Where have you been since last SEPTEMBER???

Yes, yes, I know it’s been a while since we last published our newsletter (seven months, to be precise). What can I say other than the License Application has been winding its way through the process and we’ve been shepherding it along by responding to various inquiries. In addition, I am proud to report we completed the following activities since the last edition of this newsletter:

- Signed a New Operating Agreement (NOA) with the US Army Corps of Engineers (USACE) and Southeastern Power Administration (SEPA) (see page 4)
- Provided funding to the SC Department of Natural Resources (SCDNR) to support construction of an observation platform at Sassafras Mountain (see page 4)
- Provided initial funding for the Keowee-Toxaway Habitat Enhancement Program (KTHEP) and are prepared to accept the first funding proposals (see page 5)
- Submitted the 401 Water Quality Certification request to the SC Department of Health and Environmental Control (SCDHEC) (see page 2)

So, while the pace has slowed a bit, there’s certainly still been a lot going on! And we expect to see more happening with relicensing as we get closer to 2016, the year we anticipate the New License will be issued by the FERC.

*Jen Huff*

*Keowee-Toxaway Relicensing Project Manager*

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**Upcoming Events Just for Fun**

The World of Energy has several events in coming up. Check out the [World of Energy website](#) for details.

- April 28 – May 14: Oconee County School District Art Show
- May 15: “Penguins of Madagascar” Movie Night
- May 28: Daniel High School Band Concert on the World of Energy Point
- September 26: National Hunting and Fishing Day celebration

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**Timeline Overview**

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<tbody>
<tr>
<td>Stakeholder Team Formed</td>
<td>File Proposed Study Plan</td>
<td>First Season Studies</td>
<td>Second Season Studies</td>
<td>Sign Relicensing Agreement</td>
<td>File License Application</td>
<td>License Expires</td>
<td></td>
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</table>

*We are here*
Duke Energy submitted its request for a 401 Water Quality Certification (401) from the South Carolina Department of Health and Environmental Control (SCDHEC) on March 31, 2015. This action is a required step in Federal Energy Regulatory Commission (FERC) relicensing and is intended to assure operation of the Keowee-Toxaway Project is consistent with the requirements of the Clean Water Act. Per FERC’s regulations, SCDHEC has one year from receipt of Duke Energy’s 401 request to take action.

SCDHEC’s 401 regulations require Duke Energy to provide a complete assessment of the potential effects of continued operation of the Keowee-Toxaway Project on water quality standards for dissolved oxygen (DO) in Project flow releases. As part of relicensing, Duke Energy monitored DO in the water released at Keowee and Jocassee and also developed a water quality model for Lake Keowee. Both studies demonstrate DO levels are well-above SCDHEC’s minimum state standards and will remain so for the term of the New License. This is due to two reasons:

1. Water quality at Lake Jocassee and Lake Keowee is extremely good and among the highest in South Carolina.
2. Water released by both Jocassee Pumped Storage Station and Keowee Hydro Station comes from the well-oxygenated epilimnion of each reservoir. At Lake Jocassee, the design of the intakes causes water to be pulled from the epilimnion; at Keowee Hydro Station, an underwater weir in front of the hydro station intake limits the withdrawal zone to the epilimnion. The only way this would change would be if Duke Energy was planning to modify the intake structure or the weir – which it is not. Therefore, DO levels will remain above state standards during the next license.

Consistent with the Relicensing Agreement, Duke Energy proposes to monitor DO in the tailwater areas downstream of Jocassee Pumped Storage Station and Keowee Hydro Station continually during the month of August and provide the data to SCDHEC each year. “Why August?” you ask. The Stakeholder Team selected August because historic water quality data demonstrate DO levels in hydro station flow releases at Keowee-Toxaway generally reach their lowest in August.

Public notices about Duke Energy’s 401 request were published in local papers in April and approximately 6,000 notices were mailed to lake neighbors inviting participants to submit their comments about the 401 request; comments are due May 14, 2015. If you want to learn more, you can access the public notice on SCDHEC’s website. We’ve posted the 401 request in the Online Library on the Keowee-Toxaway Relicensing website.

