



**Stakeholder Consultation Meetings
June 28 & 29, 2011, AUC Offices
(#400, 425-1 Street SW, Calgary, AB)**

**Rule 012 – Noise Control
Technical Review Session 2 – Measurement Methods,
Modelling, A2 Adjustment and LFN
(Day 2: June 29, 2011)
Meeting Summary**

Attendees:

AUC:

Don Popowich	Director, Facilities
Rob Thomas	Director, Regulatory Policy
Raymond Lee	Senior Advisor
Jack Davis	Science Specialist
Mark Kavanagh	Environmental Scientist
Jonathan Chui	Science Specialist
Leah Howard	Summer Student

Participants:

Dave Trofimenkoff	TransAlta
Stewart Russell	Capital Power Corporation
Michael Vaters	ENMAX Corporation
Art Kupper	ATCO Structures & Logistics Ltd.
Steven Bilawchuk	ACI Acoustical Consultants Inc.
Paul Wierzba	RWDI Air Inc.
Henk de Haan	Golder Associates Ltd.
Clifford Faszer	FFA Consultants in Acoustics and Noise Control Ltd.
Emilie To	Stantec
Don South	ERCB
Andrea Brack	NRCB
Justin Caskey	Patching Associates Acoustical Engineering
Vincent Chow	AltaLink Management Ltd.
David Mildenberger	AltaLink Management Ltd.
Nigel Maybee	HFP Acoustical Consultants
Barry Shymanski	UCA

1. Opening Remarks

- Don Popowich stated that all submissions from stakeholders must be submitted to the AUC by July 15, 2011. The predicted release date of Rule 012 – Noise Control, will be March 31, 2012.
- Don provided background to AUC Rule 012 and explained why a review is required.
- Don answered few questions raised from June 28, 2011 meeting:
 - Regarding joint applications and who is the lead regulator. Don indicated that there is no lead regulator. There has to be two applications under two different Acts, two different sets of Rules. However, if someone prepares one noise impact assessment, that should suffice for the Rule 012 and Directive 38. Participants asked if they can meet with AUC prior to the application to discuss their case. Don indicated that no private meetings can be conducted between the applicant/contractor and the AUC. All meetings must be requested in writing with a proposed agenda. Other affected parties may be notified, and minutes be posted on a public website.
 - With respect to rule clarification, Don indicated that AUC staff could accommodate meetings without public engagement. It depends on what needs to be clarified. Those meeting must be strictly technical and not position in favour to any parties.
 - Inquiry about the cumulative effects with neighbouring facilities, and what is the mechanism for stakeholders to phone in and get information on approval or approved levels so they can incorporate that information into their assessment for both ERCB and AUC.
 - Question with respect to obtaining information if an application is complete. Don indicated that problem exists when an application is deemed complete so that a noise permission is valid, not when the decision is issued. Sometimes it could take months to issue decision. If the application is not completed, AUC may issue IRs. If the IRs responses are satisfactory, then that applicant counts on having their application in the noise queue. It is not when the decision is issue but when the application is completed. Commission wants to avoid partial application or preliminary application to avoid queue jamming.
 - Question regarding projects that have already been approved and may or may not have a sunset clause. They asked how they should account for those in the NIA. Don indicated that applicants have the right to request an extension. In the last few years, AUC has established certain type of sunset clause terms for certain scope of the project. The Commission was trying to do is to avoid extending the project indefinitely. It has been an issue for other developers.
 - One participant proposed having other noise models and incorporates them into the overall assessment. Don replied that AUC doesn't have access to these models and it would be necessary to acquire them from the consultant. The NIA is public information but the model is not.

2. Introduction

2.1. AUC Staff

- An introduction was made by Rob Thomas regarding some logistical issues.
- All AUC staff were introduced.

2.2. Participants (round table)

- All participants were introduced.

2.3. Participants – other noise related topics to consider if time allows

- Few topics were added to an agenda:
 - How do we model transmission line noise?
 - Is there a process to gain exemptions for specific types of equipment?

3. Comprehensive Sound Level and ambient survey – Measurement and Analysis Methods

3.1. There is an inconsistency between isolation analysis used for ambient noise surveys (e.g. for an A2 adjustment) compared to isolation analysis used for comprehensive noise surveys. Is there a more precise (and consistent) means of isolation analysis that could be used?

