



Due diligence – health and safety: a performance review, and what next?

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Abstract

Across multiple jurisdictions, health and safety due diligence by company officers is a legal expectation and a core governance activity, widely recognised as a good for demonstrating care and engaging the workforce while improving business performance. It is also a recent arrival to the due diligence family: a legal defence in Canada in 1978, a deemed and then defined duty in Australia, a statutory duty in New Zealand from 2015.

This paper reviews what health and safety currently brings to the top table and what can be done to improve its contribution. Two assessments are applied, the first built from case law and the second from director, regulator and sector guidance. Their findings are consolidated and benchmarked against the structures and processes found in finance, the due diligence family's founding member (Carruthers & Espeland, 1991).

The review identifies health and safety as the due diligence outlier: the only officer duty not discharged from records kept in the course of the work. Four themes emerge. Expectations are demanding more of officers: not what they believe about operational controls, but how they know. Health and safety has imported the intent, the vocabulary and some of the assurance apparatus of finance, but not its foundational infrastructure. The solution is operational, not safety. And the absent infrastructure is operational records built from field data.

Verification alone will not realise the opportunity. The required pivot is to capture task planning and execution as the work is done, so that each task is booked against the specification it was performed to. With the focus on the controls for energies that cause harm, discrepancies surface from the record itself and can be managed, without imposing unnecessary burdens on field staff. The officer's duty is then discharged from the same record. The paper concludes by explaining how an operational ledger that starts digital can deliver this outcome.

Keywords: due diligence health and safety; officer due diligence; operational ledger; field data; verification; critical risk

1.0 Introduction: the duty without its books

It is instructive to begin with a short history trip on the origins of financial due diligence. In response to the great crash of 1929 the United States Congress passed the Securities Act in 1933, and with it the due diligence defence (Securities Act of 1933, s 11(b)). This became the foundation for financial due diligence, and it consolidated centuries, if not millennia, of business practice for managing and demonstrating financial performance through the books.

The record in finance is the ledger. Its power is double entry: every transaction is booked twice, from both sides, so that the books check themselves and a discrepancy surfaces without anyone auditing. Codified in Venice in 1494 and unchanged in principle since, double entry did more than count. It let people who were not there trust what the people who were there had done, and it was the instrument by which a venture persuaded its backers that it was legitimate (Carruthers & Espeland, 1991). That is the position an officer is in. The 1933 Act did not create the record; it made the record the ground on which the duty was discharged.

The drivers for financial due diligence rest on society requiring a company to apply accepted accounting standards, so that investors and others can understand the financial position before they commit. While not a guarantee, the approach at its heart establishes a set of books validated by audit, signed-off public reporting and related assurance. In New Zealand a company officer holds foundational duties for not trading while insolvent, financial reporting, disclosure and fair dealing, tax, environment and sustainability, anti-money laundering, privacy, and health and safety.

Stating that health and safety is a subset of broader officer due diligence duties is both an obvious and an important first step for this review. The list also exposes a pattern. Every other duty is discharged by using operational records kept for business reasons: solvency from the books, disclosure from the books, tax from the books, climate from metered consumption. Health and safety is the only duty on that list with no operational record beneath it.

This is not a legal review, nor does it offer legal advice; the law is read here for what it requires of a record. But how due diligence – health and safety (DD-HS) developed before its invitation to the top table in New Zealand explains the current state and informs what is possible.

The foundation is a Canadian case, *R v Sault Ste Marie* [1978] 2 SCR 1299, in which a unanimous Supreme Court created strict liability as a middle category between offences requiring proof of a guilty mind and offences of absolute liability. That middle category gives rise to the due diligence defence: the accused avoids conviction by proving, on the balance of probabilities, that they took all reasonable steps to avoid the particular event. It was a pollution case; it introduced due diligence into public welfare regulation, and safety inherited it. Dickson J reasoned that absolute liability adds nothing to deterrence, because a person already taking every reasonable precaution will not take more care when care is no defence. Intent was never the missing element; what the accused had to supply was the evidence of care.