**What is the “epilimnion”?**

The term epilimnion refers to the upper layers of water in a thermally stratified body of water. Generally, the epilimnion is better-oxygenated than layers deeper in a reservoir. 

The Jocassee Pumped Storage Station intake is perched on a ridge, forcing water to be withdrawn from the upper portion of the reservoir. A submerged weir in front of the Keowee Hydro Station intake causes water to be released from the upper portion of the reservoir during hydro station operation.
The Relicensing Agreement in Action
Keowee-Toxaway Low Inflow Protocol Remains in Stage 0

The Keowee-Toxaway Project entered Low Inflow Protocol (LIP) Stage 0 in September 2014 and quickly moved into Stage 1 the next month. However, in January of this year, the US Army Corps of Engineers (USACE) was able to build enough storage in their Hartwell, Russell, and Thurmond reservoirs to allow a recovery to LIP Stage 0. As defined by the LIP, the Keowee-Toxaway Project will return to Normal only when the recovery criteria for returning to Normal Conditions from Stage 0 have been met (i.e., Duke Energy’s reservoir system storage rises above 90 percent remaining usable storage). Despite what feels like a relatively wet spring so far, streamflow in the area remains below normal as demonstrated in the LIP Trigger Status below. It is likely to remain below the long-term average into at least early-summer.

When in LIP Stage 0, the LIP requires Duke Energy to convene Keowee-Toxaway Drought Management Advisory Group (KT-DMAG) meetings to review current drought conditions in the Upper Savannah River Basin and other related data. While no water conservation measures are required in Stage 0, we always encourage wise water use from company reservoirs.

### Keowee-Toxaway Project LIP Trigger Status Summary for 03/31/15 and Changes Compared to 03/01/15

<table>
<thead>
<tr>
<th>LIP Stage</th>
<th>Reservoir Storage</th>
<th>% of 4-Month Long-Term Avg. Streamflow</th>
<th>12-Week Avg. of US Drought Monitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>Normal</td>
<td>&gt;=85%</td>
<td>&lt;0</td>
</tr>
<tr>
<td>LIP Stage 0</td>
<td>DE and USACE &lt;90%</td>
<td>&lt;85%</td>
<td>&gt;=0</td>
</tr>
<tr>
<td>LIP Stage 1</td>
<td>DP=1</td>
<td>&lt;75%</td>
<td>&gt;=1</td>
</tr>
<tr>
<td>LIP Stage 2</td>
<td>DP=2</td>
<td>&lt;66%</td>
<td>&gt;=2</td>
</tr>
<tr>
<td>LIP Stage 3</td>
<td>DP=3</td>
<td>&lt;55%</td>
<td>&gt;=3</td>
</tr>
<tr>
<td>LIP Stage 4</td>
<td>DE &lt; 25%</td>
<td>&lt;40%</td>
<td>4</td>
</tr>
</tbody>
</table>

Recovery under this LIP as conditions improve will be accomplished by reversing the staged approach outlined above, except the only trigger to recover from a stage is for either the storage index for the Licensee’s Reservoirs or the USACE drought trigger to be exceeded for the current stage.

For more information about the KT LIP and LIP Stages, visit the KT-DMAG website.
The Relicensing Agreement in Action

New Operating Agreement Advances Collaborative Management of Regional Water Resources

Representatives from the U.S. Army Corps of Engineers (USACE), Southeastern Power Administration (SEPA), and Duke Energy signed a new operating agreement on October 17, 2014, defining how water resources will be shared among the Duke Energy and USACE reservoirs in the Savannah River Basin. This operating agreement is expected to increase drought tolerance within the watershed and promotes conservation efforts.

The agreement encompasses the reservoirs in Duke Energy’s Keowee-Toxaway Project (Lakes Jocassee and Keowee) and Bad Creek Reservoir, and the Corps’ reservoirs (Lakes Hartwell, Russell and Thurmond).

“We believe this new agreement represents a balanced approach to managing our respective hydroelectric reservoirs in the Upper Savannah River Basin during droughts,” explained Steve Jester, Duke Energy’s vice president of water strategy, hydrorelicensing and lake services. “We worked very closely with the U.S. Army Corps of Engineers and the Southeastern Power Administration to develop the agreement and look forward to continuing the partnership.”

