I. ORGANIZATIONAL MATTERS

A. Officers and Board of Directors

Officers

President	John Catano	Entergy Nuclear Northeast
Vice President	Tony Mitchell	Omaha Public Power District
Secretary	H. S. (Sonny) Koski	SNubber Users Group
Treasurer	Steve A. Norman	SNubber Users Group
	Mark Shutt	Duke Energy Corporation
	Russ Day	PPL Susquehanna, LLC
	Doug Boes	Nebraska Public Power District
	Paul Wright	Iddeal Concepts, Inc.
	Brent Haley	Arizona Public Service Company
	Scott Esposito	Exelon Corporation
	Cynthia Hair	South Carolina Electric and Gas

B. Agenda

The Winter 2008 SNubber Users Group (SNUG) Conference was held on January 28, 29, & 30, 2008 at the Sheraton Myrtle Beach Convention Center in Myrtle Beach, SC. The conference was hosted by SNUG. A copy of the final conference agenda is provided as Attachment I-B.

C. Attendees

There were 41 utility members representing 22 plants and 16 vendors representing 8 companies in attendance. A list of the attendees at the conference is included as Attachment I-C.

D. Opening Remarks

The conference was called to order by the presiding SNUG President, Mr. John Catano of Entergy Nuclear Northeast, Indian Point Energy Center. Mr. Catano welcomed all of the attendees to the conference and recognized SNUG.

Mr. Catano then introduced the SNUG Officers followed by the introduction of the remaining SNUG Board of Directors. The remainder of the attendees then stood and introduced themselves.

Mr. Steve Norman, SNUG Treasurer and Conference Planning Committee Chairman came forward and welcomed the attendees to Myrtle Beach on behalf of SNUG. This is the fifth time SNUG has met in Myrtle Beach, and all conferences have been well attended. Mr. Norman then gave a run down of the current agenda. This was followed by a brief description of some of the attractions in the area. Finally, there was a brief discussion on QME/QDR and the meeting scheduled for Thursday.

E. Administrative Matters

1. The Summer 2008 Conference and Trade Show will be co hosted by PPL Susquehanna and Wyle Laboratories and will be held at the Radisson Lackawanna Station Hotel in Scranton, Pennsylvania on July 21, 22, & 23, 2008. The ASME/ISTD Code Committee will meet in conjunction with this conference.

2 The 2009 Conference will be held at the Crowne Plaza Hotel in San Diego, CA on January 26, 27, & 28, 2009. At the present time, this meeting will be hosted by SNUG.

3. Mr. Steve Norman, Chairman of the Conference Planning Committee was recognized for his efforts expended in arranging this conference.

4. Mr. Norman and the Conference Planning Committee are actively engaged in locating possible locations for future conferences. If your utility would be interested in hosting a future conference, please contact one of the committee members and talk to them about your interest. The Conference Planning Committee is willing and able to provide any assistance you may need in setting up a conference.

F. Minutes of Last Conference

The Summer 2007 SNUG Conference minutes were approved as submitted.

G. Vendor Representation

There were only 16 vendors representing 8 companies in attendance at this conference. In addition to their participation in the sessions, they provided material and expertise for some of the hands-on demonstrations.

H. Elections

Elections are held during the SNUG, Inc. Business Meeting, which will be held in conjunction with the Summer Conference and Trade Show.

I. Breakout Sessions

There were no breakout sessions scheduled for this conference.

J. Conference Survey

The response to the conference survey was much less than average, with only 19 of 57 attendees responding. The hotel and conference facilities rated above average to excellent with most of the responders. A recurring negative comment expressed by several of the attendees was the number of side conversations, which were very distracting. These side conversations need to be held to a very minimum. Several attendees commented on the fact that there were no definitive answers to the panel discussions. In response to these comments, the panel discussions are intended to present differing means of accomplishing a given objective. It is the responsibility of the attendee to listen to the discussions and determine what is relevant to their particular plant. It was also suggested that SNUG look into having a movable microphone available for questions from the floor. Again, as at previous conferences, it was requested that formal answers to questions be given. Where possible, a formal answer is included in the conference minutes. However, in many instances, as with floor discussion or panel discussions, there is no definitive answer. It was again requested that all questions be submitted in writing, to insure the question was understood, but this has met with little success, in the past.

