Director’s Comments

An introduction…

Seems appropriate to start my first newsletter article by introducing myself. I served 20 years on active duty as a Maintenance Officer retiring as a Lt Col. Like many of you, I thoroughly enjoyed directly supporting the operational mission…and look forward to doing so again. On retirement, I accepted a position at Wright-Patterson AFB OH working multiple system, subsystem, and simulator acquisition programs. Challenging and interesting work ensuring our Air Force got the best possible aircraft and systems to successfully prosecute the mission. At the same time, I’m delighted to have this opportunity to get significantly closer to the Air Force’s primary mission…working to support PMEL efforts to produce highly accurate TMDE for the users and warfighter.

Recently, the Heath/Newark/Licking County Port Authority celebrated its 20th anniversary. Twenty years ago, on Oct 4 1996, Newark AFB stood down and the complex, including AFMETCAL and the AFPSL, was turned over to the Port Authority for management. This partnership between the government and a private entity has exceeded all expectations. The Port Authorities’ continued support for multiple Air Force missions here in Heath OH is a testament to the results we can achieve when we work collaboratively towards a common goal. AFMETCAL and the AFPSL look forward to building another 20 years of success with the Port Authority.

Looking a few weeks forward, we are planning to hold the next AFMETCAL Advisory Group meeting 15-16 Nov. I look forward to the opportunity to meet the MAJCOM Functional Managers and others who may be attending. This open exchange of ideas is crucial to our long term success in meeting Air Force’s calibration mission.

Lastly, thanks to all who have helped make my transition to AFMETCAL easy and painless. The steady stream of smiling faces offering information and assistance is heartwarming. I look forward to assisting you in ensuring that the AFMETCAL and PMELs’ partnership continues to provide the outstanding, world class support Air Force warfighters and senior leaders have come to expect.

Cheers,

Neil Erno
Chief, AF Metrology & Calibration Division
Disclosure & Editorial Policy

Disclosure: The Air Force Metrology and Calibration (AFMETCAL) Program Newsletter is published on a triannual basis (Mar, Jul, Nov) by the AFMETCAL Division (AFLCMC/WNMF), Plans & Analysis Section (AFLCMC/WNMRX), 813 Irving-Wick Drive W, Heath, Ohio 43056-1199.

The views and opinions expressed herein, unless otherwise specifically indicated, are those of the individual author. They do not purport to express the views of the U.S. Government, the Department of Defense, Department of the Air Force or HQ AFMC. Information contained in the AFMETCAL Newsletter is for informational purposes and is not directive in nature. Photographs are the property of the United States Air Force unless otherwise stated.

The appearance of hyperlinks does not constitute endorsement by the U.S. Air Force of the respective web site or the information, products or services contained therein. The U.S. Air Force does not exercise any editorial control over the information found at those locations.

Editorial Policy Statement: The AFMETCAL Quarterly Newsletter is the AFMETCAL Director’s forum to share insights into policy and emerging trends, personnel news, technical and other information of interest to the Air Force metrology community at large. Newsletter articles cover many topics: technical issues; clarifications of policies/procedures; process improvements; and items of general interest about Air Force metrology community members.

Submissions: We encourage readers to submit articles for the following categories: From the Bench (technical), About People (field personnel news), News & Notes (general information). Submissions should be in Microsoft Word, Times New Roman 12 font, accompanied whenever possible by digital photos in JPEG format. Native photo file sizes less than 2MB per image are preferred. Photos must be accompanied with caption information which fully identifies all individuals depicted, including rank, title or office, and event. Note that all text and photo submissions are subject to editing for content, cropping and/or size. All submissions that are technical in nature are reviewed by the AFMETCAL Engineering Branch (AFLCMC/WNME) for accuracy and appropriateness. Publication of any submission, regardless of subject matter, will be approved by the AFMETCAL Division and submission does not guarantee publication. All submissions are reviewed for compliance with Privacy Act, FDO, STINFO, OPSEC and other information security requirements as applicable.