Continued on page 8

The Relicensing Agreement in Action

South Carolina’s highest peak to become more accessible

Visitors to South Carolina’s highest peak will soon have access to a spectacular panorama of the surrounding countryside thanks to a $350,000 gift from Duke Energy. The contribution is the first step towards building an observation platform and other planned amenities at the top of Sassafras Mountain. The funds allow construction of the observation platform to begin.

The donation was formally presented on February 6, 2015, at the S.C. Natural Resources Board meeting in Columbia. Funding for the Sassafras Mountain amenities was committed as part of the Relicensing Agreement.

"Duke Energy has been a long-time partner with the S.C. Department of Natural Resources to provide public recreation since the 1960s," said Alvin Taylor, the agency’s director. "We have worked closely with Duke Energy on numerous projects involving hunting, fishing, boating and habitat protection. Building this platform is the first step in maximizing the natural beauty of the Palmetto State’s tallest peak for generations to come."

"Sassafras Mountain is a special natural asset, and this project fits right in with our mission of environmental stewardship," said Clark Gillespy, South Carolina president of Duke Energy. "Partnerships like this ensure that the natural beauty and wonders of South Carolina are protected and shared with generations to come."

With the Duke Energy contribution, fund-raising for the Sassafras Mountain observation platform, which will allow views into North Carolina and Georgia, has reached about $500,000, sufficient to move forward with

Continued on page 9
The Relicensing Agreement in Action

Keowee-Toxaway Habitat Enhancement Program to Accept First Round of Grant Applications

Beginning May 1 through July 31, Duke Energy will accept applications from governmental agencies and non-profit organizations for the newly established Keowee-Toxaway Habitat Enhancement Program (KTHEP). The program will fund projects that create, enhance and protect aquatic and wildlife habitats in the Lake Keowee and Lake Jocassee watersheds. The KTHEP was launched in September 2013 as part of the Keowee-Toxaway Relicensing Agreement (RA) Duke Energy entered into with sixteen other stakeholder organizations during the Keowee-Toxaway Hydroelectric Project Federal Energy Regulatory Commission relicensing process.

A similar habitat enhancement program was successfully established in 2007 for Duke Energy’s Catawba-Wateree Hydroelectric Project. Nearly $1.9 million has been awarded to fund projects in the Catawba-Wateree reservoirs including installation of osprey/heron nesting platforms, installation of in-reservoir fish attractors, establishment of water willow beds and other riparian vegetation, and riparian land protection. The signatories to the Keowee-Toxaway RA designed the KTHEP to encourage local resource agencies and non-profit organizations to undertake similar activities at Lake Keowee and Lake Jocassee.

The KTHEP is funded by Duke Energy and property owners adjoining Lake Keowee and Lake Jocassee who seek permits from Duke Energy under the Shoreline Management Plan (SMP). KTHEP fee payments must accompany SMP permit applications. Funds for the KTHEP are managed and administered by the Foothills Community Foundation, an Anderson-based organization serving the philanthropic needs of South Carolina for over 15 years.

Proposals will be reviewed by a Proposal Review Committee (PRC) composed of representatives from RA signatory organizations. The PRC will make funding recommendations to Duke Energy, and approved projects will receive the funds likely no later than the end of November.

The RA signatories believe the KTHEP will result in significant habitat improvements in the immediate Keowee-Jocassee watershed for a variety of aquatic and terrestrial based species. For additional information about the KTHEP, including how to submit a proposal, please visit the KTHEP website or call Duke Energy at (800) 443-5193.
Assessing the water resource situation for a region requires an observer to consider many different factors including historic and current streamflow amounts, precipitation, groundwater levels, short- and long-term weather forecasts, and regional drought assessments. When I review the many different data points and forecasts described below, I see the Keowee-Toxaway region as drier than normal and indicators lead me to believe we may be facing drought conditions soon.

While it certainly felt to some that we had a wet winter, the region received below average precipitation this winter, as well as into early spring. Since the beginning of January, Greenville received 9.19 inches of precipitation in contrast to the long-term normal of 12.03 inches, meaning we are nearly 3 inches behind. This is important because late fall into early spring is traditionally the period for groundwater recharge. (“Groundwater recharge” is how the groundwater is replenished. Generally speaking, rivers are fed by both groundwater and rainfall.)

