



2015 NPPD/NDEQ

ANNUAL REPORT

A Partnership to Sustain

NEBRASKA'S

ENVIRONMENT



Introduction

The NPPD/NDEQ Environmental Partnership is entering its 16th year!

Over the life of the Partnership, NPPD and NDEQ have attempted to use our organizational resources effectively to meet three primary objectives of the Partnership:

- *Enhance quality of life for all Nebraskans.*
- *Share ideas and resources and work together to solve problems.*
- *Produce a more sustainable and healthier environment by addressing energy and environmental issues, together.*

At the completion of 2014, the Partnership elected to continue our efforts of the past several years and concentrate on the following areas: regular meetings with focus on emerging issues; outreach activities, most notably the annual Power Summit; coordinating activities of the Nebraska Methane Workgroup; partnering with the University of Nebraska’s Biosystems Engineering Partners in Pollution Prevention program to provide energy conservation assistance to small-town wastewater treatment plants; and conducting surface water quality sampling activities. This report summarizes our related efforts.

The number of issues related to energy and our environment continues to grow. A critical Partnership effort is to examine these emerging issues jointly. Over the last year, the changing landscape for electricity producers, caused in part by the EPA Clean Power Plan, has been a primary topic. Many other issues have been examined as well, including: revisions to the National Ambient Air

Quality Standards, regional haze requirements, New Source Review requirements, carbon sequestration, changes associated with the Clean Water Act, and economic development challenges faced by Nebraska communities. These are just a few of the issues our organizations have discussed.

Developing a better understanding of emerging issues has been made possible by the dialogue that has occurred at our meetings; we have been able to examine issues from various organizational perspectives, and this has helped us develop a more comprehensive understanding of the issues and each other.

Partnership team members predict that 2016 will continue the trend of escalating issues, and we look forward to the continued mutual examination of them. If the reader has suggestions for activities the Partnership should examine or projects we should initiate, please contact Joe Citta, NPPD Environmental Manager, or Joe Francis, NDEQ Associate Director of Field Services and Assistance.

PARTNERING to Address Emerging Issues

One of the primary reasons for creating the Environmental Partnership was to make efficient use of available resources from both organizations. Over the past year, the number of issues related to energy and the environment has grown rapidly.

To stay abreast of these issues, a standing agenda item is “Emerging Issues.” Discussions concerning those topics are held at each Partnership meeting. The following represents a sampling of issues NPPD and NDEQ discuss on a regular basis:

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| • Clean Power Plan | • Mercury | • Economic development and associated environmental assessments |
| • New Source Review | • Cross State Air Pollution Rule | • Coal Combustion Residual (CCR) Rule |
| • Regional haze | • Carbon sequestration | • Steam Electric Effluent Regulation |
| • Revisions to National Ambient Air Quality Standards (i.e., Ozone) | • Clean Water Act, parts 316 (a) & (b) | |
| • Climate change | • Regulatory developments/updates | |

PARTNERING to Enlighten and Empower the Public

Public outreach activities held in 2015 included:

March 10-11

“Elkhorn Water Daze”

- Lower Elkhorn Natural Resources District

April 11

“Recycle Your Cycles”

- Keep Scottsbluff/Gering Beautiful

October 28

“Power Summit”

- NPPD and NDEQ

Recycle Your Cycles

NPPD, NDEQ and Keep Scottsbluff-Gering Beautiful hosted a “Recycle Your Cycles” event at NPPD’s Scottsbluff office. During the annual event, the public brings in used bicycles which are restored or, if restoration is not possible, stripped for scrap metal. Potter’s Wheel Ministries donates the newly refurbished bikes to adults and children who are in need. Approximately 100 bicycles were received in 2015, and 30 were returned to the public for use.



Power Summit

On October 28, NPPD Environmental Manager Joe Citta and Associate Director of NDEQ Joe Francis welcomed utility and environmental representatives to the 11th annual Power Summit. This year's event featured various presentations from electric energy industry peers and the agency that oversees monitoring and permitting. Topics ranged from U.S. Clean Water Act regulation to emerging technologies. The summit provides an opportunity for individuals involved in electric power production in Nebraska and those who regulate that activity to discuss current and evolving issues. The Power Summit was well attended with more than 75 attendees.

Summit presentations included Mike Linder (Koley Jessen), Michael Miller (Electric Power Research Institute), David Bracht (Nebraska Energy Office), John McClure (NPPD), Jim Macy (NDEQ), Rob Hansen (Monolith Materials), John Swanson (NPPD) and Jay Ringenberg (NDEQ).

