Navajo Tribal Utility Authority

Maintaining a Tribally-Owned and Operated Compliance Laboratory

The Navajo Tribal Utility Authority (NTUA) Environmental Compliance and Laboratory Department offers laboratory services to drinking water and wastewater systems throughout the Navajo Nation. The laboratory also serves in a broader capacity carrying out many essential regulatory compliance activities for NTUA systems. With a small staff serving over 90 systems across an area larger than West Virginia, the NTUA laboratory is a notable example of improving utility sustainability by investing in the development and growth of an internal laboratory department.

> ***"NTUA management understands that to keep systems in compliance we need a functioning laboratory at all times."***
>
> *Raquel Whitehorse*
> *Supervisor, NTUA Laboratory*

Benefits

The NTUA laboratory has a critical role in protecting public health throughout the Navajo Nation by ensuring compliance for drinking water and wastewater systems. With numerous NTUA systems, the laboratory's services result in significant cost savings for the utility and remove the logistical burdens of transporting samples to laboratories outside of the Navajo Nation. It also adds the benefit of reduced holding times for time-sensitive samples. In addition to performing sample analysis, the laboratory provides comprehensive compliance assistance to NTUA systems. These additional services include: determining compliance monitoring schedules, coordinating the preparation and delivery of Consumer Confidence Reports, conducting training at district offices and providing on-site assistance to systems. The laboratory also expanded its services to support organizations outside the NTUA such as the Hopi Tribe, the Bureau of Indian Affairs and the Indian Health Service to help maintain and construct infrastructure to benefit the Navajo and other tribal communities. The substantial analytical capacity that is maintained within the laboratory ensures the availability of critical analyses during public health emergencies.

Background

The Navajo Nation covers over 27,000 square miles across Arizona, New Mexico and Utah. The NTUA was established in 1959 as a single small water utility in Shiprock, New Mexico. Today, NTUA is the largest multi-utility enterprise owned and operated by an American Indian tribe. The NTUA provides electric, solar energy, water, wastewater, natural gas and communications services to residents of the Navajo Nation. Today, the NTUA serves an estimated 39,323 water customers via 94 water systems with a total of 217 groundwater wells and two surface water systems. They also have 10 National Pollutant Discharge Elimination System (NPDES) permitted wastewater facilities. The NTUA laboratory serves as the core of NTUA's drinking water and wastewater compliance activities.

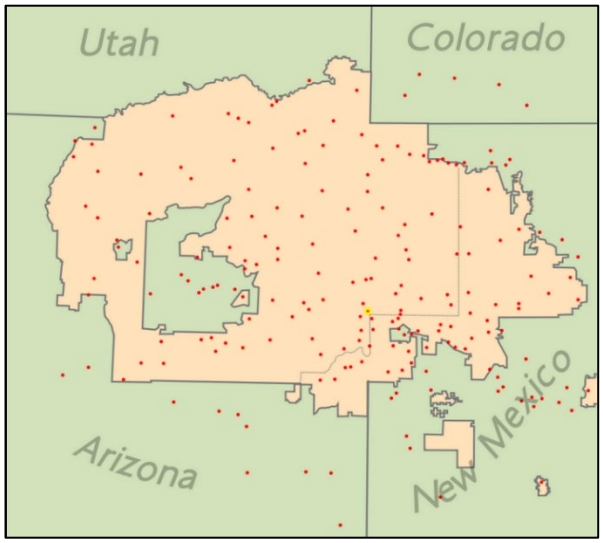

Figure 1. The Geographic Area of the Navajo Nation and Populated Communities.

The NTUA includes a headquarters office in Ft. Defiance, Arizona and eight district offices. Each district office has a drinking water and wastewater department that oversees systems in their respective area. The districts conduct sampling for their systems, as well as provide the systems operators.

The NTUA Laboratory

The NTUA Environmental Compliance and Laboratory Department is located at the NTUA headquarters office in Ft. Defiance, Arizona. The NTUA laboratory began operations in 1975 and was certified by the Environmental Protection Agency (USEPA) in 1977. Prior to starting the laboratory program, NTUA incurred significant costs associated with coordinating sample collection and transportation to the nearest laboratory in Gallup, New Mexico. The distance to the Gallup laboratory also affected the NTUA's ability to meet holding times for some regulated contaminants. With these concerns and the continued growth of the communities they serve, the NTUA made the decision to build and operate their own laboratory facility.

