

August 5, 2005

MEMORANDUM TO: Catherine Haney, Director
Policy and Rulemaking Program
Division of Regulatory Improvement Programs, NRR

FROM: Joseph L. Birmingham, Project Manager */RA/*
Policy and Rulemaking Program
Division of Regulatory Improvement Programs, NRR

SUBJECT: SUMMARY OF JULY 12, 2005, PUBLIC MEETING WITH INDUSTRY
FOCUS GROUP REGARDING SIMULATOR ISSUES

On July 12, 2005, the NRC staff held a public meeting with representatives from the Institute of Nuclear Power Operations (INPO), the Nuclear Energy Institute (NEI) sponsored Focus Group on Operator Licensing Issues, and representatives from several U.S. power facility licensees at the NRC headquarters office in Rockville, Maryland, to discuss plant-referenced simulator performance testing issues. Since implementation of the most recent simulator final rule amendment, U.S. Nuclear Regulatory Commission (NRC) inspections have identified a number of simulator fidelity and performance testing issues that have raised staff concerns regarding the potential for resultant negative training. Attachment 1 lists the attendees at the public meeting.

The public meeting helped to promote better communication and understanding of the NRC staff's concerns with regard to simulator performance testing issues. Attachment 2 is the agenda for the meeting. The discussion topics are summarized in Attachment 3.

Representatives of the NRC and the industry agreed that this meeting was useful for the exchange of information on this subject.

Project No. 689

Attachments: As stated

cc: Mr. Jim Davis, Director
Operations
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708
jwd@nei.org

CONTACT: Lawrence Vick, NRR/DIPM/IROB
(301) 415-3181

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OFFICE	NRR:DIPM	SC:IROB	PM:RPRP	SC:RPRP
NAME	LVick	DTrimble	JBirmingham	EMcKenna
DATE	8/3/05	8/4/05	8/4/05	8/5/05

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J Birmingham

P Hiland

DTrimble

SGuenther

GUsova

LVick

Richard Conte, RI

James Moorman, RII

Roger Lanksbury, RIII

Tony Gody, RIV

RidsOgcRp

RidsAcrsAcnwMailCenter

RidsNrrOD

RidsNrrDrip

RidsNrrDripRPRP

RidsNrrDIPMIROB

List of Attendees - NRC /INPO - NEI Focus Group Meeting - July 12, 2005	
Name	Organization
1- Bruce Boger	NRC / Nuclear Reactor Regulation (NRR)
2 - Pat Hiland	NRC / NRR
3 - Dave Trimble	NRC / NRR
4 - Fred Guenther	NRC / NRR
5 - Dave Muller	NRC / NRR
6 - Lawrence Vick	NRC / NRR
7 - Richard Conte	NRC / Region I
8 - Brian Haagensen	NRC / Region I
9 - Gregg Ludlam	Nuclear Energy Institute (NEI) - Licensed Operator Focus Group (LOFG), Carolina Power & Light, Progress Energy
10 - Dennis Koutouzis	Institute of Nuclear Power Operations, ANS-3.5 Working Group
11 - Kent W. Hamlin	Institute of Nuclear Power Operations (INPO), LOFG
12 - Richard Murray	Wolf Creek
13- Joseph Brodsky	South Texas Project
14 - Frank Tarselli	Susquehanna, Pennsylvania Power & Light, Mid-Atlantic Training Group
15 - Timothy Dennis	Individual, Chair, ANS-3.5 Working Group
16 - Allan A. Kozak	Dominion Virginia Power, North Anna Power Station
17 - Joel Sorensen	NEI, LOFG / Point Beach, Nuclear Management Company (NMC)
18 - Mike Wyatt	Exelon Nuclear

AGENDA FOR PUBLIC MEETING WITH INDUSTRY FOCUS GROUP (FG)
ON SIMULATOR ISSUES

July 12, 2005; 10:30 a.m. - 4:00 p.m.
U. S. Nuclear Regulatory Commission
One White Flint North, Room 7B4
11555 Rockville Pike, Rockville, MD 20852

Meeting starts at 10:30 a.m.

