

**Arizona Corporation Commission**  
**Submitted by Loris Taylor, Executive Director**  
**Center for Native American Public Radio**  
**Keams Canyon, Arizona**  
**March 22, 2005**

**INTRODUCTION**

Members of the Arizona Corporation Commission, thank you for this opportunity to offer comment in support of improving and stabilizing electrical service on the Hopi Reservation. My name is Loris Ann Taylor. I am the Executive Director of the Center for Native American Public Radio representing 33 radio stations located throughout Indian Country in thirteen states. The Native American Public Radio System is also supported by the work of the American Indian Radio on Satellite – a program distribution operation based in Lincoln, Nebraska, Koahnic Broadcast Corporation – a major national production center with offices in Anchorage, Alaska and Albuquerque, New Mexico and several independent and station-based program producers.

My comments are based on my experience and responsibilities as former general manager for KUYI Hopi Radio, an FM station located right here on the Hopi Reservation. I have had the wonderful experience of supporting KUYI from its conceptual stages through FCC licensing in 2000 and its initial 4 years of operation. In my comments today I hope to give the Commission a better understanding of the many ways in which electrical service outages affect the public service KUYI Hopi Radio provides.

It is very important to have a reliable radio signal in northeastern Arizona. KUYI, at 69,000 watts of power, has a strong radio signal in the area, providing the essential link for getting information out to the Hopi people and to portions of the Navajo reservation. KUYI broadcasts to all 12 villages of the Hopi reservation spanning a distance of 65 miles from east to west. The station's coverage area includes Interstate 40 between Winslow and Flagstaff Arizona. KUYI provides important information not only to the people who live in this area, but also to the thousands of daily travelers who cross the signal area on I-40. With increased threats of terrorism in the United States, a reliable radio signal for area residents and those traveling through becomes all the more important and KUYI is uniquely positioned to provide radio broadcasting services in this geographically remote and rural corner of the Southwest.

## **THE ROLE OF RADIO IN INDIAN COUNTRY**

Native radio stations have become essential institutions in Indian communities. They are a critical means of communication, and in many places, the only source of local news and information about health, public safety, and community events. Indian people look to the local radio station as a means of staying connected with community events. Local Native stations remind the people that they are a part of a larger community and that they have important roles to play in civic matters affecting the future as well as the here and now. Local Native stations play an important part in solidifying Indian communities that are often scattered across many miles of reservation landscape.

Native stations are also key players in cultural preservation. For many communities, the Native Station is an important caretaker of culture and history, and communicates a sense of “home” to those who live within the station’s signal range.

Native Radio also serves as an essential instrument of community service through educational and health programming. KUYI House Calls, for example, connects the radio station with the work of the Hopi Health Care Center by providing a weekly thirty-minute program about health issues relevant to local people. In its four-year history, KUYI has provided critical information on diabetes, alcohol and substance abuse, heart disease and healthy lifestyles. The program, hosted by local doctors and teachers, breaks down the communications barrier by providing an environment where community people can have a conversation with a real-life medical doctor about health issues. Radio makes this important community dialogue possible.

Some stations have successful youth training programs. On the Hopi Reservation, KUYI in partnership with the Hopi Junior-Senior High School established the first Radio Class with the two-fold mission of building succession for the radio station and to open career opportunities for local students in the field of communications, whether it is radio, print, television, web casting or new platforms. These youth broadcast live every Thursday directly from their classroom and cover school events, school issues and concerns, editorials, and live interviews with teachers and administrators.

The overarching role of Native Radio is to serve as an important voice and leader within native communities. Native Radio is unique in that it is often the only place where people on a reservation can hear programming about, for and by the people of Native communities. It is a place where people can hear their own language spoken and a place where traditions and stories of native culture are shared. Among our native listeners, radio has the unique ability to evoke a deep sense of place, a sense of identity and cultural confirmation that is vital to Native Americans.

### **Electrical Outages**

The Hopi Foundation, a non-profit 501 (c) (3), operates KUYI 88.1 FM, a community and public broadcast radio station that is also noncommercial and educational. Unfortunately, KUYI has been frequently off the air during the last four years. A consulting radio engineer recently completed an assessment to determine the causes of the station's frequent downtimes. The engineer identified two main causes for the outages: insufficient grounding at the transmitter site and unreliable electrical service in the area.

Without an additional and more comprehensive grounding system, the station is vulnerable to catastrophic equipment failure from power failures.

The last power failure caused \$7,400 in damage. It destroyed the tower plate transformer, a \$6,000 part. The station operated on a rented low-power FM transmitter for nearly a week while waiting for replacement parts and there were engineering and freight costs that added to the expense. At 3% of the station's annual budget, it was a large expense for the station to absorb.