The next development was in New South Wales, where section 26 of the Occupational Health and Safety Act 2000 (NSW) deemed a director or person concerned in management liable for the corporation's contravention, and presumed to share its guilt, unless they could prove that they had used all due diligence to prevent it, or were not in a position to influence the corporation. DD-HS arrived as an undefined standard, established after the event, and had to be proved by the accused. The Occupational Health and Safety Amendment Act 2011 (NSW) replaced deeming with a positive duty and returned the burden to the prosecution, and section 27 of the Model Work Health and Safety Act 2011 defined the duty for the first time. New Zealand adopted it as section 44 of the HSWA, and that is the numbering used from here. Across that timeline the standard tightened at every step while the record available to discharge it did not change.

For DD-HS the New Zealand sequence is important. The Independent Taskforce on Workplace Health and Safety reported in April 2013, recommending an officer due diligence duty (Independent Taskforce, 2013). The same report found that the country lacked the data to know where its risks lay or whether interventions worked. Guidance for directors followed within weeks, and the duty itself arrived in the Health and Safety at Work Act 2015 (HSWA). The pattern then repeated with verification: guidance for officers was available for years before the legal requirement was formalised in 2026, with commencement in April 2027. Notably in New Zealand both the guidance and the legislation are informed by the Pike River disaster.

The chronology matters. If guidance arrived in 2013 and the duty in 2015, and an officer was still convicted in 2024 and lost his appeal in 2026, then neither awareness nor intent nor instruction was the missing element. All three were present, early, and in writing. What the Taskforce named in 2013, and nobody built, was the record.

The review tests that observation in two parts:

1. The officer duty for health and safety was imported without the record-keeping infrastructure that makes it dischargeable, and
2. That gap is now closable.

Health and safety due diligence crossed from securities law as a liability standard, stripped of the accounting substrate that made the duty dischargeable while concurrently serving many other business purposes. The law borrowed the standard and the vocabulary, but a standard is not a system, and the system stayed behind.

Safety could not supply the substrate from its own tradition, because its unit of record has always been the exception, and a discipline that records only failures has no place for books that record the normal. The one earlier borrowing from finance, the injury rate as bottom line, failed statistically and culturally, and this discredited the analogy before anyone noticed that safety had copied finance's reports without finance's books. And until this decade the books were unbuildable: the technology to write the record where the work happens did not exist. It does now.

One important boundary on the argument that follows. The infrastructure is a necessary condition for the officer to know. It is not a sufficient condition for the harm not to occur.

2.0 Method: two assessments and a benchmark

This review applies two assessments and a benchmark. The first, and the most expensive, reads prosecutions of officers under the HSWA and its Australian equivalents for what the court held the officer had to be able to show; the cases are those cited in section 3.1 and Table 1. The second considers what officers are advised to do in governance publications from the regulator, the directors' institute and the Business Leaders' Health and Safety Forum, and from the resources sector. Neither assessment was written as a specification for evidence but when consolidated in Table 1, they produce one. Finance is then used not as a third source of requirements but as a benchmark, to ask what is required of a record before it is accepted as evidence.

Most illustrative examples in what follows are drawn from electricity distribution work, where the author's deployment experience sits. The requirements are not sector-specific, and the resources sector supplies the one complete instance of an operational ledger discussed below.

The test applied to every requirement is task-out: does the process reach task planning and execution, and beyond that the dynamic control of the energies that cause occupational injury, illness and death? If personnel are not exposed to energy above the thresholds that cause injury, health and safety processes are sound; disease generalises the same logic as dose over time. This task-out inversion is the true test of officer due diligence processes and the driver of this review.

For field staff, effective due diligence processes must deliver inbuilt processes that can answer these questions:

As I carry out my work, what are the hazards that can kill me or others?

What are the controls that stop this happening?

What is my role in ensuring and demonstrating that these controls are in place and remain reliable?

What will I do if I think the controls might not work?

And, for supervisors and line managers:

How do I monitor and verify that controls (especially those dependent on the actions of people) are always applied?

