PRODUCT STEWARDSHIP INSTITUTE
Sustainable Solutions to Protect Our Environment

WORTHINGTON CYLINDERS
A Worthington Industries Company

FINAL

MEETING SUMMARY

NON-REFILLABLE GAS CYLINDERS RECYCLING WORKSHOP
OCTOBER 8, 2009
Best Western Airport Hotel & Conference Center
Milwaukee, WI

Sponsored by Worthington Cylinders

ATTENDEES

The meeting was attended by 30 participants, with another 10 participating via phone over the course of the day-long meeting. The final participant list is on the PSI meeting webpage at: www.productstewardship.us/gascylinders.

MEETING MATERIALS

This meeting summary, final agenda, PowerPoint presentations, and other materials are posted on the PSI meeting website (above). Please consult these presentations and materials as a complement to these notes.

Welcome – *Ron Raboin, Worthington Cylinders*

Ron opened the meeting by welcoming participants and setting the tone for a collaborative day of problem solving.

Laying the Project Foundation – *Scott Cassel, Product Stewardship Institute*

Scott introduced the Product Stewardship Institute and provided an overview of the gas cylinders issue, including PSI's past work on the issue. In 2003, PSI worked on non-refillable gas cylinders, as well as 20-pound propane tanks used for barbecue grills. Both of these efforts involved representatives from tank manufacturers, tank refurbishers and exchange operations, retailers, state and local government, industry associations, and others. PSI held a National Propane Summit in Boston in 2003, and used that stakeholder input to develop recommendations for the safe management of refillable propane tanks. That project was conducted for a solid waste combustion facility in Massachusetts concerned about an excess of tanks flooding the waste stream as a result of the introduction of a new overflow protection device on tanks. PSI also held two multi-stakeholder meetings in Florida, and used that input to outline issues and potential strategies related to the collection and management of non-refillable one-pound gas cylinders. PSI also completed a document entitled, "Action Plan to Reduce Safety Risks, Environmental Impacts, and Costs Associated with Non-Refillable Gas Cylinders in the Waste Stream."

Key Issues with Small Gas Cylinders: Based on the past work, Scott outlined the following key issues and asked the group if these issues are still relevant:

- safety risks
- environmental concerns (e.g., wasted resources)
- financial considerations (particularly costs on local government)
- lack of understanding by municipal officials about safe management options for cylinders
- vagueness of regulatory guidance on how to manage cylinders that often results in agencies not wanting to get involved in cylinder collection
- lack of consumer education (e.g., why, where, and how to recycle)

Participants agreed with the current list of issues and added the following comments:

- Most consumers are not aware of the environmental impact of products they use. There is a need to educate consumers about their responsibility when buying cylinders. They don't understand the ramifications when they throw out something.
- The infrastructure for recycling gas cylinders will need to develop, including collection, transportation, and processing centers. Consumers have few places to take gas cylinders to be collected for recycling, and it is very inconvenient for them.
- The use of gas cylinders has increased considerably, including in two-cycle engines used for leaf blowers, lawn mowers, and among heating and cooling contractors.
- There is a significant cost on state and local governments to manage used gas cylinders properly. That problem has gotten worse owing to the current fiscal crisis.
- Safety concerns are paramount since there is often residual gas left in scrap cylinders. The biggest issue is whether gas remains in the cylinder and what type of gas it is.
- Most governments allow cylinders to be disposed in the regular trash.

Project Goals, Priority Strategies, and Other Areas of Action

Based on PSI's past work, Scott outlined the following Project Goals, Priority Strategies, and Other Areas of Action, and asked the group if these goals, strategies, and actions still appeared relevant.

Project Goals

- Reduce safety and environmental risks (safely evacuate and collect gas)
- Increase the recovery and recycling of used cylinders
- Reduce costs of managing cylinders
- Enhance recycling infrastructure
- Increase awareness of safe, economical, and environmentally responsible, end-of-life management options for consumers, municipal officials, and other stakeholders

Priority Strategies

- Increase acceptance of cylinders by scrap metal recyclers by reducing or eliminating obstacles (e.g., safety concerns, needed equipment).
- Provide effective cylinder collection and handling guidance for municipal and county cylinder collection programs.
- Increase consumer education on proper handling and management of cylinders.

Other Areas for Action

- Develop sample language to include in municipal waste management contracts for cylinder management.
- Research sustainable financing options to fund cylinder recycling programs.
- Consider reuse of cylinders with gas remaining.
- Consider refilling of empty cylinders (vs. recycling).

