



Thermostat Recovery Program Annual Report to the Director 2018 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 2018 annual report documents the Thermostat Recovery Program's activities and results in British Columbia from January 1 to December 31, 2018.

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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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	<ul style="list-style-type: none"> • Outreach through HRAI, the Mechanical Contractors Association of Canada (MCAC) & Mechanical Service Contractors of Canada (MSCC) • Print ads and e-blasts 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	<ul style="list-style-type: none"> • 10 new collection points • 4 new drop-off locations • 388 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	<ul style="list-style-type: none"> • 5,995 mercury-containing vessels collected (there can be anywhere between 1 to 4 mercury vessels contained in each thermostat)** • 1,100 electronic thermostats recycled • 73.81 kilograms of metals recycled • 264.05 kilograms plastics collected, but not recycled due to a global plastics recycling issue (details outlined on Page 16 & Section 6). New options will be investigated to find possible solutions for recycling/disposal of the plastics. • 0 new mercury-containing thermostats sold into the market • See Page 7 & Section 5 for details

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Recycling Regulation Reference	Topic	Summary (5-bullet maximum)
Part 2, section 8(2)(d)	Pollution Prevention Hierarchy and Product / Component Management	<ul style="list-style-type: none"> • New thermostats do not contain mercury, and also help reduce energy consumption • Recovered thermostats are not suitable for re-use • Due to a global plastics recycling issue (details outlined on Page 16 & Section 6) occurring in 2018, 0% of TRP's plastic components were recycled. • Greater than 99% of the metal components were recycled, with a high degree of certainty • Mercury vessels are sent for retort to facility in U.S., but unlike previous years in 2018 all mercury collected was recycled and re-sold for reuse for i.e. CFL and fluorescent production due to market economic up-turn in U.S. • In 2018 approximately 25% of all components were recycled due to a global plastics recycling issue (details outlined on Page 16 & Section 6). New options will be investigated to find possible solutions for recycling/disposal of the plastics, but there is no better option in the pollution prevention hierarchy for recycling the other components; therefore, no targets are in place
Part 2, section 8(2)(e)	Product Sold and Collected and Recovery Rate*	<ul style="list-style-type: none"> • Collected 3,749 mercury containing thermostats, 1,100 electronic thermostats, and 1,060 loose mercury vessels • Adjusted total: 4,506 mercury containing thermostats and 1,100 electronic thermostats, for a total of 5,606 collected • 41.25% increase from 2017 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 mercury 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.

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Comparison of Key Performance Targets		
Part 2 section 8(2)(g); See full list of targets in Plan Performance		
Priority Stewardship Plan Targets*	Performance	Strategies for Improvement
<p>1. Mercury Thermostat Collection: 3,945 thermostats (as agreed with Ministry file lead)</p>	<p>4,506 mercury thermostats collected (adjusted total) (14% over target)</p>	<ul style="list-style-type: none"> 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.
<p>2. Electronic Thermostat Collection: 905 thermostats (as proposed in revised 2015 – 2020 5 Yr. Plan)</p>	<p>1,100 electronic thermostats collected (22% over target)</p>	<ul style="list-style-type: none"> Increase communication, awareness, and education for contractors and wholesalers to place whole electronic thermostats and/or minimum electronic thermostat housing including branding in TRP pails.
<p>3. Collection points/Participants: 420 (as agreed with Ministry file lead)</p>	<p>387 participants (92% of target)</p>	<ul style="list-style-type: none"> 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*

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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 2018, and will be posted on the program website at www.hrai.ca/trp.

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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 2018 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 2018, 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 2018 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	<ul style="list-style-type: none"> • 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, as well as HRAI’s 50th Anniversary Accomplishments Video 	Contractors/wholesalers	<ul style="list-style-type: none"> • Industry outreach (print)
Ongoing outreach with Canadian Institute for Plumbing	<ul style="list-style-type: none"> • CIPH provided TRP with a free booth at the CIPH Exhibition (CIPHEX) Roadshow in Calgary. This is 	CIPH	<ul style="list-style-type: none"> • Contractors/wholesalers

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<p>and Heating (CIPH) national office</p> <ul style="list-style-type: none"> • CIPHEX West Roadshow 	<p>an important industry event that attracts attendees from BC and nearby provinces.</p>		
<p>Partnership with Mechanical Contractors Association of Canada (MCAC) & Mechanical Service Contractors of Canada (MSCC)</p>	<ul style="list-style-type: none"> • MSCC has offered its full support to the TRP program and has promoted the program to its members • TRP promoted on the MCAC website. 	<p>Contractors</p>	<ul style="list-style-type: none"> • Industry outreach
<p>BC Stewards/Stewardship Agencies of BC (SABC)</p>	<ul style="list-style-type: none"> • Formalized association of all BC stewardship associations allows all stewards to present a united front, and to collaborate on communicating to various stakeholder groups • 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. 	<p>General Public</p>	<ul style="list-style-type: none"> • Print media • Online
<p>Regional District waste calendars/brochures:</p> <ul style="list-style-type: none"> • Invermere Regional District • District of Chilliwack • Penticton Regional District • Town of Oliver • District of Summerland 	<ul style="list-style-type: none"> • Program ad and link to drop off locations in calendar 	<p>General Public</p>	<ul style="list-style-type: none"> • Print media