Lead

- Introductions and Opening Remarks NRC/FG
- Simulator Fidelity and Testing NRC/FG
- NRC Approach to Scenario Based Test (SBT) NRC
- Industry Approach to SBT FG
- Preparation for Simulator SBT Demonstration NRC/FG
- Public Comment or Questions Public
- Summary, Conclusion, and Action Item Review NRC/FG
- Adjourn about 4:00 p.m.

DISCUSSION SUMMARY

Simulator Issues

General

On April 5, 2005, the NRC staff met with Industry Focus Group (FG) on Operator Licensing Issues (a.k.a., Licensed Operator Focus Group (LOFG)) representatives and members of the public at Nuclear Energy Institute's (NEI) headquarters office in Washington, D.C., to discuss simulator issues. Following this meeting, the industry FG proposed that key stakeholders involved with simulator fidelity and testing meet with NRC staff to specifically discuss scenario based testing (SBT) in preparation for an industry-sponsored SBT demonstration. That demonstration is planned during a breakout session of the Mid-Atlantic Nuclear Training Group (MANTG) conference to be held August 16-18, 2005, at the Millstone Energy Center, Lelan F. Sillin Nuclear Training Center located in Waterford, Connecticut. The meeting would help to alleviate concerns as to clarifying what is expected from the SBT demonstration. On July 12, 2005, the NRC staff met in a public meeting with industry representatives and members of the public at NRC's headquarters office in Rockville, MD, in response to the industry FG's request for such a meeting.

Dave Trimble, Chief of Operator Licensing Human Performance in the Division of Inspection Program Management (DIPM) in the Office of Nuclear Reactor Regulation (NRR) at NRC, called the meeting to order and expressed the NRC's appreciation for the opportunity to engage industry representatives and others present to help resolve staff concerns on simulator issues, such as scenario based testing. Mr. Trimble reiterated that the NRC places a high level of importance on plant-referenced simulators used to meet regulatory requirements and that the issues on the table are resolvable. Bruce Boger, NRC Director of DIPM in NRR, also thanked all attendees for working with staff to address simulator testing concerns. Mr. Boger also reiterated that the NRC's vision is to get all simulation facility licensees on the same ANS 3.5 consensus standard that includes an effective simulator testing program. He further envisions that once a level of confidence is established with SBT, then it should be easier for all to go to and be on the same standard.

Kent Hamlin of the Institute of Nuclear Power Operations (INPO) provided a brief statement on the purpose of the meeting with the NRC staff and also expressed confidence that the simulator SBT concerns could be addressed adequately to raise the staff's confidence on the industry's use of SBT as a viable approach to performance testing the simulator as required by the Commission's regulations. Mr. Hamlin explained that industry attendees at the meeting were selected to assemble a cross section of industry personnel from a variety of job positions, representing all regional training groups, large and small companies, and other industry organizations involved with plant-referenced simulators. He also explained that the NEI-sponsored Licensed Operator Focus Group would continue the specific work that comes out of this meeting. Mr. Hamlin encouraged industry attendees as well as NRC staff to offer their viewpoints and perspectives during the discussions in order that a good exchange of ideas would enhance better communication toward bridging any differences.

Mr. Hamlin noted that recent industry events with regard to actual operator performance in the control room challenges the confidence level of the NRC staff with regard to simulator

performance testing to preclude negative training. Mr. Hamlin pointed out that industry takes very seriously the ramifications of being negatively trained or conditioned on a simulator with significant fidelity issues that should have been identified and corrected before-the-fact rather than after-the-fact. He emphasized that the industry understands that simulator negative training is not acceptable and pledged to work hard to seek out and correct significant fidelity discrepancies. Mr. Hamlin stated that the group would not discuss any specific licensee simulator fidelity performance issue(s) with regard to industry events or NRC staff inspections.

The meeting proceeded with the group focusing on the industry's proposed approach to simulator SBT performance and obtaining NRC staff feedback as well as closing out completed action items and identifying new ones.

Industry Approach to Simulator SBT

Gregg Ludlam of Progress Energy, acting as industry spokesman, reiterated that licensees have adequate simulator configuration and management programs including simulator testing programs in place to prevent or reduce the chance of being negatively trained. Mr. Ludlam described the industry's approach to simulator SBT including both proposals and concessions as a way to bridge the gap between the industry's and NRC staff's concerns. Mr. Ludlam pointed out that the industry FG's proposed approach is subject to buy-in and consensus of the industry groups (e.g., the training groups).