Participants generally agreed with these Goals, Strategies, and Other Areas of Action, and added the following comments:

- Industry should take a leadership role in developing a solution and internalize the recycling costs into the product price.
- We are seeking an industry-wide solution for all gas cylinders from all manufacturers. Worthington will input from the group, develop a project design, and present it to the full group for feedback, with a timeline of 3-6 months.
- Consumer convenience means offering them a choice of locations for collection.
- Develop a refillable cylinder if it can continue to provide consumer convenience and be done cost-effectively. We need to maintain product convenience in the solution. Redesigning the product to make it refillable would decrease consumer convenience and increase product cost, possibly making the product unattractive to consumers.
- Determine the general profile of the consumer needing cylinder recycling service.

Scott proposed the following expected meeting outcomes and asked for feedback:
(a) General agreement on issues posed by gas cylinder recycling and goals for gas cylinder recycling program; (b) Agree on concept of pilot project to develop more information; (c) Agree on goal of pilot project; (d) Agree on structure /elements needed for effective pilot project; (e) Brainstorm ideas for Worthington to consider in developing a pilot project design.

Participants generally agreed with these expected meeting outcomes and added the following comments:

- A pilot project is needed to give direction to Worthington and Coleman as they take more responsibility for recycling their products.
- What are the economies of scale to advancing a recycling program nationwide? What are the barriers?
- How can we make the pilot collection and recycling project safe and scalable?
- Retailers have new challenges to face as expectations from consumers change. Consumers want to return an item at the end of life to the retailer where it was purchased.
- The key issue is how the used cylinders need to be prepared for acceptance by metal recycling companies.
- What is the key purpose of the pilot project, and what key data do we need to collect?

Background – *Jody McKinley, Worthington Cylinders*

Jody provided background information on Worthington Cylinder and its products, and the company's ongoing efforts to find a safe and viable way to recycle cylinders. He mentioned that the two disposable cylinder manufacturers – Worthington Cylinder (Chilton WI) and Coleman (Wichita KS) – produce and sell tens of millions of gas cylinders annually with well over half used outdoors in camping related activities. Up to 30,000 tons of potentially recyclable material is discarded each year (at roughly 1 pound of steel per unit). Most governments allow general disposal of non-refillable cylinders, but any recovery efforts must comply with federal and state regulations and procedures (e.g., US DOT, US EPA, OSHA, state environmental agencies, and local fire officials). Jody also outlined the following current recycling/disposal pathways: (a) Government organized "Clean Sweeps"; (b) Local Household Hazardous Waste drop off locations; (c) Private service companies specializing in safe recovery and recycling; (d) State Park drop points; (e) Household trash for curbside pickup; and (f) Littering or other improper disposal.

Cylinder Exchange Networks – *Jay Werner, Blue Rhino*

Jay provided an overview of his company, its facility locations, and the process for refurbishing or recycling 20-pound refillable cylinders. Blue Rhino (BR) currently does not distribute or collect empty one-pound cylinders but would consider doing so as part of a pilot project. BR grill cylinder exchange is available at more than 43,000 retail locations in all 50 states. Consumers bring in empty cylinders to exchange for a newly refilled cylinder. Ninety-eight percent of the cylinders can be refurbished for resale, while about 2% are not suitable and must be recycled. Remaining gas vapor is evacuated, captured, and reused, and brass valves are separated for recycling. Cylinders to be recycled are punctured with 2 visible holes and sent to steel recyclers. BR has14 nationally dispersed production facilities across the country where cylinders are refurbished, and manages millions of tanks per year.

The Recycler's Perspective – *David Borsuk, Sadoff Iron and Metal, WI*

David discussed the challenges in recycling small non-refillable cylinders, stating that assurance is needed that propane is removed prior to processing, and stressing that moisture trapped in cylinders has the potential to explode. Dave's experience is that even punctured cylinders cannot find a market because moisture can still be trapped in them. Dave stressed that the margin of error is small but the potential problem significant, and that cylinders should be shred (split). Dave's business uses equipment that shreds cylinders and can process up to 100 tons per hour. (Other participants DID find markets for punctured cylinders, leading the group to understand that there is great inconsistency in the requirements of end markets for acceptance of the scrap cylinders. The relationship between the end markets and their source of cylinders is key. Those with a close relationship might be more flexible in their requirements if they believe they can safely receive scrap cylinders under those conditions. This became a significant issue for the group to resolve moving forward.)

