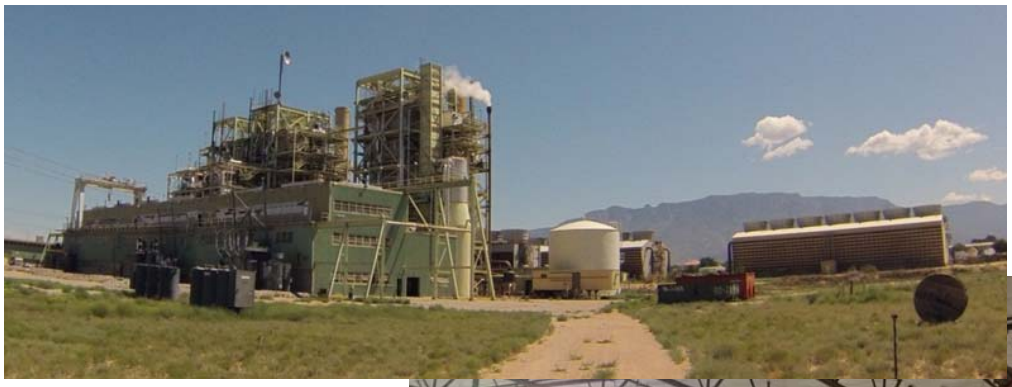
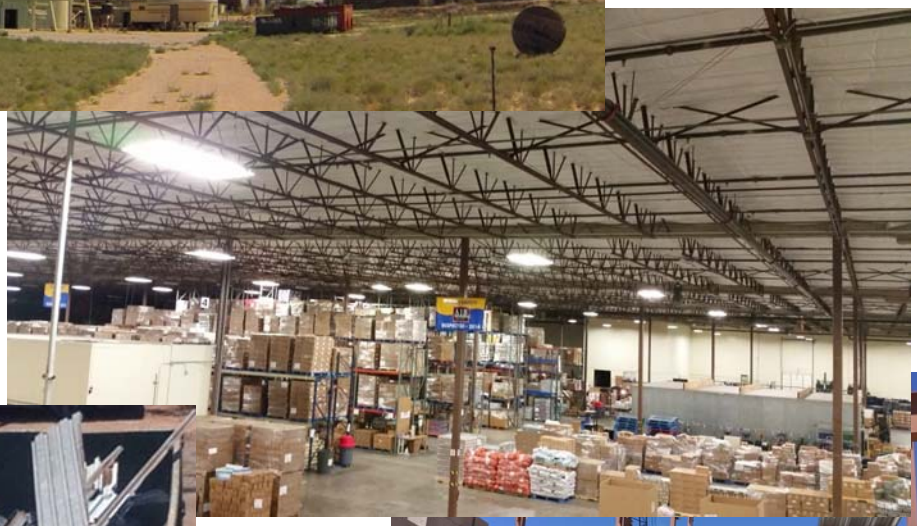
New Mexico Environment Department

P2 Pollution Prevention Internship Program

Summer 2015 Project Summary





New Mexico Pollution Prevention (P2) Internship Program

The P2 Intern Program is an opportunity for engineering students to work with New Mexico organizations helping to identify, evaluate, and implement projects with positive environmental impacts.

Summer 2015 Interns: Ebrahim Nourestani, Charles Johnston, Eric Glynn, Saydra Alvarez-Moreno, Derric Romero, Igor Goulart, and Maya Combs-Hurtado.

During the 12-week program, interns attend a 1-week training seminar then provide technical assistance to their host organization, focusing on the principles of pollution prevention and E3 (Economy, Energy, and Environment) and applying their individual engineering background.

The program is coordinated by the New Mexico Environment Department (NMED) Pollution Prevention Services. Funding is provided through a U.S. Environmental Protection Agency (EPA) Pollution Prevention grant.

The program began as a pilot in 2014 with 4 students and expanded to 7 in 2015. NMED has successfully collaborated with the University of New Mexico School of Engineering for the past two years.

Intern Perspectives:

"I have gained the knowledge of what it takes to get a project started and completed. I learned how to stay within a budget and to make sure the company is getting the best value it can for work that needs to be done. This will also be beneficial for a future job because of the experience gained from getting two projects started and completed at the same time."

- Eric Glynn

"Through this internship, I have learned that there is much more to an organization that directly relates to the engineering field, even if a food bank is not an engineering company. I was able to learn that the work done behind the scenes is very intricate and takes a lot of thinking involved from a donation brought to the warehouse to a hungry family's home. Before my internship, I did not have a plan after graduation, but this has made me realize that I want to focus my studies in operations or manufacturing."