- AUC staff indicated that the result of having the differences is that it changes the level of the recording, and could have a large impact on the PSL.
- Participants expressed opinions:
 - In an urban setting, ambient and comprehensive sound levels should be distinctive from each other. We do ambient levels on a regular basis particularly with substation in urban area.
 - Like to see a process so that the ambient level is comparable to noise impact. We need to assess the difference in sound level before and after the project for consistency.
 - There is a discrepancy between the isolation of ambient and comprehensive sound levels. Generally, the purpose is different. The ambient sound level can change with seasons, human activities. If there are some inconsistencies for isolation between ambient and CSL, these may be acceptable if the purpose of the survey is different.
 - Taking measurements in urban areas is much more complicated. There is complexity involved. Changing the Rule to be all inclusive regarding this subject would be very difficult. Should be presented in a format that is specific to that area.
 - On legal aspect, if the rules for surveying are too restrictive, it opens up possible litigation. The Rule shouldn't be too restrictive, but it should be referencing acceptable standards such as ISO 1996 or ANSI 1218.

- How do we ensure consistency? ANSI 1218, specifically designs to measure noise source to ensure consistency. It addresses wind speed, meteorological conditions and location.
- We may need more information from the isolation analysis to validate what is taken out in the determination of CSL or ASL. The comprehensive sound level works in rural areas. In rural studies, we need to find the facility contribution, not the noise from the dogs or other events. In urban setting, the situation is more complicated, but there are corrections (Table 1 for PSL) available for use. A proper background study would be a huge undertaking, as ambient sound levels in an urban area include many sources (sirens, dogs, etc). There should be no removal of these noises and how do you justify it by taking them out?
- We have to do the ambient because Table 1 of the Rule does not work. Air craft flyover, heavy road, industrial area, Table 1 cannot capture them all.
- In the Rule, the requirement for CSL gets close to only the facility contribution. We frequently do ambient survey. I wouldn't agree that everything should be included in the ambient sound levels. In the case of a dog barking half the night, is that representatives? We need guidance on that. As for background sound level, I suggest using statistical values. It provides the background noise.
- Is there anyway to stop having so much focus on the ambient sound levels. Rather than making adjustment on PSL , why don't we just worry about the actual facility's sound level? What is the drawback to do it that way?
- The reason to do an ambient survey is to increase the PSL based on existing sound conditions. Nobody in the right mind would do that to lower the existing sound level. There is an inherent danger in ambient survey that you do not take out enough (i.e. dog barking) so you artificially inflate the PSL to allow for more leeway. There should be better definitions of how that is done. There is a whole lot of gray area in there about what is considered typical condition for a given area or location. Currently, it is up to the discretion of the practitioner, there could be several dB swings and that could have long lasting effect. For CSL, you want to keep it low, and for ambient, you want to keep it high.
- Removing sources of noise in an urban environment becomes very difficult.
- A dog barking constantly in a farm should not be removed. It is part of the ambient level. Dogs bark in the country and they are there all the time. Another thing is the harvest; try to do a CSL during the harvest time.
- Let say AUC have approved a facility. We don't want to run into the issue of an elevated ambient sound level. We want to look at conservatism in our model so we do not shoot ourselves in the foot.
- Has there been a discussion for some sort of exclusionary limits if you design a facility to 32 dBA, then it does not matter who else is in the area, you are going to be OK. No net increase, so the ambient does not matter.
- You still have to establish some ambient level that you cannot exceed or add to. It is a challenge.
- It might be a good idea to allow some amount of noise creep as the population and density increases.
- We have encountered special areas with a concern of noise management plan within an industrial zone where it is difficult to establish the ambient and

understand the CSL. May be this is an avenue you want to pursue for complex area. (i.e. Fort Saskatchewan). In Europe as well, they define no net increase in industrial area with a threshold.