Mr. Ludlam outlined that the industry FG proposed approach to simulator SBT includes: (1) Bounding the number of SBT Tests over a given period; (2) Using the criteria of Section 4.1.4 of the ANSI/ANS-3.5-1998 for SBT acceptance criteria; (3) Adherence to the guidance of Appendices A and B of the standard for SBT documentation; (4) Developing a standard for malfunction cause and effects document to be used in conjunction with and support of SBT; (5) Researching, compiling, and assessing the adequacy of existing INPO simulator guidelines for developing scenarios; and, (6) Developing a simulator SBT for demonstration purposes at Millstone during the week of August 16-18, 2005, at the MANTG/NRC Region I public meeting breakout session.

Number of SBT Tests will be bounded over a given period

Mr. Ludlam advocated that the number of simulator SBTs should be bounded over a given period. He proposed that only initial and requalification operating test scenarios should be addressed as SBTs and that inclusion of all training scenarios was not intended in the ANSI/ANS-3.5-1998. Mr. Ludlam pointed out that a facility licensee may have up to approximately 20 to 30 initial operating test scenarios and about 40 to 50 requalification operating test scenarios at any one time plus any newly developed operating test scenarios that would be required to accommodate an NRC examination need. Mr. Ludlam emphasized that to include training scenarios for other purposes than operating tests would place an unnecessary burden on licensees training and simulator staff. Mr. Ludlam proposed that simulator SBTs for initial and requalification operating test scenarios will be conducted once and subsequently repeated only in the event of significant changes (e.g., changes in plant procedures, plant design, or simulator modeling) that may affect simulator performance. Bruce Boger of NRC, queried whether or not industry had considered those scenarios used in applicant experience requirements? In response to Mr. Boger's questioning, Mr. Ludlam modified the proposal to include performing SBTs for credited reactivity manipulations. Rich Conte of NRC Region I,

pointed out that Section 4.4.3.2 of the standard requires that scenarios developed for the simulator "... shall be tested before use for operator training or examination..." Dennis Koutouzis of INPO, explained that the standard may have inadvertently brought training related issues into a simulator standard, thus causing some confusion of the nature of scenario based testing. The staff listened to various viewpoints among the industry representatives without taking a position as to bounding the number of SBTs.

Use of the criteria of Section 4.1.4 of ANSI/ANS-3.5-1998 for the SBT acceptance criteria

Mr. Ludlam stated that the criteria in Section 4.1.4 of the standard should be applied. This position is a concession and is the same as the NRC's staff position: Namely that: (1) the simulator allows the use of applicable reference unit procedures; (2) any observable change in simulated parameters corresponds in direction to those expected from actual or best estimate response of the reference unit to the malfunction; (3) the simulator shall not fail to cause an alarm or automatic action if the reference unit would have caused an alarm or automatic action under identical circumstances; and (4) the simulator shall not cause an alarm or automatic action if the reference unit would not cause an alarm or automatic action under identical circumstances.

Mr. Ludlam proposed that in addition to the above, the industry FG proposed that with regard to specific malfunctions in the SBT, that a copy of the specific Malfunction Cause and Effects (MCE) documentation be attached to the SBT as evidence that expected simulator performance was identified beforehand and that one has to only attest or affirm/confirm the test results. Larry Vick of NRC, explained that if industry were to agree to the proposed use of MCE documentation in their SBT, then the MCE documentation would be subject to scrutiny from NRC inspectors. Mr. Vick noted that many licensee's simulator MCE documentation is not controlled nor kept updated since the original vendor's development of the MCE. Mr. Vick also cautioned that MCE documentation is not considered by the standard as simulator-specific documentation that should be controlled and maintained. He further noted that MCE is not design data that serves to define the scope of simulation, the simulator's operational characteristics nor to validate a simulator's performance. Mr. Vick noted that MCE documentation were, for the most part, initially developed by simulator vendors as a brief narrative of the expected first order effects for a given initial condition set without any operator intervention. MCEs were developed prior to the development of factory acceptance tests and were not subsequently updated by the vendor. Mr. Conte of NRC Region I noted that the use of MCE documents in a SBT setting is an ongoing issue with a couple of IP-71111.11 inspections for which predecisional information is not appropriate for this meeting. He also noted that MCE documentation, if allowed, would have to be based on actual plant performance and/or engineering analysis (i.e., something other than best-estimate guesses). After listening to several MCE pro-and-con viewpoints, the staff remained open to the industry's proposal.

