

OIL & GAS · HAZARDOUS LOCATION

THE OIL AND GAS TURNAROUND PLANNING GUIDE

How refinery, midstream, and upstream teams
successfully execute hazardous-location lighting
conversions inside scheduled outage windows.

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Inside this guide.

Hazardous-location lighting conversions rarely fail because of fixture performance. They fail because the work cannot fit inside operational schedules, permit windows, shutdown coordination plans, and crew availability. Here's how to beat the odds.

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HOW TO USE THIS GUIDE

Sections 02 through 05 cover the operational planning and execution framework. Section 06 maps Cooper Lighting Solutions platforms to operating environments. Sections 07 and 08 focus on avoiding project failures and improving readiness.

For fast review: Executive Summary, Section 05 (sequencing), and Section 08 (readiness checklist).

01 / Executive Summary

Most Oil & Gas lighting conversions do not fail due to technology gaps or poor lifecycle economics. They fail because they cannot be executed within normal operations.

Outside of a scheduled turnaround, even a straightforward hazardous location retrofit becomes difficult to justify. Units cannot be taken offline for lighting alone. Hot-work permits, lift access, and labor capacity are constrained, and resources are prioritized elsewhere. Turnarounds fundamentally change this equation.

Leading operators succeed by aligning engineering, procurement, safety, permitting, labor, and startup sequencing into a unified outage strategy well before the turnaround begins. Lighting is no longer treated as a standalone project, it is integrated into work that is already planned, approved, and resourced. This shift transforms lighting conversion from a disruptive, standalone shutdown event into a low-friction execution within existing infrastructure, labor, and access conditions.

WHO THIS GUIDE IS FOR

This guide is built for the teams responsible for making that fit happen:

- EPC project managers
- turnaround coordinators
- facility operations and maintenance leadership
- specifiers and electrical contractors
- reliability, maintenance, and turnaround planning teams

INSIDE THIS GUIDE

- Why turnaround windows fundamentally improve retrofit economics
- How successful operators structure pre-turnaround planning
- Three sequencing strategies used during outage execution
- Common operational mistakes that derail conversions
- Portfolio alignment by operating zone
- A readiness checklist for project teams

Successful Oil & Gas LED conversion programs are not built around fixture pricing cycles. They are built around outage windows. This guide is written to help your team operate the same way.

02 / Why Turnarounds Change the Economics of Lighting Conversion

THE ECONOMICS OUTSIDE A TURNAROUND

The fixture itself is rarely the primary cost driver in hazardous-location lighting.

The true lifecycle cost is driven by:

- relamping frequency
- shutdown coordination
- lift access
- permit cycles
- contractor labor
- maintenance exposure

That is why many legacy HID systems become operationally expensive long before they become technically obsolete.

In hazardous Oil & Gas environments, even routine fixture maintenance can require:

- hot-work permits
- aerial lifts
- confined-space coordination
- certified electricians
- safety supervision

Across a large refinery or midstream facility, these maintenance events compound rapidly over time. In many facilities, the operational disruption tied to accessing a fixture can outweigh the replacement cost of the fixture itself.

The challenge is that retrofit projects outside scheduled outages face many of the same operational barriers as the maintenance events themselves.

THE BUSINESS CASE OFTEN WORKS LONG BEFORE THE OPERATIONAL SCHEDULE DOES

Even when the lifecycle math is straightforward, the operational reality of executing the work outside a turnaround can be enough to defer the project indefinitely. The constraint is not capital. It is access.

THE ECONOMICS INSIDE A TURNAROUND

A scheduled turnaround fundamentally changes the operational equation. The shutdown is already in effect. Permits are already active. Lifts are already on site. Crews are already mobilized. Instead of creating a separate operational event, the lighting conversion becomes part of an existing outage strategy.

This is how mature operators structure long-term hazardous-location conversion programs. They align procurement, engineering, AHJ review, staging, and installation against the turnaround calendar rather than treating lighting as a standalone project.

Successful conversion programs are not built around fixture pricing cycles. They are built around outage windows.

HOW TURNAROUND WINDOWS DIFFER BY SEGMENT

Turnaround cadence and scope vary significantly across upstream, midstream, and downstream operations. The same fixture conversion executes differently in each.