- If we have crept in ambient to deal with regulated industry, un-regulated industry, and population density, would the A2 adjustment be the proper way to deal with that?
- The challenge is if you create these industrial areas, you have a lot of industrial noise unregulated by the province but it is regulated by the City but the city noise limit is much higher. We have no control around us for un-regulated industries.
- It minimizes the liability of the source for a changing target. It difficult to make it too prescriptive.
- We are looking to the consultants for consistency. When it comes to the hearing process, for the AUC, who are they suppose to listen to.
- The creeping ambient factor was addressed in ID 88-1. In regards to population increase, Table 1 accounts for this. With a population increase it is possible to increase the PSL. However, is Table 1 still appropriate for urban environments?
- Table 1 is not appropriate in regards to an urban environment. There needs to be an adjustment. In industrial, the PSL is lower than high density residential neighbourhood. You still have existing noise that meets city by laws but does not meet the AUC rule. The A2 has not been applied for or allowed for use.
- Is there a general reason why these A2 adjustments aren't being approved?
- Most people don't apply for an A2 adjustment; they feel that Table 1 is sufficient. In the past, most people do not apply for the A2 unless they could increase the sound level, so there is bit reluctance there.
- There will be more power system developments in urban settings.
- Rule 012 was originally created for steady source for rural environments. The A2 adjustment was designed to allow for a certain creep increase above ambient. There are other methods such as L_{dn} or annoyance factor that could be used in an urban environment. Teresa did a paper that compares L_{eq} to L_{dn} .
- An example of a sawmill facility that is not regulated and decides to generate power. There is nothing else around but it makes a lot of noise. Is the A2 adjustment allowed if you could back it up with proper measurement? If the A2 adjustment will be rejected, why apply for it at all.
- The cookie-cutter approach doesn't work well in an urban environment, as some industrial areas may have a small number of dwellings located nearby.
- To Steve's question about whether the Commission will accept A2 adjustment. Staff cannot answer that question. Commission has looked at Rule 012 repeatedly, if you would not allow A2 adjustment, it would have been taken out. It is there for a reason. It will be used when appropriate. For anyone who applied for A2 and rejected, what are the reasons?
- We have applied for A2 adjustment. It comes back to interpreting the Rule itself. It comes back to a couple of points: Is there just one PSL for an area? Closest or most affected residence? Which receptor is the most impacted? How much noise does the facility emit itself? After determining these, you can make an application for an A2 adjustment at the most impacted receptor. However, when applying, a full NIA is required, not just the ambient sound level. Perhaps clarifying the

requirements would help, as there are some logistical issues. The other question is if you are applying for A2 adjustment, are you applying for one location? My understanding is that only one PSL we need to adjust. You need an NIA before fully ask for an A2 adjustment, is that your understanding? How do you determine what is the most impacted or affected if you do not apply A2 to that one receptor.

- Table 1 does not apply to industrial sectors of municipalities but does it apply to residential areas? Is it not applicable to all urban settings?
- It depends. Residential areas can have a number of complications by highway, rail yard, or aircraft flyover. We don't see a need for providing an NIA with an A2 adjustment. The way the Rule is written is you determine the PSL and then combine that with the impact assessment. We do not see that ambient sound level is depending on the impact of the facility. They are two separate issues only combined in the end.
- The ambient environment usually involved a prior discussion with ERCB. On the process of once you get a request for an A2 adjustment, you must have a technical discussion or does it just to the Commission for a decision. Is there a SIR process for this?
- A2 adjustments aren't all that common, mostly they are used to increase the PSL. The isolation is not done to the same scrutiny. This may need to be refined in the Rule, as it is difficult to define in an urban setting. In terms of the process, yes it does go to the Commission.
- In ERCB, consultant would come and ask for a discussion on methodology. We will have that discussion and we are pretty open. It will vary depending on the type of applications.
- The important point with ambient levels is that there cannot be other industries. Ambient in an EIA is different from the ambient defined the Rule and presented in these documents. If important to get a feel for your background noise level in the measurement. For ERCB, you need a permission to do an ambient and there is a discussion first.
- The Rule states that you need permission to apply the A2 adjustment before you file your NIA. AUC needs to look at the process for applying for an A2 adjustment. In the discussion today, I heard you need the complete application before the A2 adjustment is considered. You spent all the money on ambient survey on A2 adjustment and the answer is no.
- I believe the A2 adjustment could be very useful. Perhaps we could tighten up the procedure and standards for determining what the ambient sound level is. The applicant should be allowed to go out to measure the ambient and present their case. There are ways in which you can prescribe how you are going to measure it and how you are going to use it for PSL. Other standards such as ANSI 12.9 allow you to use statistical wind data (up, down, cross-wind, wind rose). Consensus I am hearing is that we should use it.
- Two points. One goes along with the methodology. Because the ambient survey and A2 adjustment is not done often and there is a lot at stake, is it not out of line to require a long timeline for ambient survey in A2 adjustment (e.g. 1 week). Second point, the Rule says if A2 adjustment need to be approved prior to. Can

your NIA with A2 adjustment be treated as the request for the adjustment? That could be a significant timeline improvement. The A2 adjustment request is taking longer than 60 days.