How to Make a Submission: The AFMETCAL Newsletter editor transmits quarterly calls for inputs through the PMEL MAJCOM Functional Managers and other significant metrology program POCs to the respective PMEL managers and/or program functional offices. Normal submissions are in response to these data calls. Authors should submit their article inputs via e-mail through their respective chain of command to the AFMETCAL Newsletter editor. Authors may submit inputs out of cycle, but should use the same channels for those submissions. Deadline for submissions is the 15th of the month prior to the scheduled quarterly newsletter publication (publication months are March, July and November). Do not submit copyrighted material.

Director, Air Force Metrology & Calibration
Mr. Neil B. Erno

Editor:
Bob Nappier

Assistant Editor:
Lee Wood
News and Notes

Evaluators’ Perspective

Root Cause and Trend Analysis Tips and Techniques

Recently, members of the Evaluation Team attended a 3-day course on Root Cause Analysis (RCA) presented by Mr. Duke Okes of the American Society Quality (ASQ). While the team learned many new methods for conducting effective RCA, below are few things that we thought may assist when performing RCA and trend analysis (TA).

During an RCA roundtable discussion, it is not uncommon to see the QA Evaluator, the technician, the supervisor and maybe even the Lab Chief coming together to find the root cause of a nonconformity. Typically everyone discusses the nonconformity and follows the steps in TO 00-20-14, while an individual (QA) takes notes on a sheet of paper. One method that was introduced to the evaluation team was the use of visual aids to make the process easier. The paper note-taking method relies on individuals remembering what was discussed or to interrupt the process and go back over the notes. Removing this barrier from the process and putting notes on a whiteboard or flip-sheet allows the members to focus attention on the analytical thinking required to identify the root-cause and corrective actions as opposed to memorizing what was discussed. This resonated with a lot of members of the evaluation team because most of us have seen this method used during TA meetings but not during RCA. Some may find it beneficial to capture all of the parts of a RCA meeting on a whiteboard or flip sheet where everyone can see it and use it rather than just on a sheet of paper. For example, during the RCA course we broke down processes by using a flow chart and logic tree to determine where exactly the nonconformity occurred and what likely caused the nonconformity. The visual representation of the process and causes made the process of the RCA easier to follow. Every laboratory is different, so it should be at management’s discretion what method is used during an RCA or TA.

Another topic discussed during RCA training with Mr. Okes was analyzing data in various ways to help identify trends that may go otherwise unnoticed. As we all know, sometimes laboratories attempt to perform TA with a limited number of data points. One suggestion Mr. Okes gave was the use of a G-chart rather than a typical run chart when analyzing occurrences of nonconformities. According to Mr. Okes, “a normal run chart involves plotting data at equal time intervals on the x-axis, and some measured or counted value on the y-axis. However, if a problem occurs very infrequently, this format does not work well. For such situations, run charts can be modified to plot only the point in time at which the problem occurred and the amount of time since the previous occurrence (see example below). Reading such a graph is somewhat counterintuitive, but it aids in determining whether a problem is increasing in frequency (a shorter period of time) or decreasing in frequency (a longer period between occurrences)” (Okes, 2009). One thing of note concerning G-charts is that a downward slope on the graph indicates a negative trend, basically the time between events decreased.

(Continued on page 4)
Another tool discussed by Mr. Okes the evaluation team thought could be of some use was the concentration diagram (also known as a pictogram). This tool can be used as a visual aid to determine where in the process the errors are occurring. Typically, laboratories like to use a version of Pareto Charts to show this. Concentration diagrams can be used to show where in the laboratory most errors are occurring, what skill levels, or even what part of the certification label had the highest concentration of errors. This is a visual depiction of the data and may aid in identifying a trend. Below is an example of a concentration diagram on a certification label. The main take away is to analyze data in multiple ways. This can aid the trend analysis team in identifying the most significant trend within the laboratory.
News and Notes (continued)

Evaluators’ Perspective (continued)

(Continued from page 4)

In conclusion, there are several methods and techniques available to enable a laboratory to perform an effective and efficient root cause analysis and trend analysis. These methods are not suggested nor endorsed by the Evaluation Team. They are merely a share of information, which may be beneficial to some PMELs.