Segment	Typical turnaround cadence	Primary turnaround planning challenge
Upstream	Production-driven. Pad refurbishments scheduled around well decline curves. Highly variable cadence by basin and operator.	Shorter windows. Distributed assets increase labor and staging complexity during outage windows.
Midstream	Compressor and pump station outages. Annual or biennial	Tighter sequencing required. Vibration-rated platforms reduce post-turnaround callbacks at compressor stations.

Segment	Typical turnaround cadence	Primary turnaround planning challenge
	maintenance windows. Predictable cadence.	
Downstream	Refinery T&I cycles of 3 to 5 years for major units. Largest scope. Most administrative complexity.	Highest planning lead time. Lighting belongs in T&I scope 12 to 18 months out.

Understanding the cadence of the surrounding turnaround is the prerequisite to sequencing the conversion correctly. The planning model in Section 04 is structured to work across all three segments.

03 / Five Operational Reasons Turnaround

Windows Work

Turnaround windows reduce more than installation cost. They reduce the operational barriers that typically prevent hazardous-location conversions from moving forward in the first place.

The five areas below are where hazardous-location lighting conversions typically become difficult, expensive, or operationally disruptive outside planned outages. During a turnaround, many of these barriers are already resolved through the surrounding T&I scope.

REASON 1 – ACCESS

During normal operations, many hazardous process areas remain difficult or expensive to access safely. Turnaround windows temporarily remove many of those restrictions. Equipment is depressurized, process areas are isolated, access zones are already established, and permit structures are already active.

That allows lighting work to occur inside an existing operational access envelope rather than requiring a separate intervention event.

REASON 2 – LIFT ACCESS

Large turnaround events already require extensive lift fleets for inspections, repairs, structural work, and mechanical maintenance. Lighting conversions benefit from infrastructure that is already mobilized: aerial lifts, scissor lifts, certified operators, staging zones, and traffic controls.

Outside the turnaround window, recreating that same access infrastructure often requires a dedicated mobilization event that cannot be economically justified for lighting scope alone.

REASON 3 – PERMIT STRUCTURE

Hazardous-location work requires layered permits: hot-work, confined-space, energy isolation, fire watch, and equipment-specific clearances. These permits are administratively expensive when pulled per fixture.

Turnaround windows operate under a unit-level permit envelope that absorbs most of that administrative cost. Lighting work folds into an existing structure instead of triggering a new one for every intervention.

The savings here are not just dollars. They are calendar time. A standalone permit cycle for a single hazardous-location fixture intervention can take days. The turnaround envelope compresses that to hours.

REASON 4 – CREW COORDINATION

Specialty trades, contractor labor, riggers, and safety personnel are already mobilized and committed for the duration of the outage. The daily safety meeting, the toolbox talk, the walk-down, and the progress reporting are already happening.

Lighting work that fits inside that cadence does not require parallel coordination. It runs inside the existing rhythm of the outage.

This is the operational difference between integrated work and standalone work. Integrated work compounds the value of the mobilization. Standalone work absorbs the full mobilization cost independently.

REASON 5 – LIFECYCLE COST REDUCTION

The operational savings from LED conversion begin immediately after restart. Every avoided relamping cycle reduces maintenance labor, permit administration, lift rentals, contractor exposure, and shutdown coordination.

Deferring conversion to the next turnaround cycle means continuing to absorb the maintenance burden of the legacy HID system for years longer than necessary. In refinery cycles of three to five years, that is a meaningful cost stack to carry.

The five reasons above are not independent. They compound. Each one reduces a different category of operational friction. Together, they explain why mature operators structure long-term hazardous-location conversion programs against the turnaround calendar instead of against fixture pricing cycles.

04 / The Three-Phase Planning Model Used by Successful Operators

Most turnaround lighting conversions succeed or fail long before the outage begins. The most common project failures are not fixture-related. They are planning-related.

Typical breakdowns include incomplete fixture inventories, unresolved hazardous-location classifications, delayed AHJ review, procurement timing issues, and sequencing conflicts with other T&I scopes. The planning model below aligns engineering, procurement, and execution milestones against a typical 12-to-18-month pre-turnaround window. The phases overlap. Outputs from earlier phases feed later ones.