The top presentations for this conference were outage reports, the discussion on health reports, and the hands on practical exercises. The Visco Dampener presentation got mixed reviews. Panel discussions and ensuing group discussion again got mixed reviews. There were several comments that the panel discussions and some questions from the floor did not give definitive answers. The panel discussions are not intended to give definitive answers; they are to invite open discussion.

The Board is very interested in maintaining and improving the quality and content of the conference. The conference survey sheets is one method the attendees have of letting the Board know what they like, dislike, and any recommended changes. Please take time to complete the survey sheet and please make comments. SNUG will continue to be a viable organization only as long as we give the attendees something to take back that they didn’t come with. Any suggestion made by any attendee will be evaluated. This is your conference and it is the Board's most sincere desire that the conference meet your expectations.

K. SNUG Financial Status

Mr. Steve Norman, SNUG Treasurer and Chief Financial Officer, presented the SNUG budget for 2008. The budget had previously been approved by the Board of Directors.

II. Database Management and Website Update

There were no presentations at this conference.

III. ISTD/TECH Spec/Regulatory Issues

A. **ISTD Update** – Russell Day of PPL Susquehanna, LLC, Susquehanna Units 1 & 2

The NRC has endorsed the ASME OM Code in the 2003 Edition of 10CFR50.55a. It is now acceptable to use the OM Code in lieu of Section XI. The latest rulemaking endorses the 2004 Edition of the OM Code. The NRC has revised the target date to Spring 2008 for issue.

Article IWF 5000 has been deleted from Section XI of the ASME Code as of the 2006 Addenda. Snubber pin-to-pin examination and snubber functional testing is no longer included in Section XI. It is anticipated that rulemaking will point to ISTD when the 2006 Code is approved. ISTA and ISTD are looking at possible changes to the code in light of this change.

The visual examination table has been revised to clarify the interval $\pm$ 25%. The ballot has been approved and is due to be published in 2008.

Revision 1 of the OMN-13 Code Case," Requirements for Extending Snubber Inservice Visual Examination Interval at LWR Power Plants" provides a feedback loop in the case of visual failures. This code case was approved on 01/19/07, and is scheduled to be published in 2008. Mandatory Appendix V ballot is pending to incorporate OMN-13 into the ISTD Code.

The OMN-15 Code Case "Requirements for Extending the Snubber Operational Readiness Testing Interval at LWR Power Plants" has not been approved by the NRC. Some recent utility interest may renew activity on this Code Case.

Inquiry OMI 07-118 was submitted on 01/10/2007. The inquiry concerns the issue of snubbers being pulled for maintenance reasons and being swapped with snubbers that should be pulled for random sampling. ISTD finalized its response in June, 2007. It is not the intent of ISTD to allow this.

B. Temperature Correction Per ISTD-3220 – Dave Brown of Lake Engineering

ISTD-3220 recognizes that there may be differences between the installed operating conditions and the conditions under which a snubber is tested. In such cases, correction factors shall be correlated to operating conditions as appropriate.

The change factor varies with the valve configuration and fluid type. However, locking velocity and bleed rate for most snubber models will increase with temperature. Thus the impact of ISTD-3220 is based on the snubber design and its consistency in terms of locking velocity and bleed rate and the range of operating temperatures.

In order to comply with ISTD-3220 it is necessary to either establish the same IST acceptance for all plant snubbers or establish unique IST acceptance limits for each installed location. The first option is feasible if the range of anticipated variation from nominal locking velocity and bleed rate values is small and the maximum operating temperature variation is low. The second option may be necessary if the range of

anticipated variation from nominal locking velocity and bleed rate values is large and/or there is a wide range of operating temperatures. Regardless of which option is taken, it is practical to ensure that all snubbers are tested at the same temperature. A recommended range for testing is 70 ± 5ºF.

C. **Seal Life Start Dates** – Vendor Forum

In order to comply with service life monitoring as required by ISTD, it is necessary to know the seal life start date for the various types and models of snubbers in your plant. This date is recommended by the vendor for their particular snubber, and varies by the vendor.
Both Anvil and Fronek A/DE give the seal life start date as the date the seals were installed in the snubber. The basis of this is that this is the point in time that compression set begins. Compression set is one of the ageing factors for seal life.

