



Northern Engraving Corporation

Cooperative Environmental Agreement
Annual Report 2017

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Northern Engraving Corporation

Introduction

On June 10, 2002, the Wisconsin Department of Natural Resources (WDNR) and Northern Engraving Corporation (NEC) signed an Environmental Cooperative Agreement that included the NEC facilities in Sparta and Holmen, Wisconsin. This Agreement was amended on June 23, 2003, to include West Salem, Wisconsin, facility. It was established and is maintained pursuant to Section 299.80, Wis. Statutes, to evaluate innovative environmental regulatory methods including whole-facility regulation.

On June 7, 2007 the WDNR and NEC signed a five year extension to the Environmental Cooperative Agreement. On September 4, 2007 an amendment to the extended Cooperative Agreement was signed by both parties. Correspondence between Northern Engraving and the WDNR resulted in mutual agreement to continue under the Cooperative Agreement until entry into Green Tier.

Northern Engraving Corporation remains an active and dedicated steward of the environment. Internally, the environmental policy commits the company to meeting environmental compliance obligations, reducing waste and continually improving. The Cooperative Agreement manufacturing facilities are registered to the international environmental standard, ISO 14001. Corporate registration is maintained through successful annual audits from our third-party registrar SAI Global. The environmental management system includes processes to analyze environmental impacts, set objectives and targets, develop supporting programs, review results and redirect efforts. By using these tools and developing employee involvement, each facility has experienced ongoing success (See Appendices).

Collective Summary of 2017

Data from the baseline calendar year of 1996 and calendar year 2017 show that plant emissions of volatile organic compounds (VOC) and hazardous air pollutants (HAP) from the three Cooperative Agreement facilities decreased 67% (101 tons) and 93% (109 tons), respectively.

In 2017, these facilities used 75% less water than in 1996.

Comparing 1996-2017, the three Cooperative Agreement facilities' generation of hazardous and solid wastes decreased 70% (41,188 gallons) and 78% (1,231 tons), respectively. Non-hazardous waste increased by 609 gal compared to 1996. Reformulation of some solvent based materials to waterbased contributed significantly to the reduction in hazardous waste. The change also resulted in higher non-hazardous waste levels.

One of the three facilities experienced production increases during 2017. In comparing the three facilities' 2017 emissions to 2016, VOCs decreased 9% (9.4 ton/year) and HAPs increased 3.4 tons/year. Solid Waste decreased 8% (28 ton/year) and non-hazardous waste decreased 13% (510 gallons).

The environmental management system was instrumental to the success of the corporation's environmental initiatives. In 2017, the Cooperative Agreement facilities set a total of seven objectives with nine targets. Some of the significant environmental successes of 2017 were water usage reduction at Holmen; yield improvement efforts at West Salem and screening equipment replacement at Sparta.

Cooperative Agreement Report

Interested Persons Group

On July 25, 2017, the Northern Engraving Interested Persons Group, represented by Tom Nowakowski, Scott Halbrucker, DeLite Culpitt, Darrell Zietlow, Mary Goodman, and new members Barb Zabinski and Mark Van Wormer met in Sparta. The meeting included a review of the results from the previous year's environmental efforts, business updates, environmental objectives and targets for 2017 and audit results. An electronic copy of the information presented was sent to Scott Lindemann, Darlene Pintarro, and Dean Olson not in attendance at the meeting.

On December 21, 2017, the Northern Engraving Interested Persons Group, represented by , Scott Halbrucker, Darlene Pintarro, Dean Olson, Scott Lindemann, Darrell Zietlow, Barb Zabinski, Mary Goodman, DeLite Culpitt and new member Cathy Whaley met in Sparta. The meeting included 2017 updates regarding environmental projects and efforts toward the environmental objectives and targets for 2017 and Air Permits for 2017. An electronic copy of the information presented was sent to Mark Van Wormer and Laurel Sukup (representing the DNR) not in attendance at the meeting.

Commitment to Superior Environmental Performance

Internal audits of the environmental management system continue to be conducted at each facility. These audits are conducted by trained auditors from corporate headquarters or Northern Engraving manufacturing facilities. During 2017, Northern Engraving successfully maintained a Corporate ISO14001 registration. At each facility a registration audit of the Environmental Management System was conducted by a third party audit team. These audits totaled seven person days. No non-conformities were issues for Northern's Wisconsin facilities.

For the three facilities a total of twelve opportunities for improvement were identified. These were evaluated and implemented where determined to be of benefit.

The third-party auditor also provided many positive comments.

Compliance

On 1/9/17 the WI DNR conducted a hazardous waste generator inspection at the West Salem facility. Mislabeled used oil was relabeled correctly.

On 1/10/17 the WI DNR conducted a hazardous waste generator inspection at the Holmen facility. There were no non compliances found.

On 6/26/17 subcontractor for the Wisconsin Department of Aquiculture, Trade & Consumer Protection conducted an underground tank inspection at the Sparta facility. There were no violations found.