PHASE 1 · AUDIT AND BASELINE · 12 TO 18 MONTHS OUT

The Audit phase establishes the inventory, maintenance baseline, retrofit eligibility, and AHJ risk areas that drive the entire conversion strategy. When this phase is compressed or incomplete, every downstream procurement, engineering, and execution decision inherits that uncertainty.

Deliverable	What it drives
Fixture inventory	Procurement quantities and crew size. Location, type, mounting height, age, ambient envelope, and access difficulty for every fixture in scope.
Retrofit eligibility list	Procurement mixes between Top Hat Retrofit Adapter installs and full-replacement units. Drives unit count and lead-time strategy.
Maintenance baseline	The business case for finance and operations leadership. Twenty-four months of relamping events, rentals, hot-work permits, and contractor hours.
AHJ risk flags	Borderline Div 1 / Div 2 boundaries that need AHJ resolution before procurement. Drives engagement model in Phase 2.

PHASE 2 · ENGINEERING AND SUBMITTAL · 9 TO 15 MONTHS OUT

Phase 2 converts the audit outputs into a spec package, a photometric layout, an AHJ submittal, and a procurement timeline. This is the phase where Cooper Lighting Solutions application engineering involvement is highest. Early engagement protects the procurement and AHJ schedules from late-stage rework.

Deliverable	What it drives
Fixture spec package	Locked fixture selection per zone with classification, T-code, IP, NEMA, ambient, and mounting documentation. Procurement clock starts here.
Photometric layouts	Code compliance, IES recommended-practice alignment, and operator standards verification. Approval from facility engineering and HSE.
AHJ submittal	Classification, listings, and certifications packaged for AHJ review. Critical path. Reviewed before procurement order is placed.
Procurement timeline	Lead times locked. Delivery schedule confirmed. Fixtures on site 30 days pre-turnaround for inspection and staging.

AHJ submittal is the gating step. A classification re-review at a vent, drain, or vapor recovery boundary can shift Div 1 / Div 2 lines and invalidate parts of an already-placed procurement order. Engage the AHJ before the spec package is locked, not after.

PHASE 3 · EXECUTION PLAN · 3 TO 6 MONTHS OUT

Phase 3 integrates the conversion into the surrounding T&I scope. This is where lighting work stops being a parallel workstream and starts being part of the existing turnaround.

Deliverable	What it drives
Sequencing strategy	Front-loaded, distributed, or backloaded. Selected per unit against the surrounding T&I scope. Covered in detail in Section 05.
Permit envelope	Hot-work, confined-space, and lift permits folded into the existing turnaround permit-to-work matrix. Confirmed with safety lead.
Acceptance checklist	Per-fixture validation steps. Sign-off owner per zone. AHJ inspection trigger. Photographic acceptance record path.

Deliverable	What it drives
Toolbox content	Pre-shift briefing material covering fixture mounting, retrofit adapter installation, AHJ classification, and acceptance criteria.

THE PLANNING LEAD TIME IS THE PROJECT

Compressing this model into less than 12 months total typically triggers one or more of the four planning mistakes covered in Section 07. The schedule pressure feels like a project management problem. It is a planning model problem.

05 / Three Sequencing Strategies Used During Turnaround Execution

Once the outage begins, lighting conversions typically follow one of three execution models. Each strategy balances schedule pressure, permit overlap, crew coordination, startup risk, and operational flexibility differently. The right approach depends on the unit scope, the surrounding T&I activity, and the operator's startup priorities.

Multi-unit refinery turnarounds typically run a mix of all three. Different units within the same outage can run different strategies based on their individual scope and access plans. Sequencing is a unit-level decision, not a refinery-level one.

STRATEGY A · FRONT-LOADED

Front-loaded sequencing executes the lighting conversion while overlapping permits are minimized and crew availability is high. Work completes early in the outage and does not compete for lifts or permits during the busy middle portion of the T&I window.

WHEN IT RUNS	First 24 to 48 hours of the outage.
CONDITIONS	Site is quiet. Parallel T&I work is in early-stage activities like depressurization, isolation, and initial walk-downs.
ADVANTAGE	Quiet site, no overlapping permits, clean access. Work completes ahead of peak T&I.
TRADE-OFF	Fixtures, crew, and AHJ approvals must all be ready at shutdown. No buffer. Procurement slippage costs the slot.

