

# Bureau of Indian Affairs Protects Dams, Public Safety with Early Warning System



## Maximizing Planning & Response Time for Weather Events

### OVERVIEW

The U.S. Bureau of Indian Affairs (BIA) serves more than 574 federally recognized independent Tribal Nations across the United States and, in cooperation with the tribes, assists with management of more than 55 million acres of land. That acreage contains more than 140 dams categorized as having “high hazard potential.” Since 2003, AEM’s OneRain brand has supported the BIA and their Safety of Dams (SOD) program through the use of early warning systems that monitor weather, water level, and rainfall at 579 individual sites in and around dams, streams, and reservoirs to provide alerts when dangerous conditions are developing. Those alerts support operational response as well as the public safety of downstream communities.

## Overcoming operational challenges

The Bureau of Indian Affairs’ SOD program was charged with overseeing improvement at geographically challenging and very remote locations across the country. Given staffing and funding limitations, they required a cost-effective solution that maximized their ability to protect and empower local communities while also building a comprehensive bureau-wide understanding of conditions at dams for long-term study and improvement planning. They came to OneRain with these specific needs:

### 1. SUPPORTING A 24/7/365 EMERGENCY OPERATIONS CENTER

The solution needed to feed data from remote sites on 16 reservations in 42 different states to a central monitoring facility in Montana.

### 2. SELF-SUSTAINING TO ACCOMMODATE AGING INFRASTRUCTURE

Many BIA dams in the SOD program had limited access to power and communications options.

### 3. EMPOWERING A SMALL, DEDICATED STAFF

Given the BIA’s minimal staff, the solution needed to be easy to interpret and provide timely, actionable alerts.

### UNDERSTANDING EACH DAM & WATERSHED

No two dams or watershed areas are exactly the same. When the SOD program was first established in the ‘90s, the BIA quickly discovered that they were managing not just a variety of different dams but also a variety of different environments and ecosystems.

By partnering with AEM, the BIA was able to leverage a single approach to monitoring that could be applied to build a better understanding of each unique site, body of water, or dam, and then recognize when conditions at each location began to exceed norms, even if those normal conditions varied widely by location.



AEM has provided us a comprehensive, consistent approach to monitoring that we can now confidently roll out at any new site. The ability to monitor conditions in real-time at each location means we know exactly what’s going on and can communicate with local tribes and communities accordingly

— SOD Program Associate  
Bureau of Indian Affairs

# Solution: OneRain Sensor Network & Contrail Software

OneRain, an AEM brand, partnered with the BIA to build a solution that would balance the individual requirements of each dam alongside the need for an automated national monitoring and alerting network. The Early Warning System solution comprises integrated real-time monitoring instrumentation, telemetry, and centralized enterprise data collection services infrastructure. A network of site-appropriate solar-powered gauging stations track rainfall, water levels, and other critical data at each site. To quickly and reliably transmit data from the remote off-grid sites, we developed our StormLink® family of real-time satellite telemetry products to deliver the data to the secure central Contrail® software servers for validation, alerting, visualization, and dissemination.



## PROVIDED REAL-TIME SATELLITE COMMUNICATIONS

With OneRain StormLink satellite solution, BIA's monitoring team receives all event data from any site in the field in 22 seconds or less.



## BUILT DECISION-SUPPORT SOFTWARE

We developed the Contrail multi-tenant platform to provide the individual Tribes and the BIA with a secure, comprehensive cloud platform for dam monitoring at the local and national levels.



## PARTNERSHIP & TRAINING WITH LOCAL TRIBES

AEM provides proactive and preventative maintenance, ongoing in-person training, and remote troubleshooting/support so local tribes can leverage the Early Warning System with confidence to protect their communities.

## Contrail in Action for the BIA

After nearly 20 years of work together, our solutions now support 42 reservations, 141 dams, and 579 individual sites on a 24/7/365 basis for the BIA. To date, the system has collected 975 million data records and triggered more than 55,000 alarms for emergencies and maintenance requirements. Overall, the SOD program's Early Warning System has empowered the federal government, Tribal Nations, and private industry to achieve their goal of collaborating to protect downstream communities and cost-effectively reduce the risk associated with aging dams.



## Why AEM?

OneRain, an AEM brand, is a team of rainfall, water, and weather monitoring experts. We help our clients understand and manage their water-related missions, from flood and road weather safety, to dams, stormwater, wastewater and water resource management. Our results help improve hydrologic decision making and design standards across the United States and the world.

Since its 1992 start, OneRain has become the leading provider of rainfall-related data and services to local, state, and federal agencies across the United States. OneRain's success rests on a systems approach to managing rainfall and its consequences.



### 1. PERSONALIZED MONITORING SOLUTIONS

We help you build a rainfall, dam safety, or water monitoring system custom-designed to your needs, conditions, and community and provide ongoing support.

### 2. RELIABLE SENSORS & COMMUNICATIONS TECHNOLOGY

OneRain and our partners at AEM produce some of the best weather monitoring tools in the world backed by the instantaneous speed of satellite communications.

### 3. CLEAR, ACTIONABLE DATA

Our Contrail software presents rainfall and water management data in a clear, easy-to-interpret manner with programmable alerts to eliminate any guesswork.