SECO Generic User Input & Validation Guide

Step-by-step operating procedure for populating, checking, qualifying, and freezing a case workbook

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Core principle — Users enter assumptions only on designated input surfaces. Calculated timing, production, revenue, tax, DCF, bridge, and validation outputs must be generated by formulas and governed calculation logic—not manually overwritten.

Scope. This manual is intentionally generic. It applies to new company cases, new sites, counterfactual locations, schedule variants, policy overlays, and scenario analyses built on the SECO architecture. Company-specific calibration guides should supplement—not replace—this operating procedure.

Audience. Analysts, model owners, reviewers, and users who need to enter case assumptions, run Excel recalculation, diagnose validation failures, compare scenarios, and prepare a case for release.

1. End-to-End Workflow

1. Create a working copy of the governed workbook.
2. Select or confirm the case lens / scenario definition.
3. Populate inputs in dependency order.
4. Recalculate in native Excel.
5. Validate timing, production, revenue, cost, tax, policy, and DCF chains.
6. Confirm resource and investor bridges close.
7. Run the formal hard-test / scenario qualification campaign when required.
8. Restore the base after scenario work.
9. Save, close, reopen, recalculate, and freeze the release candidate.
10. Record the release hash and supersession metadata.

Do not skip dependency order — A downstream number can appear reasonable while being fed by stale, incomplete, or inconsistent upstream inputs. Validation should follow the same dependency direction as the model.

2. Before You Enter Any Inputs

11. Always create a copy of the latest governed or frozen base workbook. Never enter new case data directly into a released file.
12. Use a clear working filename, for example: SECO - [Company] [Case Type] Working Candidate YYYYMMDD.xlsx.
13. Open the workbook in native Microsoft Excel whenever possible.
14. Confirm Formulas → Calculation Options → Automatic.
15. If Excel reports that it repaired workbook content, stop and investigate before entering data.
16. Do not unprotect calculated sheets simply to alter a displayed result.
17. Save the working copy once before making any edits.

Frozen means frozen — A frozen release is an audit artifact. Any change—even a seemingly harmless input correction—creates a new candidate and requires requalification.

3. Understand the Input Architecture

SECO cases are populated through designated user-input and governance surfaces. Exact sheet names can vary by implementation, but the architecture should distinguish user inputs from calculated outputs.

Surface	User action	Rule
User input / assumption sheet	Enter values, status, source, classification, notes	Primary editable surface
Run values / mapped inputs	Review propagation	Do not hard-code unless explicitly governed
Timing / production / revenue / cost engines	Inspect calculated results	Calculated only
Tax / policy sheets	Inspect results and governed policy inputs	Do not force desired outputs
DCF / dashboard / decomposition	Review headline economics and closure	Never overwrite to make a bridge close
Validation / run-state surfaces	Read qualification state	Do not manually type PASS / READY

Best practice: Locate inputs by Variable ID + Location + Phase/Stage + Input Type rather than relying only on remembered row numbers. Row positions can shift across releases; governed IDs should not.

4. Input Status and Provenance

Every material input should carry an explicit status or provenance. The exact vocabulary can differ by implementation, but the semantics should remain consistent.

Example state	Meaning
PROVIDED / USER_BASE	Explicitly supplied or adopted case assumption
DERIVED	Computed from another governed input
CALIBRATED	Estimated through a calibration procedure
OPEN	Intentionally not supplied, unresolved, or not applicable
VALIDATION / CONTROL	Used for governance rather than economics

Blank is not zero — A blank/OPEN value means "not supplied / not applicable / unresolved." A numeric zero means the assumption is explicitly zero. Do not replace unknowns with zero just to remove a warning.