Process Nonconformity Changes

You’ve likely noticed in the latest revision of TO 00-20-14, the definition of a non-critical process nonconformity (PNC) was removed. Non-critical PNCs beginning with the letter “L” were removed from TO 00-20-14 because the definition of a PNC is a process deficiency that creates, or has the potential to create, a quality nonconformity that could affect safety, accuracy, reliability or traceability (SART). So if the process could not or did not affect SART, it would not be a nonconformity. However, PNC codes not beginning with the letter “L” may not affect SART but still may be used at management’s discretion to evaluate functions outside of the calibration processes.

Written By: Laboratory Evaluation Team
News and Notes (continued)

Langley PMEL Exercises “TFCU” Muscles

On 16 August 2016, the team at Langley PMEL practiced the pack-up and palletization of their Transportable Field Calibration Unit (TFCU). While the rest of the 1st Fighter Wing was practicing the mobilization of their aircraft and assets in an exercise capacity for what could easily become a real world short-notice Global Response Force (GRF) deployment, flight leadership felt this would be a great opportunity to demonstrate this unique capability to the wing, group, and squadron leadership. Being able to put a calibration capability into a wartime theater in a short time frame can be useful to streamline maintenance processes and logistics, ultimately energizing the maintenance machine.

While this capability has not been used often, it is critical to ensure the capability stays ready. Exercising as if a real tasking was ordered enabled the flight to identify areas that could be streamlined and some gaps in logistics that potentially could hinder this vital capability. Recognizing which assets to replace and maximize capability while maintaining readiness is what is important and needed to support the many customers that might need that support in an obscure location.

Throughout the process, many areas were analyzed to best determine the state of this war time requirement. One area in particular that was noted was with the documentation. The way that the TFCU is listed on the CA/CRL as a single line item can cause a lot of issues when just one piece of the TFCU needs replacement. Further analysis into Logistics Readiness Squadron support as well as how home-station capabilities may even be affected also allowed flight leadership to determine exactly how to support this war ready capability, while simultaneously supporting home station operations.

Readiness and availability of calibration support in a deployed location are vital to keeping maintenance moving, but are often overlooked. We’ve all been a part of the influx of TMDE that comes in preparation for a TDY, but having calibration capability on-site would greatly reduce the time, cost and logistic headache that could ultimately affect mission readiness down range. Right now it might not be too much of an issue, but it could easily become one, so making sure the capability to rapidly deploy to a minimally built up location to support the maintenance mission of our Airmen is crucial to being at the tip of the spear!

Ultimately, by exercising this often dormant capability, the team at Langley PMEL was able to streamline the processes and prove that precision isn’t just part of the name; it’s part of the game!

(T)Sgt Carolann Carr
Equipment Custodian / Mobility Monitor / Langley PMEL

Pictured: Left - Palletization of the Langley Test Measurement and Diagnostic Flight’s Transportable Field Calibration Unit (TFCU). Right- (T)Sgt Carolann Carr helps secure the netting to ensure there is no movement of the assets in transit.
From the Bench

PG7601-SYS-AF; Venting, The High Flow Way

Got the dreaded arms stretched and extended to the rear of the PG7601 Platform when opening or closing the vacuum vent valve.

Oh, did I mention the wait time required as the air molecules ever so slowly escape the confinements of the bell jar through the filtered vacuum vent valve.

Eyes attentive to the computer monitor watching the Bell Jar vacuum pressure reach that magical number of 43 Pa before the Bell Jar can be lifted away from the PG7601 Platform.

Well, Fluke DHI has the answers to the “no more stretched arms” and “long wait time”. Like everything else, there is a price to be paid for luxury, $725.00 plus shipping, High Flow Vent Valve Kit for PG7601/7607, P/N 401868 (PK-7600-VAC-Vent).

The High Flow Vent Valve Kit comes with everything you need to add an additional vacuum vent valve towards the front left of the PG7601 platform providing ease of accessibility and high flow venting.