Lisega gives the seal life start date as the point in time when the snubber is actually installed in the plant. The basis for this is that the effects of compression set are minimal when compared to other aging factors.

D. **Implementing ISTD** – Utility Forum

The panel discussed the process each was using to adopt ISTD in lieu of their Tech Specs and TRM's. In adopting ISTD, there will be changes that will have to be made to each plants program. The size of this task will be dependent and the disparity between the plant programs and what is required by ISTD. Once everything is in line, the change can be made via a 50.59 change process. However, it is imperative that each plant review their own licensing commitments to determine if other changes are required. Licensing changes cannot be done via a 50.59 evaluation. Panel members for this discussion were Brent Haley of Arizona Public Service, Palo Verde, Russ Day of PPL Susquehanna, and Tony Mitchell of OPPD, Fort Calhoun.

IV. Snubber Reduction

There were no presentations at this conference.

V. Hydraulic Snubbers

A. **Update on Anvil Hydraulic Installed at Catawba Nuclear Power Station** – Don Shetler of Anvil International

There has been a continual problem with a hanger on the steam bleed system at Catawba Nuclear Power Station. Originally, there was a rigid strut installed at this location. This strut failed due to the fatigue failure of the weld at the rear bracket. With this strut gone, this location had a peak-to-peak displacement of 5 inches. In October of 2000 the strut was replaced with an Anvil Hydraulic snubber.

On December 6, 2000, a visual examination revealed that the rod eye was disconnected. This was repaired by using Loctite on the rod eye and reinstalling the rod eye and placing the snubber back in service. On April 11, 2001, another visual examination revealed worn spherical bearings. The snubber was removed and successfully tested. In May of 2002 the snubber was rebuilt by Anvil and reinstalled. On February 27, 2003 the snubber was replaced with another brand. On May 28, 2003 this snubber was found to have the rod eye disconnected, and was subsequently replaced with the Anvil Snubber. On May 11, 2005 this snubber was rebuilt by Anvil and reinstalled.

The Anvil snubber has seen 75 months of actual service and experienced over 900 million cycles. Since the last rebuild the snubber has seen 31 months of actual service and experienced 375 million cycles. Visually the snubber appears to be performing satisfactorily. During the May 2008 Outage, the snubber will be tested, and the pins, bearings, and end bracket may be replaced.

B. **Radiation Testing of Anvil Snubbers** – Don Shetler of Anvil International

The nuclear industry is developing a concern for the effect of elevated radiation exposure on hydraulic snubbers. In response to this, Anvil International conducted radiation testing on samples of Figure 200 Configuration "A" snubbers and Figure 3306 snubbers. The rad levels chosen were 40, 64, 125, and $200x10^6$ Rads. Baseline locking velocities and bleed rates were performed on all snubbers tested At each rad level, locking velocities, bleed rates and leakage tests were performed. Simulated service life testing was done using the Arrhenius Law.

RESULTS USING GE SF 1154

GAMMA RADIATION LEVEL (MR)	Change in Viscosity (%)	Average Change in Locking Velocity (%)	Average Change in Bleed Rate (%)
40	7.5	12.1	5.1
64	15.1	16.9	8.6
125	45.2	21.6	14.6
200	73.0	30.2	23.0

GE SF-1154 is qualified for radiation levels of 200 MR (2×10^8 Rads. Anvil approved EPDM seals are qualified for 64 MR for 25 years at 157º F and 200 MR for 40 years at 120º F.

C. **<u>Task Group Report: Part 21 on SF-1154 Fluid</u>** Mark Shutt of Duke Energy, Catawba Nuclear Power Station

Anvil International's response to the fluid issue is as follows:

1. The root cause for the precipitation in the fluid is unknown. The manufacturer has not identified any error in the processing of the batch of fluid. A postulation that aging or exposure to extremely cold temperature could have been a contributing factor is not reasonable based on past performance of SF-1154.

   AD965 is reported to be the first batch of SF-1154 produced in Germany. While there is no indication that German manufacturing was any less diligent than previous U. S. manufacturing, the fact that no precipitate has been reported in subsequent batches could indicate a start-up issue.

2. There is no indication to date that any batch of SF-1154, other than AD965, is affected. Many batches of SF-1154 have been produced after AD965 and there is no report of precipitate in them. The filters on our purge rigs have been examined and show no sign of precipitate. Sample jars dated 7/13/01, 11/06/03, and 1/16/04 have no precipitate.

