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NEW HAMPSHIRE WATER WORKS ASSOCIATION
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Guy Chabot, Manchester 2014-2015

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### Water Works Superintendents and Other Officials

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Below is a recap of some of the noteworthy bills that came before the legislature this year.

**HB 1428 – Establishing the clean water state revolving fund non-program fund account in the department of environmental services for the purpose of funding eligible and completed wastewater projects under the state aid grant program.**

This bill passed both the House and Senate with amendments. A number of amendments were tacked onto the bill in the Senate which the House did not agree with. When it returned to the House they did not concur with the Senate amendments and it was subsequently sent to a Committee of Conference. After hashing it out in the Committee of Conference, this bill was sent back to both bodies for a subsequent vote and the bill passed as amended by the Committee of Conference. It was then sent to Governor Hassan who signed it into law on June 24.

The purpose of this bill is to fund eligible and completed wastewater projects under the state aid grant program. These are projects that have been on the “Delayed and Deferred” list under the State Aid Grant Program, and have not yet received anticipated funding by the state. Although all these projects are wastewater projects, in the future this
legislative concept may be applied to completed drinking water projects yet to be funded.

**HB 1382 – Relative to the referendum procedure for public water systems.**

NHWWA did not take a position on this bill. It pertained to the petitioning of a public water system in order to vote on whether or not to add fluoridation to the water system. The bill passed the House but came out of the Senate as Inexpedient to Legislate.

**HB 1461 & HB 1595 –** Both of these bills address instream flow. NHWWA worked with Senators, NHDES and stakeholders on changes to some of the language in both bills, specifically with regard to riparian rights. NHWWA advocated that “respect” riparian rights be changed to “protect” riparian rights. After several meetings in which the language was hashed out, the word “protected” was added to the bill text in both pieces of legislation. More detail on each of the bills is as follows:

**HB 1461 extending the advisory committee to study the impact of water withdrawals on instream flows.**

HB 1461 extends the advisory committee to study the impact of water withdrawals on instream flows. The major components of this legislation are that it changes the definition of “Protected Instream Flow” to “a pattern defined in terms of flow magnitude, duration, frequency, and timing that occurs within that stream’s natural range and variability”. In existing statute, it is simply flow.

It also requires NHDES to conduct a public hearing jointly with the Senate committee and House committee with jurisdiction over river management issues and provide a report within 30 days prior to
beginning a protected instream flow study on a designated river.

This bill came out of both the House and Senate with amendments. The House concurred with the Senate’s amendment and the bill was sent to Governor Hassan who signed it into law on June 21, 2016.

**HB 1595 relative to the rivers management and protection program.**

This bill made several changes to existing statute language, including adding definitions to aquatic connectivity, fluvial geomorphology and more. It expands the criteria for nominating a river to the Rivers Management and Protection Program. And it changes the mechanism by which members of the Rivers Management Advisory Committee are selected. It requires a representative of public water suppliers to be “nominated by the New Hampshire Water Works Association”.

This bill passed the House and the Senate with an amendment. The House concurred with the Senate’s amendment and the bill was sent to Governor Hassan’s office and was signed into law on June 21, 2016.

**SB 368-FN-A making a capital appropriation for department of environmental services monitoring equipment.**

This bill cycled through both bodies of the legislature as originally drafted. Without any amendments its original draft was signed into law by Governor Hassan on May 27, 2016.

**SB 380 establishing the drinking water and groundwater trust fund and establishing the New Hampshire drinking water and groundwater advisory commission.**
This legislation establishes a trust fund that will be kept “distinct and separate” from all other funds, and which will be used to remediate damages resulting from MtBE contamination. It also establishes a drinking water and groundwater commission.

An amendment to this bill added the language to “provide funding through cost-sharing grants to municipalities, municipally-owned water utilities, and water utilities regulated by the public utilities commission for the design, construction and extension of public water systems, and the establishment and expansion of wellhead protection areas where they provide the most cost effective method for providing safe and clean drinking water”.

This bill was amended by both the House and Senate and each body concurred with the amendments. The bill was signed into law by Governor Hassan on March 31, 2016 after which recommendations could be made for appointments to the Commission.

The MtBE settlement funds have since been received by the state and are being held in investments while the Commission meets and determines its distribution. Recommendations for the various appointments to the commission were sent to the House, Senate and Governor’s office and of the appointments made, three NHWWA members have been appointed to the commission: Brian Goetz, David Paris and Bernie Rousseau.