- Maya Combs-Hurtado

"I learned so much more during my time with the Utility Division of Rio Rancho was able to get an overall idea of how the entire water system of a city works; I learned lots of new vocabulary; I was introduced to many important figures in the "world of water"; I can continue and list my experiences for pages. I also hope that other students concerned about environmental issues strongly consider applying for the Pollution Prevention Intern Program."

- Ebrahim Nourestani

"This research experience will likely be invaluable to me when it comes time to work on my thesis. I would not be surprised if my experiences with the ABCWUA had an effect on my future coursework and/or career interests. This internship has certainly been a rewarding opportunity and I look forward to keeping in touch with the people that I worked with."

- Charles Johnston

For more information about the P2 Internship Program, contact:

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www.env.nm.gov/P2/InternProgram

Albuquerque Bernalillo County Water Utility Authority

Intern: Charles Johnston, Civil Engineering (Graduate Program)

Albuquerque Bernalillo County
Water Utility Authority

Facility Description:

The Water Utility Authority provides water and wastewater services to the greater Albuquerque metropolitan area. It is the largest water utility in New Mexico, serving over 606,780 water users.

Project Description:

The Water Utility Authority had recently become concerned with the discharge of glutaraldehyde (GA) into the wastewater system and that it could be negatively impacting processes at the Southside Water Reclamation Plant (SWRP).

GA is a biocide regulated as a pesticide under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). GA is toxic to humans and to aquatic life. It was unknown whether high concentrations were likely to reach the plant, what effect it would have, and whether any might make its way to receiving waters, such as the Rio Grande.

This summer's project was focused on researching GA in order to determine which industries might be dischargers, how GA interacted with the environment, and whether it was likely to be disrupting processes at the treatment plant. It is used in a large number of industries; however, it is best known for its use as a high-level disinfectant (HLD) in the healthcare industries. In most cases, spent GA is simply poured down the drain with copious amounts of water.

It was found that the healthcare industries use a very low concentration of GA, typically 2%. The substance is discharged generally when the concentration drops below 1.75% and is no longer effective as a disinfectant. In addition, local hospitals are beginning to use safer alternatives to GA, decreasing the amount of GA discharged to the wastewater system.

GA was also found to be readily biodegradable when interacting with oxygen, heat, and bacteria. Very little reaches the WWTP and 95% of what does is further degraded during the treatment processes.

This assessment project indicates that GA is not currently a concern for either the SWRP or the final treated water.

City of Rio Rancho Department of Public Works -

Utilities Operations Division - Environmental Programs

Intern: Ebrahim Nourestani, Civil Engineering (Senior)

Facility Description:

The Utility Operations Division is organized into three sections: Environmental Programs, Utility Operations, and Utility Systems. Through these sections, the Division is responsible for: water conservation, the domestic well program, the backflow prevention program, the Industrial Pre-treatment program, rebates, water use audits, water, wastewater, and recycled water availability. It operates and maintains the City water, wastewater, and recycled water systems; cross-connection prevention, and maintenance of Federal and State permits for the utility facilities.

Project Description:

P2 intern work this summer involved two projects: looking at the major losses of Utility revenue through inaccurate metering of the water supply and fat, oil, and grease (FOG) emissions through sewer lines affecting water treatment.

Non-Revenue Water Loss Reduction

Non-Revenue Water (NRW) is important to the water utility agency because it directly affects their product supply and operational costs. Based on the preliminary NRW analysis conducted by Cavanaugh and Associates in 2015, about 556 million gallons of water is lost on a yearly basis which equates to nearly $1,243,000.

In order to monitor water usage throughout the city there are about 33,677 active water meters, however, an estimated $800,000 loss may be due to inaccurate an inefficient meters.

Through this project, a non-revenue water conservation plan was developed for water meter testing. The objective was to create a meter testing protocol specific to Rio Rancho's system. Testing and replacing faulty meters will also bring in the lost revenue that the city needs for expensive infrastructure, equipment, manpower, and energy that allows them to provide the water. An estimated $750,000 could be recovered through a comprehensive NRW program.

FOG (Fats, Oils, and Grease) Reduction from Waste Water

A second smaller project was to inspect and attempt to reduce the emission of FOG into wastewater treatment systems.