STRATEGY B · DISTRIBUTED

Distributed sequencing is the default for first-time conversion programs. The crew executes installations in zones as they open up, coordinating daily with the broader T&I scope.

WHEN IT RUNS	Parallel across the full turnaround window.
CONDITIONS	Lighting crew rotates through the unit as zones become available during the parallel T&I work.
ADVANTAGE	Maximum schedule flexibility. Lower execution risk than front-loaded.
TRADE-OFF	Coordination overhead. Daily integration required with each surrounding unit's parallel work.

STRATEGY C · BACK-LOADED

Back-loaded sequencing integrates the lighting completion into the startup readiness package. The site is in its cleanest, most accessible condition during this window.

WHEN IT RUNS	Last 48 to 72 hours of the outage.
CONDITIONS	Site is decontaminated. Access is clear. Unit is being prepared for return-to-service.
ADVANTAGE	Site decontaminated, access clear. Integrate with startup readiness documentation.
TRADE-OFF	Schedule pressure against startup deadlines. Slippage cascades onto the startup window.

CHOOSING BETWEEN THEM

Strategy	Best when	Advantage	Trade-off
Front-loaded	Procurement is confirmed early. Fixtures staged 60+ days pre-outage.	Quiet site, no overlapping permits, clean access.	No buffer for procurement or crew readiness.

Strategy	Best when	Advantage	Trade-off
Distributed	First-time conversion programs. Multi-zone scope with variable access timing.	Maximum flexibility. Lower execution risk.	Coordination overhead with surrounding T&I scope.
Backloaded	Heavy parallel T&I scope. Lighting paired with startup readiness package.	Site clean and decontaminated. Integrates with startup.	Slippage pressure onto startup window.

Process units with the heaviest parallel T&I scope typically run backloaded to avoid permit collision. Pipe rack and tank farm work often runs distributed. Control room and perimeter work often runs front-loaded since it decouples from the unit shutdown timing.

06 / Portfolio Alignment by Operating Environment

Different operating environments create different lighting challenges.

Some prioritize vibration resistance.

Others prioritize lift reduction, hazardous-location compliance, photometric coverage, or maintenance accessibility.

The summary below maps common Oil & Gas operating environments to the operational requirements that drive fixture selection. Cooper Lighting Solutions platforms commonly specified for each environment are noted as supporting reference. Final selections must be validated during the engineering phase against the site's specific classification, T-code, ambient envelope, and mounting requirements.

REFINERY PROCESS UNITS

Process unit lighting work is dominated by retrofit pace, not new installation. Most legacy refinery fixtures are Crouse Hinds Champ FMV or VMV with established mounting hardware that has been in place for decades. Disturbing that hardware triggers re-commissioning scope that the turnaround window cannot absorb.

The fastest install path on a refinery with legacy Champ FMV / VMV inventory is direct retrofit through existing hoods. Nimalux MR and XR are commonly specified for these environments through the Top Hat Retrofit Adapter, which preserves the existing electrical infrastructure.

COMPRESSOR STATIONS

Compressor station vibration is the leading cause of premature midstream HID failure. Repeated vibration exposure near rotating equipment accelerates driver and lamp failure, creating recurring maintenance events that compound across compressor station portfolios.

Compressor stations require vibration-tolerant platforms that reduce post-turnaround maintenance callbacks. Nimalux MR and XR are commonly specified for these environments. EXC is added at Div 1 vent points where AHJ-confirmed.

PIPE RACKS AND PIPEWAYS

Pipe rack lighting work is dominated by elevation, not classification. Most pipe racks are Class I Div 2 and the standard fixture options are well understood. The operational constraint is rarely fixturing availability. It is the lift sequencing and crew access required to safely work at elevation during the outage window.

Linear runs install at elevated mount height in fewer crew hours than discrete-fixture pole-top installs. Plan lift sequencing accordingly. Nematlux BL (linear), MR, and NL are commonly specified for these environments.

PUMP STATIONS AND LOADING RACKS

Loading rack lighting often combines high-output flood fixtures over the rack with linear under-rack illumination for the loading floor. Both fixture types should be planned into the same lift cycle to avoid duplicating lift mobilization within the outage.

Nematlux AR, XR, and JR are commonly specified for pump stations and loading racks. EXC is added at Div 1 points where AHJ-confirmed.

