

Task 1 QA Evaluation of Plant Site GoldSim Model													
Model Name: NorthMet_PlantSite_Base_v01													
Workplan File: Water Modeling Workplan - Plant Site v5 APR2012.pdf													
Evaluation Performed by Interrallogic, Inc.													
May 2012													
Description	Workplan Tables		GoldSim Model		GoldSim Output		Comments	Barr Response	Reviewer Comments Regarding Barr Response				
	Value	Units	Value	Units	Value	Units							
<b>Table 1-1, Page 1:</b>													
Surface_Constant_Standards(Hardness)	500				(missing)		Listed as 500 mg/L in Table 1-2, blank in model output table	Output added to the model so that the model output tables will not be blank	Issue appears to be adequately addressed pending review of updated model outputs and model documentation				
Ground_Primary_Standards(Hardness)	999999				(missing)		Listed as 999999 in Table 1-4, blank in model output table	Output added to the model so that the model output tables will not be blank	Issue appears to be adequately addressed pending review of updated model outputs and model documentation				
Ground_Secondary_Standards(Hardness)	999999				(missing)		Listed as 999999 in Table 1-4, blank in model output table	Output added to the model so that the model output tables will not be blank	Issue appears to be adequately addressed pending review of updated model outputs and model documentation				
<b>Table 1-1, Page 2:</b>													
<i>(no issues found)</i>													
<b>Table 1-1, Page 3:</b>													
Table 1-5							Ambiguity as to which values are actually used in the model. See general comments for more info.	Headings changed to match the inputs used in the model.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation				
Table 1-6							Recommend column headings more similar to variable names	Headings changed to match the inputs used in the model.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation				
Table 1-6							Example of over-rounding of values shown in supporting tables - this is an issue impacting most supporting tables. Comparison of exact input values between supporting tables and model output was not possible due to truncation of significant figures.	Values in Excel input files rounded so that the value displayed in the work plan tables (PDF) is that ACTUAL value in the Excel input files, showing all significant digits.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation				
Table 1-7							Example of consequences of too much rounding: Values for TI at MLC-3 and MLC-4 shown as 0 in Table 1-7 but are actually 0.000001 in model output	Values in Excel input files rounded so that the value displayed in the work plan tables (PDF) is that ACTUAL value in the Excel input files, showing all significant digits.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation				
Mine_Site_Flow_Rate							Min and max input values for truncated normal distribution not shown on Table 1-8	Min and Max added to Table 1-1.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation				
Mine_Site_Conc							Min and max input values for truncated normal distribution not shown on Table 1-9 or 1-10	Min and Max values added to Table 1-1 to avoid creating additional tables.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation				
Mine_Site_Conc							Table 1-1 is missing a reference to Table 1-10 to show the standard deviation values used in the distribution. See general comments regarding the suggestion to incorporate more detailed documentation of the exact input vectors used to define uncertain variable distributions as a way to avoid this problem.	Table 1-1 changed to reference both Table 1-9 and Table 1-10.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation				
<b>Table 1-1, Page 4:</b>													
<i>(no issues found)</i>													
<b>Table 1-1, Page 5:</b>													
NM_Files_Release							Variable name as shown not found in model - suggest showing specific variable names used for each constituent on supporting tables to eliminate any ambiguity as to which model elements the table numbers are used.	Model changed to eliminate the ambiguity between work plan and model	Issue appears to be adequately addressed pending review of updated model outputs and model documentation				
NM_Course_Release							Variable name as shown not found in model - suggest showing specific variable names used for each constituent on supporting tables to eliminate any ambiguity as to which model elements the table numbers are used.	Model changed to eliminate the ambiguity between work plan and model	Issue appears to be adequately addressed pending review of updated model outputs and model documentation				
NM_Content		mg/kg					Units on Table 1-16 expressed as "ppm". Although functionally equivalent, units should be expressed consistently throughout the project. The use of "ppm" is often discouraged.	Work plan changed to use "mg/kg" instead of "ppm" since ppm is discouraged.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation				
LTVSMC_Content: Alkalinity	1.00E+20				1.00E+12		Assumed high values shown on Table 1-22 do not match values reported by model	Model updated to match work plan table.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation				
LTVSMC_Content: Cl	1.00E+20				1.00E+12		Assumed high values shown on Table 1-22 do not match values reported by model	Model updated to match work plan table.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation				
