Comments from the Havelse Creek Citizens' Group on draft GEUS report entitled "Test of Bayesian belief network and stakeholder involvement"

The comments are dated 25 May 2004.

Re Chapter 0: Preamble

It is a good idea to use "Bayesian belief networks" (BBNs) to process the analogue and digital information collected. The "car start" problem was too simplified for the use it was put to, but the model idea is fine if the necessary model is structured correctly and the various scenarios prepared on the basis of the model provide an adequate explanation of the reasons for selecting the parameters and a comprehensible description of the resultant calculated values and consequences.

It must be remembered that not only researchers and scientists have to be able to understand the consequences, but also politicians and people such as those in the Citizen's Group.

Re Chapters 1 and 2

The Citizens' Group would also very much appreciate the opportunity to review these chapters before the report is published so we can see the total work in which we are participating.

We would also suggest, for the sake of readability, that the report start with an explanatory list of the abbreviations and acronyms used. We also hope that the report is carefully proofread for language, grammar and spelling before it is published.

We recommend that the project's steering committee step forward and be mentioned by name in a description of the project’s organisation, responsibility and competencies.

Moreover, we ask that the individual authors of the various chapters be introduced by name, with their affiliations and reasons for participation listed as well.

Re Chapter 3: Introduction

The intention behind the work on and in connection with the BBN model and its results is fine, but it should not be the experts that choose "the best" result. They should present several scenarios with descriptions of the consequences and allow politicians and citizens to choose. As is apparent, unfortunately, several places in the report, some of the experts do not have any great belief in the ability of the citizens' group to understand, provide information and make decisions, and, similarly, we do not believe that some of the "experts" possess it, either.

You must be very careful that the model doesn't fascinate you so much that you forget that it cannot be used in all situations, and that the model and its results have to be

"humanised" **before** its results are used in decision-making. This is especially true with respect to the basis for farming contracts.

There is a good description of how the work should be done and what should be taken into consideration. We just hope that this does not all come from the references, but from recognised insight.

It is all right for Copenhagen Energy to get some of its water supply for the greater Copenhagen area from Frederiksborg County, but we believe that the effects on the local area should be taken more into consideration and the greater Copenhagen area should learn to conserve water better.

The chapter does a good job explaining the problems that can arise in the communication between specialists and citizens, but it is the responsibility of the specialist to adjust the information and communication, not the other way around. There are indications that not all the specialists had read and understood what was said in the publications used as references for the report.

The short presentation of the BBN is acceptable, also together with the statements about how it is used and how the results should be communicated with respect to contact with "the non-specialists". A great deal of it was taken from the reference literature, and we will just have to hope that the specialists understand the meaning of the words that were written. It does, however, give one a bit of food for thought that the specialists had decided in advance how much the "non-specialists" should be involved, asked for advice and informed, and how much they should be co-responsible. We hope that the drawing up of the BBN models and collaboration procedures in the three other cases can help make the final model more acceptable than the Danish one.

In general, however, we think that Chapter 3 was fine work, but it seemed to be inclined too much towards study of the literature and contained too little actual contact with the everyday world of the citizens' group.

Re Chapter 4: Description of the wider water resources management in Denmark

The description of the distribution of responsibility and of water supply activities in connection with, among other things, the registration of abstraction areas seems to adequately covered.

With respect to the involvement of citizens in water abstraction projects and water protection projects, we hope that the authorities will become better at living up to the requirements of the Water Directive. Copenhagen Energy tried in connection with the Havelse Creek matter, but it was a somewhat weak effort which probably should be followed up by a serious informing of each household in the area.

Re Chapter 5: Stakeholder involvement

It was a shame that more didn't come out of those activities. A different, professional management and consultancy before, during and after the meetings could have provided

substantially better results. Our first impression was that the specialists did not wish to involve themselves with the citizens.

The chapter has many lists and diagrams that were not discussed but will presumably be dealt with later. It is a too bad for Jan Poulsen that he does not quite manage to describe what he got out of chairing the Citizens' Group meetings.