Considering the frequency of the power surges, KUYI is running "barefoot" at both the studio and the transmitter. Power surges and low voltage conditions go directly to all the equipment. When outages occur, even for a few seconds, the station is off the air for a long time. Often the transmitter does not come back online unless someone drives to the transmitter site and resets the equipment. The United States government and the Hopi Foundation have invested considerable resources to create this broadcast infrastructure.

The Hopi reservation does not have an up-to-date power grid. There is a single distribution line running to the area, installed decades ago. Without an electrical loop running through Hopi land, a failure anywhere along the main distribution line on its way to the reservation will result in a complete power outage. This lack of redundancy combined with the age of the power system creates an unreliable power source for KUYI.

Severe weather occurs every year in the signal area. I-40 is closed periodically in the winter when the snow and ice make travel impossible. The station broadcasts weather alerts when there is flash flooding or severe weather advisories on the reservation. When the weather is most severe, people rely on the radio station for information, but at the same time the electrical power is most unreliable in severe weather.

KUYI is the sole provider of Emergency Alert System (EAS) services in its service area. The station experiences frequent power outages accompanied by long delays before power is restored. Power outages for 2002 – 2004 are documented in attachments as part of this testimony, demonstrating that the average power outage duration is about five hours.

### **Interim Remedies**

The electrical outages are numerous and can best be described as a major expense to the operation of KUYI. The electrical outages are so common that KUYI is planning to implement three major remedies in order to stay reliably on-air. First, by implementing a more stringent grounding system for the transmitter site; second, by installing power conditioning equipment to protect the equipment from voltage drops and spikes, and third, by installing generators to keep the station on the air during frequent power grid failures. By protecting the transmitter equipment from power spikes and power outages, KUYI hopes to reduce equipment repair and replacement costs and maintain its on-air credibility and reliability.

The objectives of this costly project are to protect the transmission system from power grid failures, to be able to broadcast without interruption during the frequent power failures that occur and help the station's economic sustainability. Every single time, KUYI is off-air due to a power outage, its reliability as a business diminishes. KUYI is unable to fulfill its underwriting

obligation to local businesses, and revenue loss becomes an issue, directly impacting station revenues.

KUYI serves real needs and can save lives. I ask the Commission to help protect the extensive investments made by both the federal government and the Hopi Foundation by addressing dirty power on the Hopi Reservation.

### **Antelope Mesa**

The transmitter sits atop Antelope Mesa, near Keams Canyon overlooking the main settlement areas of the Hopi tribe.

### **Power Conditioning Equipment**

Currently, there are no plans for a major overhaul of the electrical grid on the Hopi reservation, so the only viable solution is to install generators and power conditioning equipment at the studio and the transmitter sites. To protect the equipment from voltage spikes, the engineer recommends a Larcan model BC-3-2100 active tracking power filters. The system is for 3-phase power, 100 amps, rated 42 KVA. This equipment is the optimal way to condition the power that comes from the grid. The electricity delivered to the site is very dirty, with frequent spikes and dips making a power filter essential.

### **Backup Generator**

The engineer recommends the station acquire a backup diesel generator rated for 90KW to power the transmitter and related equipment during the power outages. The tank is sized to allow the station to continue to broadcast for 24 – 30 hours. During longer outages, KUYI will be able to refill the diesel tank daily and keep on the air continuously.

### **Studio**

Power conditioning and backup equipment is needed at the studio site to protect the studio equipment and to keep the signal on the air during power outages. The studio gets the same dirty and unreliable power as the transmitter does. The independent radio engineer recommends a 25KVA diesel generator to run the studio and a 3000-watt power conditioning unit to protect the origination equipment. The generator is sized to be able to power the refrigerated air conditioning system necessary to keep the station operational when outages occur during hot Arizona desert summers.

## **Exhibit G: Engineer's Assessment Report**

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Peak Broadcasting Company  
P. O. Box 970  
Show Low, Arizona 85902

### **ENGINEERING ASSESSMENT**

January 3, 2005

The management of KUYI Radio, located near Keams Canyon, Arizona contacted our firm regarding an on-going problem with off –air outages and damage to broadcast equipment at the KUYI transmitter site. Our firm provides engineering services to many broadcast radio stations in Northeastern Arizona. With over seventeen years experience in broadcast engineering as an engineering consultant and chief engineer for many area radio stations, we have been able to lessen the affects of lightning upon broadcast facilities. We made an on-site inspection of the transmitter and studio sites, and recommend the following to address the off-air concerns.

At the transmitter site, the outages have been caused by failures attributable to an inadequate grounding system and by failures of the commercial power source.

The existing ground system consists of a single common ground rod to which the tower and transmitter equipment are connected. This is inadequate with respect to dissipating energy induced by nearby lightning activity. In order to prevent equipment failures due to lightning, the induced energy must be conducted to ground through the ground system rather than through the transmitting equipment. To this end, a grounding system with enhanced conductivity to ground potential is required. Therefore, we recommend the implementation of a radial grounding system and a chemical ground system, both connected to a common transmitter/tower ground point, which is a proven standard in the broadcast engineering industry.