PARTNERING to Share Our Collective Resources

Topical Presentations

At each Partnership meeting, a specific topic of mutual interest is examined in detail.

Subject matter experts present programs, which cover a broad range of topics, including, but not limited to: Clean Power Plan, Clean Water Act 316(b), Coal Combustion Residual Rule, NPPD's Monolith Project, energy conservation at publicly owned water treatment works, general energy conservation updates, water quality, and the Plains Carbon Dioxide Reduction Partnership carbon capture, utilization and storage demonstration activities.

Through topical presentations and discussions, NPPD and NDEQ staff members have developed a better understanding of each other's perspective on issues of common interest. In addition, this regularly occurring activity has enhanced relationships among Partnership members and those giving presentations.

Monolith Project

One of the many topics discussed among the Partnership's topical presentations was the exciting Monolith project — a proposal which would enable NPPD to generate electricity by burning emission-free hydrogen.

By mid-year, concept had become reality.

In April 2015, NPPD announced plans to generate electricity using hydrogen instead of coal at one of the generation units at the District's Sheldon Station near Hallam.

According to the proposal, NPPD will engineer a first-of-its kind utility-scale boiler which, once installed and operational (estimated to be by 2020), will give NPPD even more emissions-free generation than the District had at the end of 2015.



NPPD anticipated finalizing the contract with Monolith early in 2016. After which the District would diligently begin preparations at one of NPPD's oldest, but most unique, power stations for this technological advance.

Since it came on-line, Sheldon Station has generated electricity from nuclear fuel, then natural gas and finally coal. Next up? Hydrogen.

Monolith Materials of Redwood City, California, announced plans to develop the Olive Creek Project near NPPD's Sheldon Station. This project will convert natural gas to carbon black using a unique proprietary process.

Carbon black is a building block chemical commodity used in tire manufacturing, electronics, pigments, and many other end-use products. Monolith Materials' unique conversion process also produces a hydrogen rich tail-gas co-product. NPPD plans to use this hydrogen as a fuel which, when burned to heat water, will produce steam ultimately to generate electricity.

Representatives from Monolith Materials have been in conversation with NDEQ and Lincoln Lancaster County for environmental permitting, and Monolith has engaged a local Lincoln-based consultant for this effort. Early topic presentations at Partnership meetings enabled NDEQ to become familiar with a new technology much earlier than would otherwise have occurred. It's exactly this kind of communication that has made the Partnership so valuable over the years.

It is predicted that Monolith's Olive Creek project will have substantial economic benefits not only to residents of Lancaster County but to the citizens of Nebraska as a whole. These benefits include, but are not limited to, carbon-free electricity generation; new, highly skilled manufacturing employment; substantial financial investment in construction and operation of the Olive Creek production facility; as well as on-going generation of state and local tax revenues.

Methane

Methane recovery from livestock operations was one of the first major topics addressed by the Environmental Partnership. As part of this early effort, the Nebraska Methane Workgroup was formed.

One of the first lessons learned in the pursuit of methane projects was that many organizations played key roles. NPPD and NDEQ were joined by USDA-Rural Development and the Nebraska Energy Office as critical players on methane efforts.

During 2015 there was continued interest expressed in methane projects. Responding to that, NPPD, NDEQ and the University of Nebraska met to develop a means of documenting overall potential of biomethane capability in the agricultural sector of Nebraska. This document was developed by the working group and released in early 2015. NPPD and NDEQ are optimistic that there will be continuing developments in 2016 and hope to report significant progress in next year's report.

Small Wastewater Treatment Plants: Energy Efficiency

Without a doubt, the NPPD/NDEQ Partnership Agreement has been good for Nebraskans. One positive accomplishment, among many over the years, began in 2010 when the Partnership turned its attention to small municipal wastewater treatment facilities.

It is estimated most smaller communities in Nebraska devote from 20 percent to as much as 60 percent of their energy budgets to water treatment for their citizenry. Moving and treating drinking water and wastewater are energy intensive. Realizing this, NDEQ and NPPD began to explore how energy consumption at small municipal wastewater treatment facilities could be reduced, thereby saving Nebraska communities precious resources.

In 2015, the NPPD/NDEQ Partnership, in conjunction with help from the University of Nebraska Partners in Pollution Prevention (P3) Internship program, continued the program developed in 2010 to assist communities in becoming more energy efficient when dealing with waste water. Coincidentally, in 2010 NPPD was also seeking opportunities to develop and implement a comprehensive energy efficiency program, and the District composed a wastewater energy efficiency self-audit checklist that fit perfectly into the project the Partnership perceived.