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<ul style="list-style-type: none"> Peace River Regional District 			
Recycling Council of British Columbia (RCBC)	<ul style="list-style-type: none"> 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) <ul style="list-style-type: none"> 73 hotline inquiries 434 website searches 219 Recyclepedia searches 	General Public; BC waste management industry	<ul style="list-style-type: none"> Online Phone
Sustainable Building & Design Magazine	<ul style="list-style-type: none"> Key TRP program info, logo and URL posted on magazine's website. 	Contractors/General Public	<ul style="list-style-type: none"> Online
HPAC/Canadian Contractor ads & e-blasts	<ul style="list-style-type: none"> Print ads appeared in all 7 issues of HPAC magazine (with a readership of approximately 20,000) E-blasts to BC, MB, and ON subscribers of HPAC in Sept. had a reach of approx. 8,240 viewers 	Contractors/wholesalers	<ul style="list-style-type: none"> Business-to-business print media
Google TRP Ads	<ul style="list-style-type: none"> TRP ads appear every time an individual enters the word "thermostat(s)" into their phone or computer Google search engine. 	General Public	<ul style="list-style-type: none"> 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

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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 2018. For example; 200 TRP public-facing brochures were sent to the Environmental Services Office of the Regional District of Central Kootenay to use for educating the general public in July of 2018, and 200 TRP public-facing brochures were sent to the Solid Waste Management office in the Regional District of Okanagan-Similkameen to use for educating the general public in June, 2018. 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, 2018, the newsletter had 771 subscribers nationally, approximately 27% 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 e-blasts:** 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 September 2018. Ads were also developed for the District of Chilliwack, Invermere Regional District, Penticton Regional District, Peace River Regional District, District of Summerland, and Town of Oliver recycling calendars.

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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 2018.

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. (previously the primary facility, and as of 2018 the sole facility) receives the collection containers from various collection points and process the thermostats (count, dismantle).
 - The use of Tri-Arrow Industrial Recovery (previously the secondary facility) was completely phased out in 2018. (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, from 2016 to 2019, 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

IMPORTANT CHANGE: During 2018 the TRP thermostat plastics collected were neither sent to West Coast Plastics or Durham Shred facilities for processing, etc. as outlined in the flow chart below. (See *“Pollution Prevention Hierarchy and Product / Component Management” section on pages 17 & 18* for full explanation)

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

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Notes:

-mercury 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.

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). 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. However, throughout 2018 TRP was finally able to overcome the issue and use Aevitas as the sole collection facility for the program; therefore, zero thermostat shipments were collected from Tri-Arrow.

Aevitas receives collection containers full of thermostats directly from all collection points in BC, and begin processing the thermostats. Aevitas acted as the sole consolidation point for the thermostat vessels from BC in 2018, as well they operate the only approved mercury retort in Canada (Aevitas' website: <http://aevitasweb.wixsite.com/aevitas1/mercury-recovery>).

The shipper of each pail is recorded in a monthly tracking sheet by Aevitas, 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.

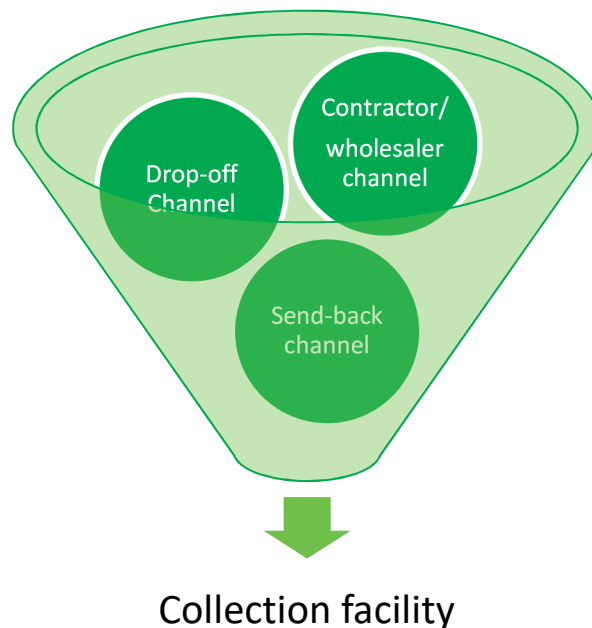
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Collection Points

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 Aevitas the collection facility. All Purolator waybills are addressed to Aevitas, and the thermostats are processed at Aevitas. This process is illustrated below.



According to the stewardship plan, the goal was to have 420*registered collection points in 2018. Through outreach initiatives described above, 10 new businesses registered as collection points for end-of-life thermostats in 2018, 4 of which elected to act as drop-off locations and 3 of which registered as a send back participants (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.

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Company Name	Type	Drop Off	City
Campbell Mountain Landfill	Municipal	Yes	Penticton
Reliance - Maple Ridge	Contractor	No	Maple Ridge
Township of Langley	Municipal	No	Langley
Gibsons Recycling Depot	Recycling Center	Yes	Gibsons
Shelley Goldfarb	Send-Back	No	Surrey
Alpine Disposal & Recycling Interior Division	Recycling Center	Yes	Grand Forks
Pacific Fireplaces	Contractor	No	Saanichton
Casa Del Sol	Send Back	No	Delta
Salvation Army	Recycling Center	Yes	Langley
Woodlands Inn & Suites	Send Back	No	Fort Nelson

**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 2018 there were no changes to any existing collection points.

Combining the new participants with existing collection points as of December 31, 2018 there were 387 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	39
Cariboo Regional District	5
Columbia–Shuswap Regional District	19
Comox Valley Regional District	11
Cowichan Valley Regional District	8
Fraser Valley Regional District	35
Metro Vancouver (Greater Vancouver Regional District)	133
Northern Rockies Regional District	2
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	6
Regional District of Mount Waddington	2
Regional District of Nanaimo	12

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Regional District of North Okanagan	9
Regional District of Okanagan–Similkameen	7
Skeena – Queen Charlotte Regional District	3
Squamish–Lillooet Regional District	5
Strathcona Regional District	5
Sunshine Coast Regional District	7
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 2018, 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

Historically, through the Thermostat Recovery Program all components of the recovered thermostats were sent for recycling, including the plastics, metals, glass, mercury and any electronics associated with the thermostat. However, as of 2018 a global issue arose that resulted in TRP’s plastics (accounting for approximately 74% of the program’s thermostat materials collected during the year) not being sent via down processors to be further processed and sold as commodity. (See [“Pollution Prevention Hierarchy and Product / Component Management” section on pages 17 & 18](#) for full explanation). Also, taking into account that occasional commingling of the materials may occur, we estimate in 2018 approximately 25% of TRP’s materials were recycled. The breakdown of materials recovered, recycled, and not recycled from the province of British Columbia during 2018 included:

- 5,995 mercury-containing vessels (there can be anywhere between 1 to 4 mercury vessels contained in each thermostat)
- 1,100 electronic thermostats
- 14.99 Kg of mercury (calculated based on 2.5 grams of Hg per vessel)
- 6.00 Kg of glass (calculated based on 1 gram of glass per vessel)
- 73.81 kilograms of metals
- 264.05 kilograms of plastics (not recycled)

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

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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.