3. Anvil has initiated a program to retain a sample of every batch of SF-1154 that we receive. The samples will be retained for seven years and periodically examined for evidence of precipitation.

4. We have tested all of the snubbers in our product line (Fig. 200N ModelsPH74 and PH76, Configuration "A", "B", and "C", and Fig. 3306N) and found that fluid containing a high concentration of precipitate did not prevent them from functioning.

5. A sample of AD965 with concentrated precipitate was heated to 120º F to cause the precipitate to dissolve. The sample was put in a freezer for three days and left at room temperature for three months without precipitation. Based on this test, we believe that no further degradation will occur.

VI. Mechanical Snubbers

There were no presentations at this conference.

VII. Test Machines and Test Methodology

There were no presentations at this conference

VIII. General Interest

A. Conference Format Feedback – Steve Norman of SNUG

This presentation was prepared using the Myrtle Beach Conference Meeting survey sheets for input. Basically, all of the responders were satisfied with the conference. Everybody agreed that the conference books need to be continued. It was suggested that the website needs to confirm conference registration. In lieu of this, the secretary can confirm receipt of registrations. Several attendees expressed a desire for more question and answer sessions. Make sure the presenters allow sufficient time for questions. The question and answer sessions are dependent on the participation by the attendees; therefore this item needs the attendee's participation. There were no negatives concerning the meeting format. From the comments received, it appears that SNUG is doing a good job of fulfilling the attendees' desires.

B. Good Practices- As-found Exams and Tests-Doug Boes of Nebraska Public Power District, Cooper Station

The following list is a compilation of good practices being used by many members. It is not all inclusive as to what each utilities program should include. This list can be used as a reference when evaluating your program.

1. The use of qual cards to document each examiners qualifications.

2. The use of radios in inaccessible areas to someone in a clean area to transmit examination data. ALARA in practice

3. It would be desirable for the test stand to be tied to the database. This would speed up the process and possibly minimize errors.

4. The use of preprinted datapacks and drawings for examinations

5. The use of flagging to indicate snubbers that are to be pulled. This could be installed during the examinations. This would expedite the process and lower dose.

C. Good Practices- Documentation – Russ Day of PPL Susquehanna, Susquehanna

The Working Group compiled the following list of documentation, which should be included in all snubber programs. This documentation will not only direct the program but will also add program credibly during an audit.

1. A good base document describing the program and listing all relevant aspects of the program. This would include the program basis, snubber lists, acceptance criteria, relief requests, test plan documentation, and any plant specific program requirements.

2. Qual card documentation. This would list the qualifications of each individual performing examinations or tests. This would provide assurance that only qualified personnel are performing tasks. It would eliminate questions that may be asked by QA and the regulator.

3. An unofficial turnover notebook would be helpful in maintaining continuity in the program. It could be used to document the day to day status of the program, and would provide a great tracking aid.

D. **Palo Verde Snubber Health Report** – Brent Haley of Arizona Public Service, Palo Verde

Palo Verde snubber program health reports are required to be submitted every six months. The first section of the health report is for issues and action plans to resolve these issues. The next section is the indicator work sheets. Here, the indicator the program is measured by, the criteria, any comments and the color code is given. At Palo Verde there are 24 indicators that are tracked. These indicators cover personnel qualifications, human performance errors, industry involvement training. INPO/WANO findings, OE, etc. The final section is for long range plans. Here, the desired program is discussed. This is the place that the program owner can tell management what enhancements are needed and the benefit of making the changes.

During the ensuing discussion, Program Health reports were discussed in general. Some plants require snubber reports, while others do not. Of those that require snubber health reports, the time frame runs from quarterly to every outage. There is no standardization. This is a plant specific requirement at the present time.

E. **Regulatory and Code Issues Group** – Russell Day of PPL Susquehanna, LLC, Susquehanna Units 1 & 2

This Working Group is tasked with providing the SNUG membership with an overview of regulatory and Code issues. Of particular interest at this time was the NRC update. There have been comments made at the NRC that ”Snubbers are a mess and an area that needs to be straightened out.” This comment was based on the fact that there is only one snubber program. Each plant does things according to their own TRM and plant specific requirements. The NRC likes things to be standardized, which is of a big advantage when reviewing audits and relief requests.