(Franklin et al., 2019, quoting the 2016 review)

Two questions for any officer on any site visit distil the test:

Is there a signal that this process is not working as designed, and

Is there a signal when it fails, without a consequential loss?

If the answer to either is no, assurance is running on hope, and due diligence is running on belief.

3.0 Findings as requirements

The two assessments are reported first, their requirements are consolidated in Table 1, followed by the finance benchmark.

3.1 The two assessments

The case law first. Patterns of conviction, of organisations and of officers, confirm the reliance fault line: where information reaches senior decision makers without adequate context, it is not acted upon. That is not a surprise while health and safety performance is measured by the absence of negative outcomes rather than by signals that controls are understood and applied by frontline staff.

We understood our operational and safety risks but as accountable leaders, we could not easily answer simple questions about controls; are they adequately specified, appropriately implemented and how do we know that they are in place?

(Franklin et al., 2019, quoting the 2016 review)

There is a common failure pathway across the cases reviewed, and each step of it has a case attached.

- Standards existed; adherence in fact was not verified. Due diligence is not done “by merely hoping others would or could do what they were told”; it requires review and auditing, formal and random, to ensure the standards set are in fact adhered to (*Daly Smith* [134]).
- The officer was informed, on a schedule, of incidents and audits, and the loss still occurred. Monthly divisional reports, the human resources manager two or three times a week, health and safety a standing agenda item (*Ritchie*). What the officer received was the loss signal; no record of routine work done well existed against which drift could show.
- Where reliance was accepted, it was because nothing could be shown either way. The prosecutor never tendered the minutes (*Doble* [75]); the officer had relied on a conscientious operations manager (*Guilfoyle*). The acquittals turned on the record as much as the convictions did.
- Verification was present, sampled and counted. An observation programme existed and was monitored by the number of observations completed; the loss still occurred (*Gibson*).

Across the pathway, work-as-documented and work-as-done were assumed to be aligned. The signal of the misalignment was inadequate in both quantity and quality: drift went undetected, or its weak signal went unamplified, until loss, and no judgment on design adequacy was possible. Two of these cases were decided under the earlier deemed standard, which the High Court treated as of limited assistance on the facts (*Gibson* (appeal) [103]); the District Court’s point stands regardless, that s 44(4) prescribes the steps those directors were found not to have taken (*Gibson* [67]).

Sampled verification sits at the centre of the pathway. In *Gibson* the programme existed and observation numbers were monitored, and in July 2020 full coverage was attempted, around the clock on every vessel, for one month. It could not be continued: the observers could only be directed outside normal hours for a defined period, and the health and safety function declined to resource it (*Gibson* [274], [278], [291]–[292]; *Gibson* (appeal) [175]).

A safety observation is a glance at a warehouse shelf; the full-coverage initiative was a stocktake; neither is a perpetual inventory. A sample can test a ledger; it cannot be one. Planned task observation is a respectable method with a long pedigree in the loss control tradition (Bird & Germain, 1996, pp. 157–184), and it may establish that people know what is expected of them and how to apply it. But people-dependent processes that control potentially fatal energies need more than that, and observation changes what is observed (McCambridge et al., 2014). A safety observation satisfies the officer that the people in that workplace are competent, and gives no knowledge of what happens when the officer is not there. Verification catches gross issues at the surface, not drift through task steps.

Now the guidance, in four voices: the regulator, NZ WorkSafe position 1058WKS-11 (2019); the directors’ institute, IoD/MBIE (2013) and IoD/WorkSafe (2024); the Forum, Barton (2025a, 2025b); and the sector, ICMM (2015a, 2015b, 2026); with the Independent Taskforce on Workplace Health and Safety (2013) as the founding voice behind all of them.

Read together, the four voices describe the same current state. On measures: injury rates are named as inadequate, with replacements undefined. On method: verification is required to move from identify-and-document to verify-and-act. On mindset: work-as-done must reach the board, and site visits that satisfy neither the duty nor the opportunity are named as such. That description is older than the current guidance. The regulatory tradition has long distinguished active monitoring, which provides feedback on performance before an accident, from reactive monitoring, which reports incidents to check whether the controls in place were adequate (Health and Safety Executive, 1997). The category was specified decades ago; what has delivered it ever since is inspection and audit, which is sampling wearing the name of active monitoring. Between them, the four voices have named the destination with unusual candour. What remains unspecified is the infrastructure by which any of it is to be delivered.