Due to the global issue that arose in 2018 resulting in thermostat plastics not being collected (See [“Pollution Prevention Hierarchy and Product / Component Management”](#) section on pages 17 & 18 for full explanation), the Thermostat Recovery Program will focus on investigating new ways to ensure our program’s plastics will not continue to be sent to landfill, so that we can increase our thermostat materials recyclability percentage up to our historical level of greater than 99%. The other materials collected via the program such as the metals and glass are recovered with a high level of certainty, and efforts to continually reduce environmental impacts will continue to focus on improving the program’s collection processes. Another 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, and dismantled. The components from the thermostats are then separated for recycling. However, due to global recycling issues that began in 2018 (as explained in the first bullet below) at this time one of TRP’s components is not currently being recycled as outlined in the plan:

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- The plastic components recovered are of mixed types; these are consolidated at the collection facility with other plastics from the facility. Up until the end of December 2017, these plastics were being sent to a downstream recycler by our primary collection facility Aevitas (either to Durham Shred and Recycle or West Coast Plastics). Once at the recyclers the plastics were then baled and sold as a commodity. However, unfortunately as of 2018 the plastics recycling industry has gone through many changes ever since China implemented a ban on the importation of global waste plastics. Because of this ban, recyclers have become very limited in the types of plastics they are willing to receive. The plastics generated from the TRP thermostats, which used to be referred to in the industry as e-waste plastics, are no longer economically viable. Therefore, Aevitas has confirmed no substantial amount of the plastics generated by the TRP thermostats during 2018 were sent for recycling, which marks this occurrence as the first time in the program's history. They have also communicated that due to this issue they have not been successful in finding any recyclers that will accept TRP's plastics. This means, Aevitas along with other waste processing facilities who also collect these plastics have had no other option but to dispose of them into landfills until such time as they find other solutions. This issue will now be the same for all producer responsibility programs with products containing these types of plastics that were previously purchased by plastic recyclers, and then purchased and shipped to China for recycling.

Aevitas along with many other processing facilities will continue to search for other suitable and viable options to take back these waste plastics they collect, including TRP's plastics. TRP will also commit to continuing to investigate possible options for recycling TRP plastics; focusing on all developments with the current plastics market, along with any government negotiations or developments directly affecting the current China plastics ban. TRP will also work with other stewardship responsibility programs who are facing this issue to come up with possible joint options and solutions.

- 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. In 2018, Aevitas sent them to Triple M Metals (a.k.a. M Metals). Triple M Metals confirmed that as of 2018 they are no longer baling (compressing/compacting) the metal into bales. Instead, the metals are simply shredded and then sold as a commodity.
- The glass vials containing the mercury are consolidated at the collection facility Aevitas 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 2018 they were sent to Bethlehem Apparatus.

During the retort process at Bethlehem Apparatus, the glass vials were crushed, glass and mercury were separated, and the mercury was triple distilled. Unlike previous years, where some volumes of the mercury collected were being sent for long-term storage, all of the mercury collected was sent for recycling to be reused in products due a market economic up-turn. The glass was crushed, distilled and sent for recycling in fibreglass applications. The latest

Thermostat Recovery Program 2018 Report to Director, Waste Management

shipment details representing the mercury-containing vessels collected and sent to Bethlehem Apparatus on May 30, 2019, can be found on the copy of the manifest under [Appendix C](#).

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	See comments below
Metals	X	Preferred	X	X	NA
Mercury Vessels (glass)	X	Preferred	X	X	NA
Mercury Vessels (mercury)	Optional	X	X	X	See comments below

For 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 program's plastics collected in 2018 were not recycled; however, as outlined on [pages 17 & 18](#) solutions to rectify this issue are currently being worked on. The percentage of mercury that is normally 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, in recent years large percentages were being put into long-term storage, though specific percentages were not available). However, in 2018 all mercury collected and sent for retort in the US was recycled and sold for re-use due to a market economic up-turn.

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

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Basis of evidence for product treatment	<ul style="list-style-type: none"> • 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 					
	<ul style="list-style-type: none"> • Annual site visit to review processes 					<ul style="list-style-type: none"> • 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	As of 2018 0%	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.

