

# Terra Industries

CASE  
SUMMARY

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## TERRA INDUSTRIES, INC. PORT NEAL CORPORATION

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### The Company

Terra Industries is a leading manufacturer of nitrogen fertilizer, with over \$1 billion in annual sales of nitrogen products worldwide. At the Port Neal plant, ammonia, UAN solution and urea liquor are manufactured for retail sale. Transition products include nitric acid and ammonium nitrate.

### Project Background

The purpose of Terra Nitrogen's P2 summer intern project was to reduce the environmental impact of the company's operations while increasing efficiency and reducing costs. The main goals of the project were to reduce oil usage and reduce ammonia emissions.

### Incentives for change

Terra has shown itself to be a steward of the environment, continually taking measures to lessen its impact on the environment. Terra has completed the following projects: selective catalyst reduction projects for both nitric acid plants; wastewater evaporator project coupled with a ground water remediation project; ammonia recovery project; wastewater recovery projects; high pressure condensate stripper project to recover methanol; ammonia flare for reduction of fugitive emissions; an extensive ditch and pond system for better control of wastewater discharges; and numerous efficiency projects not related to specific environmental issues, but improving the use of resources. Terra's TRI emission reports have shown a reduction from 4.5 pounds per ton of product to .89 pounds of emission per ton of product in the past 15 years.

### Results

#### 1. Oil usage

Currently, Terra uses Teflon packing and oil for sealing and lubrication of ammonia pumps in the ammonia plants. An alternative form of packing is available, manufactured by Slade and made of graphite and Kevlar. The graphite packing provides lubrication by the material of construction, rather than by oil injection, and seals against ammonia leakage.





According to the manufacturer, the life of the packing is in excess of one year, as opposed to 10 sets of packing used annually per pump with the existing method. In addition to eliminating 9,000 gallons of oil used to lubricate the pumps and all the collection and disposal problems associated with that, less time would be spent repacking the pumps.

## 2. Ammonia emissions

Producing urea is part of Terra's process. In the urea plant, the vent stack from the urea liquor stripper condenser was identified as a source of ammonia emissions. After testing and sampling to determine the amount of ammonia released, the exhaust gas was redirected to another part of the process, thereby emitting less ammonia to the atmosphere.

## 3. Oil collection and disposal

To remove oil from the wastewater ditches, Terra has been using both oil absorbent booms and oil skimmers. Booms, absorbent or not, are intended to contain oil; therefore booms make the oil skimmers working downstream less effective. A recommendation was made to eliminate the use of absorbent booms and allow the oil skimmers to collect all waste oil. The booms are more costly than the skimmers and are not as environmentally friendly. The oil removed from the water by the oil skimmer can be reused after collection by other companies.

## 4. Steam emissions

It was noted that steam leaks occur throughout the plant. Due to the continuous operation of the plant throughout the year, the cost of steam leaks compile quickly. It was recommended that employees receive training to note these leaks and take steps to eliminate them.

## 5. Tank vent emissions

Two other stacks, vent stacks from the urea storage tank and from an ammonia condensate tank, were identified as possible ammonia emission points. At current operating conditions, the total emissions of the two stacks were determined to potentially be 850 tons of ammonia annually. Terra is now investigating reasons for the high rate and possible improvements to the process. In addition, methods to divert the stream and eliminate the emissions are also under evaluation.

Project Summary Table

P2 Opportunity	Waste Reduced/ Raw Materials Saved	Annual Savings	Status
Urea liquor stripper condenser	173,000 pounds emissions	\$30,275	Being implemented
Oil usage	9,000 gallons oil	\$56,376	Being implemented
Remove booms	60 barrels oily waste	\$3,600	Implemented
Steam emission	215,000 gallons water	\$100,000 +	Recommended
Tank vents	Potential emissions	\$297,500	Further research necessary*
TOTALS		\$487,751	

\* Engineering study currently in place to capture the vapors.