Transportation/Cylinder Disposition – *Tom Daly, Veolia*
Veolia is a waste management company with experience managing all types of gas cylinders from commercial establishments and households. They do not process propane cylinders, but do process inert gas and empty cylinders at the Menomonee Falls facility. Tom stressed the need for proper labeling, storage, and handling of tanks. Identifying the contents of the cylinder is key to how it should be managed, including its regulatory classification. Since it is difficult to determine if a cylinder is empty or full, Veolia treats all cylinders as if they are full.

WI Local Government Cylinder Recycling Program – *Wess Damro, Brown County, WI and President of Associated Recyclers of Wisconsin (AROW)*
Wess Damro provided a local government perspective on cylinder management, stating that most cylinders are disposed in the household trash because there are no easy solutions that are cost-free for local agencies. Wess expressed support for a solution that did not require funding from his agency and did not require the consumer to pay when bringing in the cylinder for recycling. His agency does not take empty cylinders owing to the cost of managing them (from $1.50 up to $25/cylinder based on an informal AROW survey of members), but takes those that have gas remaining through the County's HHW program and puts it in their product reuse area for citizens to take for free. Wess stressed that local governments would prefer a solution that did not require governments with limited budgets to collect. These agencies do not manage cylinders willingly, and use a variety of methods to prepare them for scrap metal recyclers. Due to the lack of infrastructure, there is no standard message to consumers about what to do with the cylinders, some suggesting disposal and others recycling. For this reason, there currently is no rule of thumb for the cost to manage the cylinders in a typical local program (e.g., cost per cylinder or cost per pound). Rick Meyers of Milwaukee mentioned that his city started to collect cylinders owing to dangers of potential explosion from cylinders on the transfer station tipping floor. Rick advocated for cylinder manufacturers to set up a free recycling solution and include the cost in the purchase price of new cylinders.

Yellowstone National Park Cylinder Recycling Project – *Jim Evanoff, National Park Service*
Jim described his efforts to develop a first-in-the-nation pilot project at Yellowstone using prototype equipment (Propane Bottle Recycler) manufactured by Mountain States Environmental, Inc which is capable of processing 1,000 cylinders per day, purging propane (which is used to run the equipment), crushing the cylinder, and punching two visible holes in the unit. The prototype PBR was privately funded with donations from Worthington, AmeriGas, REI, as well as concessioners from both Yellowstone and Grand Teton National parks. There are now four PBR units in operation within the U.S., and the Yellowstone program has expanded into the region around the park. Park visitors dispose of many cylinders at regional airports around Yellowstone before flying home. In 2008, 13,000 cylinders were collected and processed within the Yellowstone/Grand Teton National Park system. Jim has found an end user that considers the crushing and hole-puncture method safe for scrap metal recycling. Jim described the challenge of educating millions of visitors each year who stay, on average, only 1.5 days in the park. Park visitors generate over 4,000 tons of garbage per year. Jim described the park's comprehensive composting and recycling program (a 79% diversion rate in 2008).

Cylinder Recycling in Ontario, Canada – *Joseph Hall, StewardEdge*
StewardEdge is a consulting firm that assists with and implements waste management programs, including gas cylinders, for the Industry Funding Organization, Stewardship Ontario. Ontario is the first to have a province-wide cylinder management program. The province requires manufacturers to currently manage 9 waste types, but will increase to 23 waste types on July 1, 2010. The provincial government approves the performance goals set by Stewardship Ontario, and these are reassessed annually. The collection-rate goals are based on Ontario product sales compared to what is collected for diversion, and are set to increase from 14% in Year 1 to 46% in Year 5. Joseph stressed that a program is only as good as its promotion and education, and collection, transportation, and processing infrastructure. StewardEdge uses the existing collection infrastructure to develop a cost effective program for cylinders, and relies heavily on municipal sites that collect a range of scrap products ("one stop shop"). There are over 100 permanent locations for cylinder collection, as well as municipal collection events. Currently, there are no

commercial collection locations, although there are plans to incorporate those in 2010. For reuse, cylinders must be in the original container, well labeled, and at least half full. The person taking the cylinder for reuse must sign a form committing to proper use and waiving liability. Cylinder collections also take place in 112 Ontario parks for the abandoned cylinders. Although the park system in Ontario has a "pack in/pack out" approach, they still pull 200,000 cylinders per year from trash left behind. The cost to manage cylinders is mitigated by also including battery collection at the same time. StewardEdge provides detailed handling instructions to those collecting cylinders and formally approves each processor. Cylinders processed must first be evacuated of residual gas and then be cut in half (sheered) or punctured, depending on the relationship with the end user.

