# **Operations Validation Questions**

## **1) Production & Process Optimization**

* Can you help me create a batch tracker sheet for employees to log production data in a GMP-friendly format?
* How do I set up a daily production log that helps with compliance audits?
* What are the best KPIs to track in my extraction lab on a daily basis?
* What is the best way to standardize my formulations so batches stay consistent?
* How do I calculate expected yield from a given biomass input?
* Can you help me design a workflow checklist for my lab techs to reduce errors?
* What are the best ways to minimize loss when transferring concentrates between vessels?
* Can you help me make an SOP for preparing biomass before extraction?
* Can you design a downtime log so we can track equipment outages and repairs?
* How can I benchmark my extraction efficiency against industry averages?
* What tools can help me track real-time production metrics across multiple shifts?
* How do I set production goals that align with sales forecasts?
* Can you build a visual daily management board (SQDIP/5S-style) for the lab?
* How do I structure tiered sign-offs (operator → lead → manager) for critical steps?
* What’s the right cadence for cross-functional production meetings (ops, QA, sales)?
* How do I build a changeover checklist to reduce batch-to-batch carryover and loss?
* Can you design a first-article run protocol for new products before full scale?
* How do I validate a new process window (DOE plan, acceptance criteria, run count)?
* What’s a good template for a weekly operations scorecard (throughput, yield, scrap, OEE)?

## **2) Extraction & Processing – Cross-Cutting**

* My chiller is overheating and shutting off—what should I check first and why?
* My extract is coming out darker than normal in ethanol—what are the top causes to investigate?
* What might cause solvent recovery rates to drop, and how do I troubleshoot?
* Why am I seeing pressure spikes during hydrocarbon recovery?
* What’s the best way to prevent channeling or channel formation in extraction columns?
* How do I troubleshoot moisture ingress in an ethanol system?
* What’s the best way to reclaim as much material as possible from transfer glassware?
* My vacuum oven isn’t pulling full vacuum—what should I test and in what order?
* How do I know if my filter media is overloaded or misapplied?
* Why am I getting inconsistent potency results from the same biomass lot?
* What parameters should I monitor to reduce terpene loss during runs?
* Can you help me set acceptance limits for in-process checks (appearance, viscosity, temp, pressure)?
* What’s a reasonable startup/warmup sequence to reduce thermal shock and failures?

## **3) Hydrocarbon Extraction (BHO/PHO)**

* Can you provide good operating parameters for running fresh frozen on my hydrocarbon system?
* How do I choose solvent ratios (propane/butane blends) for target textures (sauce, batter, shatter)?
* What’s the best practice for dewaxing vs. in-line filtration with fresh frozen?
* How do I mitigate color remediation risking over-stripping terpenes?
* What’s the right approach to post-purge to balance residual solvents and terpene retention?
* Why am I seeing nucleation issues in my batter after purge—how do I fix it?
* How do I prevent icing at valves and critical restrictions during recovery?
* Can you help me map out my relief devices and MAWP considerations for safety logs?
* What records should I keep for hydrocarbon leak checks and detector calibrations?

## **4) Ethanol Extraction**

* What ethanol proof range is optimal for my target product and why?
* How do I optimize soak time and agitation without over-extracting chlorophyll?
* What’s the best winterization workflow (ratios, temps, dwell times, filter media steps)?
* How do I track solvent water content and correct for drift over time?
* What’s the best approach to polishing (carbon/clay) without over-adsorbing cannabinoids/terpenes?
* Why is my crude viscosity inconsistent between runs—how do I stabilize it?
* How can I balance throughput vs. quality on my centrifuge extraction setup?
* What are best practices for ethanol recovery stills (fouling prevention, defoamers, CIP)?

## **5) CO₂ Extraction**

* What’s a sensible starting point for SC-CO₂ parameters for terpene-rich vs. cannabinoid-rich fractions?
* How do I schedule fraction cuts to minimize co-extraction of waxes?
* Why am I seeing pressure instability in separators—what should I check?
* Can you help me develop a fraction collection log with target ranges and notes?
* How do I compare CO₂ runs on the same biomass for repeatability (SPC basics, run charts)?