Develop a standard for malfunction cause and effects document to be used in conjunction with the SBT

In light of the above discussions, Mr. Ludlam stated that use of the licensee's simulator's MCE documentation is considered best-estimate data and that as such is an adequate technical basis for evaluating the simulator SBT performance. Mr. Trimble cautioned that if licensees have not controlled and maintained their MCE documentation to assert their simulator's performance, then use of such MCEs will not boost NRC's confidence in assurance of the

simulator's fidelity. Mr. Ludlam noted that MCE documents will be developed before running an SBT so that expected plant performance will be available prior to test conduct. Both Mr. Ludlam and Mr. Koutouzis noted that MCE documents are generally used to acquaint training personnel (e.g., simulator instructors, lesson plan developers, and examination developers) on malfunction expectations rather than to affirm or confirm that the malfunction's performance is correct. The industry FG agreed to determine the content and basis for a standard MCE document model to be used in conjunction with and support of SBT. The industry FG had no specific MCE product available for reviewed by the group during the discussions. The staff deferred any further MCE comments until a MCE product could be made available for review.

Adhere to the guidance of Appendices A and B of the standard for SBT documentation

Mr. Ludlam stated that industry believes, for the most part, that the documentation requirements of the standard's Appendix A.4, Simulator Test Documentation, and Appendix B, Guidelines for the Conduct of Simulator Operability Testing, should apply. This position is a concession and is the same as the NRC's staff position.

Research, compile, and assess adequacy of existing INPO simulator guidelines for developing scenarios

Mr. Koutouzis of INPO explained that INPO ACAD 90-022, Guidelines for Simulator Training, provides details on the content and validation of scenarios with regard to developing such scenarios. Mr. Vick of NRC responded that the ACAD infers or heavily relies on the simulator's performance being correct in order to adhere to the guidelines. The industry FG agreed to take back as an action item to research, compile, and assess the adequacy of the ACAD with regard to simulator performance in developing scenarios for training.

Develop a SBT for Demonstration at Millstone for August 16-18, 2005, MANTG meeting breakout session

Mr. Ludlam, proposed that industry will develop a SBT for demonstration at the upcoming August 16-18, 2005, MANTG/NRC Region I meeting on the Millstone Unit 3 plant-referenced simulator. The industry FG acknowledged that it's SBT product is not ready for NRC staff review and comment, but believes that it will be ready in time for the planned SBT demonstration. Mr. Conte of NRC stated that Region I will provide support (e.g. Peter Presby of NRC) to Millstone's personnel for the purpose of assisting in dry running the SBT demonstration. Mr. Trimble of NRC stated that he expects industry to reach a consensus on its approach to SBT upon conclusion of the Millstone simulator SBT demonstration. Rich Conte of NRC noted that the SBT demonstration may help to bridge the gap between the staff and the industry over concerns with SBT as a simulator performance testing approach to ensure that fidelity is sufficient and maintained. Mr. Ludlam noted that the Millstone SBT will be designed similar to the one used by the NRC at its Technical Training Center. The SBT product from the Millstone demonstration is planned to serve as a counterproposal to the NRC's effort. Mr. Trimble stated that the staff looks forward to evaluating and assessing the industry's proposed SBT product.

Burden of performance testing the simulator

Mr. Ludlam explained how simulator SBT has shifted the burden of conducting simulator performance testing from simulator personnel to training/operations personnel. He explained that licensees have limited human resources to solely devote to performance testing the simulator and that competing business interest places great demands for time on the simulator.