US DOT regulatory issues in collecting gas cylinders – *Norm Winningham, U.S. DOT*

The Federal Hazardous Materials Law regulates the transport of hazardous materials and provides guidance to determine if a material is safe to transport. US DOT regulations apply to gas cylinder management if the cylinder is considered "commerce." Municipalities do not need to abide by the DOT regulations even though the hazards may be the same as for a material considered commerce. The regulations allow a company to receive a special permit if it demonstrates an "equivalent level of safety" in the transportation of a hazardous material. Norm's role is to be a point person within the DOT, conduct preliminary research, offer safety advice, and conduct unofficial regulatory determinations on transport issues. Norm referred the group to the agency's website: www.hazmat.dot.gov and the agency Info-line at 800-467-4922.

Wisconsin state regulatory issues in collecting gas cylinders – *David Panofsky, WI DNR*

Propane cylinders destined for scrap metal recycling are not regulated as hazardous waste in Wisconsin. Discarded cylinders containing other gases may not be eligible for the scrap metal hazardous waste exclusion, but may be eligible for other hazardous waste exclusions. Persons who transport gas cylinders destined for scrap metal recycling are exempt from most Wisconsin solid waste transporter requirements, although transportation of non-purged propane gas cylinders may be subject to U.S. DOT Hazardous Materials Regulations. Persons who process gas cylinders to produce scrap metal for sale or use are exempt from all Wisconsin solid waste processing and storage facility requirements. In addition, Wisconsin air management permitting requirements may apply, depending on pollutant emissions. Wisconsin has minimal solid waste, hazardous waste, and air management requirements for a well-designed propane cylinder recycling system. In some cases, local governments have decided to separately handle propane (and other gas) cylinders because of safety risks associated with the disposal of cylinders (even consumer empty) with other municipal waste.

Developing a Pilot Cylinder Recycling Program – *Jody McKinley, Worthington Cylinders*

Jody outlined the pros and cons for a range of collection options, and the group discussed these options. Below is a compilation of participant comments related to each option.

Municipal Household Hazardous Waste Locations

Participants mentioned that HHW locations are convenient to some residents because they can bring many items to the location at one time, and they are used to using these existing locations. However, many locations are inconveniently located and open at inconvenient hours. In addition, municipalities do not have the funding to manage cylinders owing to limited budgets. Although Canada relies heavily on municipal collection, costs are fully paid for by manufacturers.

Curbside collection

Participants believed that this method would be very convenient for consumers, and acknowledged that current programs exist for non-hazardous waste (e.g., bottles, cans, newspapers, etc.). However, if cylinders are collected in the curbside bins with other products, there would be a risk of explosion at the recycling facilities where the materials are mechanically and manually separated for processing. There would also be confusion by the public that they should separate the cylinders from other recyclables going into the bin, and there would be considerable cost for this separation. Only 50% of the U.S. population has curbside collection, so this strategy would not work for everybody. Even so, cylinders are a small

portion of the waste stream, so other products are a higher priority for curbside collection. Curbside collection has not been tried in Canada. Overall, there was little interest among participants in pursuing a pilot project for curbside collection.

Retail take-back
This collection method was considered very convenient for consumers, and one participant stated that products should be as easy to recycle as they are to buy. Participants said that retailers that collect cylinders have good potential to develop a positive image as a good community citizen. There is also good potential for increased sales since it gets people into the store. Participants believed that there are greater opportunities for collection outside the store in conjunction with a cylinder exchange program, such as one operated by Blue Rhino or AmeriGas. Some participants believed that in-store collection was more complex owing to the need to train staff, find storage space, and educate about regulations, although there are no permits required for retail cylinder collection. Although REI had a previous bad experience with retail collection, the National Parks Service will soon be partnering with a Wal-Mart store in Cody Wyoming, as well as with sporting goods stores. There are lower regulatory limits on the amount of cylinders allowed to be collected in the store as compared to outside the store, and outside storage limits are not exceeded with the PBR unit since its capacity is under the legal storage limit.

Exchange facilities
This option generated a great deal of interest among participants, since it combined retail collection with an existing collection network. Participants believed that it is best to collect non-refillable one-pound cylinders at retail locations that are already collecting refillable barbecue tanks since those businesses will be familiar with the issue. However, this did not preclude collection at other retail locations in the future. One participant mentioned that consumers will feel more comfortable buying gas cylinders if there is a recycling solution

Parks
Participants viewed parks as a separate collection opportunity that was small compared to the overall need to manage millions of containers. However, operating a successful cylinder program in the parks system can educate millions of people who visit the parks each year, and this knowledge can be transferred to managing cylinders used at other locations.