The Advisory Commission had its first meeting on September 20 in which they discussed the purpose of the committee and were provided a history of how the trust fund and commission came to be. The presentation was led by DES representatives: Sarah Pillsbury, Drinking Water and Groundwater Administrator; Mike Wimsatt, Waste Management Division Director; and Gary Lynn, MtBE
Remediation Bureau Administrator. The next meeting has not yet been set.

Of the remaining drinking water related bills introduced this past year all but two were Inexpedient to Legislate and the other two were referred to interim study.

**HB 1133** – Relative to the maximum amount of a customer deposit which may be required under the rules of the public utilities commission. INEXPEDIENT TO LEGISLATE (House).

**HB 1155** – Relative to providing choice of meters to electric customers. INEXPEDIENT TO LEGISLATE (House).

**HB 1337** – Relative to rules of the public utilities commission on requiring deposits after disconnect notices to customers. INEXPEDIENT TO LEGISLATE (House).

**HB 1362** – Requiring telephone notice where an electrical outage is expected to exceed 4 hours. INEXPEDIENT TO LEGISLATE (House).

**HB 1427** – Suspending the water and air pollution control facility property tax exemption and appropriating certain revenues for water pollution control grants to municipalities. INEXPEDIENT TO LEGISLATE (House).

**HB 1505** – Allowing municipalities to exempt water and sewer/pollution control properties owned by private non-profit educational institutions from the local property tax. INEXPEDIENT TO LEGISLATE (House).

**HB 1523** – Relative to government construction contracts. REFERRED TO INTERIM STUDY (House).

**HB 1533** – Relative to the noise level limitations for permanent machinery. INEXPEDIENT TO LEGISLATE (House).

**HB 1693-FN-LOCAL** – Abolishing fluoridation in water. INEXPEDIENT TO LEGISLATE (House).
SB 311 – Relative to standards for radon in water. REFERRED TO INTERIM STUDY (Senate).

SB 367-FN – Including state water pollution control and public water system grants proposed by the department of environmental services in the capital budget. INEXPEDIENT TO LEGISLATE (Senate).

2017 Legislative Program

If you subscribed to the 2016 Legislative Program you know that you were kept informed with monthly updates on pending legislation. You also know how important it is for NHWWA to be actively involved in the legislative and rule making process. For those of you that did not participate, this is your chance to get involved!

Participating members receive monthly legislative updates which includes the bill status, a schedule of bill hearings and other important information. Updates are traditionally sent by mail but we will be focusing on sending more timely updates via email in the upcoming year. The financial support is also allocated for the time spent attending hearings, testifying and advocating for NHWWA and public drinking water.

NHWWA, and its Legislative Committee, have a proven track record of monitoring pending legislation and administrative rules that impact our business. They have established themselves as a trusted resource with our elected officials. Funding of the Legislative Program will allow the Legislative Committee to continue reporting and monitoring legislation and administrative rules that impact our business.
The cost will remain the same at only $.10 per service connection ($100 minimum). For support members, the annual fee is $250. **For more information, or to indicate your interest in participating in the 2017 Legislative Program, please contact Charity Ross at (603) 415-3959 or email cross@nhwwa.org.**

With so much focus on emerging contaminants we are bound to see legislation in the upcoming year addressing these concerns. Likewise, the Department of Environmental Services is already in the drafting process for new administrative rules pertaining to Instream Flow. Both of these issues will require time and dedicated funds to lobby for the best interests in our industry. The support provided to the Legislative Program is imperative to the success of our lobbying efforts.

Please consider participating in the 2017 Legislative Program when paying your annual membership dues. Your support is greatly needed to continue protecting our resources and our industry.

Sincerely,

The Legislative Action Committee
Variable Frequency Drive (VFD) Applications – Up and Running

by Bruce W. Lewis, P.E., Lewis Engineering, PLLC – Litchfield, NH

Abstract and Introduction:

The proper design and installation of variable frequency drive (VFD) and programmable logic controller (PLC) technology provides constant pressure, eliminates unnecessary wear and tear on mechanical and electrical parts, often lowers energy costs, and adds value to water customer satisfaction. This technology has been successfully used in NH and New England Water Works applications for many years. One exciting feature of using this technology is that it can immediately lower energy operating costs, as electric motors only run at the speed needed for the specific application and time of day demand. This may provide significant energy savings over the life cycle of the pumping and control equipment, as well as lower maintenance costs, and extend the life of pumps and motors.