- There could be a choice. If it is a big project killer, you may want to get that A2 issue out of the way earlier on.
- We are asking for A2 adjustment to the PSL not because we want to make things louder. Ambient could be a fair way over the PSL already in some areas. As soon as you build your facility, that site is not in compliance. The existing environment is so loud that you need some adjustment.
- We deal with a lot of substations in urban noisy environments, the A2 adjustment should be considered. The Table 1 does not work. In order to determine or assess the most impacted dwellings, you need predicted sound level from facility initially, based on that, you can establish your PSL in the area based on the adjustment.
- The intent of having an initial discussion of methodology with ERCB is to avoid any glitch that would technically invalidate that process. That step is pretty important. The big challenge from the regulator is getting information that is not clear or technically not acceptable practice. The discussion up front would eliminate all that. Not to wait until question period, then throw it all out and redo it. That is not an efficient way to do business. Large projects like power plants could be difficult to meet target. The PSL currently is for individual resident. In the city with high density area with 1000 homes, what is the reasonable approach to establish the PSL?

3.2. Is there a need to modify wind speed specified in Rule 012 Table 4 Favourable summertime weather conditions?

- AUC staff asked if there is a need to modify wind speed specified in the rule. Discussions are summarized as follows:
 - Participants suggested Table 4 be eliminated or refined. Upwind 10 km/hr at 1.2 m above ground would not be a favourable condition, it could be if indicated it is in conjunction strong inversion condition. Wind speeds mentioned are not favourable conditions. The numbers in the table are left over from Guide 38 when complaints occurred.
 - There was limitation to what the wind speed would be before you start getting contamination with the wind screen noise and start generating error. I like having Table 4 so there is direction of what would be a valid condition in measurement program when discussing with stakeholders. It is a good policy to help us understand what a reasonable condition is to make these measurements.
 - If we look at ISO 9613, it suggests using condition in ISO 1996 part II or equivalent atmospheric conditions that represent predictions with mild inversion so we either have wind at neutral atmosphere or you have inversion and no wind or slight upwind.
 - If we look at CONCAWE, we can have strong inversion, light upwind condition, neutral atmosphere, or down wind condition still puts us in Category 5 or 6 for meteorology which is what we want in prediction with slightly downward

reflecting atmosphere. If we look at ANSI 1228 standard, wind 45 degree +/- or no wind, mild or well developed mild inversion. Just using wind as a measure or determinant is insufficient.

- Some participants indicated that they would like to have Table 4, but don't agree with some of the numbers. Less than 500 m with upwind speed of 10 km/hr, that number should be a lot less. Anything beyond 500 m, it is surprised that upwind is allowed. Who is measuring at 1000 m away with upwind condition at all? Upwind conditions and downwind conditions both should be changed.
- This is set as a reference for what we like to see as acceptable.
- Another issue is if downwind condition at 15 km/hr is acceptable in less than 500m, then why is 15 km/hr is not acceptable at 1000 m.
- The first thing is that noise complaint form should be filled out; if it isn't then there are some guidelines. In reality, you really need that noise complaint form. If someone complains the noise and they won't tell you when it is loud, I question if you should do the measurement at all. If you have to do a CSL, first you look at noise complaint form. The guidelines are good, but they aren't realistic.
- The Rule seems to allow for some discretion by the consultant; the numbers in the table are just guidelines.

4. Modelling:

4.1. Is it appropriate to adjust predicted noise by using wind statistical data (i.e. wind rose)?

- AUC staff asked is it appropriate to adjust predicted noise by using statistical data. Discussions are summarized as follows:
 - There are no modelling tools available that do reasonably good prediction for changes in wind direction and temperature gradient. Are we going to measure under different wind conditions and do some sort of average as ANSI 12.9 suggest doing a long term monitoring over a wide area. ISO does not allow us to change wind speed or we could use Harmonise. It could be reasonably well incorporated that into your predictions?
 - If we apply ISO 9613 with wind rose statistical data, the wind rose is a long term correctional average weather condition. Is this allowable? How do we deal with conditions where the receptor is surrounded by noise sources?
 - How would we incorporate inversion in the prediction for example? What we predict is the L_{eq} under down wind condition but the corrected L_{eq} over a long period of time. It is a different value. Ultimately, it doesn't matter what we do, we still have to deal with it if there is a complaint situation. For our clients, we want to give them something that is indicative of when they could get a complaint. In Alberta, it is wind for wind farm and inversion for other area.
 - It ties back to whether we should assess representative conditions or the complaint condition. It is supposed to be the same but would be nice if we can all agree on what they are.
 - It comes up in the review of Directive 38. People complain under light down wind and summer time conditions. This is why these requirements for summer time

modelling under a range of condition came in because this is when people complain. Should we get a wind rose at very specific 14% of the time or just assume what is causing the condition.

