Pollution Prevention Institute

CAPPS MANUFACTURING

Intern: Aiden Moore
Major: Industrial Engineering
School: Kansas State University



Company background
Capps Manufacturing is a Wichita-based, privately owned aerospace manufacturing company dedicated to being the preferred supplier of aircraft detail parts, components and assemblies. Capps operates a single facility across four buildings and employs 168 people.



Project background
Capps is constructing a new in-house chemical mill to bring its raw-material-to-finished-product process fully in-house rather than outsourcing chemical milling to out-of-state vendors. Projects investigated include a waste-efficient chemical tank liner, radar-based water level automation, a tank decanting system, filter press chemical recovery, a maskant recovery system and a compressed air audit.

Incentives to change
Because the chemical milling process uses powerful, chemically volatile solutions, Capps utilized the pollution prevention intern to help ensure the new mill is lean and efficient from the outset, avoiding unnecessary waste that would otherwise need to be addressed later. Many of the proposed waste-reduction projects also reduce costs, giving Capps strong financial incentives alongside its environmental goals.

PROJECTS REVIEWED FOR P2 POTENTIAL

Chemical mill tank liner
Installation of an Inconel 625 liner in the primary chemical tank was recommended to increase run time between leak checks while decreasing waste production. Inconel 625 outperforms alternatives such as 316 stainless steel and Chlorinated Polyvinyl Chloride on weld life, cost per year, and total waste generated. The liner would prevent 7,436 gallons of hazardous waste from being produced annually while saving $349,627 per year in disposal and purchasing costs. The payback period is approximately six months.

Water level automation
Manual overnight refilling of the chemical mill and paint line tanks occasionally results in overflow due to human error. This overflow results in diluted chemical batches and forces costly disposal and replacement. The intern identified radar-level sensors (Keyence) that automatically detect minimum and maximum fill levels and integrate with Capps' existing Programmable Logic Controller system. Ten sensors cost $8,000 total. Preventing even a single diluted-tank event ($25,000 in cleanup, disposal, and replacement) recovers this investment many times over. The system is estimated to save $50,000 per year and reduce hazardous waste by 11,500 gallons annually. Implementation is 10% complete, with one sensor purchased and undergoing testing.

Tank decanting
Rather than fully draining and replacing the 5,750-gallon etching tank every four months, a decanting system would remove smaller volumes weekly, allowing spent solution to be treated on site and returned to the city water system at virtually no disposal cost. This eliminates $686,182 in annual bulk disposal and transportation costs. Decanting produces roughly 5,000 more gallons of waste per year than full-tank dumps, but this additional waste is offset by the filter press project and improved milling quality, since smaller, more frequent decants prevent the buildup of unusable sodium aluminate that causes uneven milling and scrapped parts.

Filter press chemical recovery
Decanted solution can be run through Capps' existing filter press to separate out unusable sodium aluminate (as a filterable solid) from the still-usable NaOH, Na2S, and Triethanolamine, which can be returned to the tank. At a conservative 20% recovery rate, the filter press still offsets the additional waste created by decanting; at a target 50% recovery rate, it saves $17,551 per year and recovers roughly 11,110 gallons of usable chemical annually. Because Capps already owns a working filter press, implementation cost is minimal.

Maskant recovery system
An in-house solvent-recovery system to reclaim spent maskant was investigated but is not recommended in its original form. Most recovery systems require heating the maskant until it returns to a liquid state, but the manufacturer does not disclose its melting point. Melting it could also unpredictably alter its chemistry. When the maskant is in liquid form, it is highly volatile, requiring an explosion-proof room and constant agitation. Further research is recommended for an alternative approach: selling spent maskant back to the supplier for external reprocessing.

Compressed air audit
An audit of the paint line's aging compressed air system identified several moderate leaks. Each year, these leaks are estimated to cost the company $8,261, an energy loss of 68,839 kWh, 31,391 lb. of CO_2, 30 lb. of NOx and 4 lb. of SO_2. Repair costs for the identified leaks are negligible, but the audit also surfaced a persistent 30 decibels ambient reading suggesting additional unidentified leaks throughout the system. More research is needed to determine whether the broader compressed air system warrants full replacement.

SUMMARY OF 2026 INTERN RECOMMENDATIONS

Project	Annual estimated environmental impact	Estimated cost savings ($/year)	Status
Chemical mill tank liner	7,437 gal. hazardous waste reduced	$349,627	Recommended
Water automation	11,500 gal. hazardous waste reduced	$50,000	In Progress (10% Completed)
Tank decanting	5,000 gal. hazardous waste produced	$686,182	Recommended
Filter press	11,110 gal. usable chemicals recovered	$17,550	Recommended
Maskant recovery system	N/A	N/A	More research needed
Compressed air audit	68,839 kWh 14.2 $MTCO_2e$	$8,261	More research needed
Total[1]	**25,047 gal. hazardous waste reduced 11,110 gal. usable chemicals recovered**	**$1,103,359**	
GHG reductions[1,2]	**188 $MTCO_2e$**		

[1]Does not include projects where "More research needed."
[2]EPA P2 Calculator for Reductions in Hazardous Substances, Pollutants and Contaminants & Waste Reduction Model version 16, December 2023