

Task I 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 Elements		GoldSim Output Tables		Comments
	Value	Units	Value	Units	Value	Units	
Table 1-1, Page 1:							
Surface_Constant_Standards(Hardness)	500				(missing)		Listed as 500 mg/L in Table 1-2, blank in model output table
Ground_Primary_Standards(Hardness)	999999				(missing)		Listed as 999999 in Table 1-4, blank in model output table
Ground_Secondary_Standards(Hardness)	999999				(missing)		Listed as 999999 in Table 1-4, blank in model output table
Table 1-1, Page 2:							
<i>(no issues found)</i>							
Table 1-1, Page 3:							
Table 1-5							Ambiguity as to which values are actually used in the model. See general comments for more info.
Table 1-6							Recommend column headings more similar to variable names
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.
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
Mine_Site_Flow_Rate							Min and max input values for truncated normal distribution not shown on Table 1-8
Mine_Site_Conc							Min and max input values for truncated normal distribution not shown on Table 1-9 or 1-10
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, Page 4:							

Description	Workplan Tables		GoldSim Model Elements		GoldSim Output Tables		Comments
	Value	Units	Value	Units	Value	Units	
(no issues found)							
Table 1-1, Page 5:							
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.
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.
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.
LTVSMC_Content: Alkalinity	1.00E+20				1.00E+12		Assumed high values shown on Table 1-22 do not match values reported by model
LTVSMC_Content: Cl	1.00E+20				1.00E+12		Assumed high values shown on Table 1-22 do not match values reported by model
LTVSMC_Content: F	1.00E+20				1.00E+12		Assumed high values shown on Table 1-22 do not match values reported by model
Table 1-1, Page 6:							
Size_factor(Maximum)	N/A		1e10				Table 1-1 does not show a max value for a truncated normal distribution
Table 1-1, Page 7:							
Dam_WT_Depth		m				ft	Table 1-1 should show units as ft (as in Table 1-29 and model output)
Beach_WT_Depth		m				ft	Table 1-1 should show units as ft (as in Table 1-29 and model output)
Table 1-1, Page 8:							
Pond_Bottom_Area (and other variables)							Time series output expressed as statistical summaries instead of values
Table 1-31							Model variable names not clearly related to Table 1-31 column headings
Table 1-32							Model reports identical names for variables shown in Table 1-32
Table 1-1, Page 9:							
Cell_Areas		acre					Units inconsistent between Table 1-1 and Table 1-33 (uses sq. meters)
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.

Description	Workplan Tables		GoldSim Model Elements		GoldSim Output Tables		Comments
	Value	Units	Value	Units	Value	Units	
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
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.
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
Initial_Pond_Concs_2E (Table 1-44): Ba	0.25				0.032		
Initial_Pond_Concs_2E (Table 1-44): K	12				11.6		
Initial_Pond_Concs_2E (Table 1-44): Pb	0.0016				0.0025		
Initial_Pond_Concs_2E (Table 1-44): Tl	0.00017				0.0002		
Initial_Pond_Concs_2E (Table 1-44): Zn	0.013				0.015		
Initial_Pond_Concs_1E (Table 1-44): Ba	0.25				0.032		
Initial_Pond_Concs_1E (Table 1-44): Mg	47				46		
Initial_Pond_Concs_1E (Table 1-44): Pb	0.0016				0.0003		
Initial_Pond_Concs_1E (Table 1-44): Tl	0.00017				0.0002		
Initial_Pond_Concs_1E (Table 1-44): Zn	0.013				0.015		
Table 1-1, Page 10:							
<i>(no issues found)</i>							
Table 1-1, Page 11:							
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.
Babbitt_Effluent_Conc		mg/L		ug/L			Units shown in table 1-1 not consistent with Table 1-6 and units in model
PRB_Efficiency		%		%/day			Units shown in Table 1-1 not consistent with Table 1-45 and units in model

Description	Workplan Tables		GoldSim Model Elements		GoldSim Output Tables		Comments
	Value	Units	Value	Units	Value	Units	
Table 1-1, Page 12:							
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)
Table 1-46, Variable Name: Init_Grad	(positive values)				(negative values)		
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
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.
Table 1-1, Page 13:							
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.
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, Miscellaneous							
Perc_Ntoe_MLC3							Variable name not found in Table 1-1