FOG in the water system raises the price of water treatment which increases the price of water for users. FOG makes wastewater treatment costly and tedious because the grease forms into balls and clogs pipes, breaks pumps, and kills good bacteria. If grease interceptors are used and maintained properly, the amount of grease being let out into the sewer system is dramatically reduced and the initial processes of wastewater treatment becomes easier. The city has been having issues with grease interceptor pumping compliance and inspectors make sure FOG (fats, oils, and grease) contributors are keeping up with their maintenance.

HB Construction

Intern: Saydra Alvarez Moreno, Civil Engineering (Senior)

Facility Description:

HB Construction is a local, family-owned general contractor with a portfolio of public & private sector projects throughout the Southwest. Sustainability is an integral part of the company culture where they assign a full-time LEED® AP to every project to ensure it is built with sustainable considerations which add long-term value and make a positive impact on the community. They also develop a custom set of environmentally-conscious programs for each project to help ensure quality and safety.

Project Description:

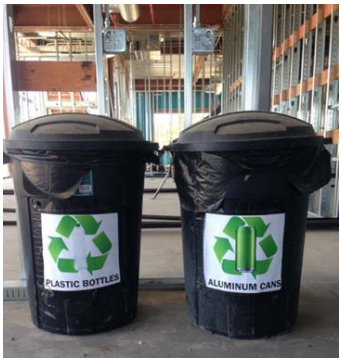
This project was based at the Rio Grande High School 9th Grade Academy construction site and focused on implementing waste reduction and reviewing required submissions for LEED (Leadership in Energy & Environmental Design) certification.

Construction Waste Reduction and Segregation

Construction and demolition waste makes up nearly a 1/4 of waste in landfills and is one of the largest impacts of a construction project. An emphasis was placed on gaining an understanding of construction site processes and how improvements could be made to the management of construction waste.

Segregating materials is key to ensuring that they are able to be recycled, so effective labeling and placement of construction dumpsters was implemented. Additional dumpsters were added to expand the amount and type of construction materials recycled.

To extend the culture of recycling in all aspects of the job site, bins were placed within the work activity areas to collect the large amounts of plastic bottles and cans used by workers.



End Note: Saydra was hired by HB Construction to continue assisting them with their LEED work and environmental goals.

PNM - Public Service Company of NM - Reeves Generating Station

Intern: Eric Glynn, Mechanical Engineering (Senior)

Facility Description:

PNM is the state's largest electricity provider, serving more than 500,000 New Mexico residential and business customers. The Reeves Generating Station in Albuquerque is a 154-megawatt natural gas plant which provides electricity during peak summer periods, and serves as a central conduit to redirect electricity from coal plants in northwestern New Mexico to communities statewide. Opened in 1958, it has received several important upgrades in the last few years.

Project Description:

Environmental improvement projects at the Reeves Plant this summer focused on conservation of water resources, water quality, and hazardous waste reduction.

Water Conservation and Improved Quality

To start, research was done to replace the metering system for water that flows into the evaporation ponds in order to get more accurate readings on water flow. The current metering was assessed and a new system researched. A replacement meter was installed which will improve the readings by 23.4%.

Next, a water balance report was developed for the facility in order to identify opportunities for water conservation. The water balance project was more than the challenge of calculating the cost and benefits of the system. The project required researching all the plant's systems that use water. Through this comprehensive review, multiple avenues for increased efficiency and conservation were found that could save millions of gallons of water per year if implemented.

The final water project was to research solutions to reduce the pollutants in the plant's waste water so that it could be discharged back into the arroyos. This will be a long-term project.

Hazardous Waste Reduction

The Reeves plant has been using a chlorine solution to clean the cooling towers. This project researched alternative methods and resulted in the installation of a new MIOX system that uses the mixing of salt and water to produce on-site disinfection. This will replace 6,000 gallons of chlorine used per year.

Roadrunner Foodbank

Interns: Maya Combs-Hurtado & Derric Romero, Mechanical Engineering (Seniors)

Facility Description:

Roadrunner Food Bank (RRFB) of New Mexico began in 1980 out of the trunk of Reverend Titus Scholl's car. The organization now has three sites, the largest being their 165,000 ft^2 food warehouse and distribution center with 60 full time staff and over 450 volunteers per week. RRFB is the largest food bank in the state and distributes more than 30 million pounds of food every year, helping 70,000 hungry people weekly.

Project Description:

The Operations Department had multiple project goals this summer for reducing energy, improving efficiency, reducing water use, reducing food waste, and gathering data for LEED certification.