## **6) Solventless (Ice Water Hash & Rosin)**

* How do I design a wash SOP (ice ratios, water temps, paddle rates, bag micron strategy)?
* What are indicators of over-agitation and contamination during wash?
* How do I manage dry/cure of hash to prevent grease-out or terp loss?
* Can you help me tune rosin press parameters (temp/pressure/time) by cultivar?
* Why are my rosin carts crystallizing—what upstream changes should I test?

## **7) Post-Processing: Distillation, Decarb, Remediation**

* What’s the right decarb profile for different matrices (crude vs. isolate blends)?
* Why is my heads/tails separation inconsistent on the wiped-film—how do I correct it?
* Can you help me set up a cleaning validation for my distillation path?
* What are safe, compliant approaches to pesticide remediation and how do I document them?
* How should I stage terpene reintroduction to avoid oxidation and off-notes?

## **8) Formulation & Manufacturing (Vapes, Edibles, Beverages, Topicals, Tinctures)**

* How do I build a master formula and controlled BOM for a new gummy?
* Can you help me design a Cpk/Cp monitoring plan for fill weights on vapes?
* What’s a good emulsion protocol for beverages (emulsifier choice, HLB, shear, stability testing)?
* How do I prevent sugar bloom or weeping in pectin gummies?
* Can you help me set torque/viscosity ranges for vape oil before filling?
* What’s a scalable workflow for topical creams (phase addition, homogenization, cooling)?
* How do I set finished-product specs (potency, moisture, water activity, micro) and release criteria?
* What’s the best small-batch R&D protocol before scale-up (pilot, line trial, validation lots)?
* How should I handle allergen controls and cross-contact documentation for edibles?
* Can you build a cleaning matrix by product type to avoid flavor cross-over?

## **9) Quality Assurance / Quality Control (QA/QC)**

* How do I structure a quality management system (QMS) that fits cannabis operations?
* Can you create a COA review checklist to catch lab inconsistencies?
* How do I build an incoming inspection SOP for packaging and ingredients?
* What’s a simple sampling plan (AQL) I can use for finished goods?
* How do I set up a hold-and-release workflow tied to QA approval?
* Can you help me track trending of out-of-spec results and CAPAs?
* How do I qualify a new third-party lab and monitor ongoing performance?
* What should a deviation report include, and who signs off?
* Can you generate a stability testing plan (real-time, accelerated) for vapes and edibles?
* How do I design sensory panels for flavor consistency while staying compliant?

## **10) Compliance, Recordkeeping, and Seed-to-Sale**

* How do I structure batch records to satisfy audits (state regs + GMP-friendly)?
* Can you build a chain-of-custody template for internal transfers?
* What reports should I pull weekly from METRC/BioTrack to reconcile inventory?
* How do I document and report waste destruction properly?
* What documents should be ready for a surprise inspection (binder contents)?
* How do I set electronic signatures and access controls for controlled records?
* Can you map my data fields so batch records sync correctly to seed-to-sale?
* What’s the best way to track transport manifests and retention periods?

## **11) Inventory, Warehousing, and Materials Control**

* How do I set min/max levels and reorder points by SKU?
* Can you help me implement FEFO/FIFO for ingredients and packaging?
* What cycle-count schedule should I run to reduce variance?
* How do I segregate quarantined, rejected, and released inventory in the WMS?
* Can you design a location codification (bin/shelf/aisle) and label schema?
* How do I measure and reduce inventory shrink in processing vs. retail?
* What are good KPIs for inventory health (DOH, turns, service level, fill rate)?

## **12) Packaging & Labeling Operations**

* Can you help me make a compliant packaging/labeling SOP for my state?
* How do I verify artwork (claims, warnings, font sizes, UPC/QR, lot/exp) before print?
* What’s a good in-line check for label placement and legibility?
* How do I choose child-resistant formats that balance cost and speed?
* Can you design a label release process with QA sign-off and revision control?
* How do I batch-print variable data (lot/UID/expiry) and prevent mix-ups?
* What packaging line speeds are realistic for my equipment and staff levels?
* How do I run a packaging line trial and document acceptance?