9. Plan Performance

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

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Plan Target	2018 Results	Strategies for Improvement in 2019
<i>Performance Targets*</i>		
1. Mercury Thermostat Collection: 3,945	Adjusted total: 4,506 thermostats collected (14% over target)	<ul style="list-style-type: none"> • 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. Electronic Thermostat Collection: 905 thermostats (as proposed in revised 2015 – 2020 5 Yr. Plan)	1,100 electronic thermostats collected (22% over target)	<ul style="list-style-type: none"> • Increase communication, awareness, and education for contractors and wholesalers to place whole electronic thermostats and/or minimum electronic thermostat housing including branding in TRP pails.
3. Participants: 420	387 participants (92% of target)	<ul style="list-style-type: none"> • 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)
<i>Communication Targets</i>		
4. Program website: monthly updates	<ul style="list-style-type: none"> • 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 1,085 visits to www.hrai.ca/trp from BC in 2018 	

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Plan Target	2018 Results	Strategies for Improvement in 2019
<p>5. Printed brochures: a minimum of 500 brochures will be printed and distributed on an annual basis</p>	<p>Approximately 2,408 brochures distributed.</p> <p>25 brochures are distributed to each new participant (250); brochures have been sent to participants upon request (1,458); approx. 300 distributed various BC Municipal depot locations (i.e. Township of Langley and District of Squamish) for consumer distribution and public outreach events; and 400 distributed to specific Regional District offices for consumer distribution.</p>	<ul style="list-style-type: none"> • 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)
<p>6. Printed posters will be distributed to all new drop-off locations to be displayed on site.</p>	<p>40 posters distributed to new (10) and existing (30) drop-off locations and as requested by participants</p>	<ul style="list-style-type: none"> • Regularly follow-up throughout the year to ensure participants always have posters to promote themselves as TRP drop-off locations.
<p>7. Industry facing advertising - a minimum of 5 ads per year will target industry</p>	<p>Print ads appeared in all 7 issues of HPAC magazine</p>	<ul style="list-style-type: none"> • HPAC magazine is an industry publication with a readership of approximately 20,000.
	<p>In addition to the targeted communications described above, as outlined in Section 3 the TRP engaged in public facing advertising in 6 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.</p> <p>A total of 5,000 handbooks were distributed to various stakeholders, including regional districts, community centers and libraries, school districts, and other relevant groups.</p> <p>A digital version is available at www.bcstewards.com.</p>	

**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.*

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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, 2018, measured against the targets outlined in the official stewardship plan, as well as the program growth as compared to the same period in 2017 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, 2018)*	Results Achieved from January 1 to December 31, 2018	Results Achieved from January 1 to December 31, 2017	Percentage difference in 2018
Number of Mercury Thermostats Collected	3,945 mercury thermostats	3,749 intact mercury thermostats; 1,060 loose vessels (1,060/1.4 = 757 equivalent mercury thermostats); Adjusted Total: 4,506	2,737 intact mercury thermostats; 1,016 loose vessels (467/1.4 = 726 equivalent mercury thermostats); Adjusted Total: 3,463	14% increase over target 30% increase over 2017's results
Number of Electronic Thermostats Collected	905 electronic thermostats	1,100 electronic thermostats	N/A	22% over target set in revised 2015 – 2020 5 Yr. Plan

**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 mercury 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 2017. Therefore, TRP will continue to ramp up communication outreach to participants in 2019. Using the industry-accepted standard of 1.4 vessels per mercury thermostat, the number of loose vessels returned in 2018 is equivalent to 757 mercury thermostats. The adjusted total number of mercury thermostats collected in 2018 is then 4,506.*

Amount Collected by Regional District

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

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Region	Number of Mercury Thermostats Collected	Number of Electronic Thermostats Collected	Number of Loose Vessels Collected
Alberni - Clayoquot Regional District	48	18	138
Capital Regional District	269	188	5
Columbia Shuswap Regional District	73	9	1
Cowichan Regional District	22	16	187
Fraser Valley Regional District	157	36	0
Greater Vancouver Regional District	2,464	708	638
Peace River Regional District	15	5	0
Powell River Regional District	28	16	0
Regional District of Buckley Nachako	42	0	72
Regional District of Central Okanagan	404	81	18
Regional District of Kitimat-Stikine	26	12	1
Regional District of Nanaimo	88	5	0
Regional District of North Okanagan	68	6	0
Thompson Nicola Regional District	45	0	0
TOTAL	3,749	1,100	1,060

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Appendices / Additional Information and Third Party Assurance

Appendix A – Earned Media

RCBC Recyclepedia

The screenshot shows a web browser window displaying the RCBC Recyclepedia website. The browser's address bar shows the URL: https://www.rcbc.ca/recyclepedia/results?material_box=Thermostats&material_detail=Mercury-containing+Thermostats&city_serviced_box=Vancouver&searched_again=false&op=Submit&form_build_id=form-Rb5RyNDWibDq7Zmur5E9UPinZcnKa22L...

The website header features the RCBC logo (Recycling Council of British Columbia) and a search bar. Below the header is a large image of a person and a child looking at driftwood on a beach at sunset.

The main content area is titled "Recyclepedia - Results" and contains the following text:

Electromechanical (mercury-containing) and electronic thermostats are collected through the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI)'s province-wide Thermostat Recovery Program (TRP). They are accepted free-of-charge at TRP depots provided that they are fully intact.

For areas without a permanent drop-off depot, a free mail-in option exists. For additional information on the program and to locate the nearest drop-off depot, please visit www.hrai.ca/trp or call the RCBC Recycling Hotline.

3 results found

Showing results for: Mercury-containing Thermostats in Vancouver

HRAI's Thermostat Recovery Program (TRP)
See what other materials this depot also accepts

Phone: (800) 267-2231
Address: Province-wide
Website: <http://www.hrai.ca/program-participants>
Hours: Varies by location. See website.

The right sidebar contains a "What We Do" section with links to Recycling Hotline, Recyclepedia, Recyclepedia Smart Phone App, and Road to Zero Waste School Program. Below this is a "Call the Recycling Hotline" section with contact information for Lower Mainland (604-RECYCLE / 604-732-9253) and British Columbia Toll Free (1-800-667-4321 / Email: hotline@rcbc.ca). At the bottom of the sidebar is a "BC Recyclepedia Mobile App" section with a download button.

INDUSTRY NEWS

SEE THE LATEST NEWS @ HPACMAG.COM

MCAC PROGRAM LOOKS TO BRING TOGETHER CANADA'S YOUNG MECHANICAL PROFESSIONALS

The Mechanical Contractors Association of Canada has launched a program for young professionals in the mechanical construction industry.