TANK FARMS

Tank farm lighting work is dominated by photometric coverage, not fixture count. Modern LED optical systems often achieve required maintained foot-candle levels with fewer fixtures, reducing pole-top maintenance exposure across large tank farm environments.

Wide-area photometric requires fewer fixtures than legacy HID at the same maintained foot-candles. Plan pole-top sequencing first. Nematlux AR (flood) and XR are commonly specified for tank farm pole tops. EXC is added at vent points where AHJ-confirmed Div 1.

WELLPAD AND SEPARATOR DECKS

Wellpad and separator deck lighting work is dominated by distribution, not unit count per site. Operators with hundreds of wellpads across a basin face crew mobilization as the primary cost driver, not fixture procurement.

Distributed sites compress crew mobilization across the turnaround window. Plan a staging hub before mobilization. Nematlux BL, AR, MR, and EXC at Div 1 points are commonly specified for wellpad environments.

DRILLING CROWNS AND LEASE FLOODS

High-mast lift access is the dominant cost driver on drilling crown and lease flood lighting. Every future service intervention on a 60- or 100-foot pole top is a major cost event.

Modular platforms that allow service at the module level rather than full fixture replacement reduce future intervention cost significantly. Nemalux ZLM is commonly specified for these applications.

TANK VENTS AND VAPOR RECOVERY

Tank vent and vapor recovery discharge points are the most common Class I Div 1 zones in Oil & Gas operations. They are also the most common sites for AHJ re-classification during the submittal cycle, which is covered in Section 07.

Confirm AHJ-confirmed Div 1 boundaries before locking the spec. Nemalux EXC is the only Cooper Lighting Solutions Class I Div 1 platform.

CONTROL ROOMS AND OPERATIONS BUILDINGS

Control room and operations building lighting is non-rated but still industrial-grade. NEMA 4X and IP65 ratings handle washdown, dust, and the corrosive environments common in petroleum facilities.

Metalux UHBS2 (NEMA 4X, IP65 high bay) is commonly specified for control rooms and operations buildings.

PERIMETER, ACCESS ROADS, AND EGRESS

Perimeter, access road, and egress lighting work is non-rated but operationally significant. Pole-top relamping cycles drive perimeter maintenance cost. NFPA 101 compliance drives egress and emergency requirements.

Streetworks pole-top, post-top, and architectural lighting are commonly specified for perimeter and access road applications. Sure-Lites is commonly specified for egress and emergency. Specific model fit is verified per project during the engineering phase.

SUMMARY TABLE

The reference table below summarizes the environments above. Use it as the orientation reference during pre-turnaround planning. Final selections are validated in Phase 2 of the planning model.

Environment	Classification	Common Cooper Lighting Solutions fit	Primary operational driver
Process units (refining)	Class I Div 2 / Zone 2	Nemalux MR, XR	Retrofit pace. Top Hat Adapter preserves existing Eaton Crouse Hinds hoods.
Compressor stations	Div 2 typical, Div 1 at vents	Nemalux MR, XR, EXC	Vibration tolerance reduces post-turnaround callbacks.
Pipe racks and pipeways	Class I Div 2 / Zone 2	Nemalux BL (linear), MR, NL	Elevated mount height drives lift sequencing.
Pump stations, loading racks	Div 2 envelope, Div 1 at points	Nemalux AR, XR, JR; EXC at Div 1	Mixed flood-and-linear scope. Plan into the same lift cycle.
Tank farms	Div 2 floor, Div 1 at vents	Nemalux AR (flood), XR; EXC at vents	Wide-area photometric. Fewer fixtures than legacy HID.
Wellpad and separator deck	Div 2 deck, Div 1 at drains	Nemalux BL, AR, MR, EXC	Distributed sites. Crew mobilization is the cost driver.
Drilling crown and lease	Class I Div 2	Nemalux ZLM (high-mast modular)	High-mast lift access. Modular service reduces future cost.
Tank vents, vapor recovery	Class I Div 1	Nemalux EXC (only Div 1 option)	AHJ classification confirmation before spec is locked.
Control rooms, ops buildings	Non-rated	Metalux UHBS2	NEMA 4X, IP65. Indoor occupancy.
Perimeter, access roads	Non-rated	Streetworks portfolio	Pole-top relamping is the maintenance driver.
Egress and emergency	NFPA 101	Sure-Lites	Battery test labor and code inspection cycles.