Implementation of plant modifications on the simulator

Mr. Hamlin of INPO, as a follow up to the last FG meeting of April 5, 2005, discussed industry's viewpoint on implementation of plant modifications on the simulator (before and after installation of modifications on the plant). Mr. Hamlin asked for the NRC staff's views on when deviation between the simulator and the plant become significant enough for the simulator to no longer be considered plant-referenced. In general, industry representatives acknowledged that NRC staff has been able to successfully resolve most simulation concerns in this topical area through direct and timely communications. Allen Kozak of Dominion Virginia Power, pointed out that one licensee held off implementing a reference plant modification (e.g., Boric Acid Blender Controller) on the simulator due in part to some confusion with regard to what constitutes a referenced-plant simulator becoming a non-referenced plant simulator. The staff emphasized that the ANS-3.5 standard allows sufficient latitude to accommodate plant modifications when the simulator follows the reference plant as well as when the simulator leads the plant (especially when training needs assessments support installing the modification on the simulator before it is on the plant.) Mr. Trimble explained that what is most important is that licensees recognize the potential created by these modifications for negative training and that they appropriately compensate for those effects through training. It is also important that licensees inform the NRC of significant differences between the plant and the simulator prior to initial operator licensing examinations / operating tests (most important) and annual operator requalification examinations. For the most part, such communications do not require a formal letter. The NRC staff believes it will be highly unlikely that a plant-referenced simulator will become non-plant referenced (unless the simulator fidelity is not maintained). Mr. Conte of NRC Region I pointed out that effective communication between the staff and the industry can alleviate most simulator modification implementation concerns. The industry FG agreed. Mr. Trimble informed the industry group that the staff would post on its web site (under its "Operator Licensing Program Feedback" web page) the staff's response to issues of simulator modifications which lead or lag the reference plant.

Simulator Boiling Water Reactor (BWR) core model replication expectations

Mike Wyatt of Excelon, presented the industry's proposed approach to BWR core model replication expectations. Mr. Wyatt proposed that, in general, BWR simulator core model performance should be validated or confirmed by conducting the same or similar core performance tests as prescribed in the reference plant's procedures. Mr. Wyatt pointed out that there was generally no disagreement with NRC staff on the scope and acceptance criteria of Pressurized Water Reactor (PWR) simulator core testing. However, for Boiling Water Reactor (BWR) simulator core models, the industry has not established confidence that the core models are being adequately performance tested and compared to actual plant performance because core physics tests employed in the plant are not always used to test simulator core modeling. Mr. Wyatt explained that the industry is not prepared to share or endorse the MANTG White Paper on BWR Core Performance. However, Mr. Wyatt did provide the staff assurance that

industry is making a concerted effort through one entity (e.g., INPO or NEI) to develop guidance for proper BWR core model performance testing and to make it available to NRC staff for review and comment. Mr. Wyatt proposed that industry's BWR core testing would be limited to the use of the ECP (Estimated Critical Position), while conducting a plant start-up, and demonstrating the Shutdown Margin. Mr. Trimble explained that industry needs to reach consensus on this topic and then provide its proposal formally to the staff for consideration. The staff questioned why very few BWR simulators are being utilized for reactivity manipulations to meet applicant experience eligibility requirements? Mr. Wyatt explained that there are adequate opportunities for applicants to obtain their reactivity experience on the actual plant. Mr. Trimble reminded industry that BWR (as well as PWR) core model performance test acceptance criteria must be included in the industry's approach to provide assurance that the nuclear and thermal hydraulic characteristics are being replicated and that the core test results are comparable (e.g., use same acceptance criteria as used on the plant with the reference plant's core performance).

Other Industry Concerns

Joel Sorensen of NMC restated the meeting objectives and briefly discussed what it would take to get facilities to want to go the same consensus standard. Mr. Sorensen noted that simulator SBT is just one area of concern that is preventing everyone to be on the same standard. Another issue is the potential of reconstituting the simulator's original verification and validation information and what value would be gained by it. Mr. Boger of NRC acknowledged that feedback he has received is that it takes a sound business case to want to make any change, whether it is going the latest standard or something else. Mr. Sorensen noted that while NMC has simulation facilities on both the 1985 and the 1998 standards, he is convinced that the methodology of SBT and its ability to better-identify simulator problems is the better way to go. Mr. Trimble thanked him for his feedback.