Both assessments have limits. Case law examines what the law requires, not what the work requires; it looks backwards, sees only the cases that were charged, and for DD-HS deployment there is usually a serious workplace injury or death. The governance publications describe destination and comfort at a point in time, with no ability to compel and without a route for user experience, positive or negative, returning to the authors. This is a sector-level fractal of the deployment without feedback of well-intentioned procedures.

3.2 The requirements consolidated

The two assessments approached the duty from opposite ends. The courts supply the standard of proof and the consequence: what an officer had to be able to show, and what followed when they could not. The guidance supplies the direction and the method: what officers are told to do, and by what mechanism. Neither was designed to produce a specification. Taken together, they do.

Table 1 carries every requirement once, with both anchors named. Where a conviction and a good practice guide demand the same thing, the requirement is not a matter of interpretation. Where one source is silent, the silence is recorded, because it tells you which source has thought about the record and which about the activity. The requirements also interlock: aggregation and reconciliation both depend on a single trustworthy entry, and a trend assembled from untested findings is only a trend in what people wrote down.

The assessment is diagnostic rather than scored. Column two describes how each requirement is typically met at present; column four states the condition any process would need to satisfy it, deliberately without prescribing a system, which leaves the field open to solutions beyond the examples that inform this paper.

Column three is offered as evidence that the requirement has already been solved in a domain where officers carry a comparable duty. The comparison is warranted, as the regulator's own guidance, quoted approvingly by the High Court on appeal, places the officer's health and safety enquiry on an equal footing with the tracking of financial performance. What has never been asked is what finance has that makes such tracking possible.

Read across, the table builds a specification based on:

- Five requirements are demanded from both directions: adherence in fact, unfiltered arrival, a failed check carried to close-out, the officer's own enquiry, and concentration where the energy is greatest. On the measure, the guidance names the requirement and *Gibson* shows what happens without it.
- Three requirements are demanded by the courts and appear nowhere in the reviewed guidance documents: the record is made at the time, its absence is distinguishable from silence, and capability is confirmed in the task. The first two are properties of an operational record, not of a safety programme.
- On one, the two assessments pull apart: the appeal court holds that conformity with the sector is no defence, while general governance guidance encourages benchmarking against it.

Both sources stop at the same place. They state the question an officer must be able to answer, and neither says what the officer must hold in order to answer it. Applied through a verification lens, work-as-done and variation from design, the guidance names the requirement plainly, without specifying how the answer is to be recorded and managed. That is the gap this paper seeks to address.

Table 1. Requirements for officer due diligence evidence, derived from case law and from guidance, with the current state of practice, the finance benchmark, and the condition any process would need to satisfy each requirement. Rows are ordered by provenance: demanded by both sources; by the guidance, with the law supplying the instance; by the law, with the guidance silent; and one on which the sources diverge.