## **13) Equipment Selection, Qualification & Maintenance**

* Can you help me spec a new chiller (load calcs, tonnage, heat rejection, redundancy)?
* What’s a URS template for selecting a new extractor or centrifuge?
* How do I run IQ/OQ/PQ on a new piece of processing equipment?
* What spare parts and consumables should I stock for critical uptime?
* Can you create a PM calendar with OEM tasks vs. in-house tasks?
* How do I track MTBF/MTTR and convert that into uptime KPIs?
* What’s the right protocol after major repairs (re-qualification steps)?
* How do I set calibration intervals for scales, thermometers, sensors, HPLCs?

## **14) Facility, Utilities, and Rooms (C1D1/C1D2)**

* Can you help me validate air changes per hour and CFM for my classified rooms?
* How do I document hazardous area classifications and MAQs for solvents?
* What’s a good daily/weekly facility inspection checklist?
* How do I size compressed air and nitrogen for simultaneous equipment demand?
* What’s the best way to trend utility costs per unit produced?
* How do I monitor and alarm critical utilities (power, HVAC, vac, chilled water)?
* Can you create a room flow diagram to reduce cross-contamination risks?

## **15) Environmental, Health & Safety (EHS)**

* Can you build a solvent handling and storage SOP with training logs?
* What should my emergency response plan include for spills and fires?
* How do I set up a confined-space, hot-work, and LOTO program?
* What are appropriate gas detection setpoints and alarm responses?
* How do I prepare for fire marshal inspections (proofs, tests, signage, drills)?
* Can you create an incident/near-miss reporting form and investigation flow?
* How do I track SDSs and ensure they’re accessible and current?
* What’s the correct PPE matrix by room/process?

## **16) Cultivation Operations (Propagation → Harvest → Post-Harvest)**

* What’s the most efficient daily plant care checklist (by stage: mothers, clones, veg, flower)?
* How do I design an IPM calendar with rotations and thresholds?
* What environmental parameters should I monitor daily (temp, RH, VPD/DLI/CO₂)?
* How do I track mother plant health, clone success rate, and genetic drift?
* Can you help me schedule labor across defoliation, trellising, and harvest prep?
* How do I benchmark grams/sq ft and grams/watt and improve them?
* What are best practices for consistent dry/cure (targets, airspeed, racks, W/A)?
* How do I document strain-specific feeding programs and adjustments?
* What’s a good post-harvest trimming SOP and QC checks for visual grade?
* How do I implement sanitation between rooms and harvest cycles?

## **17) Retail Operations**

* What are profitable sales or bundles we can run with ~100% markup without killing margins?
* How do I design daily opening/closing checklists for budtenders and managers?
* What are the best ways to reduce inventory shrink and improve cash controls?
* How do I schedule staff against peak hours and events?
* Can you build a retail compliance checklist (ID checks, signage, purchase limits)?
* What training modules should new budtenders complete in week one?
* How do I set reorder points and safety stock for fast movers?
* Can you help me design a floor plan to improve flow and basket size?
* What’s a simple demand forecast model for weekly ordering?
* How do I set up curbside/express pickup and delivery operations cleanly?
* What’s a good playbook for moving slow inventory without risky discounts?

## **18) Delivery & Logistics**

* How do I plan delivery routes that respect time windows and compliance rules?
* What should my vehicle inspection and chain-of-custody paperwork include?
* Can you help me design a vault organization for outbound orders?
* How do I calculate optimal case pack and pallet configurations?
* What KPIs matter for delivery performance (OTIF, miles/stop, cost/order)?

## **19) Financial & COGS (Ops-Focused)**

* I’m making a new product—can you help me break down COGS and price it?
* What’s a reasonable wholesale margin for concentrates or edibles in my market?
* Can you build a pro forma for a new line with sensitivity to raw material cost swings?
* How do I allocate overhead into product COGS fairly (labor, utilities, depreciation)?
* Can you generate an Excel template to track cost per batch and per unit?
* How do I compare outsource vs. in-house processing from a unit economics view?
* Can you design a margin calculator for bulk oil vs. packaged SKUs?
* How do excise taxes and fees affect my wholesale and MSRP targets?
* What KPIs should Ops review weekly with Finance (yield $, scrap $, labor/hr, $/gram)?