FIVE-YEAR LIMITED WARRANTY

Cooper Lighting Solutions provides a five-year limited warranty across the Nemalux hazardous-location portfolio and the Metalux UHBS high-bay platform. Specific warranty terms vary by product family. Confirm during the Engineering phase before procurement is locked.

07 / Four Common Planning Mistakes That Derail Turnaround Conversions

Most failed turnaround lighting projects do not fail because of fixture performance.

They fail because planning assumptions break down before execution begins.

The four issues below are the most common causes of schedule delays, procurement conflicts, permit complications, and execution risk during hazardous-location conversions. Each one traces back to a Phase 1 or Phase 2 planning decision from Section 04.

MISTAKE 1 · STARTING THE AUDIT LESS THAN 9 MONTHS OUT

The single most common failure mode. The fixture inventory and retrofit eligibility list cannot be produced reliably in less than 60 to 90 days for a refinery-scale portfolio. The maintenance baseline requires 18 to 24 months of historical data to be credible to operations and finance. The AHJ classification flag list requires a walk-down cycle with the local authority that typically takes 30 to 60 days.

Compressing the Audit phase into less than 9 months means producing an inventory the Engineering phase cannot fully trust, a baseline that finance cannot fully credit, and a classification flag list the AHJ has not actually reviewed. Procurement then operates on incomplete information, fixtures get ordered against an inventory that may be off by 10 to 20 percent, and AHJ-borderline zones get a spec the AHJ may reject during final submittal.

The remedy: Start the Audit phase 12 to 18 months pre-turnaround, not 6 to 9. The cost of starting early is planning effort. The cost of starting late is often deferral to the next turnaround cycle.

MISTAKE 2 · SEQUENCING LIGHTING AGAINST THE UNIT'S CRITICAL PATH

Lighting belongs inside the existing turnaround sequence as integrated scope, not as a parallel critical path workstream that competes with the surrounding T&I work.

Operators treat the lighting conversion as a standalone project, with its own permit envelope, its own lift schedule, and its own crew, recreating the outside-the-turnaround economics inside the turnaround. The operational advantages of the window disappear.

The remedy: Front-loaded, distributed, or back-loaded sequencing per Section 05, chosen against the unit's actual schedule. Folding lighting into the existing permit envelope and lift fleet rather than running it parallel.

MISTAKE 3 · DISTURBING EXISTING ELECTRICAL INFRASTRUCTURE

Conversions that require pulling conduit, modifying junction boxes, or replacing mounting structure trigger new hot-work permits, re-inspections, and re-commissioning cycles. Each one adds time, cost, and risk to in-turnaround execution.

The Top Hat Retrofit Adapter, where the legacy hood supports it, preserves the existing infrastructure on most Eaton Crouse Hinds installations. Operators that build the retrofit path into the procurement strategy execute conversions inside the turnaround window without the parallel administrative load. Operators that default to full replacement on every fixture often find the administrative load outpaces available crew hours during the outage.

The remedy: Phase 1 retrofit eligibility list. Top Hat Adapter where the legacy hood supports it. Full replacement only where it does not.

MISTAKE 4 · TREATING AHJ SUBMITTAL AS A BACK-END TASK

Classification re-reviews at vent, drain, separator, and vapor recovery boundaries can shift Div 1 / Div 2 lines after AHJ review. A zone the spec package treated as Div 2 may be reclassified as Div 1, and the procurement order, which has already been placed, may have to be revised. EXC fixtures, which are the only Div 1 option in the NemaLux portfolio, have longer lead times than Div 2 fixtures.

The remedy: Engage the AHJ during the Engineering phase, before the procurement package is locked. Walk borderline zones with the AHJ during the engineering walk-down. Document classification decisions in the engineering record. Incorporate AHJ decisions into the spec before the procurement order is placed.

All four mistakes share a common cause: compressing the pre-turnaround planning window. A 12-month Audit phase, a 12-month Engineering phase, and a 6-month Execution phase, run with proper overlap against an 18-month pre-turnaround calendar, avoid all four. The schedule pressure feels like a project management problem. It is a planning model problem.