The parts inventory are as follows:
1ea P/N 103123 Tee, KF25
1ea P/N 103125 Reducer, KF25 to KF16
2ea P/N 101542 KF25 Centering Rings
2ea P/N 102121 KF25 Clamps
1ea P/N 102975 KF16 Clamp
1ea P/N 100352 Adaptive Centering Ring, KF16/KF10
1ea P/N 103124 Vent Valve w/KF10 flange (Oerlikon 17337)

(Continued on page 8)
From the Bench *(continued)*

PG7601-SYS-AF; Venting, The High Flow Way *(continued)*

(Continued from page 7)

Since I had a Tee with both ends having a 20-25 ISO-KF and a center connection of 10-16 ISO-KF, I decided to not use the Tee and reducer adapter that came with the kit. This setup provided a streamlined lined plumbing configuration with less fittings and connections.

If you have a similar Tee fitting with KF16 fitting for performing the PG7601 vacuum calibration, you will need to order the High Flow Vent Valve, Adaptive Centering ring and additional Clamps.

**Note:** *The High Flow Vent Valve uses a special Adaptive Centering ring with a KF16/KF10 connection.*

Disassembly of the High Flow Vent Valve reveals a filter less valve. A quick email to Fluke DHI on the nonexistence of a filter explains, “The likely hood of dust bunnies collecting towards the rear and of close proximity to the bench was far greater that a filter needed to be installed on the original configuration. The new High Flow Vent Valve was later introduced as an add-on and since it is located in front and above the bench it is less likely to suck larger particles”.

The picture on the right shows a streamlined lined plumbing setup without the reducer adapter and a different Tee connector than what was provided in the kit. Note the orientation of the High Flow Vent Valve mounted vertically to minimize the bench dust bunnies from being sucked into the PG7601 Bell Jar and associated components.

In summary, the new Fast Vent Valve add-on makes calibration on the PG7601-AF-SYS even more enjoyable.

Girard (Jerry) Ibanez 
Davis Monthan PMEL
From the Bench (continued)

**Aircraft Weighing System Load Cell Torque Adapter Mount**

In a recent change to TO 33K6-4-3069-1, step 3.3.2 states “Using a Torque Wrench or Torque Strap, attach Load Ball Cup Adapter Plate to the TI Load Cell using 15 to 25 ft-lbs of torque.” With all changes, comes the need to adapt to, develop, and improve a process.

Nellis PMEL had to develop a local solution to comply with the change to the TO. We locally procured the torque strap wrench, but the next question was…how can we physically hold down the load cell (UUT) while simultaneously torquing the Load Ball Cup Adapter Plate? SrA Charles Blanch, PMEL Journeyman, developed a 3D printed design to solve our problem.

SrA Blanch's design allows the TI to safely mount into a "Torque Adapter Mount" that fits into the 1/2" drive torque exercise adapter mounted to a bench. The recessed pins perfectly align with the TI. The entire design/production took approximately 5 hours to develop.

This adapter is not currently available in the commercial market and the 3D printer allowed a local solution within 24 hours, restoring Nellis PMEL's support capability. The design was shared throughout ACC and Nellis PMEL is providing adapters to Mt. Home, Seymour Johnson and Moody AFB's.

SrA Charles W. Blanch
PMEL Journeyman
Nellis AFB, NV
From the Bench (continued)

S2476N Data Bus Network Analyzer Receiver Attenuation Calibration

TO 33K1-4-3126 calls for 2 EA. Decade resistors (Table 2 item 2.3, IET Labs HARS-X-5-0.1) to be used to perform the receiver attenuation calibration. The Federal Stock number for this part number, 6625-00-246-6315 or 6625-00-893-2212, will get you one of approximately 17 different part-numbered decade resistors. While they all will provide the requested resistance values, their inductance at the applied frequencies will vary from very little to unusable! If the inductance of the decade resistors changes the impedance from the dialed-in resistance value, then they are not suitable for establishing the attenuation levels for this calibration.

Construction of a calibration adapter box with non-inductive resistors will eliminate this error and allow you to accurately apply an attenuated, modulated signal to the TI receiver to establish its accuracy.