The YEPI program, unveiled at a mid-year board meeting, aims to connect young professionals from across Canada by providing industry exposure to and increasing awareness of the provincial, zone and national mechanical contractor associations.

YEPI will also create networking opportunities and support career development.

For more information, contact Ariel Shortt at ashortt@mcac.ca or 613-232-0492. www.mcac.ca



Polypropylene pressure piping in commercial plumbing application.

PLASTICS PIPE INSTITUTE LAUNCHES GEOTHERMAL AND POLYPROPYLENE PIPE COMMITTEES

The Plastics Pipe Institute, Inc. (PPI) has created two new groups within its Building and Construction Division (BCD): the Geothermal Steering Committee and Polypropylene Pressure Pipe Steering Committee.

Geothermal ground source activities

will be the focus of the BCD. BCD's first publication related to polypropylene pressure pipe, PPI TN-57 Proper Integration of Copper Tubing and Components with PP-R Piping Materials for Plumbing Applications, was published June 2018. www.plasticpipe.org

TRIMBLE ROUNDS OUT CONSTRUCTION OFFERING

Trimble has completed its acquisition of Portland, OR-based Viewpoint. With this purchase, Trimble will offer a central workflow platform for construction management. Viewpoint will focus on general, specialty and heavy civil contractors, and link project data into the owner-facing e-Builder suite.

www.trimble.com

Continued on p16

LOW INTENSITY INFRARED TUBE HEATERS

HL3 SERIES
Premier, Two-stage Low-Intensity Tube Heater

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- Documented fuel savings.
- Enhanced comfort.

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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:

Copy of Peace River Regional District Calendar 2018 Ad

Reuse

Reuse is the creative R.

Reuse can mean using the item again in the same way, or for a more creative purpose!


No matter how you choose to reuse, follow these tips.

- Think about reuse when purchasing anything.
- Skip the glitter. Adding sparkles to your reuse creation means it can no longer be recycled.
- Keep a set of cutlery with you for use in the food court or take out.
- See how long you can go without using a disposable cup or bottle. This can save more than 730 items a person each year.





EASY. SAFE. FREE.
THERMOSTAT RECYCLING

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



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November 2018

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				1	2	3
4	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	

Municipal Leader Magazine Spring 2018 Ad

FROM THE POLICY DEPARTMENT



MAJORITY OF MANITOBANS say new revenues should go to municipalities

Lynne Bereza, Communications Coordinator

The AMM recently commissioned a Probe Research poll asking 1,000 Manitobans how much, if any, of any new revenues from marijuana and carbon taxes should be earmarked for municipalities. The numbers indicated strong support for sharing of revenue from both sources with municipalities.

- **Cannabis:** 59% indicated that municipalities should get between one-half and all of the revenue from the sale of marijuana. Only 24% of Manitobans felt municipalities should get less than one-half of the revenue, and 16% were unsure.

- **Carbon tax:** 67% indicated that municipalities should get between one-half and all of carbon tax revenues. Only 21% of Manitobans felt municipalities should get less than one-half of the revenue, while 11% were unsure.

According to President Chris Goertzen, the AMM expects significant increases to policing and other costs to emerge from the legalization of cannabis. "We know there is some debate over where this new money should be spent," he explains, "and we wanted to gauge how much Manitobans feel should go toward these increased costs for municipalities."

As for carbon tax, the AMM believes revenues should go towards climate-related infrastructure, such as flood readiness and public transit. "Municipalities are front line stewards of the environment that have invested considerably in flood mitigation infrastructure," Goertzen said.

To share these findings, the AMM held two media events in Winnipeg. The first,

to present the cannabis results, was held on January 11, and the second, on carbon tax, was held on February 20.

Goertzen was joined by Federation of Canadian Municipalities (FCM) President Jenny Gerbasi for the January 11 event to discuss cannabis revenue sharing. Late last year, the FCM advocated that one-third of cannabis excise tax revenues flow to municipalities. In response, the federal government agreed to release half of its share to the provinces specifically to support municipal costs.

Goertzen is encouraged by the results of the AMM's poll. "These numbers show that Manitobans are concerned about both the increased costs of cannabis legalization and responding to climate change, and their local government's ability to pay for these things," he says.

"This is just another example of how municipalities deserve a 'fair share' of revenues, and our citizens support this."



EASY. SAFE. FREE.
THERMOSTAT RECYCLING

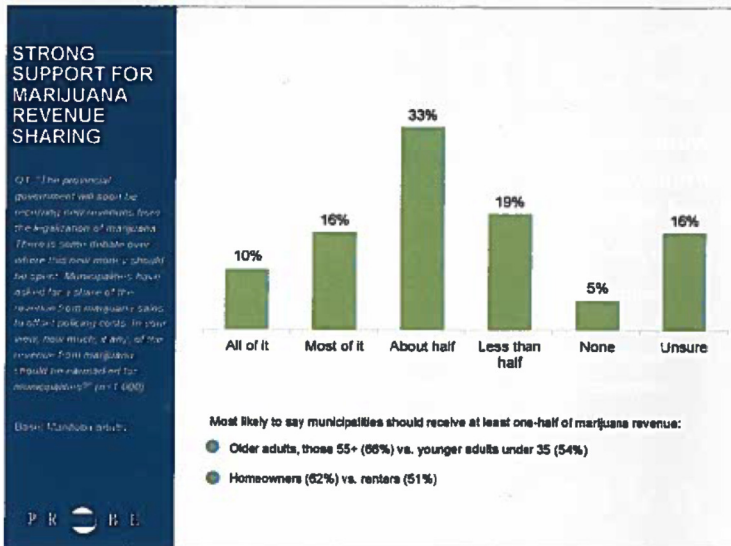
We recycle all elements of the thermostat; plastic, metal, electronics and mercury (which is particularly hazardous).