5. Recommended Input-Entry Sequence

1. Case definition and comparison lens
2. Calendar, milestones, and HVM/operation start targets
3. Capacity and phase scale
4. Utilization
5. Yield / effective yield / productivity
6. Product mix, ASP, revenue lag, and revenue assumptions
7. Physical CapEx
8. Operating resources and OpEx
9. Lifecycle / sustaining / replacement capital
10. Private soft resources, land, and public enabling resources
11. Tax assumptions
12. Policy assumptions and dated policy cash flows
13. Recalculation and validation

6. Case Definition and Comparison Lens

- Confirm the case type before entering detailed inputs. Examples include natural schedule, matched milestone/HVM, matched output, policy-off, policy-on, stress, or other explicit counterfactuals.
- Write the comparison rule in plain language: what is held constant, what is allowed to differ, and why.
- If two cases are meant to be paired, identify the assumptions that must remain identical across them.
- Do not assume that changing one scenario selector automatically rematerializes every required timing or policy input.

7. Calendar, Milestones, and Timing

- Enter or confirm investment-decision date, preconstruction duration, construction duration, tool install/qualification duration, production start, HVM, and other governed milestones.

- Distinguish physical duration assumptions from calendar placement. In a matched-milestone case, activities may shift on the calendar without changing their underlying duration.
- Check that each phase/stage follows a feasible sequence and that no required start date falls outside the modeled horizon unless intentionally allowed.
- For paired cases, verify that expected timing differences arise only from the counterfactual design.

8. Capacity and Scale

- Enter installed capacity by location and phase/stage.
- Enter pilot/initial-line logic only when explicitly modeled.
- For matched comparisons, keep the capacity path aligned unless capacity itself is the scenario variable.
- After entry, verify that capacity does not activate before the intended production window.

9. Utilization, Yield, and Productivity

- Enter utilization at HVM/start, steady-state utilization, ramp duration, and any approved stress overlays.
- Enter yield or effective-yield assumptions using the model's intended representation; do not mix raw defect density with derived yield indices unless the conversion is governed.
- For matched comparisons, align phase-age utilization and yield curves unless the scenario explicitly tests those mechanisms.
- Check endpoints and intermediate months, not only the steady-state value.

10. Product Mix, ASP, and Revenue Lag

- Enter product/node/service mix, ASP or revenue-rate assumptions, and revenue-recognition lag.
- Use identical product-quality assumptions across locations when the purpose is to isolate location economics.
- Confirm that revenue cannot occur before eligible output and that the lag is applied consistently.
- Avoid isolated hard-coded monthly revenue values that break the governed time series.

11. Physical CapEx

- Populate governed physical-capital categories such as building, process infrastructure, equipment, campus/shared infrastructure, and other approved categories.
- Distinguish economic/real alignment from nominal-dollar equality. If capital is spent at different dates, inflation/escalation can legitimately produce different nominal outlays.
- Check monthly schedules against phase totals and ensure no unexpected negative or out-of-window capital flows.
- Do not manually edit lifecycle or DCF sheets to compensate for an incorrect CapEx input.

12. Operating Resources and OpEx

- Populate labor, electricity, water, materials, maintenance, overhead, and other governed operating-resource inputs.
- Where the model separates quantity and price, populate both consistently.
- Check that required component counts are complete and that no mandatory input remains blank or INVALID_INPUT.
- Confirm that OpEx responds correctly to capacity, utilization, output, and timing.

13. Lifecycle and Sustaining Capital

- Confirm asset lives, replacement schedules, sustaining-capital rules, placed-in-service logic, and residual value where applicable.
- Ensure the replacement horizon does not extend beyond the modeled range without an explicit extension rule.
- Check that lifecycle outputs reconcile to the intended economic-life assumptions.

14. Soft Resources, Land, and Public Enabling Resources

- Populate private soft resources, land cash outflow, land opportunity cost, and public enabling resources separately.
- Do not confuse a land transaction price with the economic opportunity cost of land.
- Do not treat public infrastructure as “free” simply because it is not paid by the private investor.
- For paired cases, align the underlying resource assumptions unless the scenario explicitly changes them; timing can still change present value.