On 7/26/17 the WI DNR conducted Stormwater inspections at West Salem, Holmen and Sparta. No exposure declaration approvals are pending.

Operational Flexibility

(For a brief explanation of acronyms and terms, see the glossary at Appendix 5)

Time saved in obtaining air permits

Time saved by the reduction in record keeping and administrative requirements

These were established during the first year of the agreement and are as follows:

<u>Requirement Eliminated:</u>	<u>Approximate Time Saved:</u>
Calculations for demonstrating RACT compliance	
West Salem	3.5 hours/day
Sparta	2.5 hours/day
Calculation of VOC and HAP emissions	.75 hr/day per facility
Compiling formulas for demonstrating LACT compliance	
Sparta	10 hr/month
Holmen	10 hr/month
West Salem	20 hr/month
Discontinuation of reporting the above calculations as part of the annual monitoring summary.	10 hr/yr per facility

Energy savings from avoiding the use of the thermal oxidizer

Prior to the Cooperative Agreement, West Salem was required to operate two thermal oxidizers and Sparta was required to operate one thermal oxidizer from May 1 through September 30 to meet permit requirements. It is estimated that West Salem and Sparta avoided the usage of over 2400 MCF and 2500 MCF/month respectively, of natural gas associated with thermal oxidation for RACT.

Overall Assessment of the Success of the Agreement

For NEC the Cooperative Agreement continues to be a valuable tool for competing in an ever changing and highly competitive, global marketplace. The environmental management systems at Sparta, West Salem, and Holmen all over ten years old. As mature, successful systems they must concentrate on retaining environmental improvements while searching in their processes for innovative pollution prevention and waste reduction measures. The time saved, as a result of this agreement, allows NEC personnel to devote more of its effort toward pollution prevention and waste reduction measures. Reducing waste not only benefits the environment, it also helps NEC to contain its costs.

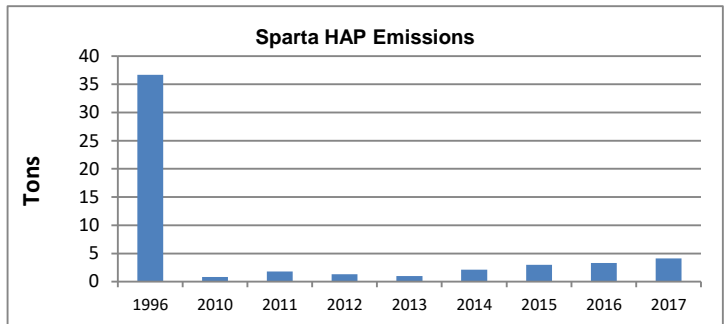
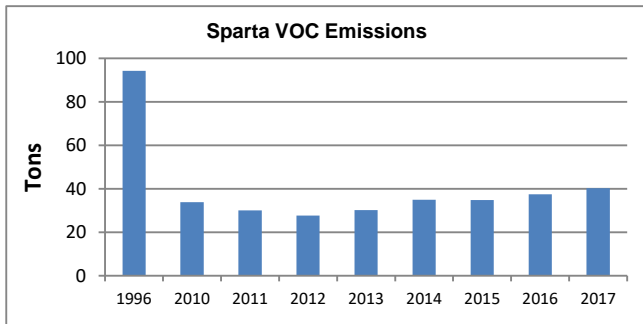
A strong working relationship has been developed with the Wisconsin Department of Natural Resources (WDNR). NEC values this working relationship and looks forward to it continuing.

Appendix 1: Sparta

Air Emissions (Tons)

	1996	2010	2011	2012	2013	2014	2015	2016	2017
VOCs	94.3	33.8	30.1	27.7	30.2	35.0	34.8	37.5	40.2
Clean Air Act HAPs	36.7	.8	1.8	1.3	1.0	2.1	3.0	3.3	4.1
NOx	5.70	4.47	3.98	3.50	3.84	3.86	3.65	3.81	3.68
CO	1.20	3.69	3.30	2.93	3.20	3.09	3.06	3.18	3.06

VOC and HAP emissions went up because of increased coating and screening activity.



Hazardous Waste Generation

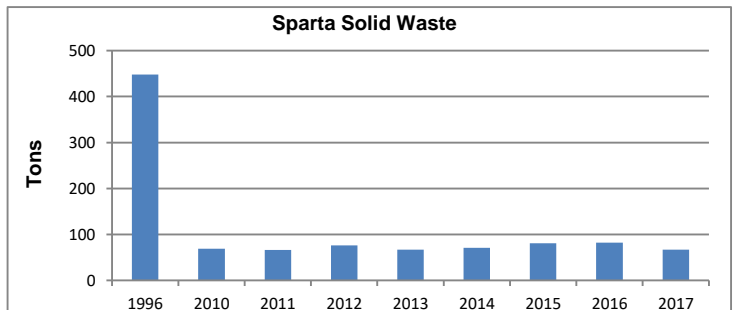
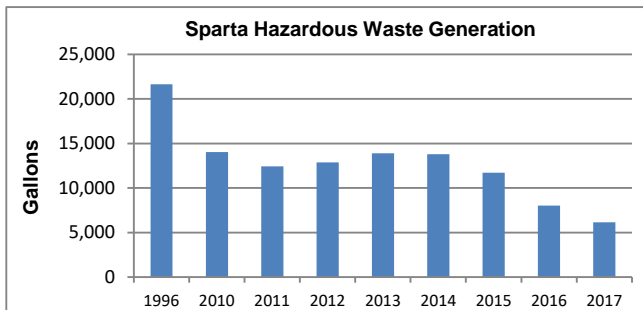
	1996	2010	2011	2012	2013	2014	2015	2016	2017
Gallons	21,639	14,025	12,440	12,889	13,900	13,805	11,715	8,043	6,160

