

**RECYCLE TECHNOLOGIES**  
**ENVIRONMENTAL SUSTAINABILITY REPORT**  
September, 2009

**EXECUTIVE SUMMARY**

As a recycler of antifreeze, Recycle Technologies (RTI) considers itself to be in a “green” industry. It recycles a product that takes a lot of energy to produce, and which can be detrimental to the environment if improperly disposed. **RTI’s existing recycling process generates only one fifth of the greenhouse gases generated by producing virgin antifreeze.\***

RTI is licensed by the Illinois Environmental Protection Agency (IEPA) and has always done its best to comply with or exceed EPA and OSHA requirements. The activities summarized within this report go beyond compliance, and can be considered to be part of RTI’s past and current focus on employing environmentally sustainable practices.

In 2007, RTI installed a distillation process in order to upgrade the quality of RTI’s recycled antifreeze, which now meets or exceeds Original Equipment Manufacturers (OEM) and ASTM specifications. Distillation has allowed RTI to recycle a larger variety of antifreeze waste streams. It has also allowed RTI to provide a more environmentally friendly high quality alternative to virgin antifreeze.

RTI has set a number of objectives to be attained by fall, 2010. The largest expected impacts are in the areas of decreasing electrical, gas and water usage in manufacturing. The full list of objectives is as follows:

- Decrease greenhouse gas emissions per gallon produced by 15%.
- Decrease electricity used per gallon produced by 10%.
- Decrease gas used per gallon produced by 15%.
- Decrease truck diesel used per gallon produced by 10%.
- Decrease water used per gallon produced by 50%.
- Reduce utility costs (gas, electric, water) per gallon produced by 20%.

## SUMMARY BY ENVIRONMENTAL CATEGORY

### Energy: Operations

Approximately two years ago, RTI installed a new distillation process. As part of this installation, the following actions were taken that decrease the effect on the environment:

- Installed 480V power supply which allows for more efficient and longer lasting motors,
- Insulated the distillation system, including piping, tanks and thermal heater. This has decreased fuel usage, improved safety, and created better working conditions,
- Designed installation in a compact area to save on length of piping, improve efficiency, and reduce power usage,
- Installed high efficiency lighting in the new area,
- Use fans during the winter to move hot air from the distillation side of the plant to the other cold side of the plant.

RTI has also taken the following additional actions to decrease energy use in operations:

- Installed double pane clear skylights to provide natural light and cut energy use,
- Buy high efficiency pumps and fans to decrease power usage,
- Use higher efficiency fluorescents for existing lighting fixtures.

RTI is currently implementing or plans to implement the following:

- Install high-efficiency lighting. (Partially Completed)
- Add Variable Frequency Drive to cooling tower fan motor. (Complete)
- Get expert assessment of electrical use in the plant. (Completed)
- Install equipment to improve electrical efficiency at major pumps and motors. (completed)
- Install mechanical system to remove scaling in the cooling tower to reduce water usage and eliminate (or at least minimize) use of chemicals (Completed)
- Engineer and install system to re-circulate cooling water for vacuum pump used in pre-treatment process to reduce water usage (Engineered and partially installed)
- Review and modify product transfer plumbing to improve flow and efficiency to reduce pump loads and to shorten pumping cycles. (Future)
- Install heat recovery system to transfer heat generated in distillation process to heat tanks of incoming antifreeze (Partially engineered — to be installed 4th quarter of 2009)
- Review heat recovery options for exhaust stack on Thermal Heater (In Process)

- Explore opportunities for more efficient scheduling for distillation process. (In Process)

### Energy: Transportation

RTI has several trucks that pick up used antifreeze and deliver recycled antifreeze. The trucks have separate tanks for waste and recycled antifreeze so that the waste material can be picked up at the same time as the recycled antifreeze is delivered. RTI uses truck routing software and onboard GPS in order to route trucks efficiently and thereby decrease diesel consumption.

RTI's truck engines are left running most of the time, because the pumps work only when the truck engines are on. RTI investigated whether a smaller separate motor could be used to provide power for the pumps, and discovered that this is currently not a viable option. When RTI replaces trucks, we will determine if a new option has become available.

New trucks will probably have a larger tank capacity that will allow RTI to service more and larger clients while taking fewer trips. Drivers will be encouraged to turn off the truck engines whenever it is feasible to do so.