15. Tax Inputs

- Populate tax rates, tax base, depreciation, expensing/bonus depreciation, credits, loss treatment, and other governed tax assumptions.
- Do not enter a desired cash-tax result; enter the assumptions that generate it.
- Inspect tax timing and taxable-income logic after recalculation.
- Keep cells beyond the governed time horizon blank rather than propagating overflow formulas.

16. Policy Inputs

- Populate policy eligibility, rates, eligible-capital ratios, begin-construction or placed-in-service rules, direct funding, financing support, and dated cash-flow schedules as applicable.
- Policy should affect the investor account unless it changes real behavior or real resource use.
- If a comparison location receives no modeled policy, confirm that pre-policy and post-policy investor value are identical for that location unless another adjustment is intentionally present.
- Do not use policy inputs to force a target post-policy ILD.

17. Recalculate the Workbook

18. Confirm Excel calculation mode is Automatic.
19. Run Calculate Now after completing the input blocks.
20. If stale results or cached errors are suspected, run a full calculation rebuild using the native Excel command available for your platform.
21. Save the workbook.
22. Close Excel completely.
23. Reopen the workbook and allow recalculation to finish.
24. Save again before interpreting final outputs.

Why reopen? — A save-close-reopen cycle is a practical defense against stale formula caches and local recalculation-state problems. A workbook that looks correct before reopening may still contain cached results from an earlier state.

18. Validation Framework — Run the Gates in Order

Do not begin with the dashboard. Validate from upstream to downstream. The recommended gates are:

25. Formula-error sweep
26. Timing
27. Capacity / utilization / yield
28. Revenue
29. CapEx / OpEx / lifecycle
30. Tax / policy
31. Monthly DCF
32. Headline DCF identities
33. Resource bridge
34. Investor pre-policy bridge
35. Investor post-policy bridge
36. Formal hard-test / scenario qualification

19. Gate 1 — Formula-Error Sweep

Search for spreadsheet errors such as:

- #VALUE!
- #REF!
- #DIV/0!
- #N/A
- #NAME?
- #NUM!

Trace upstream — If a downstream DCF cell shows an error, do not repair that cell first. Trace its direct inputs and repair the earliest actual failure. A downstream formula can be structurally correct while simply propagating an upstream error.

Target: zero governing formula-error cells.

20. Gate 2 — Timing

☐ All required milestones are populated or intentionally OPEN.

☐ Phase/stage ordering is feasible.

☐ No impossible date sequence exists.

☐ Paired-case milestone relationships match the scenario definition.

☐ Calculated timing flags / feasibility controls are valid.

☐ No unexpected activity falls outside the governed horizon.

21. Gate 3 — Capacity, Utilization, Yield, and Output

☐ Installed capacity equals the intended phase/stage assumptions.

☐ Capacity activates only when allowed.

☐ Utilization at start/HVM, ramp path, and steady state are correct.

☐ Yield/effective-yield path is correct.

☐ Equivalent phase-age paths match across paired cases when required.

☐ Effective output is internally consistent with capacity × utilization × yield/productivity logic.

22. Gate 4 — Revenue

☐ No revenue before eligible production.

☐ Revenue lag is applied consistently.

☐ ASP / product-mix treatment matches the case definition.

☐ No unexpected gaps or jumps in the monthly revenue series.

☐ Paired cases use equivalent revenue assumptions unless revenue itself is being stressed.

23. Gate 5 — Cost and Lifecycle Reconciliation

☐ Phase/stage CapEx totals equal the sum of their schedules.

☐ Operating-resource totals are complete and logically scaled.

☐ Lifecycle / sustaining / replacement schedules use the intended asset-life rules.

☐ Soft-resource and public-resource values propagate to the active run-value layer.

☐ Nominal differences caused solely by timing/inflation are not mistakenly "aligned away."

24. Gate 6 — Tax and Policy

☐ Tax base and depreciation/expensing treatment are populated.

☐ Cash tax is economically plausible and timed correctly.

