

## CASE STUDY: NORTHERN LIGHTS ELECTRIC COOPERATIVE



**DryMax**<sup>™</sup>  
**Moisture Solution**

## **NORTHERN LIGHTS SOLVES TRANSFORMER MOISTURE PROBLEM WITH DRYMAX<sup>™</sup>**

Northern Lights Electric Cooperative (NLI) operates 33 transformers, including a 230 KV, 5,000 gallon substation transformer, at its power plant in Sagle, Idaho. This transformer was recently found to have moisture content of 45 ppm in its oil with a saturation of 47.8 percent. When transformers operate with increasingly higher moisture levels (above the acceptable levels of 8 percent for a 230 KV transformer), the conductor's paper insulation becomes questionable. These excessive moisture levels compromise the dielectric integrity of the transformer and can lead to failure.

When this occurs, replacement costs can run as high as \$750,000 for this transformer, not to mention downtime costs while technicians scramble to restore or replace the unit.

To prevent a potential plant shutdown, there are several options available to reduce moisture in a transformer, including:

- Field dehydration with heat and vacuum --the process of applying heat and vacuum to the oil. This removes moisture from the oil, but often cannot remove the moisture from the paper insulation.
- Full vacuum dry-out--the process of applying full vacuum to a transformer. This is effective, but the transformer must be rated for full vacuum. This often requires extensive down-time as draining of the oil is involved.
- Factory dry-out—requires the transformer to be taken out of service and transported to the factory. This often leads to costly down-time and mobilization costs.
- SD Myers Inc. DryMax®—Substation grade online dryer installed on site while the transformer remains energized. This removes moisture from the oil and paper insulation.

"Our best option was to employ a SD Myers' DryMax® 800 transformer dehydration unit because it was the only option that would dry out our transformers' oil and insulation paper completely," explains NLI's System Engineer. "We previously tried field dehydration--the initial results looked good, but after three months, the moisture levels returned, and we were right back where we started".

After DryMax®'s first month in operation, NLI found that its transformer moisture level was reduced to 10 ppm with a saturation level at 7.5 percent. After eight months, DryMax® reduced the moisture content to 2 ppm with saturation under 3 percent.

Based on the dry-out success, NLI is using DryMax® on additional transformers with high levels of moisture. "DryMax® has already paid for itself threefold within the first month of operation," says NLI's System Engineer. "It saved my transformer from failure, which is one of the greatest catastrophes our plant could ever experience".

# NORTHERN LIGHTS ELECTRIC COOPERATIVE - **DryMax** MOISTURE HISTORY