Hazardous waste decreased due to less etching.

Solid Waste

	1996	2010	2011	2012	2013	2014	2015	2016	2017
Tons	448	69	66	76	67	71	81	82	67

Solid waste dropped off following two previous years of plant cleanup efforts.



Appendix 1: Sparta

Non - Hazardous Waste Generation

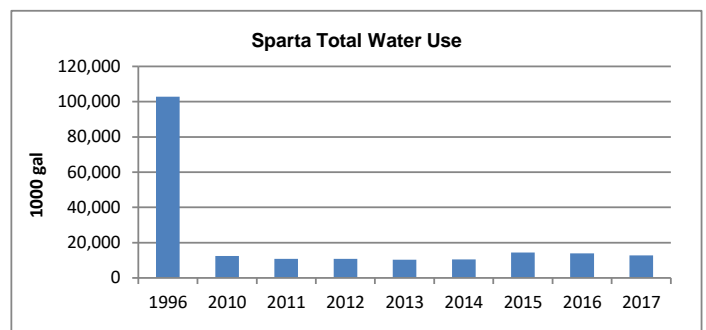
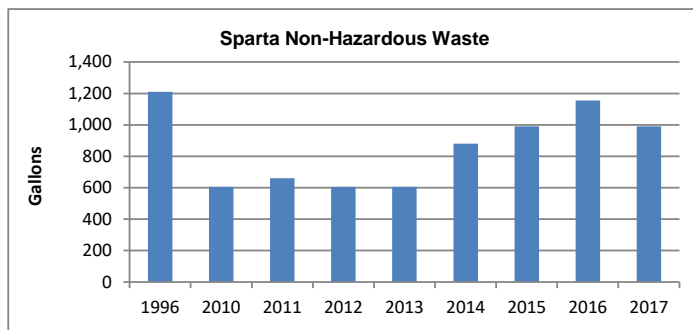
	1996	2010	2011	2012	2013	2014	2015	2016	2017
Gallons	1,210	605	660	605	605	880	990	1155	990

The decrease in non-hazardous waste was a result of less waterbase adhesive.

Water Use

	1996	2010	2011	2012	2013	2014	2015	2016	2017
Total Water 1000 gal	102,783	12,413	10,900	10,783	10,268	10,426	14,380	13,970	12,860

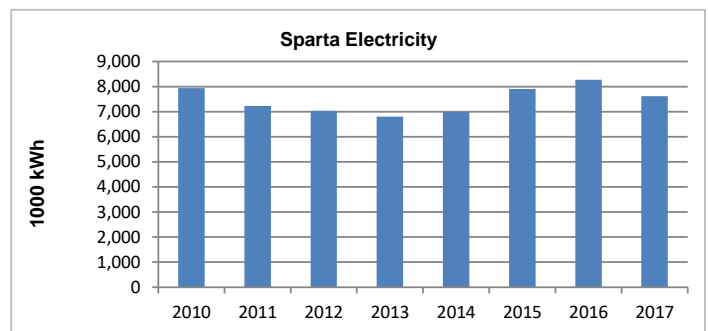
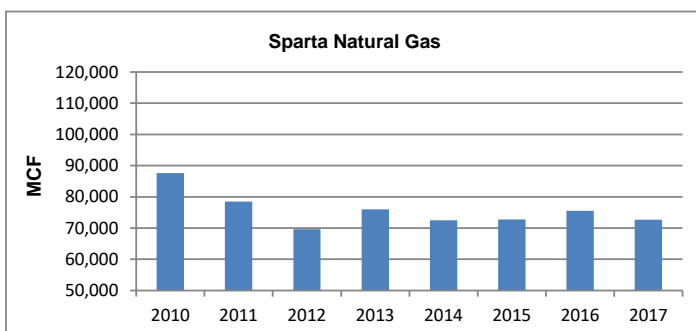
Water reduction efforts helped with the decrease in overall water use.



Energy Use

	2010	2011	2012	2013	2014	2015	2016	2017
Natural Gas (MCF)	87,655	78,469	69,620	76,035	72,484	72,759	75,559	72,723
Electricity (1000 kWh)	7,943	7,222	7,027	6,799	6,981	7,908	8,272	7,612

Natural gas and electricity use decreased due to less production hours.