LTVSMC_Content: F	1.00E+20				1.00E+12		Assumed high values shown on Table 1-22 do not match values reported by model	Model updated to match work plan table.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation				
<b>Table 1-1, Page 6:</b>													
Size_factor(Maximum)	N/A		1e10				Table 1-1 does not show a max value for a truncated normal distribution	Work plan Table 1-1 updated to include 1e10 as maximum.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation				
<b>Table 1-1, Page 7:</b>													
Dam_WT_Depth		m				ft	Table 1-1 should show units as ft (as in Table 1-29 and model output)	Table 1-1 corrected.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation				
Beach_WT_Depth		m				ft	Table 1-1 should show units as ft (as in Table 1-29 and model output)	Table 1-1 corrected.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation				

Description	Workplan Tables		GoldSim Model		GoldSim Output		Comments	Barr Response	Reviewer Comments Regarding Barr Response
	Value	Units	Value	Units	Value	Units			
<b>Table 1-1, Page 8:</b>									
Pond_Bottom_Area (and other variables)							Time series output expressed as statistical summaries instead of values	Model will output actual values from the first realization rather than summary statistics.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Table 1-31							Model variable names not clearly related to Table 1-31 column headings	Headings changed to match the inputs used in the model.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Table 1-32							Model reports identical names for variables shown in Table 1-32	Model variable names updated and work Plan headings updated so that both match.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
<b>Table 1-1, Page 9:</b>									
Cell_Areas		acre					Units inconsistent between Table 1-1 and Table 1-33 (uses sq. meters)	Table 1-1 changed so that units are m2.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Table 1-35							Numerous additional examples of over-rounding of values in supporting tables resulting in incorrect presentation of input values and inability to check all significant figures.	Values in Excel input files rounded so that the value displayed in the work plan tables (PDF) is that ACTUAL value in the Excel input files, showing all significant digits.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Table 1-37							Not clear where 4th group of columns in Table 1-37 (Pond) is output by model for QA purposes - values not confirmed	Overhaul of Excel output files will make this location more clear so that values can be confirmed the next time.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Table 1-39							Numerous additional examples of over-rounding of values in supporting tables resulting in incorrect presentation of input values and inability to check all significant figures.	Values in Excel input files rounded so that the value displayed in the work plan tables (PDF) is that ACTUAL value in the Excel input files, showing all significant digits.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Table 1-39	"Dams"				"Other"		Values for Seepage_Direction(Dams) in Table 1-39 shown in model output file as Seepage_Direction(Other). Should be greater similarity between inputs tables and names of model variables	Headings changed to match the inputs used in the model.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Initial_Pond_Concs_2E (Table 1-44): Ba	0.25						0.032	Work Plan is correct; model updated.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Initial_Pond_Concs_2E (Table 1-44): K	12						11.6	Work Plan is correct; model updated.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Initial_Pond_Concs_2E (Table 1-44): Pb	0.0016						0.0025	Work Plan is correct; model updated.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Initial_Pond_Concs_2E (Table 1-44): TI	0.00017						0.0002	Work Plan is correct; model updated.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Initial_Pond_Concs_2E (Table 1-44): Zn	0.013						0.015	Work Plan is correct; model updated.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Initial_Pond_Concs_1E (Table 1-44): Ba	0.25						0.032	Work Plan is correct; model updated.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Initial_Pond_Concs_1E (Table 1-44): Mg	47						46	Work Plan is correct; model updated.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Initial_Pond_Concs_1E (Table 1-44): Pb	0.0016						0.0003	Work Plan is correct; model updated.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Initial_Pond_Concs_1E (Table 1-44): TI	0.00017						0.0002	Work Plan is correct; model updated.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Initial_Pond_Concs_1E (Table 1-44): Zn	0.013						0.015	Work Plan is correct; model updated.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
<b>Table 1-1, Page 10:</b>									
<i>(no issues found)</i>									
<b>Table 1-1, Page 11:</b>									