Figure 2. NTUA Laboratory equipment. *Photo Credit: NTUA*

In 1977, the NTUA laboratory was certified to analyze bacteriological samples and wastewater samples for NPDES-permitted systems. In 1979, the laboratory was certified for wet chemistry and basic metals. In 1987, the laboratory acquired an atomic absorption spectro-photometer to analyze for metals. In that timeframe, it also acquired an ion chromatograph and began conducting analyses for anions. Today, the laboratory is certified to analyze biological and inorganic contaminants for drinking water. Samples for radionuclides and organic and other regulated contaminants are sent to a contracted laboratory for analysis. Whether analyzed internally or through a contracted laboratory, the NTUA laboratory accounts for all samples and reporting to the Navajo Nation EPA to ensure compliance with drinking water regulations. For NPDES permit compliance, the laboratory is certified to analyze for biological oxygen demand (BOD), total dissolved solids (TDS), total suspended solids (TSS) and *Escherichia coli* (*E. coli*).

Figure 3. NTUA staff preparing samples. *Photo Credit: NTUA*

The laboratory employs nine people, including chemists and laboratory technicians who are trained to analyze samples and technical assistants who review and record the water quality data. To maintain laboratory certification, proficiency is demonstrated annually for all analyzed parameters through third-party examiners. Laboratory staff receive training through the Inter-Tribal Council of Arizona and the Arizona Department of Environmental Quality.

Responsibilities of the NTUA Environmental Compliance and Laboratory Department

The NTUA Environmental Compliance and Laboratory Department serves as the hub for all of the NTUA's drinking water and wastewater compliance-related activities. In addition to analyzing samples, responsibilities of the NTUA laboratory include:

Sampling Support

- Coordinating annually with regulatory agencies to determine the required sampling schedules.
- Ordering sample kits containing bottles, preservatives and sampling paperwork for sample collection and preparing and shipping these kits to district offices.
- Verifying that requirements are met for samples submitted by the district offices, such as ensuring the chain of custody form is completed correctly, among other tasks
- Shipping the samples that are collected by the eight district offices and that are not analyzed in-house to the contracted laboratory.

Figure 4. NTUA staff performing laboratory analysis. *Photo Credit: NTUA*

- Providing training and field support on the use of equipment to ensure data quality and operator self-reliance.

NTUA LABORATORY
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FORT DEFIANCE, AZ 86504
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NTUA CHAIN OF CUSTODY RECORD

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CLIENT INFORMATION

Client Name	Address	City	State	Zip	Phone

System Name	PWSID#/NPDES#	Contact	Site#/Location	RDC#

Laboratory Analysis Options (Heavy Metals, Wet Chemistry and Wastewater)

Heavy Metals : Sb, As, Ba, Be, Cd, Cr, Cu, Fe, Pb, Mn, Hg, Ni, Se, Tl, Zn
Wet Chemstry : Alkalinity, Ca, Cl, Corrosivity, F, Total Hardness, Mg, NO2, NO3, pH, Phosphate, K, Na, SO4, Total Dissolved Solids, Turbidity, and Temperature
Wastewater: BOD, TSS, TDS, pH, Temperature, Total Residual Chlorine and Settable Solids

Client Sample ID	NTUA Lab #	Date	Time	Preservative: HNO_3	Preservative: Ice	Preservative: None	Preservative: Other	No. of Sample Bottles	Compliance	WATER ANALYSIS: Heavy Metals	Wet Chemistry	Lead/Copper	Nitrate (NO_3)	Nitrite (NO_2)

Figure 5. Example of an NTUA Laboratory Chain of Custody Form

Reporting and Compliance Activities

- Data entry for analyses conducted by the NTUA laboratory into a database and generating compliance reports.
- Compliance reports review for both NTUA and contracted laboratory results, and submission of the reports to the regulatory authorities.
- Set and adjust system monitoring schedules for individual systems through coordination with the regulatory agencies.
- Notify the water system of an MCL violation, conduct follow-up sampling analysis, and adjust monitoring schedules to quarterly (if required).

Figure 6. NTUA staff recording analysis results. *Photo Credit: NTUA*

- Consumer Confidence Report (CCR) reviews for the 86 NTUA water systems in Navajo Nation EPA's jurisdiction and the 8 water systems in USEPA Region 9's jurisdiction. Then coordinate with the NTUA Public Relations Department and a vendor to print, package and distribute the final CCRs to customers. Additional assistance is provided to small systems by posting their CCRs to the NTUA website and communicating the availability of the CCRs to customers.
- Sanitary survey participation, which are led by the primacy agency, and assist with system review and mitigation of potential issues.

Training Activities

- Biannual training for drinking water and wastewater operators in the eight district offices. The training includes proper procedures for compliance sampling, calibration of fluoride and chlorine monitoring instruments, and proper maintenance of laboratory records.
- Ad hoc training for district offices, as requested, or when training is needed for new equipment or sampling techniques.
- Safety training for emergency response personnel related to chemical spills and other hazardous materials, as well as emergency response training.