Appendix 1: Sparta's Objectives and Targets Program

Results for 2017

Objective 1: Improve plant product yield in sheet decoration and metal forming areas.

Yield improvement activities included installing two new screen machines to improve ink laydown, reduce ink and solvent use; installing a new oven in the Screening Department which reduced dirt rejects. Replacing a spin machine lowered grit content in the associated washer reducing scratches; the lubricant is recirculated, saving material and disposal.

The sheet prep process was reviewed. To reduce contamination incoming stock was rerouted. Better preventative maintenance was implemented. The process line was modified to eliminate a conveyor turn and a cleanroom was put in place.

Objective 2: Reduce Facility Water use by optimizing washer water use.

Reviewed and updated 11 Visual Standard Work Instructions for washer start up and shut down, added solenoids to three presses and attached labels to presses to turn water on and off, added a person to do daily washer checks (review of running washers and report issues.)

Objectives and Targets for 2018

Objective 1: Improve plant product yield, reduce reject rate to YTD Average of 18% by end of CY2018

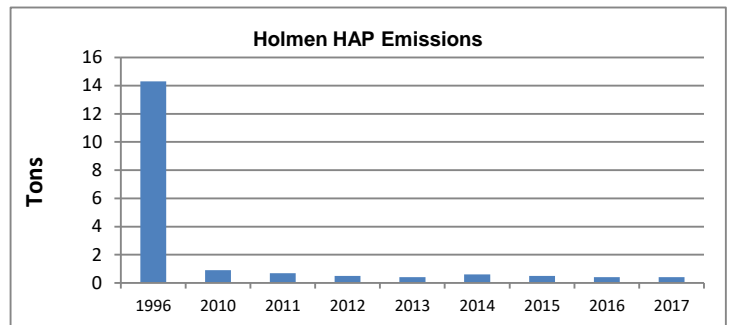
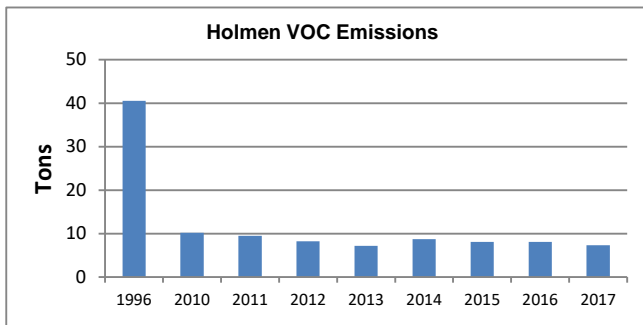
Objective 2: Reduce facility hazardous waste; reduce ink waste by 5% and reduce solvent waste by 5%, CY2018 vs CY2017.

Appendix 2: Holmen

Air Emissions (Tons)

	1996	2010	2011	2012	2013	2014	2015	2016	2017
VOCs	40.5	10.2	9.5	8.2	7.2	8.7	8.1	8.1	7.3
Clean Air Act HAPs	14.3	.9	.7	.5	.4	.6	.5	.4	.4
NOx	1.0	.60	.58	.41	.51	.49	.39	.36	.35
CO	.20	.12	.11	.08	.10	.10	.08	.07	.69

Production in screening lessened, resulting in a drop in VOCs.



Hazardous Waste Generation

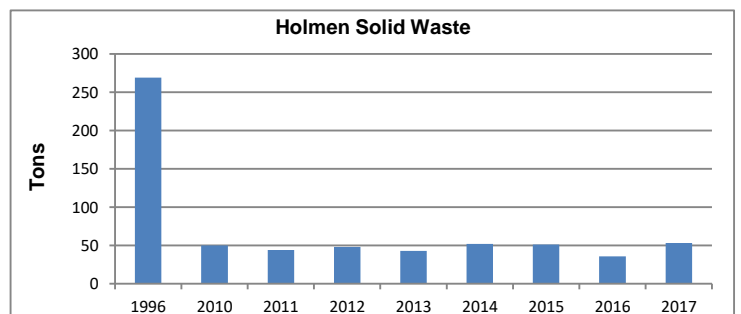
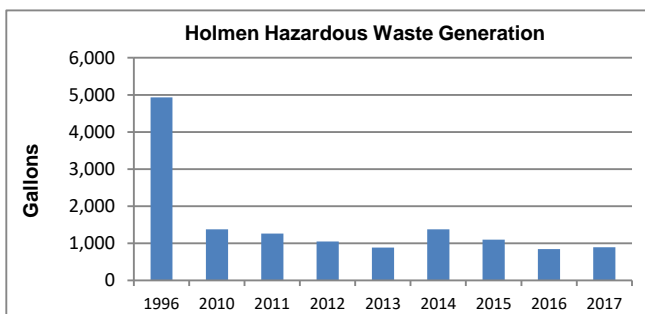
	1996	2010	2011	2012	2013	2014	2015	2016	2017
Gallons	4,929	1,375	1,265	1,045	888	1,375	1,100	841	890

Less hazardous waste was generated from printing, however with obsoleted material disposal, the overall total increased.