VFD’s using PLC’s are now found in many areas of the water works business. A few examples include well pumps, water treatment applications, and all types of water pumping applications. In many applications VFD’s allow cost savings through more efficient use of electrical power. One primary advantage is to allow a water pumping system to efficiently maintain a constant discharge pressure over a wide range of flows, only running the pumps as fast as necessary during wide variations in the daily system demand. As an example, from NE Water and Wastewater News, an operator installed a VFD on a pump and motor where there was a large variation in time of day and time of year water demand. The station
pumped approximately 1.94 million gallons of water. Prior to the VFD installation this consumed 5,260 KWH of electricity. After the installation the electrical consumption dropped to 1,622 KWH for the same amount of water pumped.

In today’s cost conscious environment, it is important that the water system operator be aware that there are a variety of practical, functional, cost saving, options through automated control. This applies to many applications. Overall, the water system will be able to provide enhanced service to its customers, as well as provide improved water system operations.

**Typical Water Works related problems and VFD solutions:**

The use of VFD’s with PLC controllers and support data input devices are now very reliable and commonly used in both new and remodeling applications. This may include water meters that generate flow signals, and pressure transmitters (PT’s) that generate pressure signals. These devices provide input signals that are used for controlling pump operations.

Reported problems may include:

- Large pumps start and stop often and the water system sees wide variations in pressure.
- Suction pressure coming into a station varies dramatically, depending on time of day, and season of year.
- Customers near the end of the system report large swings in water pressure, as well as the utility receiving many routine complaints of low water pressure.
- New customers need to be added to the service area.
A new customer connects to the system with a new set of large water needs resulting in added peak demands.

Irrigation demands from residential and commercial customers can create hours of summertime high water use demands, which are much lower during non-irrigation months.

Solutions using VFD / PLC controls may include:

- Varying suction and flow conditions do not have a significant impact on system discharge pressure.
- System discharge pressure variations are able to be reduced 0 – 5+/- psi, over a very wide range of flows.
- Pumps only run as fast as needed, saving energy costs. Overnight and other low demand period times use less electrical power than had previously been required.
- Additional customers may be added to the system, without changing the pumps, station dimensions, piping or operating conditions, using this more efficient technology.

**Operational Considerations:**

There are a number of practical items to consider relative to implementing VFD/PLC improvements.

- Prior to starting system design and/or construction, a proper evaluation of the specific application based on desired operating conditions, is very important. Please note that VFD technology may not be the best application for some project circumstances.
- There is a lot of flexibility in how VFD / PLC technology may be applied to, and integrated into, your system. As such, as the operator or water system superintendent ask about features that would be
helpful to your specific operation. How would you like to see the station operate? What type of data collection and reporting would be most helpful to your water system?

- Utilizing an overall design approach that is reliable, understandable, easy to operate, easy to upgrade and use, is very important.
- Being able to easily change certain operating parameters is helpful. This is often done with password protection being part of the process.
- Standardization in the design approach utilizing high quality, non-proprietary, readily available, component parts is the practical approach.

**VFD Operations:**

VFD’s are devices that accurately change the frequency of alternating current (AC), which in turn, changes a pump’s motor speed. Today’s VFD drives are solid state electronic power conversion devices.

- The device first converts AC input power to direct current (DC) intermediate power.
- The DC intermediate power is then converted to quasi-AC power using an inverter circuit.
- The inverter circuit changes the DC energy into three channels of AC energy that can be used by an AC motor. Figure 1 provides a schematic layout.
- An important note is that three phase AC motors used with VFD applications need to be designed for use with them, i.e. VFD rated, high efficiency motors. The exception is submersible well pumps where the motors are industry standard, but the VFD sizing
should be reviewed with the well pump manufacturer, as they are often oversized. This allows the drive to safely operate at a higher amperage draw by the well pump’s motor without any overheating.

VFD Notes:
Since incoming power is first converted to DC, most VFD units will accept either single-phase or three-phase input power. When using single phase power, the VFD will act as a phase converter creating three phase power. This allows the drive to also control motor speed by varying the frequency (hertz) to the motor.

Figure 1 Allen - Bradley

Typical VFD System Schematic Layout

In many cases VFD’s allow a more efficient way to add Energy into Water

NHWWA Summer Journal 2016
As a note, proper VFD sizing is important when using single phase input power and converting it to 3-phase power. The supplier of the VFD may be consulted when this type of application is desired.

Single phase to three phase applications are very useful when the electric utility company does not have three phase power available nearby the application site. It is important to evaluate the single phase amperage draw that will be required for the specific three phase motor application.