Requirement, and where it comes from	How it is met now?	The finance benchmark	What would satisfy the requirement?
Verification that processes are not only provided but adhered to in fact; from 1 April 2027, a duty to verify in its own right. <i>Law:</i> s 44(4)(f); s 44(5); <i>Gibson</i> [80]; <i>Kenoss</i> ; <i>Daly Smith</i> [134]. <i>Guidance:</i> WorkSafe (2019); IoD/WorkSafe (2024) p. 9; ICMM (2015a, 2015b, 2026), identify-and-document to verify-and-act.	Sampled verification and site visits, which catch gross issues at the surface, not drift at the edges. A programme can be shown to exist; a visit records a satisfactory finding; nothing independent records what the task required.	Continuous recording, with sampling used to test the record and never to be it. Under double entry an entry is trustworthy only because something else must agree with it.	Confirmation generated by the work itself, at the frequency the work occurs, recorded against the specified control.
Field information reaching the officer unfiltered, with any reliance shown to have been reasonable; work as it is actually done reaches the officer directly. <i>Law:</i> <i>Gibson</i> ; <i>Bekier</i> ; <i>Ritchie</i> ; <i>Doble</i> ; <i>Guilfoyle</i> . <i>Guidance:</i> WorkSafe (2019); IoD/WorkSafe (2024) pp. 32–33, 46–47.	Reports assembled upward through management layers, each summarising the one below; fidelity degrades upward. Site visits are episodic and mediated by whoever selects the site and the day.	The officer reads entries made by the people who did the transactions and can follow any figure back to its origin. No one summarises the ledger on the way up.	The officer can reach the original record, not only its summary.
A control found wanting generates a record of what was done about it, carried through escalation and close-out. <i>Law:</i> s 44(4)(d); <i>Downer EDI Works</i> (the Zagaretos case). <i>Guidance:</i> ICMM (2015a, 2015b, 2026), the “act” in verify-and-act; IoD/WorkSafe (2024).	Corrective actions tracked in incident systems. A failed verification is often not an incident, so it leaves no trace.	An exception is an entry. The discrepancy is recorded, not only its resolution.	Failure and close-out recorded as linked entries, with the gap between them visible.
The officer’s own record of asking, knowing and acting, distinct from the organisation’s systems. <i>Law:</i> s 44(4); <i>Gibson</i> [80]; <i>Gibson</i> (appeal) [162]; <i>Daly Smith</i> . <i>Guidance:</i> WorkSafe (2019), ask, obtain credible information, follow up and challenge; IoD/WorkSafe (2024) self-assessment.	Board minutes record decisions rather than enquiry. Director field visits produce an impression, sometimes a note, and no durable record of what was asked or what came back.	Maritime New Zealand guidance, quoted approvingly on appeal, puts the officer’s health and safety enquiry on an equal footing with tracking financial performance.	Information of a standard the officer could follow up and challenge, traceable to source.
Verification aimed where energy is highest and control hardest, with the control tested in those conditions rather than the conditions it was designed for. <i>Law:</i> s 44(5); <i>Farrell v Jackson</i> (SafeWork SA, 2026). <i>Guidance:</i> ICMM (2015a, 2026); IoD/WorkSafe (2024), self-assessment and work-as-done; Bird & Germain (1996), pp. 129–156.	Rostered verification lands on daytime, planned, accessible work; after-hours, unplanned and poor-weather work is the least verified and carries the most energy. Pre-start checks can record non-compliance, but not unworkability.	Assurance is directed by materiality, concentrated where misstatement would matter most; controls are tested at the transaction, not at the policy.	Coverage shown against the energy and conditions of the work, so that a control which works in fine weather and fails in the wet is distinguishable from one that simply works.