- We cannot accurately incorporate wind rose in changing conditions, why do we try to do it? We may not be able to identify the conditions when the complaint is likely to occur, which has always been the driver for representative conditions. May be inversion happens 10% of the time, that may trigger a complaint.
- If the inversion happens less than 10% of the time and it is considered as representative complaint conditions, do we consider that or we say because it is less than 10% of the time, then we say “suck it up”.
- Temperature inversion can be validated base on historical data and the predicted percentage of occurrences can be derived from that. What time period is that based on? 1 year, 5 years? Is historical inversion data available in Alberta? That date will give us a stability class (hourly). It is extrapolated from different stations with actual data.
- How could consultants help their client do a risk assessment? If company A’s consultant does a noise model using wind rose data to reduce the noise level at a receptor, then company B decides to develop next door and their consultant does another model without the wind rose data. When company B’s consultant include company A’s model with downwind condition, they found out that it is over. That could be a real problem; your facility cannot even get built because the neighbour facility is too loud based on your model using assumptions that are different fundamentally from other consultants. For a given area, when determining what ground assumptions we use, we probably end up with different answers.
- One of the reasons why we revised Guide 38 number of years ago is trying to make all these assessments consistent so do not end up with a wide range of different assumptions. This may be more applicable to the wind turbine situation. We need some good reasons for making it more complicated. As a regulator, we can make it tough but we must keep it consistent and repeatable.
- Wind is not the only driver for noise propagation, atmospheric stability is also important. The wind rose data is not enough, atmospheric stability should also be incorporated. There are six categories atmospheric class in the standard, 5 or 6 will enhance sound propagation result in higher level at receptor. You can fall into that category with different combination of upwind and down wind conditions in combination with stability classes. If we go the path of looking at statistical, wind rose alone is not enough to incorporate; you also need to incorporate atmospheric stability. Just wind rose is not the single diver.
- Atmospheric stability plays an important role. Just using wind rose data is not sufficient.
- One thing that is most important is compliance with PSL or there will be consequences. No matter how predictions are done, compliance is the key.
- Do we base on the sound level during the three hours compared to the PSL, or do you make a time average? In section 3.3 of the rule, it states that you don’t average it out for the entire 9 hour period. The reason why this has came up because of emergency generator installations are being tested for a very short

period of time. If we get 180 degree wind shift, the facility noise could drop 20 dB. If we stop not taking the full night time because the facility does not run all the time, in mining operation, the truck keep running up and down all the time, we have to consider the fluctuation of level though out the whole night time period. It is very specific for a very good really reason. Just to put it in there and it applies to everything; you are missing the point of the night time L_{eq} , because of the huge variation of the environment.

- Peak generation facility such natural gas generator that operates during peak demands - 2 to 3 hours in the evenings and 2 to 3 hours in the day.
- Another angle to look at this. Reduce hours of operation over the 9 hours of operation is a potential mitigation measure.
- The whole scientific base that looks at dosage response effect between noise level and annoyance is L_{eq} based on average value. Every standard I know is based on average L_{eq} values in the night-time. What do you do with transformers with cooling fans that go on and off during the entire night time period.
- Paragraph in Section 3.3 has shifted away from the L_{eq} concept. This kind of goes away from the concept that allows exceeding the PSL for 5 minutes if during the night it is below the L_{eq} ?
- The paragraph is intended to ensure there is compliance if the equipment is operating all the time. We find some difficulty that emergency generators are only going to be operating twelve hours per year. We need to ensure that the applicant put in the worst noise control just because a facility is operating 1 hour out of 9 hours in the night-time. We may have to reword this to clarify in the Rule. If emergency generators are being used for peaking power, it is no longer defined as an emergency generator. In terms of compliance testing, how do you monitor whether or not these things become an issue?
- For facility that is shut off and not emitting noise, why would we dilute the noise generated by the facility with the ambient background? What are the circumstances that are creating problems for the AUC because the applicant is running the generators? Emergency generators operate on the basis of random maintenance. We do peaking power plant. The AUC regulates all generators. So, this creates some issues when the application doesn't indicate when the equipment is operating and for and how long. The equipment is bought off the shelf with no noise control, which is our concern in terms of public interest. Consistency is important, but is this too prescriptive? This may need to be reworded in the Rule.
- One side use of reduced hours of operating as mitigation which is legitimate. The other hand, you have the situation where once an hour for a minute you have this horrendous noise that will wake everyone up. A common ground could be introduced, where we look at the full night-time level, but limit the hourly L_{eq} to exceed the PSL by only 5 dB or 10 dB. Someone using VFD for cooling fan is no different from the reduced hour of production. We can set a hard cap and still use the full night-time level. The hard cap could be a maximum hour use, limited to 5 dB to 10 dB over the PSL.
- Is it possible to base your NIA on peak sound levels, so that they do include big noises? The time average concept is used. The way I read Rule 012, we are