## **20) Data, Systems & Integrations (LIMS, ERP, Seed-to-Sale)**

* Which data fields should live in LIMS vs. ERP vs. seed-to-sale to avoid duplication?
* Can you map integrations between METRC/BioTrack and our ERP for fewer manual entries?
* How do I design dashboards for throughput, yield, and compliance exceptions?
* What’s the right data retention policy for batch and QA records?
* How do I implement barcode/RFID to reduce mislabeling and speed inventory checks?
* Can you propose role-based access controls for sensitive operational data?
* How do I audit data integrity and reconcile daily between systems?

## **21) Training, Onboarding & Competency**

* Can you build a 30/60/90 plan for new lab techs?
* What should a skills matrix look like for operators by equipment/process?
* How do I run and document annual competency checks?
* Can you design microlearning modules for critical procedures (3–5 min each)?
* How do I structure train-the-trainer and version control for SOP updates?
* What’s a fair on-call rotation and escalation matrix for key roles?

## **22) SOPs, Work Instructions & Change Control**

* Can you draft a master SOP template with required sections and approvals?
* How do I split SOPs vs. Work Instructions vs. Forms to keep them usable?
* What’s a practical change control workflow (risk rating, validation needs, training)?
* How do I sunset old documents and prove only the latest is in circulation?
* Can you propose a periodic review schedule and owner assignments?

## **23) Risk Management, Deviations, CAPA & Recalls**

* Can you build a deviation form and triage rubric (minor/major/critical)?
* How do I run a root cause analysis (5 Whys/Fishbone) and document it?
* What does an effective CAPA plan look like, and how do I track closure?
* Can you help me write and test a mock recall (roles, comms, lot trace, timing)?
* How do I design a non-conformance log and trending dashboard?
* What leading indicators should I monitor to prevent recalls?

## **24) Supplier & Procurement Management**

* How do I qualify new suppliers (ingredients, packaging, labs) and maintain ASL status?
* Can you design an incoming COA verification checklist by material type?
* What KPIs should I hold suppliers to (OTIF, quality incidents, corrective actions)?
* How do I set MOQ/EOQ and safety stock given supplier lead times?
* Can you create a cost/quality/risk scorecard to compare vendors?

## **25) Sustainability & Resource Efficiency**

* How do I baseline and track energy, water, and solvent per unit produced?
* Can you suggest solvent recovery and reuse targets and controls?
* What waste segregation improvements would reduce disposal costs?
* How do I design a take-back/recycling program for packaging (where legal)?
* Can you build a simple carbon footprint model for my facility operations?

## **26) R&D, Pilot, and Tech Transfer**

* What’s a good R&D request form so production can evaluate feasibility?
* How do I run a pilot plan (objectives, success metrics, sample size, hazards)?
* Can you create a tech transfer checklist from R&D to Operations?
* How do I protect IP and document trade secrets in process docs?
* What is the right sampling and testing plan during pilot to de-risk scale-up?

## **27) Customer Service & Complaint Handling (Ops Interface)**

* Can you design a product complaint intake form that routes to QA and Ops?
* How do I investigate complaints tied to specific lots (trace-back plan)?
* What’s the correct replacement/credit decision flow and documentation?
* How do I trend complaint categories and feed improvements back to Ops?
* Can you propose standard reply templates that are compliant and non-admissive?

## **28) Security & Loss Prevention (Ops-Relevant)**

* What controls reduce diversion risk in processing (cameras, access, reconciliation)?
* Can you design a vault access log and dual-control policy?
* How do I run variance investigations tied to seed-to-sale discrepancies?
* What’s a good visitor/vendor escort SOP for production areas?
* How do I structure random audits to deter internal theft?

## **29) Project Management & Capacity Planning**

* Can you create a capacity model (people, equipment time, utility constraints) by SKU?
* How do I prioritize projects (RICE/WSJF) across Ops and QA?
* What’s a practical template for equipment commissioning/qualification timelines?
* How do I scenario-plan for seasonal demand spikes and promos?
* Can you design a line balancing exercise to remove bottlenecks?

## **30) Retail–Processing Coordination (Make-to-Order / Replenishment)**

* How do I align production run sizes with retail sell-through to reduce aged inventory?
* Can you build a simple S&OP cadence between Ops, Sales, and Retail?
* What’s the best way to set MOQ by SKU to keep changeovers efficient?
* How do I set freshness dating and rotation policy across warehouses and stores?
* Can you create a returns/RMA handling SOP that protects product integrity?