



Thermostat Recovery Program Annual Report to the Director 2015 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 2015 annual report documents the Thermostat Recovery Program's activities and results in British Columbia from January 1 to December 31, 2015.

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.....	6
3. Public Education Materials and Strategies.....	7
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	19
8. Summary of Deposits, Refunds, Revenues and Expenditures (N/A).....	19
9. Plan Performance.....	20
Appendices / Additional Information and Third Party Assurance	24

Thermostat Recovery Program 2015 Report to Director, Waste Management

1. Executive Summary

Products within plan	Thermostats (electronic and mercury-containing)
Program website	**During 2015 was www.switchthestat.ca (changing to www.hrai.ca/trp in Summer 2016)

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 eblasts with the Municipal Leader, and the HPAC and Sustainable Building & Design magazines; ads in regional district recycling calendars • Collaboration through Stewardship Agencies of BC (SABC) • Recycling Council of British Columbia (RCBC) hotline and Recyclepedia • In person engagement at RCBC annual conference and Coast Waste Management Association (CWMA) annual conference
Part 2, section 8(2)(b)	Collection System and Facilities	<ul style="list-style-type: none"> • 23 new collection points • 17 new drop-off locations • 362 total collection points • Collection points in 27 regional districts • 2 collection facilities
Part 2, section 8(2)(c)	Product Environmental Impact Reduction, Reusability and Recyclability	<ul style="list-style-type: none"> • 5,286 mercury-containing vessels collected (there can be anywhere between 1 to 4 mercury vessels contained in each thermostat) • 91.22 kilograms of metals recycled • 257.83 kilograms of plastics recycled • 0 new mercury-containing thermostats sold into the market
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 • 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

Thermostat Recovery Program 2015 Report to Director, Waste Management

Recycling Regulation Reference	Topic	Summary (5-bullet maximum)
Part 2, section 8(2)(e)	Product Sold and Collected and Recovery Rate *	<ul style="list-style-type: none"> Collected 3,439 mercury containing thermostats, 206 electronic thermostats, and 454 loose mercury vessels Adjusted total: 3,763 mercury containing thermostats and 206 electronic thermostats, for a total of 3,969 collected 17% improvement from 2014 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 will transition over to full management and delivery by HRAI from Scout Environmental. The name of the program will change from S.T.S. to the Thermostat Recovery Program (TRP); it will be fully re-branded and the new program website will be 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.

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. Collection: 3,160 thermostats	3,969 thermostats collected (26% over target)	<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.

Thermostat Recovery Program 2015 Report to Director, Waste Management

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: 400	362 participants (90% of target)	<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*

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.switchthestat.ca (changing to www.hrai.ca/trp during summer 2016). As stated earlier, during 2015 the program was being delivered

Thermostat Recovery Program 2015 Report to Director, Waste Management

by Scout Environmental on behalf of the manufacturers and the Heating, Refrigeration, and Air Conditioning Institute of Canada (HRAI). However, as of summer 2016 it will be fully administered and delivered by 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 or by zooming in on a map, 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 2015, and will be posted on the program website at www.switchthestat.ca (changing to www.hrai.ca/trp during summer 2016).

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 2015 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 2015, 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 2015 were:

Thermostat Recovery Program 2015 Report to Director, Waste Management

- Regular 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 Thermostat Recovery Program (TRP) accomplishments was included in the HRAI Accomplishment List, accompanying renewal letters sent to all HRAI members 	Contractors/wholesalers	<ul style="list-style-type: none"> Industry outreach (print)
Ongoing outreach with Canadian Institute for Plumbing and Heating (CIPH) national office <ul style="list-style-type: none"> CIPHEX West Roadshow 	<ul style="list-style-type: none"> CIPH provided TRP with a free booth at the CIPH Exhibition (CIPHEX) Roadshow in Burnaby. This is an important industry event that attracts attendees from BC and nearby provinces. 	CIPH	<ul style="list-style-type: none"> Contractors/wholesalers
Partnership with Mechanical Contractors Association of Canada (MCAC) & Mechanical Service Contractors of Canada (MSCC)	<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. 	Contractors	<ul style="list-style-type: none"> Industry outreach
BC Stewards/Stewardship Agencies of BC (SABC)	<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 	General Public	<ul style="list-style-type: none"> Print media Online

Thermostat Recovery Program 2015 Report to Director, Waste Management

	<p>of the programs (including Thermostat Recovery Program)</p> <ul style="list-style-type: none"> 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>Region District waste calendars/brochures:</p> <ul style="list-style-type: none"> Peace River Regional District Kootenay Boundary Regional District 	<ul style="list-style-type: none"> Program ad and link to drop off locations in calendar 	General Public	<ul style="list-style-type: none"> Print media
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 and online tool (the Recyclepedia) <ul style="list-style-type: none"> 75 hotline inquiries 837 Recyclepedia searches Attendance at the RCBC Annual Zero Waste conference, which provides an opportunity to conduct face-to-face outreach and engagement with representatives from Regional Districts, recycling depots, and other relevant stakeholders. 	General Public; BC waste management industry	<ul style="list-style-type: none"> Online Phone In person outreach
Coast Waste Management Association	<ul style="list-style-type: none"> Attendance at the Coast Waste Management Association annual conference, which provides an opportunity to conduct face-to-face outreach and engagement with representatives from Regional 	BC waste management industry	<ul style="list-style-type: none"> In person outreach

Thermostat Recovery Program 2015 Report to Director, Waste Management

	Districts, recycling depots, and other relevant stakeholders.		
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 & eblasts	<ul style="list-style-type: none"> Print ad appeared in all 7 issues of HPAC magazine (with a readership of approximately 18,800) Eblasts to BC, MB, and ON subscribers of HPAC in September had a reach of 8,240 viewers 	Contractors/wholesalers	<ul style="list-style-type: none"> Business-to-business print media