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

FOR MORE INFORMATION
www.hrai.ca/trp
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Thermostat Recovery Program 2018 Report to Director, Waste Management

Appendix C – Retort Manifest and Shipment Related Copies

Front View

MOVEMENT DOCUMENT / MANIFEST DOCUMENT DE MOUVEMENT / MANIFESTE		Equivalency Certificate No. SU7498 (Ren. 9) In case of EMERGENCY call 24-HOUR NUMBER 1-866-856-5386		CJ34307-3	
A Generator / consigneur Registration No. / Provincial ID No. / N° d'immatriculation - d'id. provincial ON2002102 Company name / Nom de l'entreprise Avisilas Inc (Ayr)		B Carrier Registration No. / Provincial ID No. / N° d'immatriculation - d'id. provincial NYDEC-9A-332 Company name / Nom de l'entreprise FRANK'S VACUUM TRUCK SERVICE INC. 1717 NEW RD, NISAGARA FALLS, NY 14304 Tel. No. / N° de tél. 716-284-2134		C Receiver / consignee Registration No. / Provincial ID No. / N° d'immatriculation - d'id. provincial M106863 (cont)	
Mailing address / Adresse postale 75 Wireless Court City / Ville Ayr Province ON Postal code / Code postal N0B 1E0		Mailing address / Adresse postale 1717 NEW RD, NISAGARA FALLS, NY 14304 City / Ville NISAGARA FALLS Province NY Postal code / Code postal 14304		Receiver / consignee information same as in Part A Les renseignements du réceptionnaire / destinataire sont les mêmes qu'à la Partie A <input type="checkbox"/> Yes / Oui <input type="checkbox"/> No, complete the box below / Non, remplir la case ci-dessous	
Shipping site address / Adresse du lieu deexpédition 75 Wireless Court City / Ville Ayr Province ON Postal code / Code postal N0B 1E0		Vehicle / Véhicule Trailer - Rail car No. 1 2290173 Trailer - Rail car No. 2 MF		Company name / Nom de l'entreprise Mailing address / Adresse postale City / Ville Province Postal code / Code postal Email / Courrier électronique Tel. No. / N° de tél. Receiving site address / Adresse du lieu de destination Date received / Date de réception Year / Année Month / Mois Day / Jour Time / Heure <input type="checkbox"/> A.M. <input type="checkbox"/> P.M.	
Intended Receiver / consignee Registration No. / Provincial ID No. / N° d'immatriculation - d'id. provincial 9700022-88001 Company name / Nom de l'entreprise SULLY'S APPLIANCE COMPANY Mailing address / Adresse postale 810 FRONT STREET City / Ville HELLERTOWN Province PA Postal code / Code postal 16866		Carrier Certification I certify that I have received waste or recyclable material from the generator / consigneur for delivery to the receiver / consignee as set out in Part A and that the information contained in Part B is complete and correct. 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) MARTIN T. NOONE Tel. No. / N° de tél. 716-284-2134 Year / Année Month / Mois Day / Jour 19 05 30 Signature:		If waste or recyclable material to be transferred, specify intended company name / Si les déchets ou matières recyclables doivent être transférés, préciser le nom du destinataire Registration No. / Provincial ID No. / N° d'immatriculation / d'id provincial	
Provinces / Codes prov. 3 Shipping name Appellation réglementaire 4 Class / Classes Sub-classes / Sub-classes 5 UN No. / N° NU Packing / risk gr / G. d'emballage / de risque 6 Quantity shipped / Quantité expédiée 7 Units L / or / ou Kg / Unités 8 Packaging / Conteneur Codes 9 Phys. state / Etat (phys.) 10 Quantity received / Quantité reçue 11 Units L / or / ou kg / Unités 12 Comments / Commentaires 13 Handling Code / Code de manutention 14 Shipment / Envoi Accepted / Refused / Pack. Cont. / Veh. / Véh. 15 Decort. / Véh. / Véh.		National code in country of / Code du pays 16 Export / Import 17 Customs code(s) / Code(s) de douanes 18 If handling code "Other" (specify) / Si code de manutention "autre" (spécifier) 19 Receiver / consignee certification / Attestation du réceptionnaire / destinataire Name of authorized person (print) / Nom de l'agent autorisé (parapente d'imprimerie) Signature Tel. No. / N° de tél. 20 Special handling / Manutention spéciale Attached / Copied / As follows / Ci-contre 21 Date shipped / Date d'expédition Year / Année Month / Mois Day / Jour Time / Heure Scheduled arrival date / Date d'arrivée prévue Year / Année Month / Mois Day / Jour			
Notice No. / N° de notification Notice Line No. / N° de ligne de la notification Shipment / Envoi Or / De D or R Code / Code D ou R C Code C Basel Annex VIII or OECD Code / Annexe VIII de Bâle ou Code OCDE H Code H Y Code Y National code in country of / Code du pays Export / Import Customs code(s) / Code(s) de douanes		Name of authorized person (print) / Nom de l'agent autorisé (parapente d'imprimerie) Signature Tel. No. / N° de tél. 519-740-1333		Date shipped / Date d'expédition Year / Année Month / Mois Day / Jour Time / Heure Scheduled arrival date / Date d'arrivée prévue Year / Année Month / Mois Day / Jour	
(i) 148B Waste Mercury 8(6.1) 2809 III 1135 kg 1 07 L (ii) 148B Waste Mercury 8(6.1) 2809 III 808 kg 2 01 L (iii) 146T Mercury Contained in Mercury and/or 8(6.1) 3506 III 1844 kg 8 01 S (iv) 146T Environmentally Hazardous Substance 9 3077 III 2107 kg 12 01 S		(i) 705044 2 1 6 R4 C16 A1030 H8+H11 Y29 U151 N/A 2805,40,00,00 (ii) 705044 2 1 6 R4 C16 A1030 H8+H11 Y29 U151 N/A 2805,40,00,00 (iii) 705044 2 1 6 R4 C16 A1030 H8+H11 Y29 U151 N/A 2805,40,00,00 (iv) 705044 4 1 6 RL C16 A1030 H13 H8+H11 Y29 U151 N/A 2805,40,00,00		Signature Tel. No. / N° de tél. 07-107	
Generator / consigneur certification: I certify that the information contained in Part A is correct and complete. I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. Attestation du producteur / expéditeur: J'atteste que tous les renseignements à la partie A sont exacts et complets. Je déclare que le contenu de ce chargement est décrit ci-dessus de façon complète et exacte par la désignation officielle de transport et qu'il est convenablement classé, emballé, marqué, étiqueté, muni de plaques-étiquettes et à tous égards bien conditionné pour être transporté conformément aux réglementations internationales et nationales applicables.		Retained by Consignor / Gardée par l'expéditeur		Copy / Copie 2 (green / verte)	