modelling off peak sound level but we use L_{eq} 9 hours for compliance testing. There is a disconnection there. You made things safe and conservative rather than accurate. The solution might be having two different values.

- Few things that need to be addressed. Peaking plants and emergency generators (i.e. hospital or condo), can probably be dealt with some specific clauses within the Rule. Peaking plants could be tricky because you do not know how long you will be running it for.
- There are small powers plants around Calgary that are peak shavers. They are intermittent and can cause annoyance. If there are concerns in that respect, we need to define those issues, is it the smaller facility, peaking power facility, peak power plant? Do we need to incorporate that in our NIA for the whole year? What is causing the complaint and how do we get the rule in place to fix that to make sure we do not have complaints in the future, instead of one small issue in one area may be 1 or 5% of the complaint and penalize everyone else for it.
- We have received a number of NIA is for peaker plants, different variation and sizes. We look at the cycle of start up, running, shutdown, venting is included with the anticipated sound level. What they have done is running it once a night, start up and shutdown once or twice during the night until they exceeded the PSL. There is some indication of the noise limitation of the operation. If they think the operation will go above that, they will introduce mitigation to go five times a night. If something starts up for 15 minutes, how many times could that occur during the night time until the PSL is exceeded?

5. Lunch

6. A2 Adjustment:

6.1. Are any changes to AUC Rule 012, Table 1 needed? Clarify the situation where it would be corrected to use A2 adjustment to the permissible sound level (PSL)? (i.e. urban environment)

- AUC staff asked if a PSL applies to one house, does it apply to your neighbour? Should corrections be based on population density? And if there is an A2 adjustment for one household, does it apply to other residents? Feedback of these questions are summarized as follows:
 - WHO suggest 55 dBA for night time residence, similar to 56 dBA Category 3 in Table 1 for high density population area? US housing development suggest L_{dn} 65, L_{eq} 58.6 dBA. The BSL defined for Category 3 and over 160 dwellings in Table 1 in the Rule is not a bad starting point. May be a separate category needs to be created for urban environments. Another one for commercial areas.
 - Suggest the A2 adjustment applies to a neighbourhood instead of only one dwelling. It is an overkill to go out to measure at every resident.
 - The issue is with power plants within an urban area and that should be category dealt with (City of Calgary, Edmonton, Lethbridge, Red Deer). Have an agreement of what it is and define it.

- Table 1 has not worked. It has not accounted for factors such as traffic road and non-regulated industries. Maybe you need an industrial category in the Table 1. That would cover areas in Calgary that do not have residences but are loud. There is discussion about local municipal noise limit. That could dictate the amount of noise you could make. The city of Edmonton is 50 dBA night time. We could be in a suburban neighbourhood but few blocks away from a heavy road (56 dBA under AUC but 50 dBA under city of Edmonton. Whether or not the 10 dBA maximum is correct, we could have 15 to 20 dB differences between the measurement level and the ASL. The PSL should not be lower than the ambient. How about eliminated the +/- 10 dBA maximum.
- The ambient sound level in an industrial area varies a lot. I would recommend capping it a certain level to avoid any health issues (i.e. above 60 dBA night time level)
- The question of PSL to an individual dwelling versus area? The concept of control for the most impacted dwelling works well because everyone else behind that dwelling should have less. This should be a reasonable approach versus trying to come up with assigning an average PSL for an area. If you can determine the key control or most impacted residence.
- A concern is that one PSL works well for rural but not for an urban environment. If you are in the second row of houses from the freeway and the noise level could be 5 to 8 dB less because of shielding. However, the relative contribution from a proposed facility would only 1 or 2 dB less. The relative impact of the facility for the second house in would be a lot more than the house closer to the freeway. If you use one PSL for the entire neighbourhood, it wouldn't work. You may need to look at it from a house to house perspective but you may not want to survey every house.
- The way it is written in the Rule implies one house – the most impacted dwelling. In a urban setting, should we be looking at different directions? Currently, the choice is up the consultant.
- Is the PSL based on the closest or most impacted receptor? Are we going to do a representative sampling of the area to figure out the most impacted. It has to be realistic of what the expectation are for sampling. Do we need a better definition of most impacted? It's relatively easy to define within a rural setting, but becomes more difficult in urban areas. One PSL for an entire neighbourhood might not work. The most impacted resident is usually in the quietest location. This could get complex if we assigned different PSLs. Although, one way to do a blanket PSL would be to take an average of the ambient noise levels.
- Is one dwelling sufficient when maybe one thousand might be affected? Or do we need to identify more than one? One is sufficient if it's a homogeneous sound environment. However, if it's heterogeneous, then we should have multiple areas.
- If the goal or the consensus is no net increase, the appropriate way may be to build a model for the area, use baseline measurement for calibration method. Leave the practitioner to determine where and how many measurements you need to do to have a accurate picture of the model. For the point forward, you can show no net increase based on the model. Is that a reasonable approach if no net increase is the target?