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 (New website for 2016):** The program's website, www.switchthestat.ca (changing to www.hrai.ca/trp during summer 2016), 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 also has an interactive map of drop-off locations that is searchable by postal code or by clicking directly on map 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. The program website will be re-designed in 2016 to reflect the new program name and branding, as well as to make it more eye-catching and appealing to users.
2. **Promotional Resources:** The Thermostat Recovery Program website also features an exclusive section that can only be accessed by registered collection points and program supporters who have been given the link to this part of the site. This exclusive section provides special promotional resources for participating collection points to use while conducting outreach to the public about thermostat recycling. The promotional resources portion of the website can be found at www.switchthestat.ca/resources (changing to www.hrai.ca/trp during summer 2016) and includes a variety of digital resources for participants to use to promote the program, such as downloadable Thermostat Recovery Program logos to add to their promotional materials, as

Thermostat Recovery Program 2015 Report to Director, Waste Management

well as web banners that can be added to a webpage or an e-newsletter to promote their participation in the program. All of these website features will be re-designed in 2016 to reflect the new program name and branding.

3. **Introduction letters (To be updated in 2016):** 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. These letters will be re-designed to include the new program name and branding in 2016.
4. **“Thermostats Only” Stickers (To be updated in 2016):** To prevent materials other than thermostats from being recovered in the Thermostat Recovery Program collection containers, the program developed “thermostats only” stickers at the end of 2011. These stickers are placed on the sides of all collection containers before they are shipped to participants and will continue to act as a visual reminder that only thermostats are accepted in the collection containers and to ensure contents are managed and handled with proper care. These stickers will be re-vamped in 2016 with the new name and branding, as well to include “contains mercury, do not dispose with regular waste” to reduce any chances of disposal mishandling.
5. **Posters (To be updated in 2016):** Promotional posters are continually available for participants to use in displays on-site at the collection locations. In 2016 the posters will be redesigned to include the new program name and branding, as well they will be more eye-catching to increase their effectiveness as a tool for drop-off locations.
6. **Brochures (To be updated in 2016):** 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 2015. These brochures include facts about mercury and information about the Thermostat Recovery Program that is used to educate customers and the public. Both versions will be re-designed with the new program name and branding in 2016.
7. **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. The newsletter has three main sections: key news/information; “Stat Chat,” (this name will change in 2016) which addresses FAQs; and a version of the results counter from the switchthestat.ca homepage (changing to hrai.ca/trp in 2016), which shows cumulative collection totals to date. As of December 31, 2015, the newsletter had 716 subscribers nationally, approximately 25% of who are in BC.

Thermostat Recovery Program 2015 Report to Director, Waste Management

8. **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.
9. **Print ads and eblasts:** Print ads were published in all 7 issues of HPAC magazine, which has a readership of approximately 18,500 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 2015. Ads were also developed for the Peace River and Kootenay Boundary Regional District recycling calendars.
10. **Banner stands (Re-vamped for 2016):** 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 2015. Due to the program's new name and re-branding, these banner stands will also be re-designed for 2016 to be even more attention grabbing.

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
 - Tri-Arrow Industrial Recovery or Aevitas Inc receive the collection containers from various collection points and process the thermostats (count, dismantle, and in the case of Tri-Arrow periodically ships Hg vessels to consolidation point)
3. Consolidation point
 - Aevitas Inc. receives Hg vessels from Tri-Arrow and consolidates them with vessels from across the country
 - All vessels are shipped to 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:

Thermostat Recovery Program 2015 Report to Director, Waste Management



**note: 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, the Thermostat Recovery Program uses two collection facilities: Tri-Arrow Industrial Recovery located in Surrey, BC and Aevitas Inc. located in Ayr, Ontario. These facilities receive collection containers full of thermostats from all collection points in BC, and begin processing the thermostats. The shipper of each pail is recorded in a monthly tracking sheet, 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.

The main collection facility used for the program is Aevitas. They act as a consolidation point for thermostat vessels from BC as well they receive pails of intact thermostats directly from collection points. In response to feedback received from the third-party assurance provider in 2014, the program is currently transitioning to use only Aevitas, which is intended to streamline program operations.

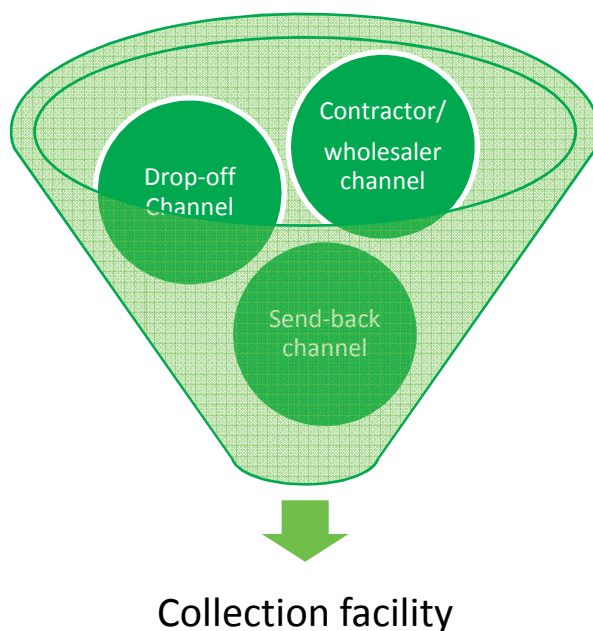
Collection Points

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.

Thermostat Recovery Program 2015 Report to Director, Waste Management

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 addressed to Aevitas, so as of 2016 returns to Tri-Arrow will be phased out as participants use their older waybills). At the collection facility, the thermostats are processed (for more details about processing, please see [Section 6](#)). This process is illustrated below.