Solid Waste

	1996	2010	2011	2012	2013	2014	2015	2016	2017
Tons	269	50	44	48	43	52	51	36	53

Solid waste increased due to pallets disposal with other solid waste. Starting mid 2017 excess pallets were stored and available to employees.



Appendix 2: Holmen

Non - Hazardous Waste Generation

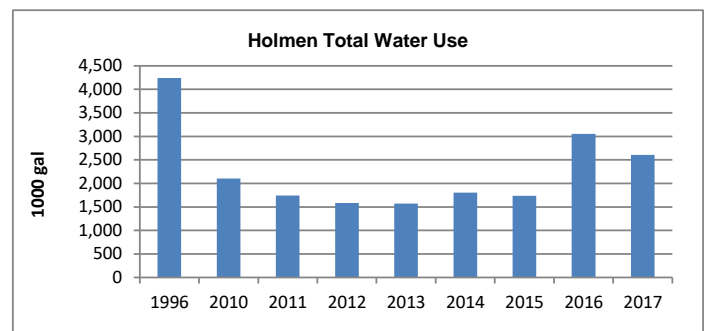
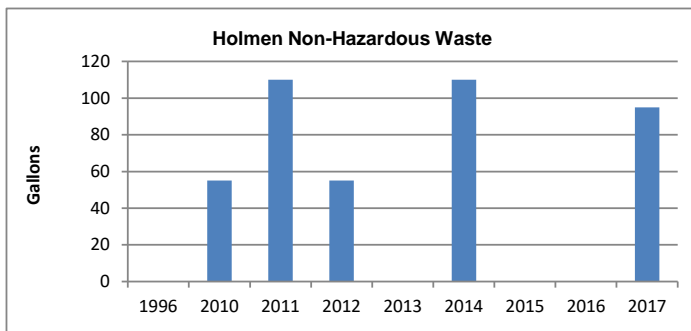
	1996	2010	2011	2012	2013	2014	2015	2016	2017
Gallons	0	55	110	55	0	110	0	0	95

Some obsolete materials were disposed of in 2017.

Water Use

	1996	2010	2011	2012	2013	2014	2015	2016	2017
Total Water 1000 gal	4,242	2,104	1,745	1,581	1,574	1,806	1,739	3,051	2,606

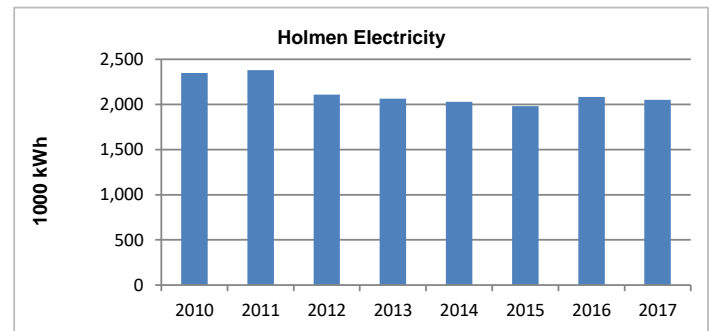
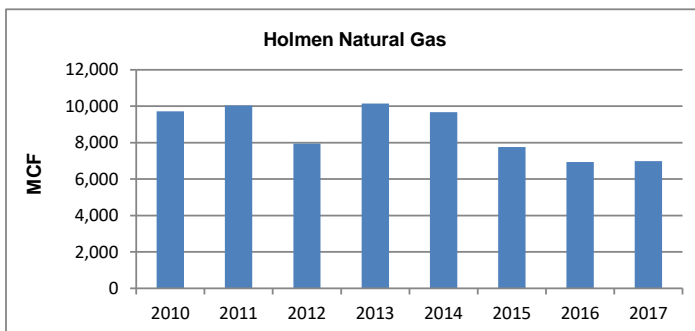
Water use dropped off as a result of optimizing water use in washers and hydraulic presses, an environmental focus for 2017.



Energy Use

	2010	2011	2012	2013	2014	2015	2016	2017
Natural Gas (MCF)	9,721	10,030	7,955	10,154	9,681	7,760	6,945	6,982
Electricity (1000 kWh)	2,348	2,380	2,108	2,065	2,029	1,981	2,085	2,051

Natural gas usage held steady while electricity dipped slightly.



Appendix 2: Holmen's Objectives and Targets Program

Results for 2017

Objective 1: Reduce facility water use by optimizing water usage for washers and hydraulic presses

Water flow meters were installed on washers, hydraulic presses and a CST. Water flow rate for each unit was evaluated and reduced to an optimal rate. Visual instructions showing the optimal water flow rate were posted at each unit. A procedure was developed for turning on/off the water on hydraulic presses. Employees were trained.

Objective 2: Improve plant product yield by achieving yields as reflected in urgent turnaround projects.