☐ Policy eligibility and rate logic are consistent with the case.

☐ Dated policy cash flows fall in the correct periods.

☐ Policy-free comparison locations do not receive unintended policy cash.

☐ Policy-tax interactions reconcile to the model's treatment.

25. Gate 7 — Monthly DCF

Validate the monthly investor cash-flow row, discount-factor row, and discounted-cash-flow row over the full active horizon. The exact row numbers vary by implementation.

Target: zero errors and no unexplained blanks inside the active period.

26. Gate 8 — Headline DCF Identities

At minimum, confirm the investor disadvantage identities:

ILD Pre ≈ NPV Pre B − NPV Pre A

ILD Post ≈ NPV Post B − NPV Post A

If a signed DeltaNPV is used: DeltaNPV ≈ −ILD

Small differences can arise from hidden decimal precision. Material differences indicate a real reconciliation problem.

27. Gate 9 — Resource Bridge

The resource bridge must reconcile the headline resource difference to the governed decomposition without using a hidden residual plug.

☐ Resource bridge residual is approximately zero.

☐ Mechanism/component contributions sum to the headline resource difference.

☐ Interactions are explicit where required rather than buried in an unexplained residual.

☐ No policy transfer is misclassified as a real-resource saving.

28. Gates 10–11 — Investor Pre-Policy and Post-Policy Bridges

☐ Investor pre-policy bridge reconciles to the corresponding investor disadvantage.

☐ Investor post-policy bridge additionally reconciles policy cash, policy-tax interaction, cash-tax effects, and other governed investor adjustments.

☐ Both residuals are approximately zero.

☐ No residual is manually forced to zero.

29. Understand Validation-State Semantics

A validation surface may distinguish among historical results, not-run scaffolds, current calculations, and qualified states. Users must not equate “NOT RUN” with “FAIL.”

State	Interpretation
NOT RUN	The formal campaign has not been executed or populated.
FAIL	A test was executed and failed its requirement.
PASS	A test was executed and met its requirement.
HISTORICAL CHECKPOINT	Preserved evidence from an earlier release state; not necessarily the current case.
READY / QUALIFIED	Current governed qualification criteria have been met and recorded.

Never promote manually — Do not type PASS, 62/62, READY, or similar qualification labels merely because the economic outputs look reasonable. Qualification metadata should record an actual executed campaign.

30. Scenario and Sensitivity Work

Each scenario must be traceable to an explicit mechanism and should change only the intended assumption family.

Minimum scenario record:

- Scenario ID / name
- Changed variable(s)
- Base value(s)
- Scenario value(s)
- Headline resource outputs
- Pre-policy and post-policy investor outputs

- Policy coverage where relevant
- Bridge residuals
- Formula-error count
- PASS / CHECK state

No stale scenario envelopes — If the base calibration changes materially, rerun the scenario family. Do not carry forward old low/high ranges and label them as current robustness results.

31. Restore the Base After Scenario Runs

37. Restore every scenario input to the frozen/base value.
38. Rebuild any scenario-dependent policy or timing schedules.
39. Run a full recalculation rebuild.
40. Confirm headline base outputs return to the frozen reference values within tolerance.
41. Confirm formula-error count is zero and all bridges close.
42. Only then save the scenario workbook under a separate name.

32. Release / Freeze Checklist

☐ Correct case definition and comparison lens documented.

☐ Input provenance complete for all material assumptions.

☐ No unintended blanks or placeholder zeros.

☐ No calculated sheet manually overwritten.

☐ Timing validation passed.

☐ Capacity / utilization / yield validation passed.

☐ Revenue validation passed.

☐ CapEx / OpEx / lifecycle validation passed.

☐ Soft-resource and public-resource propagation verified.

☐ Tax and policy validation passed.

☐ Formula-error count = 0.

☐ DCF identities close.

☐ Resource bridge closes.

☐ Investor pre-policy bridge closes.

☐ Investor post-policy bridge closes.