According to the stewardship plan, the goal was to have 400*registered collection points in 2015. Through outreach initiatives described above, 23 new businesses registered as collection points for end-of-life thermostats in 2015, 17 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 business 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
Abbotsford School District #34	Contractor	No	Abbotsford
PipeDream Plumbing	Contractor	No	Abbotsford
Allied Plumbing, Heating and Air Conditioning	Contractor	No	Burnaby
Mr. Electric	Contractor	Yes	Campbell River
Tweedsmuir Plumbing and Heating Ltd.	Contractor	Yes	Burns Lake
Britech HVAC Ltd.	Contractor	Yes	Kelowna
Cariboo County Plumbing	Contractor	No	108 Mile Ranch

Thermostat Recovery Program 2015 Report to Director, Waste Management

North Central Plumbing & Heating Ltd.	Contractor	Yes	Smithers
Aqua Plumbing & Heating Ltd.	Contractor	Yes	Terrace
Jesse's Plumbing and Heating	Contractor	Yes	West Kelowna
Burns Lake Recycle Depot	Recycling Centre	Yes	Burns Lake
Grand Forks Bottle Depot	Recycling Centre	Yes	Grand Forks
Interior Freight & Bottle Depot	Recycling Centre	Yes	Vernon
Bulkley Valley Bottle Depot Ltd.	Recycling Centre	Yes	Smithers
Cariboo Metal Recycling	Recycling Centre	Yes	Quesnel
Musqueam Indian Band	Send Back	No	Vancouver
Emco	Wholesaler	Yes	Burnaby
BA Robinson	Wholesaler	Yes	Surrey
Andrew Sheret Ltd.	Wholesaler	Yes	Terrace
Emco Corp. 881	Wholesaler	Yes	Vancouver
EMCO	Wholesaler	Yes	Terrace
Emco	Wholesaler	Yes	Vancouver
Proair Heating & Cooling	Contractor	No	Salmon Arm

* 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.

Changes to Collection Points

In 2015 there were two changes to existing collection points. These changes are as follows:

Company Name	Type	Drop Off	City	Change
Sims Recycling Solutions	Recycling Centre	Yes	Langley	This company shut down operations
Plumbingworks	Contractor	No	Vancouver	No longer in business

Taking these changes into account, and combining the new participants with existing collection points as of December 31, 2015 there were 362 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	9
Cowichan Valley Regional District	9
Fraser Valley Regional District	32
Metro Vancouver (Greater Vancouver Regional District)	125
Northern Rockies Regional District	1
Peace River Regional District	12

Thermostat Recovery Program 2015 Report to Director, Waste Management

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	9
Regional District of Kitimat–Stikine	6
Regional District of Kootenay Boundary	4
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	4
Strathcona Regional District	4
Sunshine Coast Regional District	5
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 2016, 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 2015, the breakdown of materials recovered and recycled from the province of British Columbia included:

- 5,286 mercury-containing vessels (there can be anywhere between 1 to 4 mercury vessels contained in each thermostat)
- 13.22 Kg of mercury (calculated based on 2.5 grams of Hg per vessel)
- 5.29 Kg of glass (calculated based on 1 gram of glass per vessel)
- 91.22 kilograms of metals
- 257.83 kilograms of plastics

Thermostat Recovery Program 2015 Report to Director, Waste Management

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 "thermostats only" stickers (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 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:

Thermostat Recovery Program 2015 Report to Director, Waste Management

- 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, either Global Wood Waste or Durham Shred. Here 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 then sent to the downstream processor, either ABC Recycling or M Metals. Here the metals are baled and then sold as a commodity.
- The glass vials containing the mercury are consolidated at the collection facility (Tri-Arrow or Aevitas) until a large volume has been collected and are then shipped to the consolidation point (Aevitas). At Aevitas these vessels are consolidated with vessels collected across Canada and then sent to an appropriate retort facility; this year they were sent to Veolia. During the retort process, 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 of mercury-containing vessels was sent to Veolia on December 15, 2015. [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:

Thermostat Recovery Program 2015 Report to Director, Waste Management

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	<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 facilities 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	>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)

Thermostat Recovery Program 2015 Report to Director, Waste Management

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	2015 Results	Strategies for Improvement in 2016
<i>Performance Targets*</i>		
1. Collection: 3,160 thermostats	Adjusted total: 3,969 thermostats collected (26% 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. Participants: 400	362 participants (91% 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>		
3. 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 2,084 visits to www.switchthestat.ca (changing to www.hrai.ca/trp in 2016) from BC in 2015 	

Thermostat Recovery Program 2015 Report to Director, Waste Management

Plan Target	2015 Results	Strategies for Improvement in 2016
4. Printed brochures: a minimum of 5,000 brochures will be printed and distributed on an annual basis	Approximately 2,185 brochures distributed. 25 brochures are distributed to each new participant (575). Extra brochures have been sent to participants upon request (188).	<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)
5. Printed posters: a minimum of 20 posters will be printed and displayed in year 1 (number will increase with number of retail events)	129 posters distributed as requested by participants Note: retail events have been discontinued, due to poor results, but posters are still distributed to new participants, upon request to existing participants, and at outreach events.	In 2016 new posters will be developed including new program name & branding, and will be distributed to wholesalers listed as drop-off locations.
6. Advertising via the Recycling Council of British Columbia (RCBC)'s website and hotline	Thermostat Recovery Program info is available via both the Recyclepedia and RCBC's hotline.	
7. Advertising in waste reduction/ community calendars for regional districts (25 municipalities in Year 1, TBD based on effectiveness for years 2-5)	<p>As described in Section 3, Thermostat Recovery Program advertised in the Peace River and Kootenay Boundary Regional District calendars, as well as being promoted in the Peace River and Northern Rockies Regional Districts by NEAT.</p> <p>In addition to advertising in these regional district calendars, 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>	In 2016 the TRP will be advertised in 4 additional BC regional district calendars.