NRC approach to simulator SBT

Mr. Trimble briefly explained NRC's approach to SBT as discussed in its letter dated June 6, 2005, to Kent Hamlin, Director, Accreditation INPO. Mr. Trimble reiterated the staff's purpose for developing its simulator SBT. Namely, it was to independently determine first hand the feasibility, suitability, and acceptability of SBT as envisioned by NRC staff for meeting the Commission's simulator rule pursuant to 10 CFR 55.4 and 55.46 respectively. He explained that the staff was able to validate the feasibility of the SBT approach. The NRC's SBT included use of applicable procedures, key parameters, pertinent alarms, and automatic actions. Mr. Trimble noted that initial feedback, including at this meeting, on the NRC's approach has raised few concerns, in general, with its overall approach. However, some industry folks have indicated that logistical human resources and time on the simulator is the biggest obstacle to conducting an SBT performance test as envisioned by the NRC staff. As stated previously, the NRC staff agrees to continue working with industry representatives to help resolve concerns with SBTs.

Public Meeting Action Items

The NRC staff and industry representatives mutually agreed to the following actions items (action items are sequentially number for status tracking purposes) as a result of the public meeting:

Closed Action Items

- 1 - The NRC and Industry will rely on the FG for further interactions on the simulator issues identified in this meeting. (e.g., April 5, 2005)
- 2 - The FG will encourage facility licenses to remain on the ANSI/ANS-3.5 standard to which they are currently committed until the simulator SBT issues are resolved.
- 3 - Participants will jointly work to resolve outstanding simulator SBT performance issues. Industry will obtain time in August 2005 on a plant-referenced simulator for a joint NRC/Industry simulator SBT performance test demonstration.
- 4 - The NRC staff will provide industry an opportunity to review the NRC-developed simulator SBT approach prior to joint SBT demonstration.

Open Action Items

- 5 - Industry will formally provide to the NRC staff for review and comment its consensus white paper on simulator core performance testing for BWRs.
- 6 - Under INPO-lead, the industry will provide its view on appropriate criteria for determining what simulator deficiencies should be communicated to the NRC prior to operating tests.
- 7 - Under INPO-lead, the industry will research and compile existing guidelines for scenario development and assess their adequacy for minimizing negative training by appropriately confirming simulator accuracy.
- 8 - Industry will provide to the staff a proposed approach to SBT that could then be compared to that developed by the NRC.

New Action Items

- 9 - Industry to conduct a simulator SBT demonstration using a plant-referenced simulator during the week of August 16-18, 2005 during the MANTG/NRC Region I conference meeting at the Millstone Energy Center. NRC staff will assist as requested.
- 10 - After simulator SBT approach is finalized and found acceptable by NRC staff, the NRC will update its IP-71111.11 to describe expectations for documentation of SBT for the purpose of providing regulatory certainty, i.e., to prevent inspectors from asking for more documentation than necessary.
- 11 - NRC staff will publish on its public web site a FAQ (Frequently Asked Question) addressing modifications to simulators and maintenance of plant-referenced status. The staff's response will include the sufficiency of the examiner standard (ES-201, Item 15g) when communicating differences to the NRC between the simulator and actual plant.

12 - NRC staff will provide feedback to industry FG in its next meeting with the NRC on the Millstone simulator SBT demonstration of August 16-18, 2005.

13 - Industry will determine the content and basis for a model Malfunction Cause and effects document and provide guidance to ensure these documents are accurate and up to date.

14 - Industry will verify content of INPO ACAD 90-022, Guidelines for Simulator Training, with regard to scenario content and validation guidance in light of simulator performance.

15 - The FG will work to achieve industry consensus on the FG positions discussed at this meeting, which include: Use of the criteria of section 4.1.4 of ANSI/ANS-3.5-1998 as acceptance criteria for SBT, and adherence to Appendices A and B of the standard - for documentation of SBT including initial conditions, how perturbations were induced, anticipated simulator response, trends/plots of key parameters, list of deficiencies identified, and list of deficiency reports.

Public Meeting Participation and Feedback

Members of the public were provided an opportunity to ask questions and participate in the simulator issues discussions. Three NRC public meeting feedback comments were received at the conclusion of meeting. One individual noted that the meeting was very open and accommodating and that frank discussions were very helpful in understanding the complex topic and that a better understanding of the staff's positions had occurred. Another individual stated that he could not locate a convenient place on the NRC's web page to find outstanding simulator inspection issues. A third individual thought the meeting provided very good information exchange and that progress is being made to resolve the ANS-3.5 issues. One feedback comment was received in the mail following the public meeting. No negative remarks were annotated by the individual. No other public questions or comments were brought forward to the group.