Yield improvement efforts included implementing a maintenance plan for dies that remain in place in the punch press. Employees started in place die inspections and maintenance. Oven cleaning using best practice was conducted. Adding an additional screening step to one job improved the yield significantly. Suspect reject parts are inspected a second time to determine status. Template for backlit parts allows for inspection of the lit section. A change to UV ink for a multicolor layered part helped reduce rejects.

Objectives and Targets for 2018

Objective 1: Maintain plant product yield at 92% YTD average.

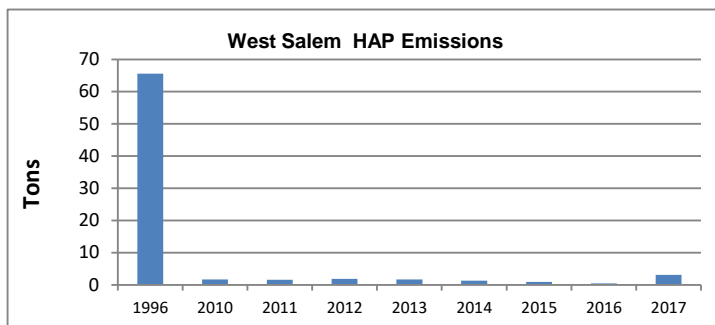
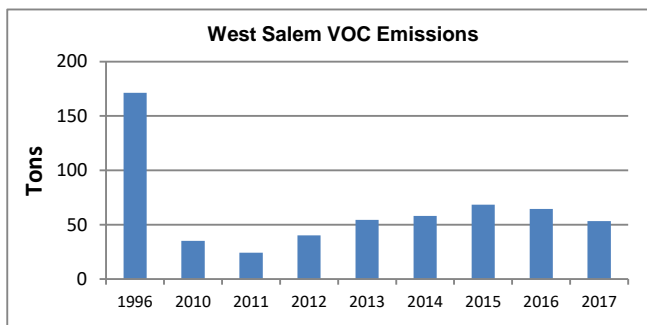
Objective 2: Reduce facility energy use by replacing air compressor and promoting energy conservation to employees.

Appendix 3: West Salem

Air Emissions (Tons)

	1996	2010	2011	2012	2013	2014	2015	2016	2017
VOCs	171.3	35.1	24.3	40.3	54.5	58.2	68.3	64.5	53.2
Clean Air Act HAPs	65.6	1.7	1.6	1.9	1.7	1.3	0.9	0.5	3.1
NOx	1.50	2.52	2.92	2.95	3.14	3.38	3.75	3.54	3.21
CO	.34	1.11	1.23	1.24	1.35	1.62	2.01	1.88	1.60

The decrease in VOC emissions was the result of less spraying.
HAPs increased due to HAP content detail on material information.



Hazardous Waste Generation

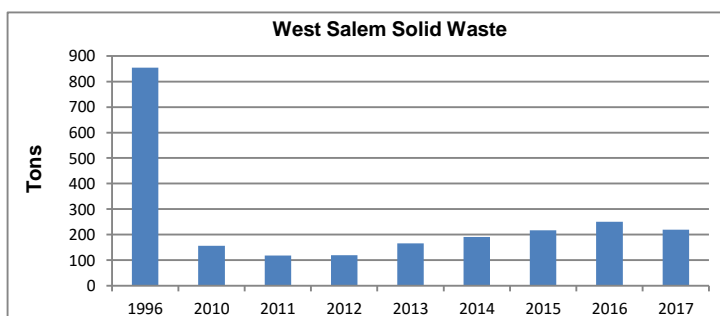
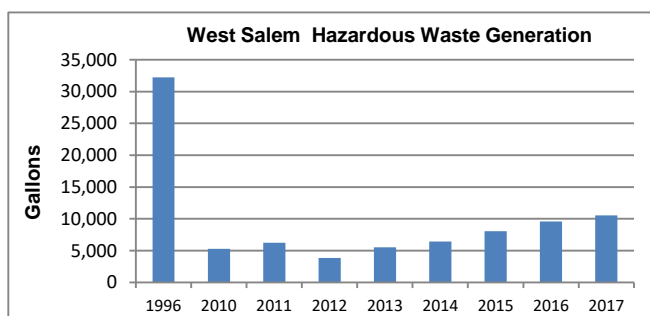
	1996	2010	2011	2012	2013	2014	2015	2016	2017
Gallons	32,230	5,295	6,250	3,867	5,529	6,435	8,030	9,570	10,560

Increased coating process cleanup activity resulted in more hazardous waste.

Solid Waste

	1996	2010	2011	2012	2013	2014	2015	2016	2017
Tons	854	156	118	120	166	191	217	250	220

Solid waste level dropped to near 2015 level following the 2016 spike.