The NRC expects utilities to begin utilizing ASME code, Subsection ISTD with their next 10-year update or earlier. For snubber visual examinations and tests, the current 10CFR50.55a allows the use of either Section XI or ASME OM Code, Subsection ISTD with VT-3 visual examinations. However, If a licensee wants to use ISTD with the owner’s visual examination in lieu of the VT-3 visual examination, then a relief request is required.

The working group also looked at Code Case OM-13 and the Visco Dampeners. Both of these items are discussed in other sections of these minutes.

F. **Visco-Dampeners Used as Dynamic** Restraints – Dr. John Stevenson of Stevenson and Associates

Viscoelastic pipework dampeners have been extensively used since 1992 in the seismic upgrading of nuclear power stations in Eastern Europe and are currently being used in new nuclear power plant installations in China. In addition to their use as seismic dynamic restraints, they have seen wide use throughout the world as a means to control and reduce vibration in piping systems during normal steady state and transient operation. They have also been used to accommodate impulse and impact loads due to water and steam hammer or a postulated pipe break. Visco dampeners are capable of extending the service life of the distribution systems and components it supports by reducing fatigue type stress in piping systems during operation.

Visco dampeners have recently been added to the types of dynamic restraints covered by ASME Boiler and Pressure Vessel Code (B&PVC) Section III, Subsection NF. However, at present time, neither the qualification requirements nor the preservice and inservice inspection requirements have been addressed. At the present time, the Visco dampeners are not allowed in a Code application in the United States. ASME QME, Subsection QDR is addressing the qualification needed to be included in Subsection QDR. It has not been determined who will address the preservice and inservice requirements.

G. **Japan Earthquake Seismic Data** – Mark Shutt of Duke Energy, Catawba

The Niighata Earthquake occurred on July 16, 2007 at 10:13 AM. The magnitude of the earthquake was 6.6. The earthquake occurred at a depth of 10km beneath the surface. The epicenter was located approximately 10 km from the Kashiwazzki-Kariwa Nuclear Power Plant. This is the world's largest nuclear power plant in terms of power output capacity.

The impact was as follows. The operating units automatically shut down. Small puddles of water were found with minor amounts of radioactivity. Radioactive water leaked through penetrations to a discharge sump and approximately 317 gallons of water was discharged into the Sea of Japan. The total amount of radioactivity of the discharged water was very low. Over 100 drums stored in a solid radwaste storage warehouse fell over, but there was no measured release of radiation. Radioactive iodine and other radioactive particulate matter was found only in the Unit 7 ventilation stack. The total amount of radioactivity released was extremely low.

The USNRC will continue to collect and evaluate information related to this event. The NRC will evaluate the lessons learned in order to identify any actions necessary to be implemented at both operating and future reactors. Lessons learned from the data could lead to changes in regulations, issuance of regulatory guides or generic communications, or change inspection plans. The USNRC is reviewing all data from this event to enhance our programs.

H. **Farley 1R21 Outage Report** – Tom Sexton of Southern Nuclear, Plant Farley

Plant Farley has changed to the 10% test plan. This resulted in 39 snubbers being in the test plan. There was one retest due to a failure in 1R20. There were no visual examinations required this outage. One mechanical snubber in the original sample failed functional test resulting in a scope expansion. One of these snubbers failed its functional test resulting in another scope expansion. A total of 49 test plan snubbers were tested. In addition, three Grinnells were repaired due to non inservice leakage found. All PSA mechanical snubbers that were pulled for testing were replaced with Lisega Hydraulic snubbers.

I. **South Texas Project Electric Generation Station (STPEGS) Unit 2 Fall Outage, 2007 Report** – Safar Shojaei of South Texas Project Nuclear Operating Company, STPEGS

During the fall outage 351 mechanical snubbers and 16 hydraulic snubbers were visually examined. There were 15 AD Mechanical snubbers, 20 PSA mechanical snubbers and 2 hydraulic snubbers tested as part on the test plan. In addition, 5 snubbers were tested either for cause or service life. One AD mechanical failed the As-Left drag test, but was evaluated and declared degraded and subsequently replaced. Two hydraulic snubbers had the chevron pack and rod wiper replaced as part of the PM program. Over all the snubber portion of the outage wet well. The only challenge to the snubber program was scaffolding.