08 / Turnaround Readiness Checklist

The working checklist below is the operational tool for project teams scoping and executing the conversion. Print and use during the planning cycle. Completing every item before the outage begins protects in-turnaround execution from the four mistakes covered in Section 07.

PHASE 1 · AUDIT AND BASELINE · 12 TO 18 MONTHS OUT

- **Fixture inventory complete.** Every legacy fixture in scope counted, located, classified. Mounting height, ambient envelope, access difficulty noted.
- **Retrofit eligibility list complete.** Each fixture marked Top Hat Adapter eligible, full-replacement required, or out-of-scope. Eligibility verified against actual legacy hood inventory.
- **Maintenance baseline documented.** Twenty-four months of relamping events, lift rentals, hot-work permits, and contractor hours. Reviewed and accepted by operations and finance.
- **AHJ classification flags identified.** Borderline Div 1 / Div 2 zones documented. Initial AHJ contact made.
- **Master inventory shared with Cooper Lighting Solutions.** Application engineering engaged. Initial portfolio fit review scheduled.

PHASE 2 · ENGINEERING AND SUBMITTAL · 9 TO 15 MONTHS OUT

- **Fixture spec package complete.** Per-zone selection finalized. Classification, T-code, IP, NEMA, ambient envelope, mounting documented. Retrofit-vs-replacement disposition locked.
- **Photometric layouts complete.** Foot-candle calculations and uniformity ratios per zone. IES compliance confirmed. Operator standards verified.
- **AHJ submittal package complete and submitted.** Review status tracked weekly.
- **AHJ walk-down complete on borderline zones.** Classification decisions documented. Spec updated to reflect AHJ-confirmed classifications. Procurement order placed against approved spec.
- **Procurement timeline locked.** Lead times confirmed. Delivery schedule established. Staging plan confirmed. Spare inventory percentage agreed.

PHASE 3 · EXECUTION PLAN · 3 TO 6 MONTHS OUT

- **Sequencing strategy selected.** Front-loaded, distributed, or backloaded per unit. Aligned with surrounding T&I scope.
- **Permit envelope confirmed.** Hot-work, confined-space, and lift permits are folded into the existing turnaround permit plan. Confirmed with safety lead.
- **Acceptance checklist complete.** Per-fixture validation steps locked. Sign-off owner per zone. AHJ inspection trigger if required. Photographic record path defined.
- **Toolbox content complete.** Pre-shift briefing material ready. Integrated with the broader turnaround toolbox program.
- **Fixtures on site, inspected, accepted.** Thirty days pre-turnaround. Damaged or non-conforming units identified and replaced. Spare inventory staged.

DAY-OF · OUTAGE START

- **Crew briefed.** Pre-shift briefing run. Sequencing strategy reviewed. Permit envelope confirmed.
- **Lift schedule integrated.** Lighting work folded into broader lift scheduling. Daily lift coordination meeting attendance confirmed.
- **Daily progress tracking actively.** Per-zone progress reported daily. AHJ inspection triggers managed against schedule.
- **Acceptance documentation in progress.** Per-fixture validation completed in the install shift. Photographic record collected. Defects flagged for rework before the outage closes.

POST-OUTAGE CLOSEOUT

- **AHJ acceptance complete.** Final inspection scheduled and completed.
- **Maintenance baseline reset.** Post-conversion log started against the new portfolio. ROI tracking activated against the pre-conversion baseline.
- **Lessons learned documented.** Sequencing, procurement, and AHJ engagement reviewed. Inputs captured for the next turnaround cycle.

THE CHECKLIST IS THE PROJECT

A turnaround lighting conversion that runs every item on this checklist before the outage will execute inside the window. The checklist is not a formality. It is the operational record of the planning model that makes the window work.

09 / Glossary and Resources

GLOSSARY

Definitions of key terms used in this guide. The vocabulary assumes working knowledge of NEC Class I Division classifications and standard refinery and midstream operations terminology.

AHJ. Authority Having Jurisdiction. The local code authority is responsible for reviewing and approving classification decisions, fixture selections, and installation methods for hazardous-location lighting.

Class I Division 1. NEC classification for areas where ignitable concentrations of flammable gases or vapors exist or may exist under normal operating conditions. In Oil & Gas operations, typically tank vents, vapor recovery discharge, separator drains, sumps, and areas around open process.