An acceptable calibration adapter box can be constructed using the following parts:

Materials List:

<table>
<thead>
<tr>
<th>QUANTITY</th>
<th>STOCK NO.</th>
<th>FULL DESCRIPTION</th>
<th>UNIT PRICE</th>
<th>ESTIMATED COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>546-1550JBK</td>
<td>Enclosure</td>
<td>$29.72</td>
<td>$29.72</td>
</tr>
<tr>
<td>12</td>
<td>4243</td>
<td>Double Banana Jack</td>
<td>$7.99</td>
<td>$95.88</td>
</tr>
<tr>
<td>1</td>
<td>Z201 2R 0.1%</td>
<td>2 OHM Resistor</td>
<td>$27.41</td>
<td>$27.41</td>
</tr>
<tr>
<td>1</td>
<td>Z201 7R 0.05%</td>
<td>7 OHM Resistor</td>
<td>$27.04</td>
<td>$27.04</td>
</tr>
<tr>
<td>1</td>
<td>Z201 18R 0.02%</td>
<td>18 OHM Resistor</td>
<td>$27.78</td>
<td>$27.78</td>
</tr>
<tr>
<td>1</td>
<td>Z201 26R 0.01%</td>
<td>26 OHM Resistor</td>
<td>$29.94</td>
<td>$29.94</td>
</tr>
<tr>
<td>1</td>
<td>Z201 32R 0.01%</td>
<td>32 OHM Resistor</td>
<td>$29.94</td>
<td>$29.94</td>
</tr>
<tr>
<td>1</td>
<td>Z201 43R 0.01%</td>
<td>18 Ohm 0.01% Resistor</td>
<td>$29.94</td>
<td>$29.94</td>
</tr>
<tr>
<td>1</td>
<td>Z201 49R 0.01%</td>
<td>49 OHM Resistor</td>
<td>$29.94</td>
<td>$29.94</td>
</tr>
<tr>
<td>1</td>
<td>Z201 57R 0.01%</td>
<td>57 OHM Resistor</td>
<td>$29.94</td>
<td>$29.94</td>
</tr>
<tr>
<td>1</td>
<td>Z201 68R 0.01%</td>
<td>68 Ohm Resistor</td>
<td>$29.94</td>
<td>$29.94</td>
</tr>
<tr>
<td>1</td>
<td>Z201 73R 0.01%</td>
<td>73 OHM Resistor</td>
<td>$29.94</td>
<td>$29.94</td>
</tr>
<tr>
<td>1</td>
<td>Z201 75R 0.01%</td>
<td>75 OHM Resistor</td>
<td>$29.94</td>
<td>$29.94</td>
</tr>
<tr>
<td>6 FT</td>
<td>As available</td>
<td>18AWG Solid Copper Wire</td>
<td>$29.94</td>
<td>$29.94</td>
</tr>
</tbody>
</table>

TOTAL: $447.35

VENDOR: Mouser Electronics

RESISTOR VENDOR: UHP resistors

The resistors can be verified using a 3458A prior to use. Resistors should meet the minimum use specifications listed for the decade resistors (0.1% of setting).

(Continued on page 11)
From the Bench (continued)

S2476N Data Bus Network Analyzer Receiver Atten Cal (continued)

(Continued from page 10)

Spreadsheet to calculate actual attenuation from resistance charted values and applied voltage ($V_{ref}$)

<table>
<thead>
<tr>
<th>Vref</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Res#1</th>
<th>Res#2</th>
<th>Ratio*</th>
<th>R1 Volts</th>
<th>R1 dB</th>
<th>LL</th>
<th>TI</th>
<th>Reading</th>
<th>UL</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>=S5/2-A4 =A4/S5$2 =C4*$S52 =20*LOG10(D4/$S52) 0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>=S5/2-A5 =A5/S5$2 =C5*$S52 =20*LOG10(D5/$S52) =E5-1 2.9</td>
<td>=E5+1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>=S5/2-A6 =A6/S5$2 =C6*$S52 =20*LOG10(D6/$S52) =E6-1 6.8</td>
<td>=E6+1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>=S5/2-A7 =A7/S5$2 =C7*$S52 =20*LOG10(D7/$S52) =E7-1 -11.4</td>
<td>=E7+1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>=S5/2-A8 =A8/$S5$2 =C8*$S52 =20<em>LOG10(D8/$S52) =E8</em>(1 + 0.0606*(ABS(G8) - 18)) -20</td>
<td>=E8+(1 + 0.0606*(ABS(G8) - 18))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>=S5/2-A9 =A9/$S5$2 =C9*$S52 =20<em>LOG10(D9/$S52) =E9</em>(1.788 + 0.1846*(ABS(G9) - 31)) -30.9</td>
<td>=E9+(1.788 + 0.1846*(ABS(G9) - 31))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Calculation for applied attenuation using charted resistors and applied voltage ($V_{ref}$)