The origins of Annexes 1 and 2 should be stated.

Re Chapter 6: Development of Bayesian belief networks

There is an interesting description of a case in Lyngby (the Lyngby near Aarhus) that describes the means that can be used to reduce groundwater pollution from agriculture, although doubt is expressed that it would be possible to use the same model in the Havelse case.

There is another explanatory introduction to BBNs – a good one – and there are even cited readable references about the model, and it tells you what you should be careful about and how you can use the results in decision-making, and recommends that you remember to consult the stakeholders. So remember to ask the citizens as well.

It says that BBNs are instruments that can be used to deal with theoretical and practical problems with a built-in degree of uncertainty and complexity, and in dealing with the problems achieve results that can be used and can make a decision-making process easier. As an example, it is used to look at the problems in connection with farming contracts aimed at stopping the use of pesticides in groundwater abstraction areas that need to be protected against pollution.

The first draft model for farming contracts is stated as a result of generalised paperwork [*literally, “desk work” –translator*].

In the presentations for "the professional stakeholders", only one model was provided, and there was no description of parameters; for the citizens' group, the model was not shown: they probably thought no one would be able to understand it.

This has been an overall flaw in the contact with stakeholders: that the specialists underestimated the ability of "the citizens"' to comprehend the significance of the models.

You are going to have to try to agree on whether the "citizens' group" consisted of nine or eleven people. Have a single editor look at the entire report.

Unfortunately, the description of the groups' work and results shows the problems the specialists had communicating with the citizens’ group and even "the professionals".

As described, information from the groups was built into the altered BBN models and presented to "the professionals", but not to the citizens' group – a big mistake that shows a lapse in judgement [*literally, “lack of assessment ability to evaluate” –trans.*] on the part of the project management.

The results from several of the meetings were poor because information was not provided far enough in advance of the meetings. For example, the BBN models plus the parameters and assessments used should have been sent to each of the participants for their comments before the meeting, and if, for example, the specialists were in possession of data necessary to understand the results, then the data should have been given to the groups as well. The model can presumably also be handled on a home computer of a reasonable size: a copy on CD would be of great interest.

Actually, it is odd that no feedback situation was used in the model with an optimisation as a result.

Against a backdrop of the comments on clean drinking water, the models should also consider what qualities of water are necessary for human intake, toilet flushing, field irrigation, industrial process water, etc.: water quality is much more complex than it appears from the description in the report.

The comments on results also show that it would be advantageous if more of an effort was made to collect the necessary relevant water-quality data before taking drastic decisions about farming contracts, expropriations or the like.

Moreover, one should know the actual crop cultivation in the Havelse area in detail and be ready to make individual contract calculations.

Where several bars appear in diagrams, they should be coloured.

It is correct that BBNs are a good support tool, but the results must be followed by a detailed description of the parameters used and why, plus a description of the results and their consequences. It is much to risky to allow politicians or civil servants to make decisions based on the "naked" data. So one should rather allow citizens to become more involved (farmers are citizens, too).

It is probably correct that, in certain cases, expropriation is the only realistic solution if the pesticide load is to be reduced.

Using a BBN on Havelse Creek flooding is fine, but the section in the report is messy; the stated units for data must be adjusted (the water current cannot be different by a factor of a thousand at stations 19.80 and 52.08). The figures must be labelled correctly and the Danish text should be removed. Additional work is very much necessary: this chapter may be the most important one with respect to the history and future of the entire area. Also, the information in the May 2004 newsletter from Frederiksborg County about temporarily giving up on wetlands should be included in the report.

We very much agree that more data on water quality, water flow and flooding should be collected and processed. Perhaps it would be a good idea to include Copenhagen Energy's existing data on water abstraction, upstream emissions from Hillerød, for example, and precipitation quantities should be included in the model for flooding. The section numbering should be adjusted.

Re Chapter 7: Data collection for groundwater protection management

Shouldn't "clayey till" be "clayey tilth"? What does "esker" mean?