Appendix 3: West Salem

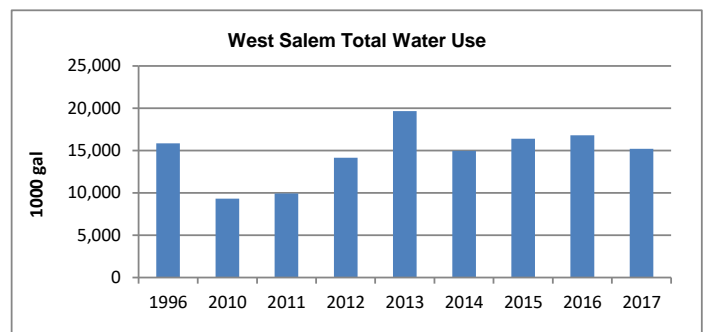
Non - Hazardous Waste Generation

	1996	2010	2011	2012	2013	2014	2015	2016	2017
Gallons	2,236	3,527	2,365	4,235	4,455	3,795	4,345	3,410	2,970

Water Use

	1996	2010	2011	2012	2013	2014	2015	2016	2017
Total Water 1000 gal	15,842	9,326	9,927	14,156	19,664	14,958	16,385	16,819	15,219

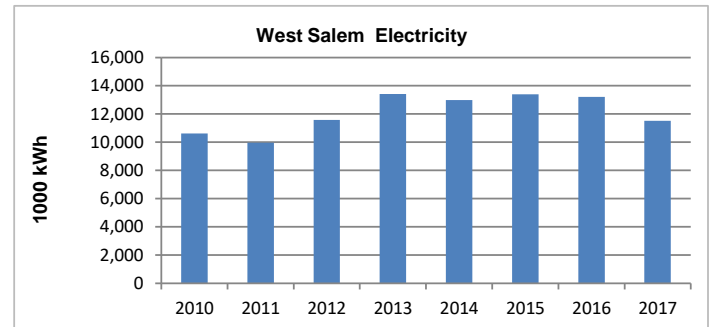
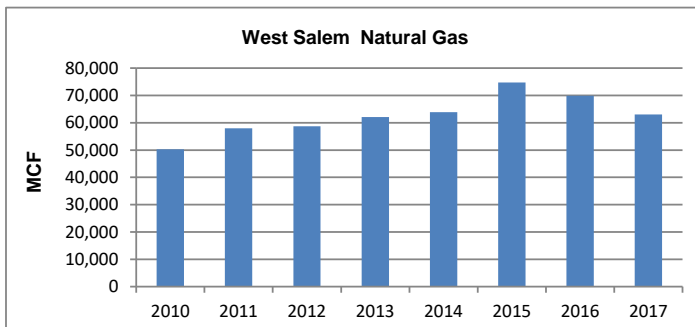
Less water usage resulted from less parts washing.



Energy Use

	2010	2011	2012	2013	2014	2015	2016	2017
Natural Gas (MCF)	50,224	58,014	58,692	62,118	63,834	74,730	69,863	63,062
Electricity (1000 kWh)	10,630	9,978	11,591	13,416	12,990	13,404	13,208	11,526

Two oven replacements helped lower natural gas usage. Although two new electric drying ovens were installed, electricity saving efforts and less spraying resulted in less electricity usage.



Appendix 3: West Salem's Objectives and Targets Program

Results for 2017

Objective 1: Reduce facility water use by reducing water use in sheet prep area.

Flow meters for monitoring water flow were installed. Pinch rollers were repaired, float was replaced. Rinse water discharge was re-routed to a pre-rinse tank.

Objective 2: Reduce facility energy use by continuing facility lighting improvements and implement facility compressed air leak program.

Three remaining non-LED parking lot lights were replaced with LED lights. Over 75 indoor T-12 lights were replaced with T-8s.
72 identified compressed air leaks were fixed.

Objective 3: Improve plant product yield by reducing rejects from slugs, scratches and contamination.

Yields improved as a result of using pre-rinsing and finer water filters on washers, modifying clean rooms to be cleaner-installing hard sides, monitoring air filters for incoming air and more frequent filter changing. Two new drying ovens replaced old ones. Training was given on sheet handling, washer loading, and line pacing. Reject numbers from each of slugs, scratches and contamination dropped during 2017.

Objectives and Targets for 2018

Objective 1: Reduce soap concentration in Sheet Prep Area to 3-5%.

Objective 2: Improve Plant Product Yield by 5%.

Objective 3: Reduce Plant Energy Use by changing over to LED lighting with priority in Punch Press.
Promote LED usage to employees.

Appendix 4: Greenhouse Gas Emissions

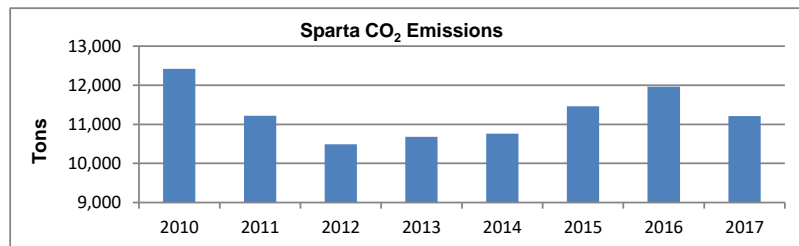
For Northern Engraving the primary source of greenhouse gas emissions is from the use of energy in its manufacturing facilities. Carbon dioxide (CO₂) is directly emitted by burning of natural gas and propane at NEC facilities. Use of electricity results in the emission of CO₂ at the generating facility, thus use of electricity results in indirect emissions of CO₂.