Realizing a potential synergy, NDEQ, NPPD and the University of Nebraska-Lincoln began performing wastewater energy efficiency assessments at Nebraska wastewater treatment plants. In 2015, an assessment was performed for the communities of Cambridge and Bartley.

Taking part in the assessments in 2015 were NPPD's Energy Efficiency Consultant Kenneth Young; NDEQ's Section Supervisor Cay Ewoldt; and Matt Thompson, UNL intern. Using

the NPPD-constructed self-audit list, Thompson evaluated various techniques and technologies for reducing energy consumption. The assessment also evaluated opportunities for renewable energy. In addition, the 2015 project developed an asset management plan for the facility.

Ewoldt summarized the efforts: "The wastewater energy efficiency audit performed at Cambridge is representative of the processes that we hope to continue.

"Working with small communities in Nebraska to improve their lives and create a more sustainable future is rewarding not only for the towns, but also for the state and the student who worked on the projects. Energy savings created by these audits are vital to our small towns' sustainability.

"This year Matt Thompson went the extra mile in his efforts," Ewoldt continued, "by staying at the Cambridge Wastewater Treatment Facility throughout a 24-hour period taking readings of dissolved oxygen. This action had not been performed in previous assessments, and data collected played a significant role in the final report.

"The Environmental Council of the States also made a video on the small community waste water program developed and implemented through efforts by NDEQ, UNL and NPPD. This video has been added to the Environmental Council's website to illustrate innovative energy efficiency efforts in the State of Nebraska," Ewoldt said.

The video can be viewed at: <https://vimeo.com/148536041>.

The wastewater program continues to identify potential energy savings in a cost-effective manner, Young said. "The assessment provides information that allows communities to establish priorities for their investment in wastewater infrastructure. Once again, the program has shown much can be accomplished when entities work together for the common good," he concluded.





Water Quality Sampling

NPPD Environmental Department staff members assisted NDEQ with the Nebraska Recreational Season Water Quality Monitoring Program.

Statewide, NDEQ collects water samples on a weekly basis during the summer (April to September) to gather information on the quality of the state's water resources.

Samples are monitored for E-coli, an indicator bacteria used to determine the presence of other harmful pathogens, bacteria and viruses.

Water sampling results are used to inform Nebraska citizens of the quality of Nebraska's recreational waters. In 2015, NPPD personnel took water samples from Loup Power District's Lake North near Columbus.

NDEQ provided training and test equipment, and NPPD personnel collected and ran tests on the samples and submitted results to NDEQ.

PARTNERING to Enhance Nebraskans' Quality of Life

Conclusion

With each Partnership annual report, we mention the immeasurable value of communication between our two organizations. As indicated in the opening of this report, the number of issues we examine each year continues to grow. The rise in number of issues has been accompanied by an increase in their complexity. This combination makes effective communication essential if we are successfully to address the responsibilities our organizations face.

At each Partnership meeting, presentations are made on topics of mutual interest. These presentations are an important first step in establishing effective communication on these critical issues.

Over the last year, presentations ranged from carbon dioxide capture and recovery to surface water quality sampling at Nebraska's beaches. A presentation that was particularly interesting was provided by Dr. Mike Nastasi, Director of University of Nebraska's Center for Energy Sciences and Research. Dr. Nastasi provided background information about the Center, and he summarized a few of the projects researchers within the Center are pursuing.

The projects Dr. Nastasi summarized emphasized the importance of energy and environmental issues and their nexus to Nebraska's precious water resources and agricultural industry. Dr. Nastasi emphasized a goal of the Center is to educate the next generation of leaders in energy science and technology. Awareness of the high-quality research and development efforts being undertaken by the Center, coupled with the Center's goal to provide a significant knowledge base for our next generation of leaders, gives cause for optimism. Hopefully the Partnership will one day be examining a project from the Center for Energy Sciences and Research that will have a significant positive impact on the energy and environmental landscape of Nebraska!



The Partnership looks forward to the pursuit of our goal to develop a sustainable Nebraska for our citizens. We welcome the reader's ideas on potential Partnership projects. If you would like to attend a Partnership Team meeting, contact Chris Ahlstrom: (402)563-5855; or Tricia Scott: (402)471-6974 for meeting dates and agenda.

This Annual Report is jointly submitted and approved by:



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The NDEQ and NPPD share a desire to continue the development of a sustainable Nebraska, which will leave our descendents with the same high-quality environment to which we have become accustomed.



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