Babbitt_Effluent_Conc							Although listed as a model variable, a unique element with this name is not found in the model. As mentioned in the Description, Babbitt_WWTP uses SW_RO_Concentration as an input. Perhaps should not be listed as a separate uncertain variable, but instead shown as deterministic values linked to SW_RO_Concentration so it does not give the appearance of additional uncertainty.	Variable removed from Table 1-1.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Babbitt_Effluent_Conc		mg/L		ug/L			Units shown in table 1-1 not consistent with Table 1-6 and units in model	Variable removed from Table 1-1.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
PRB_Efficiency		%		%/day			Units shown in Table 1-1 not consistent with Table 1-45 and units in model	Model units are correct; work plan units and definition updated for more clarity.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
<b>Table 1-1, Page 12:</b>									
Table 1-46, Variable Name: L							Variable name shown on Table 1-46 (L) doesn't match variable name in Table 1-1 (La) and model output (La)	Work plan table 1-46 updated so that the variable name matches the model.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Table 1-46, Variable Name: Init_Grad	(positive values)			(negative values)				Negative values are correct; work plan Table 1-46 updated.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Table 1-47, Constituent: Sb				(not reported - "uncertain" variable)			Suggest that all uncertain variables and distribution characteristics be listed on Table 1-1 and not just on supporting tables	All input variables from Table 1-47 (3 constant deterministic and 1 uncertain) added to Table 1-1 to replace input variable Kd. Model updated accordingly.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Table 1-49	".."			"0"			Table 1-49 shows some areas as "..", model output reports as "0". Might consider alternate means of representing non-existent values (i.e. -999999 for example) here and elsewhere.	Replaced ".." with 0 in Table 1-49.	Potentially okay unless the use of "0" to represent non-existent values could lead to interpretation issues by users of model
<b>Table 1-1, Page 13:</b>									

Description	Workplan Tables		GoldSim Model		GoldSim Output		Comments	Barr Response	Reviewer Comments Regarding Barr Response
	Value	Units	Value	Units	Value	Units			
Watershed_Yield							Although it might function as an uncertain variable when combined with additional model elements, the model element referenced by this name is a deterministic lookup table not an uncertain element.	Changed to a "deterministic, user defined lookup table by month".	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Expected_Toe_Conc		mg/L		ug/L		ug/L	Units shown in table 1-1 not consistent with Table 1-54 and units in model	Table 1-1 updated to match Table 1-54 and model.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
<b>Table 1-1, Miscellaneous</b>									
Perc_Ntoe_MLC3							Variable name not found in Table 1-1	Variable added to Work plan Table 1-1.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
<b>General Comments</b>									
Significant Figures							General comment was that the was error between the number of digits IN the work plan tables and SHOWN in the work plan tables. The model was reporting many more digits than was shown in the work plan tables so the numbers could not be exactly matched.	The values shown in the work plan tables will exactly represent the value imported into and used in GoldSim. There will be no difference due to rounding.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Reporting of statistical summaries rather than actual values							Comment was that for some inputs, a statistical summary was exported rather than an actual value.	This is corrected by changing what is exported. For those time series elements where this was done, the actual values from the first realization only will be exported so that what is exported is not a statistical summary, but is also not many realizations of the same exact same values.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Inconsistency and Ambiguity between work plan data descriptions and variable names in the model							Ambiguity made it difficult to do the QA/QC because some variable names did not match up exactly and some judgement had to be used. In other cases, there was the same variable name in the model representing two different inputs.	These will be corrected by making the link between work plan and model much more clear and accurate, removing duplicate names, and using actual variable names in the work plan headings rather than descriptions.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Documentation of vector based inputs to uncertain elements							Ambiguity when vectors are used as input to uncertain elements. The work plan is not clear which columns or values are the actual inputs.	These will be corrected by making the link between work plan and model much more clear and accurate, removing duplicate names, and using actual variable names in the work plan headings rather than descriptions.	Issue appears to be adequately addressed pending review of updated model outputs and model documentation
Suggestion to streamline future QAQC							It was very difficult to match up the actual work plan to the tables which contained exported data and information. Force GoldSim to export tables which closely resemble the work plan so that QAQC is easier.	This will be done for the next QAQC iteration so that the review is quicker and easier.	Please feel free to contact reviewer when making these modifications if there are any questions