- The A2 adjustment might be the most practical. It is a relatively straight forward calculation. Is it one receptor point as your measurement for compliance or is it going to be numerous. Only one PSL is required based on the Rule. This is all based on rural settings.
- Situation with transformer or substation in an industrial area with increase of 0.1, 0.2, or 0.3 dBA. What is the real cut off before an application would be denied?
- On no net increase. We have mechanisms of putting into substations where there is a saturation of noise. This is why we need to consider the no net increase concept. In the case of a transformer, it is a very minor component. It is not defined in Rule 012. Say a facility was approved in 2006, and they are at 55 dB at 1.5 km away. Now that they are in operation, they wish to make a change to their facility. Do they need to comply with the 40 dB rule, or do they need to do retrofitting, or is it a no net increase?
- Does it make sense to make some exclusion limits such that if you meet those, you do not have to worry about ambient. For example, if design your facility to 30 dBA at 1.5 km away, it not going to impact the ambient. Does that make sense. If you put a substation next to a big oil sand facility, it is insignificant. If we design low enough, then we do not have to worry about it. The deferred facility is only limited in time to approximately 2018. The facility is required to comply with the PSL after that date. We don't want a no net increase to a facility that's not in compliance.
- Each facility must meet at least 40 dBA at 1.5 km away. If it's a substation and the noise contribution is in the mid 20s dBA, it's not adding anything.
- If no one lives there, does it even matter? Electric facility operators are much quieter. A pre-set number would help us greatly in demonstrating that we are in compliance. In Section 3.2 of the Rule, the applicant must demonstrate how the noise levels are not affected by this proposed facility or modification. How do we demonstrate that a facility is not making noise? Is it a process, a meeting, or studies and research?

7. Rule 012 Standards Section

7.1. Should Rule 012 contain a list of technical standard material, standards and protocol, or acronyms? If yes, does the current list (Rule 012 Appendix 7) need to be updated and expanded? Any suggested references to be included?

- AUC staff asked that if more references are needed or should it be left to the consultants?
 - There is no intent to limit the standards that could be used. We would like the standards to be referenced as non restrictive, as there are always updates.
 - Should the list of standards even be in the rule? Could be called reference other than standards.
 - The standards originated from Directive 038. The Rule is not limited to these standards and we should qualify that. We appreciate any further input. We can qualify it by saying that it is not restricted to these standards as a disclaimer.
 - Send us any additional standards you believe should be included.

- Should there be a list of websites or any other information that would be valuable in the Rule? Should these standards be made available via link? Should the AUC have the complete library of all these standards?
- A link might be helpful, although be careful of copyright. The AUC should have a complete library of these reference standards.

8. Low Frequency Noise

8.1. Section 4.2(1) requires determination of dBC minus dBA and identification of a tone. Is the two-part requirement necessary? Is there a concern about low frequency noise (LFN) that does not have tonality or tonality without LFN? If so how should it be determined, measured and managed?