Efficiency & Food Waste Reduction

Roadrunner has two freezers, a dairy cooler and, the newest addition, a produce cooler. Initially, this room was used as a freezer, but to accommodate for a wider variety of foods, the room was converted into a cooler. There were problems with temperature variations and too much condensation which lead to many pounds of food having to be thrown away. Through detailed research and assessment, multiple solutions were found to address the temperature differentials and keep food at the proper temperature for storage and distribution.

Leadership in Energy and Environmental Design (LEED) Certification Process - Waste & Energy

Several assessments of the facility were conducted as part of the LEED certification process. These included waste, lighting, HVAC efficiency, and water use.

A waste audit was conducted for the entire facility including the office area and warehouse. Most of the waste comes from donated food that is determined to not be fit for human consumption. Some is composted or donated for animal feed. Other options for additional landfill diversion were implemented.

Work on a lighting assessment began over the summer and continued during the fall. This included an inventory of all light fixtures in the facility - and identifying those in need of replacing with higher efficiency T5 lamps. In addition to major lighting it was determined that replacing just 3 of the incandescent Exit sign bulbs with LEDs could save up to $3,000 / year.

An assessment of the HVAC system also began and will be continued throughout the year.

In the water assessment, opportunities for reducing water use were identified primarily in the restrooms and outside landscaping. Recommended measures could lead to reducing 60,000 gallons of water annually and a savings of $2,000.

End Note: Maya was hired by Roadrunner to continue her work through the fall of 2015.

Albuquerque District 2030

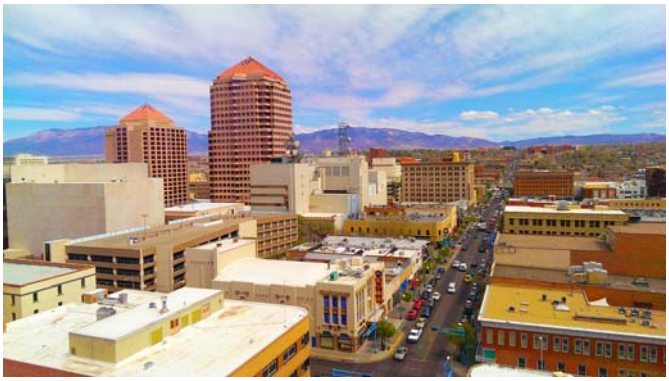
Intern: Igor Goulart, Chemical Engineering (Senior)

Facility Description:

Launched in May of 2015, Albuquerque's 2030 District is a private sector-led effort utilizing collaboration, incentives, shared resources, and unique public-private partnerships to promote the development of high-performance buildings and a more healthy, livable city of the future. Districts are forming across North America to meet the energy, water and vehicle emissions reduction targets for existing buildings and new construction called for by Architecture 2030 in the 2030 Challenge for Planning.

Project Description:

The goals of all the 2030 Districts are to develop sustainable/carbon neutral urbanization. For existing Buildings the goal is a 50% reduction of energy use, water use, and transportation greenhouse gas emissions by 2030. For new construction the goal is to be Carbon Neutral by 2030, have 50% Reduction in water use, and transportation greenhouse gas emissions by 2030. These reductions are relative to a base year in the early 2000s.



2030 District goals are being achieved through evaluating the performance of buildings, benchmarking, education, developing trackable metrics, and incentivizing sustainable practices. Initially, property performance was assessed through various software platforms. Then these properties were benchmarked based on a baseline year to track their progress towards the 2030 District goals. The other goals stated above are works in progress.

Initial partners of Albuquerque District 2030:

Century Rio 14
CNM
Design group
Hotel Andaluz
Hotel Parq Central
Levitated Toy Factory
Occidental Life building
Presbyterian
UNM

Work this summer and fall focused on launching the District's initiatives. One primary objective was gathering information from initial district partners to analyze with Energy Star Portfolio Manager (ESPM). Energy and water performance reports were generated from this tool and shared with participating businesses.

Setting up baselines for energy, water, transportation metrics required working closely with District businesses and organizations as well as the utilities that supply them. It also required running diagnostics on preliminary buildings in ESPM to calibrate the program, identify any missing data, and evaluating the importance of each metric. An protocol was drafted for setting up new properties joining the District.

New Mexico Pollution Prevention (P2) Internship Program

For more information about the P2 Internship Program,
to participate as an intern, or to participate as a host organization,
go to the program website at:

https://www.env.nm.gov/P2/InternProgram/index.html

Or Contact:

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