

From: Bao Le
Sent: Monday, February 04, 2008 4:28 PM
To: 'Irle, Pat (ECY)'
Cc: Mary Mayo
Subject: RE: phone message

Hi Pat, I've attached a document that outlines the study plan outline topics in the email below and where information supporting each of these topics may be found in the two documents provided to you (2006 EES TDG Study and the IIHR TDG Model Development Study Proposal) last week. I've tried to include section references and starting page numbers. Hopefully, this will allow your engineer to go right to areas that are of most concern. I think this will also help us to identify items that may need more in depth discussion for our future meeting. Thanks. Bao

Bao Le
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From: Irle, Pat (ECY) [mailto:PIRL461@ECY.WA.GOV]
Sent: Friday, February 01, 2008 1:00 PM
To: Bao Le
Subject: RE: phone message

Sounds good!

From: Bao Le [mailto:baol@dcpud.org]
Sent: Friday, February 01, 2008 11:36 AM
To: Irle, Pat (ECY)
Cc: Shane Bickford
Subject: RE: phone message

Hi Pat, I have a suggestion that might work and save us a meeting.....in your previous email (captured below) you've provided me with a detailed outline about what your engineer would like to see. I could take this outline and specifically reference the areas (by page number and section) where he/she would be able to find this information in either the IIHR Study Proposal and/or the 2006 EES TDG Study. What we could present to him/her would be an outline that would serve as a map/reference document to finding all of the requested information along with the two reports where all the information is available. That might be more efficient than creating a new document from the two which from what we can tell would involve some pretty intensive formatting and quite a bit of extra time. I could certainly have something to you early next week to provide to your engineer. Let me know what you think. Thanks. Bao

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From: Irle, Pat (ECY) [mailto:PIRL461@ECY.WA.GOV]
Sent: Friday, February 01, 2008 10:44 AM
To: Bao Le
Cc: Shane Bickford
Subject: RE: phone message

Okay. How about if I meet with you and Shane (and Beau, to take notes and develop a document) before we head over to Olympia? Do you have time next week, perhaps later in the week?

I've attached a couple of documents that I think show what our engineer would like to see. Maybe we can create an outline based on that and pull into it the information (from existing documents) that the engineer would like to see... and reference the larger sections of the existing documents, as needed.

Thoughts?

P.S. Probably shouldn't include Denise on e-mails about the development of technical documents... Policy, yes, technical, no.

P.P.S. I have a couple of large documents I want to send as examples. However, I am going to send them separately, to see if they will get through...

From: Bao Le [mailto:baol@dcpud.org]
Sent: Tuesday, January 29, 2008 1:51 PM
To: Irle, Pat (ECY)
Cc: Shane Bickford; Mills, Denise (ECY); Merz, Jonathan (ECY); Bob Clubb
Subject: RE: phone message

Hi Pat, there has not been any changes to this proposal compared to the one submitted earlier. In discussions with IIHR earlier this week they felt that the proposal they provided should sufficiently address the requested items in the email below. Also, please find attached the 2006 Wells Project TDG Report. This report has a thorough presentation of all of the data that will be used, it's location and quality as well as the figures of the project and transect locations for calibration, etc. We discussed this report in the past but I'm providing it again as it serves as the basis in many respects of the proposed work and this report coupled with the IIHR proposal will hopefully suffice. The only area that is yet to be determined is the specific analysis scenarios (Proposed Analysis Scenarios) which will be discussed in the near future as the model calibration/verification is near complete. If you and the engineer review the IIHR proposal in combination with the attached report and have any additional questions that need to be addressed I'd be happy to set up a call with IIHR. Thanks. Bao

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From: Irle, Pat (ECY) [mailto:PIRL461@ECY.WA.GOV]
Sent: Tuesday, January 29, 2008 1:35 PM
To: Bao Le
Subject: RE: phone message

Have there been any changes to this, since the earlier one was submitted? If so, where would I/we find them...

From: Bao Le [mailto:baol@dcpud.org]
Sent: Tuesday, January 29, 2008 10:45 AM
To: Irle, Pat (ECY)
Cc: Shane Bickford; Merz, Jonathan (ECY); Mills, Denise (ECY)
Subject: RE: phone message

Hi Pat, please find attached the Wells Project TDG Study Proposal from the University of Iowa. I think that this document will meet the needs of your engineer's request with regard to the email below. If he/she has any additional questions, please let me know and I will work with Dr. Weber (University of Iowa) to address them in a timely manner. Thanks and hope all is well. Bao

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From: Irle, Pat (ECY) [mailto:PIRL461@ECY.WA.GOV]
Sent: Wednesday, January 16, 2008 2:47 PM
To: Bao Le
Cc: Shane Bickford; Merz, Jonathan (ECY)
Subject: RE: phone message

Hi, Bao - As you know, our engineer and management have approved using the model proposed by your consultant. The next step that would be most helpful to our engineer would be to receive a completed study plan on how the model is to be applied to this specific project. Some of the questions are listed below. I can help you address some up them (particularly, objectives) – and answer questions about the rest. If there is some point where the consultant really can't move forward without further discussions, we would be glad to meet. At this point, however, we expect that to occur after the study plan is close to complete.