It is a good idea to include this section, but it seems a bit thin and quickly prepared when you consider how important the pollution data are in the report as a whole.

We would like to hear the reasons why some areas are protected against water abstraction.

Someone should proofread the chapter.

Re Chapter 8: Main conclusions and perspectives in relation to WFD

Next time the project group addresses this subject, they must be more aware of the fact that the citizens' group is often much more interested than expected (and much better qualified – in some areas perhaps even better and more broadly orientated out of interest than the specialists). For this reason, the project group should do better preparatory work with better information; the citizens' group does not wish to be put off with cursory information. And it sounds as though the work has led to somewhat of an understanding of this.

It is correct that it is best to include interest groups in the BBN model construction phase, but it should be done openly, objectively and from the beginning. Don't keep the citizens' group outside the door because you don't think they understand the topic. Be aware of the fact that the citizens' group is willing to contribute much more volunteer work than you apparently think; you only have to include and engage them. They know that the result of the work will have an impact on their own situation, and the specialists should not forget that many members of the general public are extremely well qualified when it comes to finding information on the Internet. The old specialist world is changing.

The citizens' group can understand a BBN just fine if it is explained properly by the specialists.

Yes, it is true that BBN models in which no feedback is used have a problem, but that is something that simply can be changed in the model. (See how it was used in the "Limits for Growth" model.)

Unfortunately, it is correct that decision-makers and others have a tendency to use the results from models without understanding their background and consequences, which is why models can be dangerous. Just look at how politicians misused or ignored the "Limits for Growth" warnings.

Overall, however, we believe that BBN models are necessary tools in many complicated decisions.

The project group statements are a good thing, but a few of the essential considerations of making parameter input and the results comprehensible to and useable for decision-makers and the citizens [*the Danish phrase can also mean "the general public" or "the citizens' group –trans.*] were lacking. Also, it is not only the interest group participants that should be "selected" with care: the participating specialists should be screened as well. It would especially be a good idea if the specialists were to describe the model, background and structure on the basis of their own understanding and not so much on the basis of quotes from references. A little more respect for the citizens [*see above –trans.*] would be becoming.

It is correct that specialists are essential in preparing the BBN models, but it is an absolute necessity that the citizens take part as well – and this is where the project group has to get a handle on the expression of its statements rather than shifting from participation-is-essential to participation-is-not-desirable. There is no doubt that the project group and the report authors need to have one or more critical voices read through the report before it is published.

Although the northern-Zealand countryfolk will not come to heel voluntarily, the BBN model does, however, show some of the way and shows a little of what can be achieved and what has not been taken into consideration. For example, what do you do if earnings per hectare from speciality crops exceeds the compensation granted twentyfold?

It is interesting to read about Copenhagen Energy's activity plans. We of the citizens' group expect that we will be kept informed, and we hope that the local residents in the affected water abstraction areas will be kept informed through the local press, door-to-door handouts or the like.

Re Appendix? 1: Economic loss on conversion to pesticide-free crop cultivation in the Havelse abstraction area

It is great that the Appendix states that the basic data must **illustrate** the use of BBN models and not show the actual situation. For this reason, it is also acceptable that all data are based on average figures that do not have their origins in the actual area itself. There is some text missing at the top of page 4. We recommend proofreading.

Where crop prices are stated, it is worth noting that they are now DKK 1.10 per kilo. It would also be worth the trouble to adjust to match the changes/pending changes in EU agricultural policies.

When reading Tables 1a, 1b and 1c, it would be nice to have a description of what "treatment index" is defined as, and not just have a reference be cited.

Where the DB2 in the case of "pesticide-free" cultivation is stated, there is a perfectly good reference to the loss figures, but this is where the chain really falls off the bicycle: when these figures are then subsequently used to illustrate the actual situation of financial loss in the conversion to pesticide-free cultivation in the Havelse wellfield. The beautiful thoughts expressed in the introduction have fallen away.

