QUANTIL

Probabilistic risk & project management

VERIFICATION NOTE

Independent computational verification

Schedule Risk Analyzer Pro, demo case Hollin Sands Wind Phase 2

Version 2.1 | 2026-10-27 | original verification 2026-07-15

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1. Purpose and approach

This note documents an independent re-implementation of the computational core, used to verify that the tool computes what it claims. The deterministic CPM (forward pass over the FS / SS / FF / SF network with lags and working-day calendars including holiday lists) and the full Monte Carlo simulation (Beta-PERT durations, Bernoulli risk occurrence with Beta-PERT impacts distributed over activities via the risk map) were rebuilt from scratch in Python 3.11, sharing no code with the VBA engine. Inputs were read directly from the shipped workbook; outputs were compared with the values the tool wrote to 20_CPM_DET, 05_ACTIVITIES and the 10,000 stored finish dates on 21_MC_ENGINE (seed 20260421). Two scripts ship in folder 08 so any reviewer can repeat the comparison: Quantil_SRA_Verification_Script.py (CPM and Monte Carlo) and Quantil_SRA_P6_Import_Reference_Script.py (the P6 import rules); README_Python_Scripts.txt explains requirements, usage and expected output. On 2026-10-27 both were re-run against the final package 2.1 workbooks with the results in section 2.

2. Results

Metric	Tool (VBA, 10,000 iterations)	Rebuild (Python, 5,000 iterations)	Difference
Deterministic finish	909 days, 2028-10-26	909 days, 2028-10-26	0
Critical activities (deterministic)	21	21	0
Activities / relations	45 / 57	45 / 57	0
Per-activity ES / EF	n/a	44 of 45 exact; 1 ES differs 1 day (FF back-calculation); all EF exact	see 4
P50 total duration	1,099 days	1,099 days	0
P80 total duration	1,169 days	1,167 days	2 days

Metric	Tool (VBA, 10,000 iterations)	Rebuild (Python, 5,000 iterations)	Difference
P90 total duration	1,208 days	1,204 days	4 days
Mean total duration	1,102 days	1,101 days	1 day

Differences of 2 to 4 days on P80 and P90 fall within Monte Carlo sampling error at 5,000 iterations (standard error about 2 to 3 days) and different random number generators.

3. Verdict

The deterministic scheduling engine reproduces exactly. The Monte Carlo engine reproduces within sampling error on all reported percentiles. The engine computes what the documentation describes: Beta-PERT three-point sampling, risk mapping onto activity durations, CPM propagation per iteration and working-day calendar conversion anchored on each activity's early start.

4. Observations

- **Holiday read range.** The original engine read holidays from row 13 of 07_CALENDARS while the list starts at row 12. Resolved in engine v1.1; no shipped result was affected (the row-12 holiday lies before the demo start).
- **FF early-start convention.** For one activity with an FF predecessor the early start differs by one day from strict working-day anchoring: A007 in the Standard demo, and A006 (ENG1070, FF from ENG1050) in the Professional DHN-380 case. Early finish, critical-path floats and the project finish are unaffected in both.
- **Professional edition (DHN-380, durations only, seed 20260421).** Deterministic finish 618 days (2028-07-12) in both tool and rebuild; 44 of 45 early starts exact (A006, see above), all early finishes exact. P50 / P80 / P90: tool 652 / 668 / 676 days, rebuild 652 / 668 / 675 days, within sampling error. The P6 reference script reproduces the import of DHN-380_test.xer row by row (45 activities, 59 relations, 9 dropped, 16 WBS rows).
- **Duration anchoring.** The working-day to calendar-day conversion is correctly anchored on each activity's early start.

5. Status in package 2.1

Change since the verification	Effect on results
Engine v1.1 holiday fix	None on the demo; correct holiday handling for lists starting at row 12
macOS workbooks: Scripting Dictionary replaced by the clsQDict class	None: the HSW reference run reproduces exactly (deterministic 2028-10-26, P50 2029-05-04, P80 2029-07-13, P90 2029-08-21). The verification script, re-run on 2026-10-27 against the final Windows and macOS Standard workbooks, gives the same results as in section 2
Charts v1.4.2, Control Center 2.0, hidden tabs, navigation	None: presentation only
Activity and risk count formulas on the Control Center	Counts now correct (45 / 25); simulation unaffected
Package 2.1: charts v1.4.2 in the Windows Standard workbook, English number text, P6 import in English, DEMO edition	None on the calculation: Standard 2028-10-26 / P80 2029-07-13 and Professional 2028-07-12 / P80 2028-08-31 reproduce exactly on Windows and macOS

6. Scope and independence

The verification covers the computational core (CPM, Monte Carlo, calendars, risk mapping) on the shipped demo case. It does not cover chart rendering, the report generators or user-modified workbooks. The rebuild was produced separately from the VBA development and shares no code with it. It is a computational reproduction, not a formal software audit.

Scope limitation: the Python rebuild samples durations and risks independently; it does not model the correlations on 10_CORR. The Standard reference case applies correlations between some activities, so the close agreement above also shows that their effect on the reported percentiles is small in this case. The correlation step itself is not verified independently.