** 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.*

Thermostat Recovery Program 2015 Report to Director, Waste Management

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, 2015, measured against the targets outlined in the official stewardship plan, as well as the program growth as compared to the same period in 2014 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, 2015)*	Results Achieved from January 1 to December 31, 2015	Results Achieved from January 1 to December 31, 2014	Percentage increase in 2015
Number of Thermostats Collected	3,160 thermostats	3,439 mercury containing; 206 electronic; Total: 3,645	2,639 mercury containing; 81 electronic; Total: 2,720	34%
Number of Loose Vessels Collected	n/a	454	1,114	-59%
Adjusted Total Thermostats Collected**	n/a	3,969	3,515	17%

*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 due to communication outreach with the participants, etc., the number of loose vessels collected has dramatically decreased compared to 2014. Using the industry-accepted standard of 1.4 vessels per thermostat, the number of loose vessels returned in 2015 is equivalent to 454 thermostats. The adjusted total number of thermostats collected in 2015 is then 3,969.

Amount Collected by Regional District

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

Region	Number of Thermostats Collected***	Number of Loose Vessels Collected
Capital Regional District	321	208
Columbia-Shuswap Regional District	75	0
Comox Valley Regional District	34	0
Fraser Valley Regional District	161	79
Greater Vancouver Regional District	2058	127
Powell River Regional District	23	0
Regional District of Central Okanagan	831	40
Regional District of East Kootenay	42	0

Thermostat Recovery Program 2015 Report to Director, Waste Management

Regional District of Kitimat-Stikine	17	0
Regional District of Nanaimo	37	0
Regional District of Okanagan-Similkameen	29	0
Thompson–Nicola Regional District	17	0
TOTAL	3,645	454

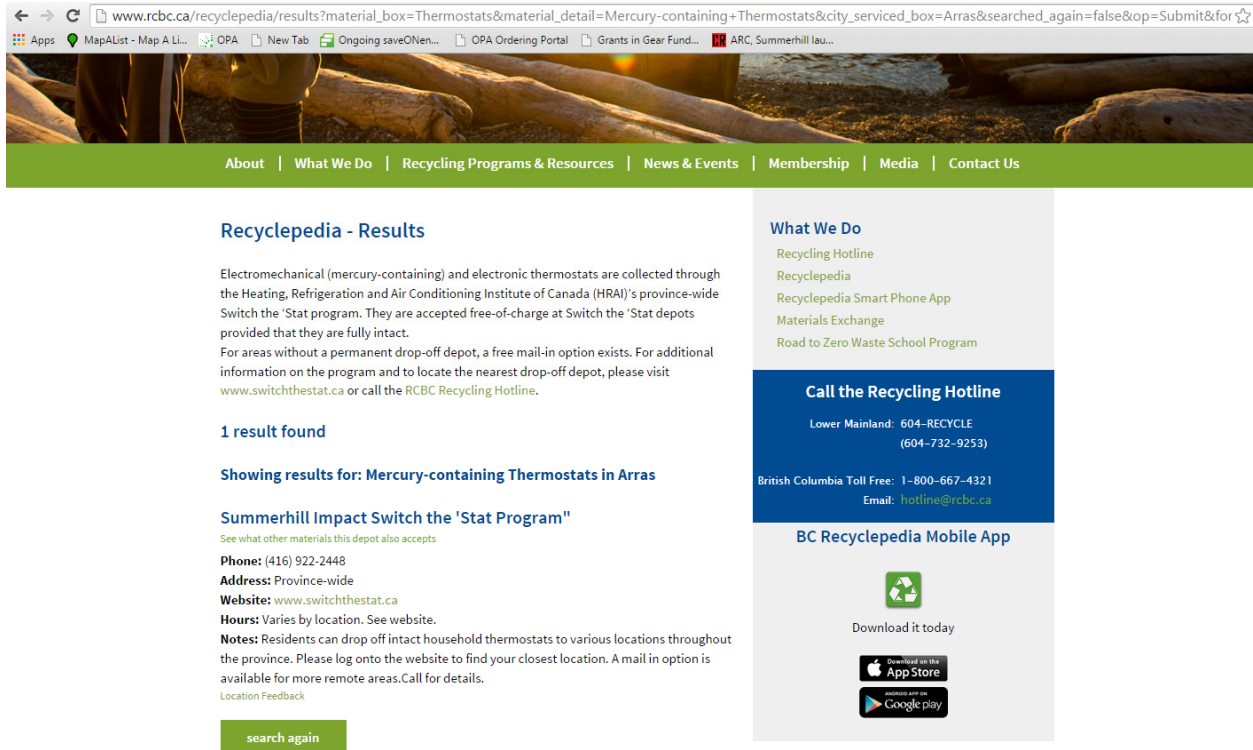
***Number of intact thermostats (both mercury-containing and electronic)

Thermostat Recovery Program 2015 Report to Director, Waste Management

Appendices / Additional Information and Third Party Assurance

Appendix A – Earned Media

RCBC Recyclepedia



The screenshot shows the RCBC Recyclepedia website interface. At the top is a navigation bar with links: About, What We Do, Recycling Programs & Resources, News & Events, Membership, Media, and Contact Us. The main content area is titled 'Recyclepedia - Results' and displays search results for 'Mercury-containing Thermostats in Arras'. The results show one finding: 'Summerhill Impact Switch the 'Stat Program''. Details for this finding include: Phone: (416) 922-2448, Address: Province-wide, Website: www.switchthestat.ca, Hours: Varies by location. See website, and Notes: Residents can drop off intact household thermostats to various locations throughout the province. A 'search again' button is located below the results. On the right side, there is a sidebar with 'What We Do' links (Recycling Hotline, Recyclepedia, Recyclepedia Smart Phone App, Materials Exchange, Road to Zero Waste School Program), a 'Call the Recycling Hotline' section with contact information for Lower Mainland and British Columbia, and a 'BC Recyclepedia Mobile App' section with download links for the App Store and Google Play.

www.rcbc.ca/recyclepedia/results?material_box=Thermostats&material_detail=Mercury-containing+Thermostats&city_served_box=Arras&searched_again=false&op=Submit&for

Apps MapAList - Map A Li... OPA New Tab Ongoing saveONen... OPA Ordering Portal Grants in Gear Fund... ARC, Summerhill lau...