There should be consistency in the numbers used. It is wrong to state in this report figures for losses that would be suffered by crop farmers and cattle farmers if they convert to pesticide-free farming, since the statistics behind these figures are not relevant to the field. Such numbers are always misused by decision-makers, and the article itself is used as a reference (just look at Appendix 2).

Setting up the various compensation and contract models is fine, but, for example, the effect on the market value of the property is forgotten, as is the loss of the option of converting from standard crops to speciality crops. Perhaps the changed work situation of the individual farmer should be considered more as well, and the changes in his daily activities when his cultivated area is reduced in size or used for different purposes.

The calculation examples are highly theoretical and do not, for example, take into consideration the changed values of the different crops, inflation, etc., which happens in actuality, but, well, it **is** a purely theoretical chapter.

The conclusions about variations between the different farms, their losses and their motivation are very daring and uncertain. It should be rewritten.

Farmers' desire to take upon themselves a change in the work they do must also be included in the assessment of farmers' willingness to convert to pesticide-free cultivation.

It may sound acceptable that society, Copenhagen Energy or the county buys the properties, but it is a political question whether this land should be converted from private to public-sector ownership.

Table 10 must be set up correctly. It is wrong to state exact, seven-digit numbers in the examples shown: the material does not permit that degree of precision. This degree of exactitude will always be taken for the truth. It is frivolous to juggle numbers this way in a certain area and make it look like a solution to an actual situation, since a field investigation would show that farmers are not motivated at all to sign the contracts described under the conditions described.

The afterword is fine, but could contain an extra remark that the entire chapter should be considered a theoretical case and has no actual value in relation to the Havelse wellfield situation.

By the way, Appendix 1 should be translated into English if it is to be part of the report.

Re Appendix 2: Economic analysis of abstraction strategies for groundwater in the Havelse Creek catchment area

The introduction to the analysis seems serious, proper and well-considered. It should be proofread.

Unfortunately, we note that the analysis makes use of the faulty data in Appendix 2, which means that the "exact" numerical values of the work are irrelevant in practice. However, the estimates could be used in the comments.

The remarks on farming contracts and set-aside programmes are fine and the most serious ones in the report, but, as mentioned above, the figures cannot be used in practice.

Afforestation is no longer relevant for farmers as an alternative occupation today.

The section on economic analysis, with its pricing of environmental effects, is excellent and adds some comments to the report that should be included, with a bit of politics added, in the decision of where the next wellfield should be, but it does not solve the issue of generally ensuring clean drinking water. However, afforestation at Græse Bakkeby sounds like the best solution for locating a new wellfield while establishing a new wellfield. This is a high-lying area as well, and thus one able to avoid pollution by surface water.

Appendix 2 should also be translated into English.

Re Appendix 3: When citizens are to be involved: From water in the basement to Bayesian networks

The issue of how much the general public should be involved in public-sector tasks in which "professionals" and specialists are also involved receives an excellent treatment in this appendix. We are very strong advocates of citizens being involved much more than normally is the case, but such involvement should involve open and adequate information, acceptance of the fact that it takes time to get people to become actively involved, and respect for the fact that citizens can contribute valuable knowledge or evaluations.

Thank you for the quote.

Appendix 3 should also be translated into English – after proofreading.

Re Appendix 4: Contribution from the Havelse wellfield citizens' group

We have no comments: it is our own contribution.

We hope that the comments above on the draft report we received will be taken seriously and utilised.

We also believe that the project participants may not have been ready until now to set up the right BBN model, and that the values achieved and ideas about the contract model are unsuitable for solving the task at hand. Only with individual agreements will it be possible to ensure clean water.

We are very sure that there is a risk that the report will be misused.

Allow us also to draw your attention to the fact that citizens with a minimum of schooling might need an explanation of foreign loan words used by "professionals" and specialists, but that the same citizens may still possess a knowledge and understanding that could

result in valuable and necessary modifications in the comments and models derived from studies of the trade literature.

The citizens' group is interested in learning how much in subsidies the EU has contributed to the Danish MERIT project and who has received these subsidies.

We expect to receive feedback on the comments above and information on the use to which they will be put.