The US Geological Survey (USGS) graphic (top right) depicts regional streamflow relative to long-term average values. The Keowee-Toxaway area shows many streamgages experiencing below normal hydrologic conditions. The USGS describes a percentile as a value on a scale of one hundred that indicates the percent of a distribution that is equal to or below it. For example, on the map of daily streamflow conditions a river discharge at the 90th percentile is equal to or greater than 90 percent of the discharge values recorded on that day of the year during all years measurements have been made. The USGS classifies a streamflow below the 25th percentile but above the 10th percentile as “Below normal.” In the example illustrated, very low flows in the 6-9 percentile range are widespread in the Keowee-Toxaway region.

The National Ocean and Atmospheric Administration (NOAA) graphic (bottom right) details the precipitation departure from the long-term average for the last 90 days. Consider where the Keowee-Toxaway River Basin is located; the Keowee-Toxaway Basin has received 2 to 12 inches less precipitation than the long-term average.

When considering precipitation amounts, one must also think about evaporation including evaporation from the lake surfaces such as Lake Keowee. The Clemson-Seneca Airport data for the period January 1 through March 31, 2015, recorded 9.6 inches of precipitation, but it also shows evaporation from an open water surface equivalent to 8.8 inches for the same period. Looking at March alone, the airport received 2.4 inches of precipitation but 4.5 inches of evaporation. Seasonally speaking, plants and gardens as well as trees are “greening up” which means that evapotranspiration (the combination of evaporation from free water surfaces and transpiration of water from plant surfaces to the atmosphere) is increasing.
What is expected for the spring and looking into summer for temperature and precipitation projections? NOAA’s prediction for temperatures for the period April through June is that they don’t really know - there isn’t a strong signal for what temperatures will do (thus equal chance for above, below, or normal temperatures). For the same period NOAA predicts above average precipitation. A weather phenomenon known as El Nino is developing and some forecasters believe it will develop to a moderate level, further supporting the predicted higher probability for above normal precipitation in the region.

For the period July – September, NOAA is predicting above average temperatures, but no clear signal what precipitation is expected to do.

Another factor to consider is soil moisture. NOAA data suggest soil moisture conditions are below normal for this time of year. Looking forward, NOAA forecasts we will see normal soil moisture conditions by the end of April and above average conditions by the end of June.

As an additional data point, data from the USGS groundwater well in Oconee County funded by Duke Energy (top right) suggests recharge this winter was generally less than long-term average values.

One final trend to consider is the NOAA Drought Monitor. NOAA has been slowly expanding what they classify as abnormally dry conditions (highlighted in yellow in the graph on the bottom right) in and along the Southern Appalachian Mountains and Piedmont of the Southeast.

To summarize all of the above, streamflow, rainfall, soil moisture, and groundwater levels all appear to be below normal for this time of year. The Drought Monitor appears to be expanding gradually in North and South Carolina, particularly in the Keowee-Toxaway region. National forecasts suggest a probability for above average precipitation this spring coupled with warmer than average temperatures. It will remain to be seen if the predicted rainfall will help offset, and hopefully ease, the areas of dryness.

George Galleher, P.E.
Hydro Fleet Operations
Duke Energy Carolinas

Prepared April 2, 2015
“Good stewardship of the basin’s freshwater resource is one of our highest priorities, and this agreement advances that effort,” said Stan Simpson, Savannah District’s senior water manager. “We are committed partners with SEPA and Duke. We are proud to work with them to provide innovative solutions to operational needs as well as basin needs.”

The new operating agreement supersedes a 1968 agreement put in place to ensure proportionate use of water resources during drought at both the Corps’ reservoirs and Duke Energy’s reservoirs. Since 1968 there have been many changes in both the USACE and Duke Energy systems without modification to the operating agreement. For example, the USACE and Duke Energy have each constructed an additional reservoir since 1968 in the Savannah River Basin. Both reservoirs incorporate pumped storage facilities that affect operation of their systems. The USACE constructed the Richard B. Russell Pumped Storage Project, and Duke Energy constructed the Bad Creek Pumped Storage Project and the Oconee Nuclear Station. The USACE also modified its reservoir operations through implementation of a Drought Plan, with the latest update occurring in July 2012.