About | What We Do | Recycling Programs & Resources | News & Events | Membership | Media | Contact Us

Recyclepedia - Results

Electromechanical (mercury-containing) and electronic thermostats are collected through the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI)'s province-wide Switch the 'Stat program. They are accepted free-of-charge at Switch the 'Stat 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.switchthestat.ca or call the RCBC Recycling Hotline.

1 result found

Showing results for: Mercury-containing Thermostats in Arras

Summerhill Impact Switch the 'Stat Program"

See what other materials this depot also accepts

Phone: (416) 922-2448

Address: Province-wide

Website: www.switchthestat.ca

Hours: Varies by location. See website.

Notes: Residents can drop off intact household thermostats to various locations throughout the province. Please log onto the website to find your closest location. A mail in option is available for more remote areas.Call for details.

[Location Feedback](#)

[search again](#)

What We Do

- [Recycling Hotline](#)
- [Recyclepedia](#)
- [Recyclepedia Smart Phone App](#)
- [Materials Exchange](#)
- [Road to Zero Waste School Program](#)

Call the Recycling Hotline

Lower Mainland: 604-RECYCLE
(604-732-9253)

British Columbia Toll Free: 1-800-667-4321
Email: hotline@rcbc.ca

BC Recyclepedia Mobile App

Download it today

[App Store](#)

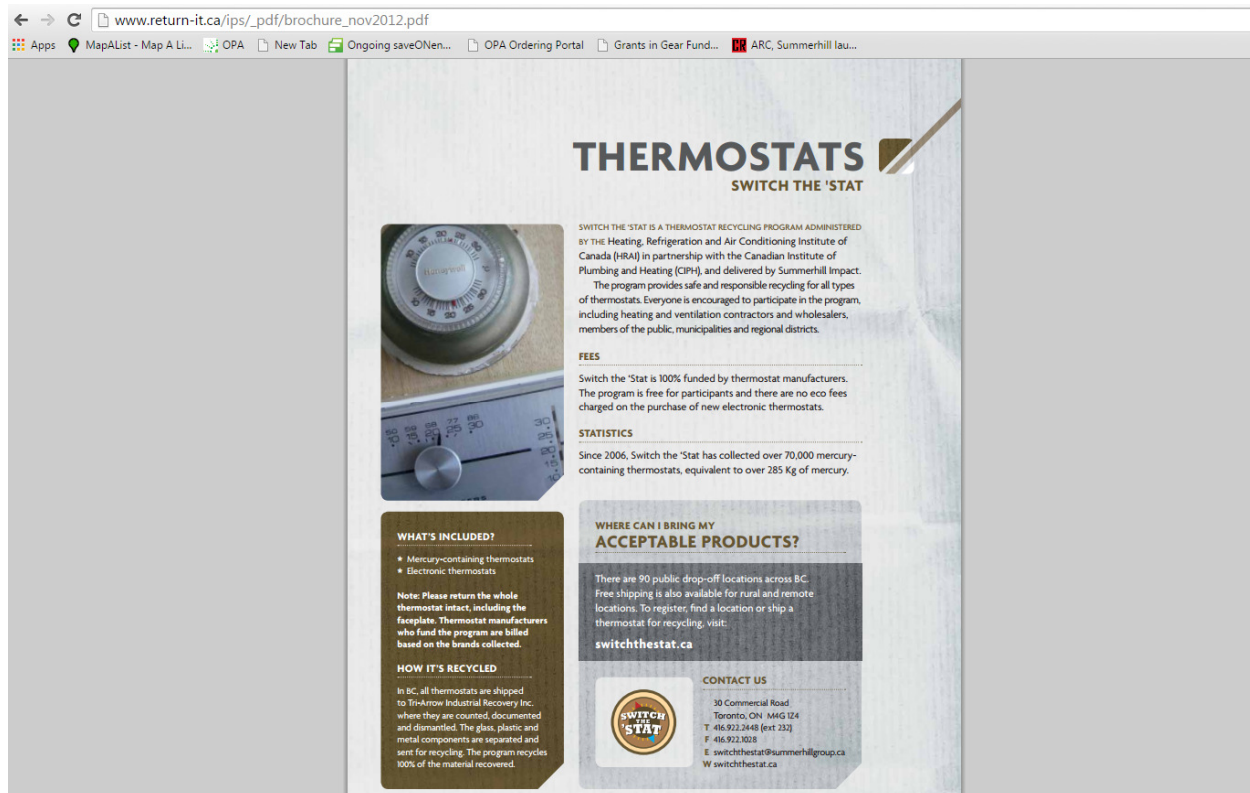
[Google play](#)

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MSCC Website



SABC Recycling Handbook



Thermostat Recovery Program 2015 Report to Director, Waste Management

HPAC Magazine

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Tools Sign Comment

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Recognize Text in English(U.S.)