The transmitter site is also susceptible to frequent power outages and large voltage spikes, and brown-outs from the commercial power source. To mitigate the effects of “dirty power” upon the transmitting equipment, we recommend the implementation of an active power conditioning unit. After analyzing the load requirements of the site, a unit with 100KvA capacity is required. In order to supply site power during frequent prolonged outages, a generator and automatic transfer switch is required with a capacity to supply 90 KW power.

At the studio site, the grounding is satisfactory; however, the same power outage problem exists at the studio which exists at the transmitter site. When commercial power is out, both the studio and transmitter simultaneously have no power. It is pointless have the transmitter on the air with back-up power with the studio unable to provide audio to be broadcast. Therefore, we recommend a small 3000 watt power conditioning unit to provide surge protection and line regulation to essential studio equipment, including: the main board, the STL, remote control, CD and tape players, satellite receivers, SOSS computer, and the automation computer. We further recommend a generator and transfer switch to provide power to the aforementioned equipment and the HVAC system so that the station can remain on the air with the equipment kept at the proper operating temperature. By direct load measurements, a 25 KW generator system is required.

Although not a 100 percent guarantee for never suffering lightning damage, the aforementioned recommendations will greatly improve the reliability of the KUYI facility, and thus, keep the station on the air in the future during situations where it has not been able to broadcast in the past.

Prepared by:

Michael Woodworth

Chief Engineer for Peak Broadcasting Company

**Exhibit H: Highlighted Summary  
Power Outage Log, June 2002 – November 2004**

Shortest Documented Power Failure: 1 minute  
 Longest Power Failure: 30 hours 38 minutes  
 Average of all Power Failures: about 5 hours  
 Outages greater than 10 minutes are listed in **bold**.

\*Please note that outages do not include every single outage. In addition, outages continue to occur.

	Date	Power Failure	Power Restored
1.	6/1/02	2:55 pm	2:56 pm
2.	7/19/02	2:08 pm	2:09 pm
<b>3.</b>	<b>11/9/02</b>	<b>10:27 am</b>	<b>2:23 pm</b>
<b>4.</b>	<b>11/18/02</b>	<b>1:15 pm</b>	<b>11/19/02 8:38 am</b>
<b>5.</b>	<b>11/30/02</b>	<b>11:50 am</b>	<b>1:54 pm</b>
6.	11/30/02	3:25 pm	3:29 pm
<b>7.</b>	<b>11/30/02</b>	<b>5:52 pm</b>	<b>7:04 pm</b>
<b>8.</b>	<b>12/23/02</b>	<b>9:23 am</b>	<b>10:13 am</b>
9.	12/23/02	12:05 pm	12:15:pm
10.	2/2/03	11:07 am	11:08 am
11.	2/2/03	11:36 am	11:37 am
12.	2/2/03	11:59 am	11:59 am
13.	2/2/03	12:11 pm	12:12 pm
<b>14.</b>	<b>2/2/03</b>	<b>12:13 pm</b>	<b>5:39 pm</b>
15.	4/11/03	10:17 am	10:19 am
16.	4/17/03	10:40 am	10:48 am
17.	9/9/03	1:33 pm	1:38 pm
18.	9/9/03	1:51 pm	1:53 pm
<b>19.</b>	<b>10/3/03</b>	<b>10:04 am</b>	<b>12:21 pm</b>
20.	6/23/04	9:16 am	9:18 am
<b>21.</b>	<b>9/27/04</b>	<b>5:00 pm</b>	<b>9/28/04 11:38 pm</b>
<b>22.</b>	<b>11/8/04</b>	<b>6:00 am</b>	<b>3:38 pm</b>
<b>23.</b>	<b>11/20/04</b>	<b>6:10 pm</b>	<b>11/21/04 12:00 pm</b>

New Item	Related Equipment
Chemical and Radial Ground System	Grounds the <b>Antenna Model 6810-10R-PS</b> , the 300' <b>tower</b> , the 325' Andrew 3" <b>Transmission Line</b> and all the equipment in the transmitter building.
Larcan Power Conditioning Unit	Protects the <b>Broadcast Electronics FM 20T FM Transmitter</b> and all other equipment in the transmitter building from power dips and spikes.
90 KW Generator	Powers the <b>Broadcast Electronics FM 20T FM Transmitter</b> and all other equipment in the transmitter building during power failures.
25 KW Generator	Powers the <b>Audio Console</b> and other basic equipment needed to keep the station on the air during power failures. It also must power the cooling system to prevent the equipment from overheating during hot Arizona summers.
Tripp Lite Power Conditioning Unit	Powers the <b>Audio Console</b> and other minimal equipment needed to keep the station on the air during a power failure while the generator is starting. It also protects this equipment from power dips and spikes.