While the new agreement still balances the percent of remaining usable water resources between Duke Energy and USACE reservoirs, it also incorporates Duke Energy’s drought tolerance measures (Low Inflow Protocol) to coordinate drought mitigation measures in the upper basin. This results in a more resilient operation, more prudent water conservation and accounts for the new pumped storage facilities in the basin. The new agreement is consistent with the Keowee-Toxaway Relicensing Agreement, and it allows Duke Energy to make flow releases to support downstream water needs deeper into severe droughts than the 1968 agreement.

The new agreement also incorporates the USACE’s 2012 Drought Plan so the minimum outflows from Thurmond Dam would remain the same. The agreement was also designed to be environmentally friendly. An Environmental Assessment demonstrates the new Operating Agreement would result in no significant environmental impacts and represents sound natural resource management practices and environmental standards.

Reminder: Large Inflatables Prohibited at Lake Keowee and Lake Jocassee

Based on the Shoreline Management Plan, the use of large inflatable recreation equipment such as trampolines, slides, and diving boards is prohibited at Lake Keowee and Lake Jocassee as well as on Catawba-Wateree and Nantahala Area lakes managed by Duke Energy. These large, secured inflatables can block navigational access and raise aesthetic objections.

Last summer, Duke Energy offered lake residents a grace period and allowed the inflatables to remain through Labor Day 2014. That period has ended, and large inflatable recreation equipment is now prohibited. If Duke Energy Lake Services representatives identify prohibited large inflatables on the lake, the homeowner will receive notification explaining the large inflatable recreation equipment must be permanently removed.

Smaller water toys used primarily with moving watercraft, such as ski and inner tubes, and towables for three people or less are permitted and are not affected by this notice.

For questions regarding large inflatables, please contact Duke Energy Lake Services at 800.443.5193.

Large inflatables like these are not allowed at Lake Keowee or at Lake Jocassee.
construction of the platform. Construction of the platform will likely begin this summer, and should take less than six months. The construction of other amenities, such as restrooms, a picnic area and a barrier-free trail to the observation platform will require additional fund-raising.

"We challenge other corporations to follow Duke Energy’s lead and join us in this effort, because the Sassafras Mountain project is important to the citizens of South Carolina," Taylor said.

Sassafras Mountain, in addition to being the highest point in South Carolina at 3,553 feet, sits on the border of South Carolina and North Carolina and is also on the Eastern Continental Divide. It is the separation point for three distinct watersheds—two of these watersheds drain into the Atlantic Ocean and another travels to the Gulf of Mexico. The 77-mile Foothills Trail (www.foothillstrail.org) passes over the top of Sassafras on its journey between Table Rock and Oconee state parks.

Partners in the Sassafras Mountain effort in addition to DNR and Duke Energy include Pickens County, Clemson University, The Conservation Fund, The Highpointers Club, the Foothills Trail Conference, and the Harry Hampton Memorial Wildlife Fund.

For more information, visit the Sassafras Mountain project website: http://www.dnr.sc.gov/sassafrasmountain.html.

Duke Energy Recreation Updates

**Stamp Creek Access Area:** Both boat ramps at Stamp Creek Access Area are now open following the completion of repair work to one of the ramps.

**Warpath Access Area:** Work continues at the Warpath Access Area where both boat ramps are being rebuilt and extensions added to the courtesy docks. The boat launches are currently scheduled to open by mid-May, depending on weather conditions.

**Vandalism:** Vandalism has been observed at some of the access areas. Duke Energy requests all access area users to please report incidents to the local police if vandalism is observed.

**Safety:** As the weather gets warmer and the recreation season nears, lake activities are increasing. Residents and visitors are reminded to follow boater safety rules and use life jackets while in and on the water.

For more information about KT Relicensing, check out the relicensing website at www.duke-energy.com/lakes/keowee-toxaway-relicensing.asp

To subscribe electronically to this newsletter, send an email to ktrelicensing@duke-energy.com.