Change

Convert

Create PDF

Send Files

Store Files

HPAC PRODUCTS

The redesigned Dakin M33 two, three- and four-port multi-zone heat pumps have a maximum connected capacity that is expected to allow indoor units of higher capacity to be connected. The units offer a maximum efficiency of up to 13.5 HSPF, cooling performance rated up to 18.0 SEER and up to 22.7 EER. Coming with a head-held LCD display remote, they are designed for entire homes or floors of homes, multiple zones, new construction, primary living areas and basements.

www.dakincanada.com

The Setra model MRC is a multi-range, differential pressure transducer designed for use in critical environments. It has six selectable ranges and three selectable outputs. The MRC comes with an optional dust probe, an integrated Diffraul mount and IP65-rated housing. It is suitable down to 12.5 mVdc.

www.alphascontrols.com

LG Electronics has produced an air-cooled, region-specific VRF unit (LG VRF S78V) that has matching voltage for its Canadian market, removing the need for additional equipment and heavier gauge cables that are required for the lower voltage reduces costs. The S78V unit can be incorporated into new buildings or retrofits and is available in capacities ranging from six to 30 tons. These heat pump systems can provide cooling or heating in multiple zones.

www.LGVRF.ca

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switchstate.ca

Recycling with Switch State is safer for you and the environment!
We recover all components of a thermostat (copper, steel, plastic, PCB, mercury, battery & hazardous materials).

Let us take care of them for you in three easy steps:

1. SIGN UP
2. DROP STATS IN THE PAIL
3. SEND THE PAIL BACK

USPS #BX 02N 176 1102 923030471

Administered by **HRAI** Supported by **SummaCare** Delivered by **SummaCare**

The Silver Diamond Fit and Forget range of condensate removal pumps uses the principle named Rotary Diaphragm, meaning the pumps are designed, developed, tested and assembled in house. The condensate is drawn into the pump by vacuum and mechanically driven by an elastomer diaphragm to the outlet under pressure.

www.sumpcanada.org

The Greenheck Model RV (E120) is a pre-engineered system featuring capabilities for larger dedicated outdoor air systems, multi-zone VAV systems and single-zone VAV systems. It features a two-in, R12 foam panel construction and thermally broken design. Four independent cooling circuits are designed to allow for cooling uniform and control. The unit has performance capacities of up to 12,000 cfm, up to 48 tons of cooling and up to 800 MWh heating.

www.greenheck.com

continued on p.76

saveonenergy FOR BUSINESS

When he reduced costs by 13% with a new RTU, he wasn't just saving money. He was setting a precedent.

Once your clients start seeing the benefits of our incentives for upgrading to high efficiency RTUs, they will want to look into making other parts of their business like ventilation, boiler and building automation systems more efficient too. When they do, they'll be joining thousands of organizations across Ontario who are already enjoying the savings that our programs deliver.

Take a look at their stories and our incentives at saveonenergy.ca/business

ieso
Independent Electricity

Peace River & Kootenay Boundary Regional District Waste Management Calendar Ad



EASY. SAFE. FREE.
THERMOSTAT RECYCLING

We recycle all
thermostat components:
hazardous mercury,
plastic, metal & electronics



Visit switchthestat.ca to:

- A. FIND A DROP OFF LOCATION**
- B. REGISTER TO RECEIVE A FREE COLLECTION CONTAINER**

ADMINISTERED BY:  **HRAI**
YOUR ENVIRONMENTAL EXPERTISE

SUPPORTED BY:  **CIPH**
Canadian Institute
of Plumbing & Heating

DELIVERED BY:  **Summerhill**
IMPACT

Thermostat Recovery Program 2015 Report to Director, Waste Management

Appendix C – Retort Manifest Copies

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/manifester est conforme aux législations fédérale et provinciale sur l'environnement et le transport.

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

WB43865-3

A Generator / consigneur Producteur / expéditeur Registration No. / Provincial ID No. N° d'immatriculation - d'Id. provincial ON2002102		B Carrier Transporteur Registration No. / Provincial ID No. N° d'immatriculation - d'Id. provincial A860427		C Receiver / consignee Réceptionnaire / destinataire Registration No. / Provincial ID No. N° d'immatriculation - d'Id. provincial WB43865-3	
Company name / Nom de l'entreprise AEVITAS INC. Mailing address / Adresse postale same as below City / Ville same as below Province same as below Postal code / Code postal same as below Email / Courriel électronique same as below		Company name / Nom de l'entreprise VEDLIA ES CANADA INDUSTRIAL SERVICES INC Mailing address / Adresse postale 4140 BELGREEN DRIVE OTTAWA City / Ville ON Province ON Postal code / Code postal K1G3M2 Email / Courriel électronique same as below		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 Company name / Nom de l'entreprise Mailing address / Adresse postale City / Ville Province Postal code / Code postal Email / Courriel électronique Receiving site address / Adresse du lieu de destination	
Shipped in / Expédié en 5 VALUABLE CONTAINERS Crates / Boîtes 5 Intended Receiver / consignee Réceptionnaire / destinataire prévu VEDLIA ES CANADA INDUSTRIAL SERVICES INC Mailing address / Adresse postale same as below City / Ville same as below Province same as below Postal code / Code postal same as below Email / Courriel électronique same as below Receiving site address / Adresse du lieu de destination same as below		Vehicle / Véhicule Type - Rail car No. 1 AK33679 Trailer - Rail car No. 2 same as below Port of entry / Point d'entrée same as below Port of exit / Point de sortie same as below Carrier Certification / I certify that I have received waste or recyclable material from the generator / consigneur for recovery in 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 du représentant autorisé (imprimer) P. KOPPELANS Tel. No. / N° de tél. 1 800 461 3267 Year / Année 15 Month / Mois 12 Day / Jour 15 Signature [Signature]		Date received / Date de réception Year / Année 15 Month / Mois 12 Day / Jour 15 Time / Heure 1:00 AM / PM <input type="checkbox"/> AM <input type="checkbox"/> PM 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 WB43865-3	
Prol. code / Code prol. 1488 Waste / Déchet VASTE MERCURY CONTAINED IN MANUFACTURED ARTICLES (AUTOMOTIVE) Quantity shipped / Quantité expédiée 400 Units / Unités 2 Phys. state / État phys. S		Prol. code / Code prol. 1488 Waste / Déchet VASTE MERCURY CONTAINED IN MANUFACTURED ARTICLES (THERMOSTAT) Quantity shipped / Quantité expédiée 150 Units / Unités 1 Phys. state / État phys. S		Quantity received / Quantité reçue Units / Unités Comments / Commentaires Handling / Code / Code de manipulation Accepted / Refused Shipment / Envoi Accepted / Refused Disposal / Vég. Date / Date	
Note No. / N° de notation Note Line No. / N° de ligne de notation Shipment / Envoi C / D D or R code / Code D ou R C code / Code C Basel Annex VIII or OECD Code / Annexe VIII de la Bâle ou Code C H code / Code H Y code / Code Y Export / Importation Customs code(s) / Code(s) de douanes		National code in country of / Code du pays If handling code "Other" (specify) / Si code de manipulation « 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 du représentant autorisé (imprimer) Signature Tel. No. / N° de tél. Special handling / Manipulation spéciale <input type="checkbox"/> Attached / Joindre <input checked="" type="checkbox"/> As follows / Comme : 24-HOUR NO. 1-877-818-0087		Date shipped / Date d'expédition Year / Année 15 Month / Mois 12 Day / Jour 15 Time / Heure 1:00 AM / PM <input type="checkbox"/> AM <input type="checkbox"/> PM Scheduled arrival date / Date d'arrivée prévue Year / Année 15 Month / Mois 12 Day / Jour 15	