RTI frequently picks up waste antifreeze from a variety of small car/truck repair establishments that may only have one or two drums of antifreeze at a time. RTI provides their clients with clear or opaque drums so that their clients can easily see when it is time to reorder and avoid inefficient rush orders.

### Energy: Buildings

RTI does not use a lot of energy for heating/cooling its building. The manufacturing area is heated but not cooled, and the office space is relatively small. We will investigate whether to replace the existing air conditioner and heater with newer, more efficient models.

### Climate Change

The climate change impact at RTI is driven primarily by the use of gas and electricity during the manufacturing process, and to a smaller degree the diesel fuel used in picking up and delivering the antifreeze. The manufacturing process is energy intensive and therefore has a climate change impact. However, it generates approximately only one fifth of the greenhouse gases generated by producing virgin antifreeze.\*

### Water/Groundwater

Cooling water is cooled through evaporation during the distillation process and then released into the atmosphere through a cooling tower. RTI is investigating using a heat

exchanger (particularly during the winter months) to use the hot water to warm the cold waste antifreeze. This would not only save on water usage, but would decrease the amount of energy used for heating and processing the cold waste input.

Water is used to continuously cool a vacuum pump; the warmed water is then poured into a drain. RTI is looking into a water cooling/recirculation system, where the same cooling water would be continuously reused.

RTI has installed secondary containment and epoxy floors in order to contain any spills from the tanks holding waste or recycled antifreeze.

The biggest threat to groundwater is by the end user – the home mechanic who dumps used antifreeze into the sewers. RTI has no direct control over this, but is looking for ways to further encourage the return of waste antifreeze to auto repair shops or car parts stores.

Auto repair shops currently purchase approximately two times more antifreeze than they return in used antifreeze. A higher recycling rate is desirable from both an environmental perspective as well as a business perspective, since RTI needs adequate waste stream resources so that it can recycle enough antifreeze to meet the needs of its clients. RTI would like to increase the proportion of used antifreeze which is returned for recycling, but feels that there's a limit to how much we can affect client and end user behavior.

RTI tracks how much waste antifreeze is provided by its clients, and can generate an audit trail showing how much was purchased and how much was recycled. This helps RTI to analyze where it might need to focus to improve recycling rates. It can also provide this to clients for their own sustainability efforts or in case of an EPA audit.

### Chemicals/Toxics

Non-hazardous still bottoms from the distillation process are shipped to a cement kiln for use as fuel. The cement kiln, which is licensed by the EPA to burn hazardous material, scrubs out the chemicals from being released into the air.

RTI will install an electrolysis system to decrease the use of chemicals and water.

RTI's first stage of recycling uses diatomaceous earth to filter out any solid materials and oils, in order to make the distillation process run more efficiently. The post-process diatomaceous earth has been tested and passed EPA requirements for disposal with regular waste. RTI will continue this mode of disposal until it finds a better way to reuse or dispose of the material.

### Air Pollution

The new distillation process substantially decreases emissions into the outside air as well as inside the plant. The air quality in the plant is improved, leading to a healthier and more pleasant working environment.

### Waste Management

RTI has implemented a recycling plan for recycling cans and office paper. RTI will replace bottled water with reusable water bottles that can be filled from a water cooler.

RTI reuses the drums from additives by distributing them to clients who need drums for collecting waste antifreeze.

### Other Environmental Categories

A number of other environmental categories are not directly or significantly impacted by RTI's manufacture or distribution of antifreeze.

- Other than water, RTI does not utilize any source materials that should be considered for resource conservation.
- RTI does not utilize any chemicals that have a significant impact on the ozone layer, or that are considered hazardous materials.
- RTI operations do not directly impact oceans or lakes. Antifreeze which is dumped into sewers may have a negative impact on rivers, lakes, and eventually oceans. This issue was discussed under the section "Water/ Groundwater."
- RTI has a relatively compact processing plant in an existing industrial area, and as such it does not have a significant negative impact on deforestation, wetlands or biodiversity.

\*From *Life Cycle Assessment of Ethylene Glycol and Propylene Glycol Antifreeze*, February, 1996, available at <http://www.sae.org/technical/papers/96102>.