Thermostat Recovery Program 2018 Report to Director, Waste Management

Bill of Lading for Mercury Shipment

BILL OF LADING

ORIGINAL - NOT NEGOTIABLE

75 WANLESS COURT, AYR, ONTARIO N0B 1E0
www.aevitas.ca
(519) 740-1333

CARRIER: AEVITAS INC. Frank's Vacuum Truck Service Carrier's A 106863

Vehicle: X Manifest No. CJ34307-3

Name: K Date: May 30/19

Signature: X 24 Hour Emergency Response: (866) 856-5366

FROM: same as carrier

Shipper/Consignor: Aevitas Inc

Street: 75 Wanless Court

City: Ayr Prov.: ON

Postal Code: N0B 1E0 Tel. No.: (519) 740-1333

Name: _____

Signature: _____

TO: same as carrier

Receiver/Consignee: Bethlehem Appliances Company Inc

Street: 590 Front Street

City: Hellertown Prov.: PA

Postal Code: 18055 Tel. No.: 610-878-7034

Name: _____

Signature: _____

LAMPS	NO. OF UNITS	PACKAGING				LAMP TYPE								ESTIMATED COUNTS	NO. OF SKIDS	NOTES/WEIGHT	
		Cartons/Boxes	Blue Bins	Luggers	Other	4 Foot Fluores.		8 Foot Fluores.		HID/HPS	INC	HAL	UV				OTHER
						T8	T12	MIX	T8								

NON HAZARDOUS DANGEROUS GOODS

145B-WV2809 - Waste Mercury - Class 8(61) - Pkg - III - 1 vat - 1,135 kg

145B-WV2809 - Waste Mercury - Class 8(61) - Pkg - III - 2 Drums - 805 kg

146T-WV3506 - Mercury Contained in Manufactured Appliances - Class 8(61) - Pkg - III - 8 Drums - 1,94 kg

146T-WV3077 - Environmentally Hazardous Substance Sched. MSD (mercury debris) - Class 9 - Pkg - III - 2 Drums - 2,107 kg

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, are properly classified and packaged, have dangerous goods safety marks properly affixed or displayed on them, and are in all respects in proper condition for transport according to the Transportation of Dangerous Goods Regulations.

Name: Chris Young Signature: [Signature]

Workers: _____ Total Time on Site _____

USED OR LEFT ON SITE

Arrival Time: _____ Departure Time: _____

Drums: _____ Blue Boxes: _____ Notes: _____

Cartons/Boxes Type: _____ Other Type: _____ P.O.: _____

Pursuant to applicable legislation, it is mutually agreed as to each carrier of all or any part of, said property over all or any said portion of said route to destination and as to each party that the carrier performed hereunder shall be subject to all bill of lading terms and conditions in the governing classification on the date of

Thermostat Recovery Program 2018 Report to Director, Waste Management

Toxic Substance Control Act (TSCA) Certification for Mercury Shipment

Toxic Substance Control Act (TSCA) Certification

Date: March 6, 2019

Waybill or reference number: A105111

Check only one

Positive Certification

I certify that all chemical substances in this shipment comply with all applicable rules or orders under TSCA and that I am not offering a chemical substance for entry in violation of TSCA or any applicable rule or order thereunder.

or

Negative Certification

I certify that all chemicals in this shipment are not subject to TSCA.

Company name: Aevitas Inc

Company address: 75 Wanless Court, Ayr, ON, N0B 1E0

Certifier name: Chris Young

Certifier title: Materials Coordinator

Certifier phone number: 519-740-1333

Certifier email address: cyoung@aevitas.ca

Certifier signature: **Chris Young**

Digitally signed by Chris Young
Date: 2019.05.28 13:28:44 -04'00'

Product description

1.	Mercury Relays, Mercury Automotive, Switches & Mercury Thermostat Switches
2.	Mercury contaminated debris
3.	Liquid Mercury
4.	
5.	
6.	
7.	
8.	
9.	
10.	

If the certifier is unsure if their chemical substance is subject to TSCA compliance, contact the Environmental Protection Agency, TSCA Assistance Office at 1.202.554.1404 between 8:30 a.m. and 5:00 p.m.

Rev 1/17

Appendix D – Third Party Assurance



June 26, 2019

Independent practitioner’s reasonable assurance report on HRAI’s 2018 Annual Report to the Director of Extended Producer Responsibility Programs at the Ministry of the Environment, Government of British Columbia

To the Directors of the Heating, Refrigeration and Air Conditioning Institution (HRAI)

We have undertaken a reasonable assurance engagement on the following information (the “subject matter information”) of Heating, Refrigeration and Air Conditioning Institution (HRAI), as detailed in Appendix A, and also included within HRAI’s 2018 Annual Report (the “report”) to the Director of Extended Producer Responsibility Programs at the Ministry of the Environment, Government of British Columbia (“MOE”) during the period from January 1 to December 31, 2018:

- 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, 2018 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.