J. **Hope Creek 2007 Fall Outage** –Ardie Shabazian of PSE&G, Hope Creek

Hope Creek has a population of 651 Lisega hydraulic snubbers. The 37 Plan is used for testing. There were a total of 42 snubbers tested, either for the test plan or for service life, with no failures. Hope Creek has demonstrated a high reliability with the Lisega hydraulic snubbers. As a result Hope Creek is planning on implementing ISTD and adopting Code Case OMN-15. The adoption of OMN-15 will require NRC approval since this code case has not been endorsed by the NRC.

K. **Overview of Southern California Edison SONGS Units 2 and 3 Snubber Program** – Quoc Tran of Southern California Edison, SONGS

SONG's essential snubber population consists of 126 PSA mechanical snubbers on Unit 2 and 136 PSA mechanical snubbers on Unit 3. There are 350 non-essential PSA mechanical PSA mechanical and 8 essential Lisega Large Bore Snubbers per unit. SONGS uses a Barker/Diacon S2000 NM Snubber Test Machine.

The program basis for the snubber program is Licensee Controlled Documents. Functional testing is done by either the test bench or in-place testing. Hand stroking is also employed. The current Service Life is 40 years for the mechanical snubbers and 18 years for the hydraulic snubbers.

Maintenance Engineering is the program owner. As such, they are responsible for maintaining the database, selecting the test sample plans, interpreting the data, and initiating any required corrective action. They monitor the performance of the snubbers and perform failure evaluations and recommend any corrective actions. Design engineering is responsible for the analysis and issuance of any design packages. All

examinations and testing are performed by Wyle Laboratories.

100% visual examinations are performed every 48 months. Functional testing is per the 10% Plan with a 5% follow-on sample for each failure. Service Life monitoring is done every 24 Months.

The visual acceptance criterion is that the snubber does not exhibit any indications of damage or impaired operability. Examination is from the rear bracket to the pipe clamp. The acceptance criterion for preservice testing is 2% drag and 0.02g activation. The acceptance criterion for inservice/return to service testing is 2% drag (5% with analysis) and 0.02g activation. Drag values between 2% and 5% are considered degraded. Any drag value above 5% (>10% for PSA ¼ & ½) is considered a failure. The Service Life acceptance criteria is the same.

L. **OE/SNUG Forum Topics** – Brent Haley of Arizona Public Service, Palo Verde

1. FMG per ISTD does not seem to be practical. It appears that you would have to wait until all testing was complete in the initial sample population before starting any expansion sample testing. What is ISTD- 5313 intended as an acceptable alternative?

   This topic generated a great deal of discussion with nothing being decided.

2. Should a snubber found with a missing load pin be counted as a Visual Failure if it is not one of the snubbers counting for 50% examinations?

   A Visual Failure is considered a failure regardless of when it is found.

4. For members with a program using ISTD, how do you address ISTA 3120, which requires the test plan to be prepared for the preservice and inservice test intervals? Also are the items in ISTA 9220b required for the test plan?

   At this time this question can not be answered

5. Component Support Examination Questions.

   This is an ISI issue and as such falls under Section XI.

6. Based on some Scheduling/coordination issues during our last RFO, Outage Management wants to know if performing baseline tests on new snubbers is an industry practice.

   While baseline testing is a good practice, it is not required.

8. We have Paul-Munroe14", 1300kip snubbers. The print and acceptance criterion for lockup velocity is 6-10 ipm. Our actual reading was 10.27 ipm. Is there any allowance for rounding to significant digits? As it stands, it does not meet our acceptance criteria and must be classified as a failure.

If your acceptance criteria does allow for a degraded condition or a range of acceptance values, then it would be a failure.

9. Our safety related piping outside the drywell was designed with very few seismic anchors, which creates large seismic groups that encompass multiple safety systems. The majority of our snubbers have loads other than seismic loads, making them ineligible for TS 3.0.8 LCO time. Without extensive analysis to justify individual snubber removal, implementation of TS 3.0.8 has made on-line testing nearly impossible and presents significant operational challenges in the event we find an inoperable snubber during plant operation. Are there any members that have overcome this problem without performing expensive snubber by snubber analysis?

   While this question generated a lot of discussion pro and con, TS 3.0.8 cannot be used on any snubber that has significant nonseismic loads.