Susitna-Watana Hydroelectric Project Document
ARLIS Uniform Cover Page

Title: Geomorphology study, Study plan Section 6.5 : Initial study report -- Part B: Supplemental information (and errata) to Part A (February 3, 2014 Draft Initial Study Report)	**SuWa 223**
Author(s) – Personal:	
Author(s) – Corporate: Tetra Tech	
AEA-identified category, if specified: Initial study report	
AEA-identified series, if specified:	
Series (ARLIS-assigned report number): Susitna-Watana Hydroelectric Project document number 223	**Existing numbers on document:**
Published by: [Anchorage : Alaska Energy Authority, 2014]	**Date published:** June 2014
Published for: Alaska Energy Authority	**Date or date range of report:**
Volume and/or Part numbers:	**Final or Draft status, as indicated:**
Document type:	**Pagination:** 3 p.
Related work(s): The following parts of Section 6.5 appear in separate files: Part A ; Part B ; Part C ; Appendices ; Figures.	**Pages added/changed by ARLIS:**
Notes:	

All reports in the Susitna-Watana Hydroelectric Project Document series include an ARLIS-produced cover page and an ARLIS-assigned number for uniformity and citability. All reports are posted online at http://www.arlis.org/resources/susitna-watana/

ARLIS
Alaska Resources Library & Information Services

SUSITNA-WATANA HYDRO

Susitna-Watana Hydroelectric Project
(FERC No. 14241)

Water Quality Modeling Study
Study Plan Section 5.6

Initial Study Report
Part B: Supplemental Information (and Errata) to Part A (February 3, 2014 Draft Initial Study Report)

Prepared for

Alaska Energy Authority

SUSITNA-WATANA HYDRO

Clean, reliable energy for the next 100 years.

Prepared by

June 2014

PART B: SUPPLEMENTAL INFORMATION (AND ERRATA) TO PART A (FEBRUARY 3, 2014 DRAFT INITIAL STUDY REPORT)

Part A Reference	Description
Page 4, Paragraph 4, sentence 1	To meet the Study Plan objectives, the pre-project river upstream of the dam site will be modeled using imagery shorelines and LiDAR bed elevations.
Page 7, Paragraph 2 (after first set of bullets)	These categories of parameters represent 14 state variables. The standard set of sediment organic and nutrient variables in the diagenesis module will be used. Reaction rates and particulate settling velocity will be based on analysis of observational data and literature values for high latitude reservoirs and rivers. The primary reaction rates and parameters which can be adjusted during calibration include: • Optimum growth temperatures and reference growth rates of phytoplankton species and periphyton • Half saturation levels for light and nutrient limitations on phytoplanktos and periphyton growth • Mortality and predation rates for phytoplankton and periphyton and settling rates for phytoplankton • Reareation rate for dissolved oxygen • Optimum decay temperature and reference decay rates for dissolved and particulate organic carbon • Optimum decay temperature and reference decay rates for dissolved and particulate organic nitrogen • Nitrification rate relating Nitrate and ammonia nitrogen • Optimum decay temperature and reference decay rates for dissolved and particulate organic phosphorous • Partition coefficient relatingdissolved and particulate inorganic phosphorous • Settling velocities for phytoplankton species and dissolved organic matter.
Page 7 end of paragraph 2, after "sediment transport model component" add:	organic carbon concentrations will be provided by the water quality model The primary reaction parameters in the mercury cycling model include: • Methylation and demethylation rates • Oxidation and reduction rates

	• Volatilization rate and equilibrium concentration • Photoreduction rate • Partition coefficients And will be based on literature values. Like the reservoir nutrient cycling model, the mercury model cannot be calibrated: however sensitivity simulation will be conducted to span the range of realistic parameters.
Page 7, Section 5.2, Paragraph 1, Line 8	"topographic layer" should be changed to "topographic data"
Page 7, Section 5.2, Add a new paragraph after paragraph 2:	Two three-year reservoir model simulations for 1974-1976 and 1979-1981 were conducted for the Proof of Concept Technical Work Group meetings (Tetra Tech, 2014a). Hydrodynamic and temperature were simulated to show how model results are transferred to other study components. Although the results should not be considered as representative of future conditions in the reservoir, they indicated the model to be robust and provide physically realistic simulation of water surface elevation, velocity and temperature.
Page 8, Section 5.3, Add a new paragraph after paragraph 2:	Three-year river model simulations for 1974-1976 and 1979-1981 were conducted for the Proof of Concept Technical Work Group meetings (Tetra Tech, 2014b). Two pair of simulations were for without project conditions and two pair were for post project conditions. For the post project simulations, upstream boundary flow and temperature were provided by reservoir model output. Hydrodynamic and temperature were simulated to show how model results are transferred to other study components. Although the results should not be considered as representative of future conditions in the river they indicated the riverine model to be robust and provide physically realistic simulation of water surface elevation, velocity and temperature.
Page 8, Section 5.4, Line 5, replace with: (to add FA 128)	FA-104 (Whiskers Slough), FA-113 (Oxbow 1), FA-115 (Slough 6A) and FA_128 (Slough 8A)
Page 8, Section 5.4, Add a 2nd paragraph after the first paragraph	Using results for the three-year river model simulations for 1974-1976 and 1979-1981 conducted for the Proof of Concept Technical Work Group meetings, four simulations of the periods May through October 1979 and 1981 for without project and post-project conditions were conducted (Tetra Tech, 2014c). Hydrodynamic and temperature were simulated to show how model results are transferred to other study components. Although the results should not be considered as representative of future conditions in the river they indicated the riverine focus area model to be robust and provide physically realistic simulation of water surface elevation, velocity

	and temperature.
Page 9. Section 7. New paragraph added to the end of the Discussion:	Modeling tasks are ongoing through 2015 as the model is further calibrated and incoming data provides higher accuracy. It was discussed in the April 15 -17, 2014 POC meeting that if water quality monitoring models show no change to parameters during pre and post dam conditions, water quality and geomorphology modeling will not be continued below PRM 29.9. This decision was based on the fact that the majority of the flow in the lower river comes from three main tributaries (Chulitna, Yentna, and Deshka Rivers) rather than the mainstem Susitna.
Page 10, Literature Cited section, add additional citations below the last Tetra Tech citation.	Tetra Tech. 2014a. Reservoir Water Quality Modeling. PowerPoint Presentation, Riverine Modeling Proof of Concept Meeting on April 15-17, 2014. Prepared for Alaska Energy Authority, Anchorage, Alaska. Susitna-Watana Hydroelectric Project, FERC No. P-14241. http://www.susitna-watanahydro.org/meetings/past-meetings/ Tetra Tech. 2014b. Riverine Water Quality Modeling. PowerPoint Presentation, Riverine Modeling Proof of Concept Meetings on April 15-17, 2014. Prepared for Alaska Energy Authority, Anchorage, Alaska. Susitna-Watana Hydroelectric Project, FERC No. P-14241. http://www.susitna-watanahydro.org/meetings/past-meetings/ Tetra Tech. 2014d. Riverine Water Quality Modeling FA-128. PowerPoint Presentation, Riverine Modeling Proof of Concept Meetings on April 15-17, 2014. Prepared for Alaska Energy Authority, Anchorage, Alaska. Susitna-Watana Hydroelectric Project, FERC No. P-14241. http://www.susitna-watanahydro.org/meetings/past-meetings/