MOE 04-1917 (12/13)

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

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Thermostat Recovery Program 2015 Report to Director, Waste Management

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/manifester est conforme aux législations fédérales et provinciales sur l'environnement et le transport.

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

WB43865-3

A Generator / consigneur Producteur / expéditeur Company name / Nom de l'entreprise EVITAS INC. Mailing address / Adresse postale same as below City / Ville Province Postal code / Code postal Email / Courriel électronique 514 788-1333 Signature / Signature 75 VANESS COURT City / Ville Province Postal code / Code postal ON M9B 1B9		B Carrier Transporteur Company name / Nom de l'entreprise VEDLIA IS CANADA INDUSTRIAL SERVICES INC Mailing address / Adresse postale 4140 BELDEN DRIVE OTTAWA City / Ville Province Postal code / Code postal ON K1G 3M2 Email / Courriel électronique 613 739-1440 Vehicle / Véhicule Trailer - Rail car No. 1 Trailer - Rail car No. 2 2' container - wagon Registration No. / N° d'immatriculation AK 33679 Port of origin / Point de départ Port of destination / Point de destination Carrier Certification / I certify that I have received waste or recyclable materials from the generator / consigneur for delivery to the receiver / consignee as set out in Part C and that the information contained in Part C is correct and complete. Attention du transporteur: J'atteste avoir reçu des déchets ou matières recyclables du producteur/expéditeur en vue de leur livraison au récepteur/destinataire, tel qu'il figure à la partie C et que les renseignements fournis à la partie C sont exacts et complets. Name of authorized person (signature) P. POPELANSKI Tel. No. / N° de tél. 1 800 461 3267 Year / Année 15 Month / Mois 12 Day / Jour 15 Signature [Signature]		C Receiver / consignee Récepteur / destinataire Company name / Nom de l'entreprise VEDLIA IS CANADA INDUSTRIAL SERVICES INC Mailing address / Adresse postale same as below City / Ville Province Postal code / Code postal Email / Courriel électronique 613 739-1440 Receiving site address / Adresse du lieu de destination 600 HENRY ROAD City / Ville Province Postal code / Code postal ON L1V 2T4 Date received / Date de réception Year / Année 15 Month / Mois 12 Day / Jour 15 Time / Heure 15:00 If waste or recyclable material is to be transferred, specify intended company name. Si les déchets ou matières recyclables doivent être transférés, préciser le nom du destinataire. Signature [Signature] Tel. No. / N° de tél. 1 800 461 3267	
Item No. / N° de notification Notice Line No. / N° de ligne de la notification Shipment / Envie OR / Ou D or R code Code D ou R C code Code C Basic Access Unit / Unité d'accès de base Access Unit No. / N° de l'unité d'accès de base Code Code Y code Code Y Export Import Customs code(s) / Code(s) de douane National code in country of / Code du pays Code du pays		Quantity shipped / Quantité expédiée L or R kg / L ou kg Units / Unités No. / N° Packaging / Conditionnement Codes Codes Phys. state / État phys. Quantity received / Quantité reçue L or R kg / L ou kg Units / Unités Comments / Commentaires Handling / Codes de manipulation Accepted / Accepté Refused / Refusé Pack / Pack Unit / Unité			
1400 WASTE MERCURY CONTAINED IN MANUFACTURED ARTICLES (AUTOMOTIVE) 8 (6.1) UN3506 N/A 400 I 2 01 5 400 K 01 ✓		1400 WASTE MERCURY CONTAINED IN MANUFACTURED ARTICLES (THERMOSTAT) 8 (6.1) UN3506 N/A 150 I 1 01 5 150 K 01 ✓			
Generator / consigneur certification: I certify that the information contained in Part A is correct and complete. Attention du producteur / expéditeur: J'atteste que tous les renseignements à la partie A sont exacts et complets. Name of authorized person (signature) [Signature] Tel. No. / N° de tél. 1 800 461 3267		Receiver / consignee certification: I certify that the information contained in Part C is correct and complete. Attention du récepteur / destinataire: J'atteste que tous les renseignements à la partie C sont exacts et complets. Name of authorized person (signature) [Signature] Tel. No. / N° de tél. 1 800 461 3267			

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Appendix D – Third Party Assurance



June 30, 2016

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 2015 Annual Report

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 Waste Management at the Ministry of the Environment, Government of British Columbia ("MOE"), as hosted on the Switch the 'Stat program website' (<http://www.switchthestat.ca/eng/program-results.php>) for the year ended December 31, 2015:

1. 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");
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;
3. The total amount of the producers' product collected for the year ended December 31, 2015 in accordance with 8(2)(e) of the Recycling Regulation; and
4. 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), *Assurance Engagements other than Audits or Reviews of Historical Financial Information*, published by the International Federation of Accountants, and the *Guide to Third Party Assurance for Non-Financial Information in Annual Reports – 2015 Reporting Year*, dated February, 2016 ("Assurance Requirements"), published by the MOE.