(Continued on page 12)
From the Bench (continued)

S2476N Data Bus Network Analyzer Receiver Atten Cal (continued)

(Continued from page 11)

Schematics for each attenuator.

Joe Peace
Elmendorf Lead Technician
AFMETCAL Personnel News

Evaluation Team Welcomes SMSgt Jessica Stevens

In July, the Evaluation Team welcomed SMSgt Jessica Stevens. She arrived with her husband Mike and daughters Charlotte and Caitlyn. She brings 18 years of experience to the team with expertise in every area of a PMEL. Prior to her arrival, SMSgt Stevens has been stationed at Eielson AFB, Nellis AFB, Osan AB, Langley AFB, Misawa AB, JB Lewis-McChord and has deployed to Prince Sultan AB, Saudi Arabia and Baghdad, Iraq. The Evaluation team is lucky to have Jessica; we wish her family the best as they settle into the Heath community.

MSgt Charles Roberts
AFMETCAL Evaluator

AFMETCAL Says Farewell to Jim Baird

Jim Baird, AFMETCAL Mechanical Engineer, retired on 1 October after more than 33 years of federal service—including 20 years with AFMETCAL. Jim graduated with a Mechanical Engineering degree from The Ohio State University in 1982 and began working on base at the Aerospace Guidance and Metrology Center (AGMC) in 1983. In 1996, Jim transferred to AFMETCAL and worked in the torque, air velocity and tachometer measurement areas. Jim doesn’t know for sure what he’s going to do in retirement, but it’s certain that he’ll enjoy waking up when he wants and that he’ll be reading the newspaper with his coffee every morning. Jim is a true professional in every way, and he will be greatly missed.

Jeremy Latsko
Mechanical Engineering Branch Chief/WNMM
About People (continued)

Some of the articles to look for in the next edition:

- Comments from the AFMETCAL Director
- Words of Wisdom from the Chief of the Laboratory Certification Branch
- *News & Notes* from AFMETCAL, the AFPSL and PMELs in the field
- Interesting articles *From the Benches* of PMELs throughout the world
- And much, much more!

**Submissions:** We encourage readers to submit articles for the following categories: *From the Bench* (technical), *About People* (field personnel news), *News & Notes* (general information). Submissions should be in Microsoft Word, Times New Roman 12 font, accompanied whenever possible by digital photos in JPEG format. Native photo file sizes less than 2MB per image are preferred. Photos must be accompanied with caption information which fully identifies all individuals depicted, including rank, title or office, and event. Note that all text and photo submissions are subject to editing for content, cropping and/or size. All submissions that are technical in nature are reviewed by the AFMETCAL Engineering Branch (AFLCMC/WNME) for accuracy and appropriateness. Publication of any submission, regardless of subject matter, will be approved by the AFMETCAL Division and submission does not guarantee publication. All submissions are reviewed for compliance with Privacy Act, FDO, STINFO, OPSEC and other information security requirements as applicable.

**How to Make a Submission:** The AFMETCAL Newsletter editor transmits quarterly calls for inputs through the PMEL MAJCOM Functional Managers and other significant metrology program POCs to the respective PMEL managers and/or program functional offices. Normal submissions are in response to these data calls. Authors should submit their article inputs via e-mail through their respective chain of command to the AFMETCAL Newsletter editor. Authors may submit inputs out of cycle, but should use the same channels for those submissions. Deadline for submissions is the 15th of the month prior to the scheduled quarterly newsletter publication (publication months are March, July and November). Do not submit copyrighted material.