8.2. Evaluate the LFN cumulatively with consideration of the ambient dBC level? :

8.3. Is there a need to adopt a dBC noise threshold limit such as that used by other noise regulatory agencies?

- AUC staff indicated that there are many standards on how to measure tonality. Some of this was touched on during the wind turbine discussion. There was an allowance for tonal and impulse noise that was taken out of the rule. It was assumed that everything had impulse and tone, and therefore was incorporated into the rule. From a tonal perspective, is this an issue if we've removed it? Discussions were summarized as follows:
 - Most of the complaints regarding LFN occur with a tone or firing in a compressor. In closer proximity you might have C minus A less than 20, which can still be annoying. Generally this doesn't happen at farther distances away. Is any kind of penalty for tonal components considered because these issues can be separated? Is there some kind of a penalty for tonal noise? We could then use C minus A as a rough guide for concern with residents but not as a regulatory requirement.
 - Tone is assessed in one-third octave.
 - The majority complaints regarding noise do have a LFN aspect to them. The A-weighted is not the issue but the low frequency side does. We do not get a lot of complaints now. When we have a tonality 250Hz or less and dBC minus dBA greater than 20 dB, then we have a valid complaint. Those two variables have been successful in qualifying the complaints. It's difficult to measure these, because the wind skews the dBC measurement. There is a challenge with that method. This method is managing the complaints fairly. However, we have run into odd situation where it is 30 dBA and the dBC is at higher value. Even you add the extra 5 dB to the CSL, it is still not making that complaint go away. There is room from improvement. Both variables being present seems to validate the complaint situation. From the modelling standpoint, we always ask the consultant to consider LFN. Most consultants have been providing it and indicate the potential for LFN and it does not restrict approval. We have never rejected an NIA base on the potential for LFN, the true test is the measured CSL.

- We include dBC – dBA in our assessment, frankly, I do not believe that. The model just spits out the number and extends the capability of the model. ISO 9613 is limited to 63 dBA, it is just to satisfy the NIA. We can limit our predictions to a certain distance, perhaps 4-5 kilometres instead of 8 kms. Tonality is a separate issue from LFN. They can exist without one another.
- A common example of a compressor station with a generator that contains a low frequency tone plus the engine air inlet not silenced. The high frequency source rises dBA level but the low frequency tone is still there. The dBA louder by introducing a high frequency noise source so the dBC minus dBA is below 20 dB. In those situations, as you move farther away from the source, the dBA disappears, and you are left with the LFN. You can manipulate the source but as you go further out to where the complaints are this is when the compliance is determined. The challenge is how to measure without the wind skewing the level.
- We do the dBC minus dBA as well and we try to tackle the potential issue earlier on, so try to design to 35 dBA. In the case of the LFN issue, was the house resonating because of the standing waves – structural borne vibration issue – very special case. In one case study, we did three days of monitoring. On different days, one day we hear muffler exhaust clear, then other day we can hear the engine casing noise from the facility wall. It was a valid noise complaint.
- Would it be too far to suggest that if there is a tonal component and you exceed. The tonality could cause annoyance. The tonality may be at 30 to 35 Hz range. You need to get rid of that particular tone.
- What if can prove it and there is a tone. You apply 5 dB to it and you are still below the PSL. The proponent is well within their right to say “we are done and we are out of here”.
- It would make sense to say that the measurement indicates dBC minus dBA and there is a tonality, you are out of compliance. Once you can meet that compliance with mitigation why would you need the 5 dB penalty, unless you use the 5 dB to slip out of the net by taking the penalty. If the reason they are not in compliance is because they are not meeting the two criteria, then will not be back in compliance until they meet the criteria, not by just using the 5 dB penalty.
- Seems to be that if there is a tonal component and it is really quiet, is that a problem.
- The dBC minus dBA criteria should only apply if there is receptor
- Reason this criteria is there because there is small percentage of complaints that would not go away because of the A-weighted approach. The A-weight was in the mid to high thirties and the dBC was 57 to 58 with tonality were associated with that. We normally do not get the complaints at 32 dBA, it always at 36, 37, 38 dBA, close to the 40 dBA with a tone and low frequency. They need to do treatment and measurement. Ended up at 30, 31 dBA with the problem taken care of.
- Regulators always have the discretion to ask the operators to address the problem.
- What are reasonable weather conditions in taking the measurement for LFN issues? Is the current guideline acceptable? Wind speed at 1 to 3 m/s seems to OK.
- We have not identified any LFN concern. Apparently, stakeholders indicated that LFN is not an issue.
- We have seen tonality issues with substation transformer – 50 to 60 Hz related.

9. Wrap-up section

- Rob Thomas concluded that the scheduled meeting for July 4th, 2011, will not be necessary.
- The AUC staff members are available for further discussion.
- Participants are reminded to send in the written submission no later than Friday, July 15, 2011.