☐ Formal hard-test / scenario campaign completed when required.

☐ Base restored after scenario work.

☐ Save → close → reopen → full recalculation completed.

☐ Final file hash generated and recorded.

☐ Supersession / release metadata recorded.

33. What Users Should Never Do

- Overwrite formulas on calculated sheets to force a desired result.
- Replace an unknown with zero merely to remove a warning.

- Edit a bridge residual or DCF result directly to make the workbook close.
- Manually type PASS / READY / QUALIFIED without executing the corresponding validation.
- Overwrite a frozen release workbook.
- Mix inputs from one case lens with outputs from another.
- Use a scenario envelope generated from an obsolete base calibration.
- Force nominal A/B values to match when timing/inflation legitimately differs.
- Interpret a low discounted resource difference as proof of physical-cost parity without checking timing.
- Interpret a grant or tax credit as a reduction in real-resource cost unless it changes real resource use.

34. Troubleshooting Decision Tree

Symptom	First check	Next action
#VALUE! / #REF! in a DCF cell	Direct upstream references	Repair earliest failing dependency; recalc downstream
Unexpected blank in active period	Blank/completeness gate	Identify which required input or control returns blank
Bridge residual material	Component/interaction coverage	Trace missing or double-counted contribution
Pre B ≠ Post B when B has no policy	Tax/policy path	Identify whether tax, policy cash, or another adjustment is active
ModelReady says NOT READY but economics look clean	Validation-state semantics	Determine whether campaign is NOT RUN, stale metadata, or genuine failure
Outputs change after reopen	Recalculation state	Run full rebuild and inspect stale/cached formulas
Scenario base does not restore	Scenario inputs/policy schedules	Do not save over frozen base; restore from clean release

35. Condensed Operating Sequence

COPY / RENAME WORKBOOK
↓
DEFINE CASE LENS
↓
ENTER TIMING
↓
ENTER CAPACITY / UTILIZATION / YIELD
↓
ENTER PRODUCT / ASP / REVENUE LAG
↓
ENTER CAPEX
↓
ENTER OPEX / LIFECYCLE
↓
ENTER SOFT / LAND / PUBLIC RESOURCES
↓
ENTER TAX / POLICY
↓
FULL RECALC
↓
CHECK TIMING
↓
CHECK PRODUCTION

↓

CHECK REVENUE

↓

CHECK COST / TAX / POLICY

↓

CHECK MONTHLY DCF

↓

CHECK HEADLINE IDENTITIES

↓

CHECK 3 BRIDGES

↓

RUN FORMAL VALIDATION

↓

RESTORE BASE AFTER SCENARIOS

↓

SAVE → CLOSE → REOPEN → RECALC

↓

FREEZE / HASH / SUPERSEDE

Appendix A — Recommended Case Documentation Fields

Field	Required record
Case name	Company/project, location pair, case lens, version/date
Case purpose	Question the case is intended to answer
Comparison rule	What is held constant and what is allowed to differ
Calibration source	Workbook / ledger / compendium release used
Input provenance	Source, date, method, status for material assumptions
Validation state	Formula errors, DCF closure, bridge closure, hard-test state
Scenario state	Base only / scenario family executed / pending refresh
Release state	Candidate / qualified / frozen / superseded
File hash	SHA-256 or other governed release hash
Supersedes	Prior release replaced by this case

Appendix B — Suggested Reviewer Sign-Off

☐ Input owner confirms assumptions and provenance.

☐ Model reviewer confirms no unauthorized hard-coding on calculated surfaces.

☐ Validation reviewer confirms formula-error sweep, DCF closure, and bridge closure.

☐ Scenario reviewer confirms scenario family was rerun after any material base change.

☐ Release owner confirms save-close-reopen recalculation and final hash.

☐ Release owner confirms prior candidate/release is superseded where applicable.

Release discipline — A SECO workbook is ready for use only when the economics, the calculation state, the validation state, and the release metadata all describe the same case.