¹ The maintenance and integrity of the Switch the 'Stat website is the responsibility of Switch the 'Stat; the work carried out by PricewaterhouseCoopers LLP does not involve consideration of these matters and, accordingly, PricewaterhouseCoopers LLP accepts no responsibility for any changes that may have occurred to the reported information or criteria since they were posted on the website

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



We apply International Standard on Quality Control 1 and accordingly maintain a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

In conducting our engagement, we have complied with the independence and other ethical requirements of the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants.

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. 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.

Methodology and Assurance Procedures

We conducted our reasonable assurance engagement in accordance with ISAE 3000. 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 were:

- 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, 2015 is presents fairly, in all material respects, in accordance with the evaluation criteria listed in Appendix A:

1. 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");
2. 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;
3. The total amount of the producers' product collected for the year ended December 31, 2015 in accordance with Section 8(2)(e) of the Recycling Regulation; and
4. The description of performance for the year in relation to targets in the approved stewardship plan under Section 8(2)(c), 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.

PricewaterhouseCoopers LLP

PricewaterhouseCoopers LLP
Chartered Professional Accountants
June 30, 2016



Appendix A to the Independent Reasonable Assurance Report

Selected Information:

1. **The location of collection facilities, and any changes in the number and location of collection facilities from the previous report in accordance with Section 8(2)(b) of the Recycling Regulation as presented on page 12 and 13 of HRAI's Annual Report to the Director.**

"Collection facilities: Tri-Arrow Industrial Recovery or Aevitas Inc..."

"...Thermostat Recovery Program² uses two collection facilities: Tri-Arrow Industrial Recovery, located in Surrey, BC and Aevitas Inc., Located in Ayr, Ontario."

Evaluation Criteria:

- "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 Scout Environmental (previously Summerhill, HRAI's agent) 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
- Reporting Period: January 1st to December 31st annually.
- Scout Environmental ("the Agency") currently considers Tri-Arrow and Aevitas Inc. to be the only Collection Facilities. The rationale being that the "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 the Agency 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.

² As of the summer 2016, the Switch the 'Stat' program will be rebranded to the "Thermostat Recovery Program", and for the purposes of the 2015 Annual Report, the new name has been used



Selected Information:

2. The description of how the recovered product was managed in accordance with the pollution prevention hierarchy under Section 8(2)(d) of the Recycling Regulation as presented on page 16, 17, and page 18 of the Annual Report to the Director.

"In 2015, the breakdown of materials recovered and recycled from the province of British Columbia included:

- 5,286 mercury-containing vessels collected (there can be anywhere between 1 to 4 mercury vessels contained in each thermostat)
- 13.22 Kg of mercury (calculated based on 2.5 grams of Hg per vessel)
- 5.29 Kg of glass (calculated based on 1 gram of glass per vessel)
- 91.22 kilograms of metals
- 257.83 kilograms of plastics"

The descriptions of how components (i.e. plastic, metals, glass vials containing mercury) are processed, as presented in a list on page 18 of the Annual Report.

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

Evaluation Criteria:

- 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.
- Reporting Period: January 1st to December 31st annually.



Processor Due Diligence:

- i. The Agency 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 the Agency, 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.
- 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 the Agency 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:

- i. 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 the Agency. Reporting includes both quantitative and qualitative end of fate data for Program Products.

Primary Processors by Commodity	
Mercury	Aevitas
Glass	Aevitas
Plastics	Global Wood Waste, Durham Shred
Metals	ABC Metals, M Metals

Method of Reporting:

- 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 Kgs of glass is calculated by multiplying the total number of mercury vessels by the industry standard of 1 gram of glass per vessel; and
 - The weight in Kgs of mercury is calculated by multiplying the total number of mercury vessels by the industry standard of 2.5 grams of mercury per vessel.
- Recover: 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.

Selected Information:

3. **The description of total amount of the producer's product collected, in accordance with Section 8(2)(e) of the Recycling Regulation, as presented on page 5 of HRAI's Annual Report to the Director.**

"Collected 3,439 mercury containing thermostats, 206 electronic thermostats, and 454 loose mercury vessels"

"Adjusted total: 3,763 mercury containing thermostats and 206 electronic thermostats, for a total of 3,969 collected"

Evaluation Criteria:

- "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.
- Reporting Period: January 1st to December 31st annually.

Product Collected:

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).



Selected Information:

- 4. The description of performance for the year in relation to targets in the approved stewardship plan under Sections 8(2)(e) in accordance with 8(2)(g) of the Recycling Regulation as presented on page 5, 20 and 22 of HRAI's Annual Report to the Director.**

The first target, "Collection: 3,160 thermostats" and 2015 results of "Adjusted total: 3,969 thermostats collected" in the table describing the progress made towards the performance target on page 20 of the Annual Report.

The progress against targets and program growth for the collection of mercury-containing thermostats listed in the table on page 22 of the Annual Report.

Evaluation Criteria:

Specific 2015 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 Switch the 'Stat 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) - 80% capture rate of the estimated number of mercury-containing thermostats available for collection (3,950).
- v. Section 8(2)(e) - 3,160 thermostats to be collected.



Appendix B to the Independent Reasonable Assurance Report

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, 2015 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, 2015 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.