are expected to be 100% recyclable. Non- program products that may be included in shipments are not recorded or reported by the program but efforts are made to dispose of them in accordance with the pollution prevention hierarchy

Definitions:

- The Pollution Prevention Hierarchy includes the following:

  "Reuse" includes all Program Products that are refurbished or can be reused "as-is" through either, resale, return to inventory, or given away as a donation.

  "Recycle" includes:

  - Any Program Product that cannot be reused.
  - Any Program Product where the sales agreement strictly prohibits the reuse of that product or requires its destruction.
  - Any Program Product that is harvested for parts.
  - Any commodities that are captured from the recycling process.

  "Energy Recovery" relates to processing activities after the recycling stage and includes any element of the Program Product that is harvested to generate energy.

  "Waste" includes any products not captured in the three streams above.
- "End of fate" is defined as final processed state of each commodity before entering a re-use stream or shipment to landfill / sequestration.

3. The total amount of the producer's product sold and collected and the recovery rate as presented on page 5 of HRAI's 2017 Annual Report to the Director.

Total amount of producer's product collected in 2017 is:

- 2,737 mercury containing thermostats
- 506 electronic thermostats
- 1,016 loose mercury vessels
- 3,463 adjusted total mercury containing thermostats

Adjusted total mercury containing thermostats are estimated as follows:

$$\textit{Intact mercury containing thermostats} + \textit{Loose mercury vessels} \div \textit{average mercury switches per vessel} = 2{,}737 + \frac{1{,}016}{1.4} = 3{,}463$$

NOTE: *The selected information represent Aevitas' totals and do not include materials received by Tri-Arrow. As described in page 6 of the Annual Report, the collection figures provided by Tri-Arrow were not auditable because their contract ended with HRAI on December 31, 2015.*

Reference: page 5 of HRAI's 2017 Annual Report to the Director.

Method of reporting:

- Reporting Period: January 1 to December 31.
- Quantification of Product Collected is based on the number of Thermostats and Hg vessels reported by the Collection Facilities as having been received/collected and diverted as a result of the approved product stewardship plan dated February 3, 2010 during the reporting year.
- These amounts are monitored on a monthly basis through information collected that includes the number of thermostats and Hg vessels collected by geographic location.
- Although all participating collection points are encouraged to return only intact thermostats, loose vessels (which have been clipped out of thermostats) are occasionally returned as well. The equivalent number of thermostats is calculated by dividing the number of loose vessels by the industry-accepted standard of 1.4 vessels per thermostat (determined through averages provided by the industry and confirmed during a pilot study conducted by the Agency in 2006).
    - The "Adjusted total number of thermostats" collected is calculated by summing the total number of thermostats collected and the equivalent number of thermostats calculated above.
- Additional information is also collected for internal tracking purposes such as:
    - Weight of plastics and metals collected;
    - Brand of the thermostat collected; and
    - Details of the mechanism used for collection (e.g. name and location of the Collection Point/Participant).

Definitions:

- "Program Products" are all products included in the program as listed in the currently approved product stewardship plan dated February 3, 2010 Section 1.3.
- "Product Collected" is the amount of all Program Products collected from sources known to be located within the province of BC that occurred through the Collection Facilities. The amount of Product Collected is reported as the total number of thermostats, adjusted total number of thermostats, total number of Mercury ("Hg") vessels, and number of loose Hg vessels received by the Collection Facilities during the reporting year.

4. The performance for the year in relation to targets in the approved stewardship plan under Section 8(2)(b), (d) and (e) in accordance with Section 8(2)(g) of the Recycling Regulation as presented on pages 6 and 20 of HRAI's 2017Annual Report to the Director.

Result:

The target is 3,555 mercury thermostats for 2017 and the result is 3,463 adjusted total mercury thermostats. This is 3% below the target.

NOTE: *The selected information represent Aevitas' totals and do not include materials received by Tri-Arrow. As described in page 6 of the Annual Report, the collection figures provided by Tri-Arrow were not auditable because their contract ended with HRAI on December 31, 2015.*

Method of reporting:

- Reporting period: January 1 to December 31.

Specific 2017 targets set out in the draft Stewardship Plan for Thermostats, Revised 5 Year plan: 2015-2020 – see below:

i. Section 8(2)(b) - target is set for collection points, not collection facilities and therefore, no assurance provided.
ii. Section 8(2)(d) - no target set for how the product is managed in accordance with the pollution prevention hierarchy because the Thermostat Recovery Program is already able to recycle greater than 99% of materials recovered through the program, efforts to continually reduce environmental impacts have centered on improving the program's collection processes.
iii. Section 8(2)(e) - no targets set for product sold (Product sold is not calculated or reported).
iv. Section 8(2)(e) - 90% capture rate of the estimated number of mercury-containing thermostats available for collection (3,950), which equals a target of 3,555 thermostats to be collected.

Appendix B - Exclusions

HRAI has not reported the recovery rate for the year in accordance with 8(2)(e) of the Recycling Regulations for the year ended December 31, 2017 as the approved stewardship plan does not outline the requirement to report recovery rates. If the stewardship program does not report a recovery rate in the approved plan, assurance for producers' product sold data is not required as outlined in the Assurance Requirements.

HRAI has not reported its performance for the year in relation to targets under 8(2)(b) and (d) in accordance with 8(2)(g) of the Recycling Regulation for the year ended December 31, 2017 as HRAI is not required to report this to the Director as there are no targets set in the amended stewardship plan for these sections applicable to the reporting year.