Carbon dioxide equivalent (CO₂-e) emission calculations for methane and nitrous oxide from natural gas, propane and electricity were reviewed. Because methane and nitrous oxide emissions are minor, they have not been included.

Changes in CO₂ emissions are associated with changes in the amount of energy used. Each facility continues to benefit from energy savings resulting from the environmental programs.

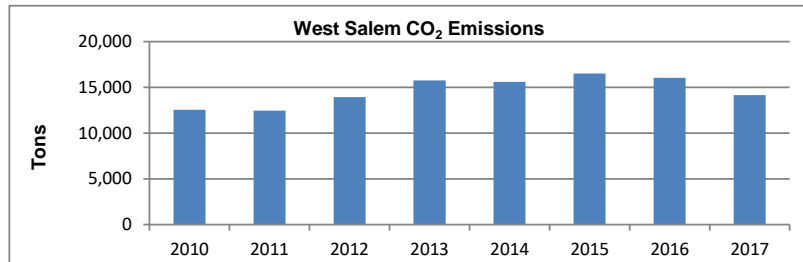
Sparta

	2010	2011	2012	2013	2014	2015	2016	2017
MMBTU	88,499	79,067	69,841	76,403	74,720	72,895	75,838	73,162
1000 KWh	7,943	7,222	7,027	6,799	6,981	7,908	8,272	7,612
Tons CO₂	12,417	11,220	10,488	10,680	10,759	11,461	11,965	11,213



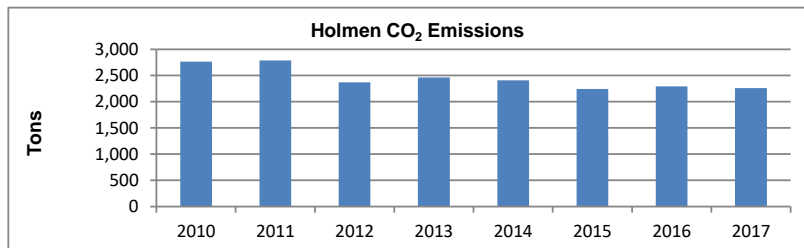
West Salem

	2010	2011	2012	2013	2014	2015	2016	2017
MMBTU	50,372	58,244	58,904	62,431	65,668	74,782	70,296	63,631
1000 KWh	10,630	9,979	11,591	13,416	12,990	13,404	13,208	11,526
Tons CO₂	12,548	12,438	13,923	15,770	15,596	16,498	16,056	14,150



Holmen

	2010	2011	2012	2013	2014	2015	2016	2017
MMBTU	10,825	10,840	8,039	10,209	9,791	7,815	7,083	7,000
1000 KWh	2,348	2,380	2,108	2,065	2,029	1,981	2,085	2,051
Tons CO₂	2,764	2,790	2,372	2,463	2,407	2,245	2,295	2,258



Appendix 5: The Glossary

VOCs - Volatile Organic Compounds: Organic materials that evaporate into the air.

Examples: Solvents used for cleanup or present in coatings, inks and sprays.

HAPs - Hazardous air pollutants: A group of hazardous chemicals listed by the EPA. These chemicals are believed to carry a greater health risk.

Examples: Toluene, Xylene, Glycol Ethers, etc.

RACT - Reasonably available control technology: Application of RACT provisions provide the lowest emission rate that a particular source is capable of achieving by the application of control technology that is reasonably available considering technological and economic feasibility. Such technology may previously have been applied to similar, but not necessarily identical, source categories.

LACT - Latest available control technology: This is required when it is determined that a source is technologically infeasible of controlling 85% of its organic compounds. LACT control measures are determined by the permit writer taking into account the control techniques and operating practices used by similar facilities.

NOx - Nitrogen oxides (Emission amounts are determined by the WDNR from data provided by Northern Engraving Corporation.)

CO - Carbon monoxide (Emission amounts are determined by the WDNR from data provided by Northern Engraving Corporation.)

MCF - Thousand cubic feet: The standard measure of volume for natural gas used.

kWh - Kilowatt-hours: The standard measure for electricity used.

YTD - Year to Date

Hazardous Waste - Waste with a chemical composition or other properties that make it capable of causing harm to humans and other life forms when managed improperly or released to the environment. Hazardous wastes are characterized for ignitability, corrosivity, reactivity, and toxicity. The majority of Northern Engraving's hazardous waste is ignitable or corrosive.

Non-Hazardous Waste - Waste that does not exhibit ignitability, corrosivity, reactivity, or toxicity and would not be expected to cause harm to humans or the environment but may require special processing prior to disposal.

Solid Waste - All waste sent to a landfill or the La Crosse County waste-to-energy incinerator.

Questions and requests for additional information should be directed to Mary Goodman at the address below:

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*submitted April 13, 2018
by Mary K. Goodman*