- Project scope, objectives, and outcomes
- Brief summary of studies done to date
- Proposed analysis scenarios
- Figures of project area. Transects to which the model is to be calibrated.
- Summary of data to be used; e.g., TDG, velocity, flow, or temperature data. Depth and location of data; data quality.

- How model output will be analyzed; how determine quality/accuracy of the results.
- Model calibration and verification procedures.

Thanks,
Pat Irle
(509) 454-7864

From: Bao Le [mailto:baol@dcpud.org]
Sent: Tuesday, January 15, 2008 4:49 PM
To: Irle, Pat (ECY)
Cc: Shane Bickford
Subject: phone message

Hi Pat, I've been at Wells Dam all day so I was unable to call you back. I'll call you first thing Wednesday morning re: the IIHR comments from your engineer. Hopefully, I can be of some help but it is more likely that a sit down meeting with your engineer, other Ecology staff and Dr. Larry Weber and some of his staff would be the most productive way to address any issues, comments or concerns that Ecology staff may have. Dr. Weber is able to make a trip to Washington for such a meeting. If you and appropriate staff have any days in mind, I think it would be great if we could identify potential dates that would work. Please let me know what your thoughts are. Thanks. Bao

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**Total Dissolved Gas Model Development
Wells Hydroelectric Project
FERC Project No. 2149**

PROJECT SCOPE, OBJECTIVES, AND OUTCOMES

In the “Proposal for TDG Modeling for the Tailrace of Wells Dam,” submitted by IIHR, University of Iowa, they briefly discuss the scope, objective and desired outcome in Section 1 (pgs. 1-2).

BRIEF SUMMARY OF STUDIES DONE TO DATE

There are various areas within the TDG proposal submitted by IIHR that identify studies done to date and relevant experience of the researchers. Several of the areas that address studies done to date are found:

- Section 6: Summary Statement (pg. 41)
- Section 8: Relevant IIHR Publications
- Section 9: Resumes of both principals at IIHR
- Section 3.3 (pg.19-32) Discuss in detail the work done at Wanapum Dam

PROPOSED ANALYSIS SCENARIOS

As we discussed previously, the specific analysis scenarios after the model has been calibrated/verified have yet to be determined. Sections 4.3.3 and 4.3.5 on pg. 38 of IIHR’s proposal detail the proposed number of model runs but do not present specifics.

To better understand the “likely” types of operational scenarios that will be tested, please refer to Section 6: Conclusions of the 2006 EES Wells Project TDG Assessment (pg. 83). In this section, there is a brief summary of the results including the several operational scenarios identified that appeared to minimize the production of TDG at Wells Dam. The numerical model proposed by IIHR will likely assist in verifying the utility of these specific operations to reduce TDG production at Wells Dam toward meeting compliance with the WA State Water Quality Standard.

FIGURES OF PROJECT AREA AND TRANSECT LOCATIONS FOR DATA

To better understand the geographic scope of the Wells Project and the study area, please refer to several figures included in the 2006 EES Wells Project TDG Assessment:

- Figure 1.1-1 Regional Map with Project Location (pg.2)
- Figure 1.1-2 Cross Section of a Spillway Unit (pg.3)
- Figure 1.1-3 Wells Project Turbine and Spillway Configuration (pg.4)

- Figure 3.0-1 Study area for the 2006 Wells Project TDG Study (pg.10)
- Figure 4.1-1 Station Deployment Locations for FB and TW 1 and 2 transects (pg. 13)
- Figure 4.1-2 Station Deployment Location for TW3 transect (pg. 14)
- Figure 4.3-1 Bathymetry and Station Locations for Hydrodynamic Data (pg. 21)

SUMMARY OF DATA TO BE USED

Please review the 2006 EES Wells Project TDG Assessment for an overview of the data that will be used for the TDG model development. Specifically, review Section 5.0 Results (pg.25), Appendix C TDG Test Treatment Results of the report.

MODEL OUTPUT ANALYSIS

Please review the IIHR TDG Proposal, Section 3.2 (pg. 11) for a detailed description of the proposed IIHR TDG model. This section discusses free surface modeling and bubble transport. Also, see pgs. 21-32, Numerical Results and examples of typical outputs of TDG concentrations and hydrodynamics produced for the Wanapum Dam modeling exercise. These example outputs will likely be similar to what will be provided to Douglas PUD. Pages 26-32 summarize the validation of the model output (using Wanapum as an example) to ensure quality and accuracy of results.

MODEL CALIBRATION AND VERIFICATION PROCEDURES

Please review sections relevant to the model output analysis (above) for more detail related to model validation. Also, please refer to Section 4.3.2 Model Calibration and Valication (pg. 37-38) of the IIHR TDG Proposal for more information on the calibration process.