Class I Division 2. NEC classification for areas where ignitable concentrations are not normally present but could exist under abnormal conditions. Covers the broader operating envelope of process units, pipe racks, loading racks, and partially enclosed petroleum facilities.

Hot-work permit. Site-specific authorization to perform work that produces heat, sparks, or open flame in a hazardous-location envelope.

IES. Illuminating Engineering Society. The North American professional organization that publishes recommended-practice documents for industrial lighting design.

IP rating. Ingress Protection rating per IEC 60529. IP66 is the Oil & Gas hazardous-location standard. IP66/67 is specified for flood-prone or low-mount applications. IP68 is specified for encapsulated variants.

NEC. National Electrical Code (NFPA 70). The U.S. standard governing hazardous-location classification.

NEMA enclosure. Enclosure rating per NEMA 250. NEMA 4X (corrosion-resistant) and NEMA 7 (hazardous-location Class I Div 1) are the Oil & Gas standards.

T-code. Temperature code per NEC. Indicates the maximum surface temperature of the fixture under normal operating conditions, matched against the auto-ignition temperature of the site's hazardous materials. T3 (392°F / 200°C) is the most common in Oil & Gas operations.

Top Hat Retrofit Adapter. Cooper Lighting Solutions / Nematlux adapter that allows the Nematlux LED platform to install directly into existing Eaton Crouse Hinds hoods without disturbing conduit, mounting infrastructure, or junction boxes.

Turnaround. Scheduled facility outages for major maintenance, inspection, and repair. Also called T&I (turnaround and inspection) or TAR.

COOPER LIGHTING SOLUTIONS RESOURCES

The resources below are recommended starting points for project teams scoping an Oil & Gas turnaround lighting conversion. Application engineering involvement is highly recommended during the Engineering phase.

- **Application engineering.** Supports fixture selection, photometric layout, AHJ submittal preparation, and procurement timeline planning. Engage 9 to 12 months pre-turnaround.
- **Nematlux hazardous-location portfolio.** EXC (Class I Div 1), MR, XR, AR, BL, NL, JR, ZLM, GS, and LS platforms. Top Hat Retrofit Adapter for legacy Eaton Crouse Hinds hood compatibility.
- **Metalux indoor industrial portfolio.** UHBS2 round LED high bay. NEMA 4X, IP65. Five-year limited warranty.
- **Streetworks outdoor industrial portfolio.** Pole-top, post-top, and architectural lighting for perimeter, access roads, parking, and visitor areas.
- **Sure-Lites egress and emergency.** NFPA 101-compliant emergency and exit lighting.
- **Five-year limited warranty.** Applied across the Nematlux hazardous-location portfolio and the Metalux UHBS high-bay platform. Specific warranty terms vary by product family.

HOW TO ENGAGE

Project teams scoping an Oil & Gas turnaround lighting conversion are encouraged to engage Cooper Lighting Solutions application engineering early in the pre-turnaround planning window. Phase 1 engagement is typically a portfolio fit review and an initial retrofit eligibility assessment. Phase 2 engagement is the working partnership on the fixture spec package, photometric layouts,

and AHJ submittal preparation. Phase 3 engagement is execution support and crew briefing content.

Contact Cooper Lighting Solutions at cooperlighting.com to start the conversation. Project teams should be prepared to share the fixture inventory, the maintenance baseline, the AHJ classification flags from Phase 1, and the scheduled turnaround date.

The fixture is not the project. The window is.

ABOUT COOPER LIGHTING SOLUTIONS

Cooper Lighting Solutions, a Signify business, provides industrial lighting platforms for Oil & Gas, manufacturing, infrastructure, and commercial applications. The portfolio includes Nermalux hazardous-location LED, Metalux indoor industrial, Streetworks outdoor industrial, Sure-Lites egress and emergency, McGraw-Edison outdoor, HALO and Eaton heritage brands, and Lumark commercial outdoor lighting. The portfolio supports a five-year limited warranty for most product families. Specific warranty terms vary by product family.

This guide is provided as a planning reference for project teams scoping Oil & Gas turnaround lighting conversions. The framework is general. Fixture selection, classification decisions, and AHJ submittal preparation for any specific project require engineering review.