Equistar Chemicals

CASE SUMMARY 5

EQUISTAR CHEMICALS, LP

Clinton, Iowa
Clinton County

Intern: Abby Hancock
Major: Chemical Engineering
School: Iowa State University

The Company

Equistar Chemicals, LP, is a joint venture of Lyondell and Millennium Chemical companies. The Clinton Equistar plant converts ethane and propane gases into three main products: ethylene, high density polyethylene (HDPE) and low density polyethylene (LDPE). The plant produces plastic resins that are sold to become common household products, such as plastic toys or plastic milk cartons. The Clinton location is one of 16 sites owned by Equistar Chemicals, LP, which is headquartered in Houston, Texas. Equistar has 10 facilities along the Gulf Coast and six facilities in the northern region of the U.S. The Clinton plant is one of the largest employers in Clinton County, employing 330 people and providing nearly $34 million annually in payroll and benefits.

Project Background

The facility had fugitive emissions sources that needed to be quantified. The intern worked to calculate the flow rate and the speciation of two fugitive emission sources: from one of the extruders in the low-density (LD) area and from the primary compressor vents for the low-density area. By quantifying the Volatile Organic Compounds (VOCs) leaking, the company will be able to save money in lost product potential and comply with EPA regulations. The intern also performed preliminary work on fugitive emissions of gases released from the pellets after production.

Incentives to Change

Equistar is ISO 9000 certified and currently has an Environmental Management System in practice. The facility is concerned with health, safety and the environment and desires to control known fugitive emission sources in the plant. By identifying which sources are the largest contributors to these emissions, prioritized efforts can be made to reduce emissions from these sources.

Results

The extruder emissions can be minimized to almost zero by installing a double lip seal on the rear of the extruder. The installation cost to the company would be approximately $30,000, but

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would save $10,300 yearly in lost product. If Equistar were able to put similar seals on all of the extruders, nearly $61,700 would be saved annually, and this source of emissions would be eliminated. The addition of the lip seals is a recommendation.

The compressor vent emissions could be minimized by routing the vent outlets to the company flare. There are plans to install a line to the flare from near this location during the summer of 2005. Although the costs of this project are significant, the emission reduction potential is also significant. The flare tie-in is a recommendation and the company is considering implementation within the next year.

Another alternative for conversion of the VOCs from the compressor vents into carbon dioxide would be to install a regenerative thermal oxidizer (RTO). The RTO works by converting the VOCs into carbon dioxide and water by means of high temperature thermal oxidation. The heat released from this oxidation can be used to fuel the system and will save on utility costs. This option has a much higher installed cost than use of the flare and thus will not be pursued.

Preliminary work was done on fugitive emissions from the pellets. Further study is recommended in order to achieve the ultimate goal of this project: pollution prevention at the source through process controls. The work done by the intern was a valuable first step for the company in working toward this goal.