**Typical VFD Installation:**

Figure 2 provides a typical schematic layout for a VFD installation.
Notes:

- The integral keypad on the face of most drives provides a means for an operator to start and stop the motor and adjust the operating speed.
- The operator interface often includes a display and/or indication lights to provide information about the operation of the drive.
- Automatic control from an external process control signal is the usual operational mode. This might include pressure and/or flow signals.
- The input signals and operations are often part of a PLC program, although many VFD’s now allow direct inputs, and offer a level of control programming.

Electric Motor Operations using a VFD:

- When a VFD starts a motor, it initially applies a low frequency and voltage to the motor.
- The VFD controls the applied frequency and voltage. As they are increased at a controlled rate or “ramped up”, the motor accelerates to its correct operating speed without drawing a high in-rush current.
- This starting method typically allows a motor to start smoothly while the VFD is drawing less than 50% of its rated current from the electric utility company. Smooth starting of pumps also helps avoid hydraulic shock/water hammer to a water system when pumping water in certain applications.
- The stopping sequence is just the opposite as the starting sequence. The frequency and voltage applied to the motor are ramped down at a controlled rate.
When the frequency approaches zero, the motor is shut off.

- One potential drawback of using a VFD with a standard electric motor is that if it is running at low speed for extended periods the motor may overheat. The reason for this is that the motor’s built in cooling fan is not rotating at full speed. As such, the fan is not moving enough air. As a solution, supplemental fan cooling or the installation of a VFD rated motor may be required.

**Application for Pumping water with a VFD controlling speed:**

- The most frequently used pumps in the water works industry are centrifugal pumps. This is the most common pump used in water works applications. Energy is transferred into the water by “whirling” the water around and increasing its velocity. At full speed using an electric motor, with power provided at a certain voltage and 60 hertz the impeller is spinning at a fixed speed. Many pumps operate at 1800 or 3600 revolutions per minute (rpm).

- Energy is then transferred into the water through the spinning impeller. The efficiency of this energy transfer varies widely across a pump’s operating curve. Figure 3 (page 28) is a summary of key components of a centrifugal pump and its operation.
A Typical Water Booster Station Application – the Pennichuck Water Works Tara Heights Booster Station Nashua:

Figures 4 and 5 represent a typical water booster station application where the station provides a constant discharge pressure over a wide range of flow. The station provides domestic and irrigation demands including fire flow demands. This station was designed and constructed to service a portion of Pennichuck Water Work’s (PWW) existing water system where elevations are such that the existing gravity fed system could not provide enough water pressure for new apartments, and commercial/light industrial areas.
Figure 4 shows the pumping arrangement that includes two 7.5 hp jockey pumps, two 20 hp domestic pumps, and a 250 hp fire flow pump. Figure 5 shows the electrical and control panels area.

Figure 4 Tara Heights - Nashua

2 @ 7.5 hp, 2 @ 20 hp, & 1 @ 250 hp
95 psi Discharge @ 0 – 3200 gpm

Figure 5 Tara Heights - Nashua

Electrical and Control Components

460/277V/400A – 3 Phase Elec. Service, 5 VFD Pumps, & a Harmonic Filter for the 250 hp Motor
The well planned use of VFD/PLC applications in today’s water works environment provide multiple benefits for the water system operator and for their customers. Not all applications call for VFD’s, but there are many instances that support and provide benefits to the water system. These devices and applications are highly reliable, operationally cost effective, and provide enhanced service.

Author Information:

Bruce W. Lewis is the manager of Lewis Engineering with offices located in Litchfield, NH. Lewis Engineering specializes in a wide range of water works engineering services for new as well as existing public and private drinking water systems. Mr. Lewis has been actively associated with a broad spectrum of engineering, operation, and construction of projects associated with the water works industry for more than 40 years, the last 30 of which have been in private practice. He is a Lifetime Member of American Water Works Association (AWWA), and received the New England Water Work’s (NEWWA) Award of Merit in 2015. He may be contacted by email at lewis.h2o@comcast.net, or by telephone at 603-886-4985.
18th Annual Construction Day
Wednesday, August 3, 2016

Left: The first stop on Construction Day was the Bedford Hills Booster Station.

Below: On the second stop, attendees viewed Manchester Water Works’ Radial Collector Well on the Merrimack River.

Left: The third stop was a follow-up visit to the newly erected 6.5 MG storage tanks in Manchester.
Above: After lunch at White Park in Concord, the bus traveled to Penacook to visit a water main replacement project and then on to the Sewalls Falls Bridge project.