Other Options: The group saw promise in collecting at "hot spot" locations.

Additional Participant Comments:
- We need a range of solutions for a comprehensive solution.
- The perception of the biggest challenge for cylinder recycling depended on the perspective of the individual. Some participants believed that end user acceptance represented the biggest challenge, whereas others believed that collection locations or education of consumers posed the greatest challenge.
- Some stakeholders wanted to first figure out the best pilot project and solve the problem before discussing who will pay for the system. Local government stakeholders, however, were concerned that, no matter how great the collection system was, it needed to be free for consumers and could not rely on government funding.

Developing a Pilot Cylinder Recycling Program - *Ron Raboin, Worthington Cylinders*

Ron Raboin outlined the following scope for a proposed pilot project: (a) Develop and implement a local, consumer-driven process for recovery and recycling of non-refillable gas cylinders; (b) Carry out the project in accordance with all applicable federal, state and local requirements; (c) Conduct the project in a locality representative of the average buying population based on cylinder sales analysis; and (d) Implement the project over a 12 - 18 month period.

Ron said that the pilot cylinder recycling project should be designed to demonstrate the following:
1. Level of consumer interest in cylinder recycling, and which users are more likely to recycle.
2. Factors necessary to run a process that is sustainable, safe, and retains consumer awareness.
3. Cost per cylinder, including separately tracking offsets from the sale of recovered materials.

4. Achieve a minimum recycling rate of 20% of all cylinders sold annually.
5. No increase in risks posed to scrap metal processors or end users of scrap.
6. Process can be replicated/implemented on a larger scale (e.g., national).

Ron presented the group with ideas to consider as it relates to consumer education, drop-off facilities, collection/transport of cylinders, and cylinder processing. Participants made the following comments:

- Key questions for the pilot are: What do we want to test? What data do we need?
- There should be multiple collection locations that are safe, secure, and convenient.
- We should consider 3 pilot tests: (1) exchanges at retail; (2) HHW facilities; and (3) Parks
- A good pilot project would compare the mobile PBR unit (which decreases transportation cost) to a stationary unit (e.g., exchange processors), which requires longer transportation distances but the ability to process more cylinders in a larger facility.
- We should estimate the number of cylinders in a region that are available for collection. The priority for a project is to go to an area where significant volumes are collected.
- Find the end market early in the process, right after selecting the pilot location, since this is a significant barrier to project success.
- We can't stop the pilot once it has started or this will frustrate the public.
- There will be lower costs collecting from locations that are already collecting cylinders since these locations have already educated consumers. The location for the pilot should be where there are average sales, but recognize that the size of the pilot will affect the pilot cost. The cost analysis should include scale up. One goal of the project should be to determine the normal annual costs to manage cylinders in a community.
- There is a high demand for solving the problem in parks even though the volume available is lower. The parks can serve as a model for collections in higher volume areas.
- Since cylinder sales are cyclical, the pilot should be 12-18 months in duration.
- Education about collection locations can appear at retail, on the product label, and where the consumer needs to dispose of the cylinder. Some education might need to happen outside the pilot area, and we need to account for regional differences in use.
- The pilot should seek to measure the change in consumer awareness and consumer behavior to return the cylinder for recycling, which can be measured through zip code sampling. We should consider financial incentives (e.g., coupons at retail) and ways to make recycling more convenient (e.g., invent an easy cylinder carrying case so they don't flop around in the back of a pickup).
- Use an existing proven cylinder processing facility and recognize that the distance to the processor is key to cost effectiveness.
- Unfold solutions over time, similar to the way that the thermostat recycling program has been developed. We should go after "low lying fruit" first and build the program over time.
- Should we consider developing a universal standard for the acceptance of scrap cylinders by end users, or should we leave it up to the business relationship between the end user and the scrap metal processor?
- One data point should be the number of cylinders collected that still contain product.

Next Steps

At the end of the meeting, participants suggested that the following additional participants would be helpful for the project: more retailers (e.g., Home Depot, Lowe's, Ace, and others selling cylinders), those who use large amounts of cylinders (e.g., HVAC, utilities, plumbers, appliance mfrs), public relations staff from companies, and US DOT engineering staff working on cylinders.

Representatives of Worthington Cylinder said that they will use the feedback provided during the meeting to develop an internal draft design for a pilot project and share it with the stakeholder group for feedback. They expect to come back with a draft in 3 to 6 months.