Management’s responsibility

Management is responsible for preparation of the subject matter information in accordance with the evaluation criteria established in Appendix A. Management is also responsible for such internal control as management determines necessary to enable the preparation of the subject matter information that is free from material misstatement.

Our responsibility

Our responsibility is to express a reasonable assurance opinion on the subject matter information based on the evidence we have obtained. We conducted our reasonable assurance engagement in accordance with the International Standards on Assurance Engagements (ISAE) 3000, *Attestation Engagements Other Than Audits or Reviews of Historical Financial Information*, and the *Guide to Third Party Assurance for Non-Financial Information in Annual Reports – 2018 Reporting Year*, dated October, 2018 (“Assurance Requirements”), published by the MOE.

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.



This standard requires that we plan and perform this engagement to obtain reasonable assurance about whether the subject matter information is free from material misstatement.

Reasonable assurance is a high level of assurance, but is not a guarantee that an engagement conducted in accordance with this standard will always detect a material misstatement when it exists. The nature, timing and extent of procedures selected depends on our professional judgment, including an assessment of the risks of material misstatements, whether due to fraud or error, and involves examining evidence about management's preparation of the subject matter information in accordance with the criteria.

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

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 behavior.

The firm applies Canadian Standard on Quality Control 1, *Quality Control for Firms that Perform Audits and Reviews of Financial Statements, and Other Assurance Engagements* 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.

Opinion

In our opinion, HRAI's subject matter information for the period from January 1 to December 31, 2018 has been prepared, in all material respects, in accordance with the criteria.

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 this matter.

Purpose of statement and restriction of use and distribution

The subject matter information has been prepared to report to the MOE Director, Extended Producer Responsibility. As a result, the subject matter information may not be suitable for another purpose.



Our report is intended solely for the purposes of HRAI and the MOE Director, Extended Producer Responsibility, in accordance with the terms of our engagement, and should not be distributed to or used by parties other than HRAI and the MOE Director, Extended Producer Responsibility.

PricewaterhouseCoopers LLP

Chartered Professional Accountants

Toronto, Ontario
June 26, 2019



Appendix A – Results and 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 12 of HRAI's 2018 Annual Report to the Director.**

Result:

There is one main collection facility by December 31st 2018.

Reference: Page 4 and 12 of HRAI's 2018 Annual Report to the Director.

Method of Reporting:

- Reporting Period: January 1st to December 31st.
- 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.
- 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 revised product stewardship plan 2015-2020, Section 2.4.
- "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



- o 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, 16, 17, 18 and 19 of HRAI's 2018 Annual Report to the Director.

The breakdown of materials recovered, recycled, and not recycled from the province of British Columbia during 2018 included:

- 5,995 mercury-containing vessels (there can be anywhere between 1 to 4 mercury vessels contained in each thermostat)
- 1,100 electronic thermostats
- 14.99 Kg of mercury (calculated based on 2.5 grams of Hg per vessel)
- 6.00 Kg of glass (calculated based on 1 gram of glass per vessel)
- 73.81 kilograms of metals
- 264.05 kilograms of plastics (not recycled)

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 2018 Annual Report for Aevitas Inc.

The acceptable end fates for each of the components of a thermostat, is presented within the table on page 19 of the 2018 Annual Report.

Component	Reuse	Recycle	Energy Recovery	Landfill	Other
Plastics	X	Preferred	X	X	See page 19
Metals	X	Preferred	X	X	NA
Mercury Vessels (glass)	X	Preferred	X	X	NA
Mercury Vessels (mercury)	Optional	X	X	X	See page 19

Reference: Pages 4, 16, 17, 18 and 19 of HRAI's 2018 Annual Report to the Director.

Processor Due Diligence:

- i. 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).



- ii. 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 revised product stewardship plan 2015-2020.
- iii. 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.
- iv. 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.
- v. 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.

Method of Reporting:

- Reporting Period: January 1st to December 31st.
- 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 revised product stewardship plan 2015-2020.
 - Recycle: Products are reported by each separately identifiable end of fate commodity (e.g. 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: In 2018, the plastics generated from the TRP thermostats were disposed of into landfills.

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 pages 5 and 24 of HRAI’s 2018 Annual Report to the Director.

Total amount of producer’s product collected in 2018 is:

- Collected 3,749 mercury containing thermostats, 1,100 electronic thermostats, and 1,060 loose mercury vessels
- Adjusted total: 4,506 mercury containing thermostats and 1,100 electronic thermostats, for a total of 5,606 collected

Adjusted total mercury containing thermostats are estimated as follows:

$$\text{Intact mercury containing thermostats} + \text{Loose mercury vessels} \div \text{average mercury switches per vessel} = 3,749 + \frac{1,060}{1.4} = 4,506$$

Reference: Pages 5 and 24 of HRAI’s 2018 Annual Report to the Director.

Method of Reporting:

- Reporting Period: January 1st to December 31st.
- 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 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 revised product stewardship plan 2015-2020, Section 2.4.
- "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, 21 and 23 of HRAI's 2018 Annual Report to the Director.

Result:

The target number of thermostats to be collected in 2018 is 3,945 and the result is an adjusted total of 4,506 mercury thermostats. This is 14% above the target.

Reference: Pages 6, 21 and 23 of HRAI's 2018 Annual Report to the Director.

Method of Reporting:

- Reporting period: January 1st to December 31st.

Specific 2018 targets set out in the revised stewardship 2015-2020 are:

- 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) - 95% capture rate of the estimated number of mercury-containing thermostats available for collection (4,153), which equals a target of 3,945 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, 2018 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, 2018 as HRAI is not required to report this to the Director as there are no targets set in the revised stewardship plan for these sections applicable to the reporting year.