Additional Compliance Services

- The NTUA laboratory performs drinking water analyses for other clients. These services are performed for a fee and are arranged through an annual purchase order with the laboratory or on an individual sample basis. Other entities utilizing NTUA laboratory services include:
  - Bureau of Indian Affairs' (BIA) school system and other public schools;
  - Hopi Tribal Utilities;
  - National Monument water systems;
  - Indian Health Service Office of Environmental Health; and,
  - Casinos.
- The NTUA laboratory performs analyses for treated wastewater discharge for the BIA.
- The laboratory manages a website which enables users to view and obtain drinking water and wastewater sampling information online. Utility staff can review sample results online from the previous 90 days. The website also reports the number of samples collected for the month and the number of remaining monthly samples that are required (Figure 7).

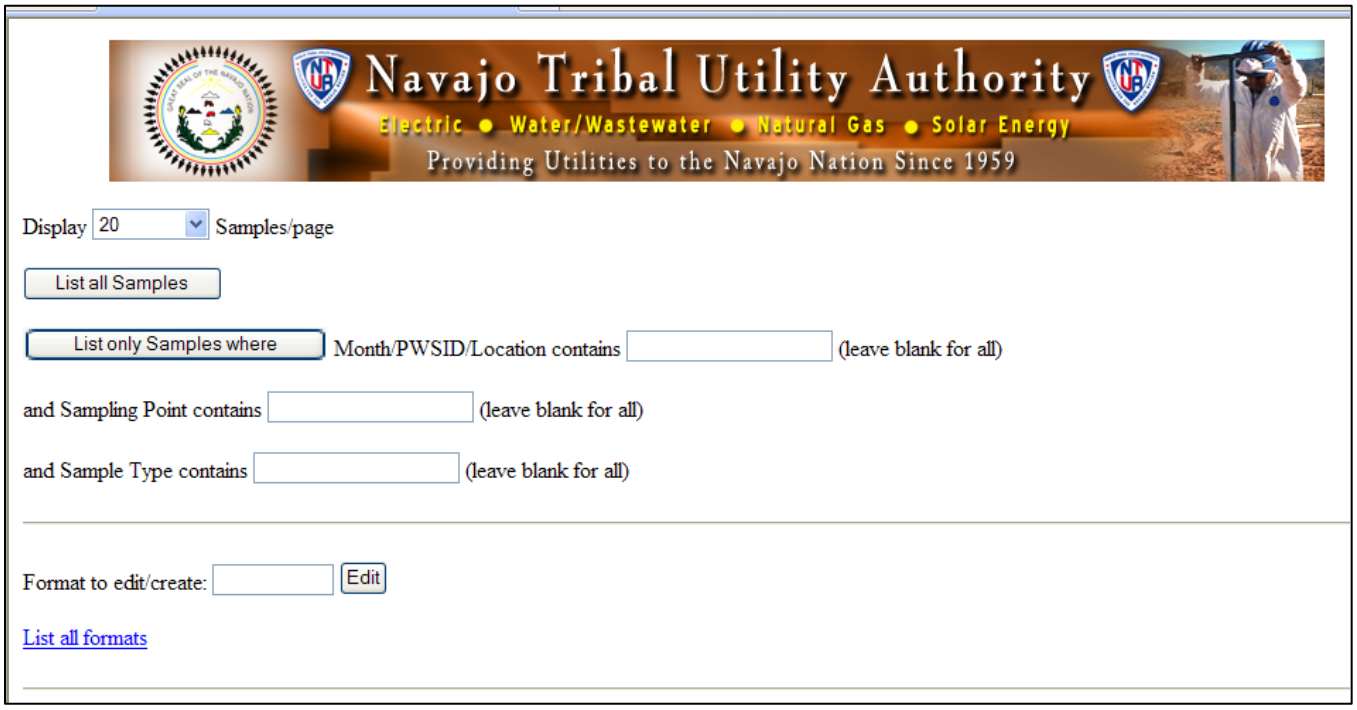

Figure 7. Snapshot of NTUA Laboratory Website Where Systems Can Use to Check Sample Results.

Looking to the Future

The NTUA laboratory plays a pivotal role in utility compliance and has enjoyed a great deal of stability due to limited staff turnover. Still, the responsibilities of the laboratory and the number of NTUA systems have grown steadily over the years while the number of laboratory staff (9) has remained unchanged since the early 1990s. In an effort to improve efficiency, the laboratory recently purchased compliance monitoring software for drinking water systems, which is expected to result in streamlined tracking and reporting. The laboratory is also working on expanding their workforce so that they can continue to provide high quality services to their existing and future customers. Raquel Whitehorse, Supervisor at the NTUA laboratory, notes that the laboratory department started with the goal of providing routine sampling analyses but has grown substantially over the years as additional monitoring and compliance support was needed. Ms. Whitehorse recommends that other utilities looking to develop in-house laboratory capacity start small and add new responsibilities slowly over time to build a sustainable program.

Figure 8. NTUA Environmental Compliance and Laboratory Department Building. *Photo Credit: NTUA*

EPA United States Environmental Protection Agency

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