Right: The day finished with a stop in downtown Concord to see the last phase of the Main Street Project.
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<td>HD Supply Waterworks</td>
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<td>JUTE (SQUARE BRAIDED, BRAIDED &amp; TWISTED)</td>
<td>HD Supply Waterworks</td>
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<td>LAB. SUPPLIES &amp; INSTRUMENTATION</td>
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<td>LEAD SUBSTITUTES</td>
<td>Stiles Co Inc.</td>
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<td>LOCATING INSTRUMENTS</td>
<td>E.J. Prescott, Inc.</td>
<td>HD Supply Waterworks</td>
<td>Stiles Co Inc.</td>
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<td>Ti-SALES, Inc.</td>
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<td>MANHOLE FRAMES &amp; COVERS</td>
<td>E.J. Prescott, Inc.</td>
<td>HD Supply Waterworks</td>
<td>Ti-SALES, Inc.</td>
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<td>MECHANICAL JOINT MATERIALS</td>
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<td>Ti-SALES, Inc.</td>
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<td>METER - SETTINGS</td>
<td>E.J. Prescott, Inc.</td>
<td>Ferguson Waterworks</td>
<td>Stiles Co Inc.</td>
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<td>Ti-SALES, Inc.</td>
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<td>METERS - WATER</td>
<td>Epping Well &amp; Pump</td>
<td>E.J. Prescott, Inc.</td>
<td>HD Supply Waterworks</td>
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<td>Stiles Co Inc.</td>
<td>Ti-SALES, Inc.</td>
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PAINT
HD Supply Waterworks  Stiles Co Inc.  Ti-SALES, Inc.

PIPE - BRASS & COPPER
E.J. Prescott, Inc.  HD Supply Waterworks  Stiles Co Inc.
Ti-SALES, Inc.

PIPE - DUCTILE IRON
E.J. Prescott, Inc.  HD Supply Waterworks

PIPE - GALVANIZED & BLACK
HD Supply Waterworks

PIPE LINING
E.J. Prescott, Inc.  HD Supply Waterworks

PIPE CUTTERS
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PRESSURE REGULATING VALVES
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Stonkus Hydraulics  Technology Sales  Ti-SALES, Inc.

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Stonkus Hydraulics

PUMPS - CHEMICAL FEED
BAU-HOPKINS  Epping Well & Pump  E.J. Prescott, Inc.
HD Supply Waterworks  Stiles Co Inc.  Ti-SALES, Inc.

PUMPS - DITCH
Epping Well & Pump  E.J. Prescott, Inc.  HD Supply Waterworks

PUMPS - PORTABLE

PUMPS - TURBINE
HD Supply Waterworks  Maher Services

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TANKS & STANDPIPES
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TAPPING MACHINES
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Stiles Co Inc.             Ti-SALES, Inc.

TAPPING SLEEVES & VALVES
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TELEMETERING EQUIPMENT
Technology Sales         BAU-HOPKINS

TEST PLUGS
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E.J. Prescott, Inc.

TOOLS
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Stiles Co Inc. Ti-SALES, Inc.

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JOURNAL ADVERTISING - 2 Issues per year published in Spring and Fall.

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<th></th>
<th>Cover Page</th>
<th>Full Page</th>
<th>½ Page</th>
<th>¾ Page</th>
<th>Business Card</th>
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<tr>
<td>Space Size</td>
<td>4.5” X 7.5”</td>
<td>4.5” X 7.5”</td>
<td>4.5” X 3.75”</td>
<td>4.5” X 1.7”</td>
<td>2” X 1”</td>
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<td>Cost/Year</td>
<td>$345.00</td>
<td>$230.00</td>
<td>$145.00</td>
<td>$115.00</td>
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Directory of Manufacturers Listing $85/year
Includes names of up to 3 representatives, contact information and product listing.
See back of page for directory categories.

NEWSLETTER ADVERTISING - 3 Issues per year, January, June and September

One ad - 2.5” X 1.75” $250/year

WEBSITE ADVERTISING

Medium Rectangle — appears on all pages, links to advertiser’s site. $400/year
Footer Banner — 3 ad animation loop, appears on all pages, links to advertiser’s site. $300/year

SPONSORSHIP OPPORTUNITIES

Drinking Water Week Festival $50
- held the first week in May for NH school children

Construction Day/Field Trip $50
- held early August, includes an ad in an 8 1/2” X 11” color brochure

NH Drinking Water Expo & Trade Show $50, $100, $150
- held late October, General Support, Food & Beverage, Seminar Rooms

Please note that billing for advertising will be done once per year, in November for the fiscal year November 1 through October 31. Sponsorships are solicited prior to each event.

Advertisers and representatives receive copies of the Journals, Newsletters and meeting notices and are welcome to attend meetings at member rates, which are held in various locations throughout the state.

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