Requirement, and where it comes from	How it is met now?	The finance benchmark	What would satisfy the requirement?
A measure of control performance able to replace injury rates, and which does not degrade when it becomes a target. <i>Law:</i> Gibson supplies the instance: observation counts monitored in place of control performance ([274]; appeal [175]). <i>Guidance:</i> Independent Taskforce (2013), Finding 7; IoD/WorkSafe (2024) pp. 8–10; ICMM (2026); Barton (2025a).	Injury rates supplemented by activity counts. One measures outcomes too rare to steer by; the other measures effort, and attached to a target it produces the number and says nothing about what was found.	The accounts report position and flow continuously. You cannot hit a revenue target by writing more invoices, because the entry has a counterparty.	A measure of control performance that moves with the work and is a by-product of it, so that the only way to raise the number is to do the work.
The record made at the time of the work, not assembled afterwards. <i>Law:</i> s 44(4)(f); Gibson [80]; Evidence Act 2006 (NZ), s 19. <i>Guidance:</i> silent.	Field paperwork completed at shift end or back at the depot and consolidated at period end, made after the work, sometimes by someone who was not there.	The business records exception rests on entries made at or near the time, in the ordinary course. The timing earns the record its standing.	Entries made at the point and moment of the work, not alterable afterwards without the alteration itself being an entry.
Verification must distinguish a control's absence from its silent success. <i>Law:</i> s 44(4)(f); s 44(5); Gibson; Farrell v Jackson. <i>Guidance:</i> silent.	Observation programmes record only what was watched; silence is ambiguous between no event and no signal. In Gibson, the organisation's own board report had said its incident table was likely not reflective of actual events for lack of reporting (appeal [183](e)), and full coverage, when attempted, lasted one month ([291]–[292]).	A missing entry is itself detectable, because the record is expected to be complete.	A signal on non-completion, aggregated so a pattern can be read against its cause: not implemented, or implemented and not workable in the conditions.
Capability confirmed against real conditions, not against training records. <i>Law:</i> the Queensland tyre deflation device prosecution (OWHSP, 2024). <i>Guidance:</i> silent.	Competency matrices and refresher schedules record attendance and currency, not whether the person can do the task in the conditions they meet.	Qualification is necessary but the work is still tested: the audit tests the output, not the accountant's certificate.	Capability recorded as demonstrated in the task, not only as credential held.
Evidence that stands on its own record, not on what the sector does. <i>Law:</i> Gibson (appeal) [129], [158]. <i>Guidance:</i> general governance guidance encourages benchmarking against peers (IoD, 2021); the health and safety guidance is silent.	Benchmarking against peers shows where an organisation sits, not whether its steps were sufficient.	The accounts are tested against a standard and the entity's own transactions, never against comparable firms. The question is whether the record is true, not whether it is typical.	Evidence readable on its own terms, without reference to sector comparison.

3.3 The finance benchmark

Why use finance as the benchmark in a review of health and safety due diligence? Because finance has been at the top table since long before safety was invited to it. Every officer's fundamental duty is to operate an organisation that remains solvent, and the discipline that discharges that duty daily does so from records written by the people doing the work. Those records are readable by people who were not there, durable as memory, and accepted as contemporaneous evidence. Due diligence itself is derived from finance: the term, the intent and the assurance apparatus crossed from securities law, and this review benchmarks the duty against the discipline that built it. The Taskforce reached for the same comparison, recommending that directors' health and safety duties be as strong as their other fiduciary duties (Independent Taskforce, 2013, p. 22).

Asked what it requires of a record before it is accepted as evidence, finance answers with the ledger's seven properties, and they are column three of Table 1 read down:

1. the entry is authored by the person transacting, at the moment of the transaction;
2. it is classified at source against a defined account;
3. it can be followed back to its source: who made it, when, and from what;
4. the normal is booked, so that a missing entry is a finding;
5. it is aggregated without re-authoring;
6. it is reconciled continuously against independent records; and
7. position at a date and performance over a period are derivable from the same books.

The first six make a record trustworthy. The seventh makes it a ledger. The record does not only say what happened; at any moment it states where things stand, and it does so without anyone assembling it, because every entry updates the position as it is made.

Its comparability is of meaning, not of outcome: a shared convention lets an entry mean the same thing in any firm, and the audit still tests each firm's own books. All seven reappear in section 4.5, among the characteristics of the record this paper goes on to describe. That section adds three more: energy status carried in the workflow, a record designed to support the field, and a reading that returns to its author. Those three are about people. Money does not need persuading to be counted.

The financial benchmark's strengths are universality, scalability, service to multiple users, and a mature infrastructure of standards, profession, assurance and evidentiary status. Safety is not being asked to invent this, only to borrow, adapt, and apply for equivalent DD-HS outcomes.

The benchmark has limits. The operational transaction is harder to record: not money and goods, but task planning and execution, including how energy is managed. There is no common unit, because energy in a task is not fungible; comparability in safety can rest only on common categories and recognition rules, never on a common number.

Books do not guarantee truth; Enron had books. What they deliver is detectability and attribution: Mainzeal's books recorded advances that could not be recovered and, read properly, showed insolvency from 2005; its directors traded on oral assurances of support instead; and a decade after the collapse the Supreme Court held all four to what the books had recorded (*Yan v Mainzeal Property and Construction Ltd (in liq)* [2023] NZSC 113).

And financial due diligence, as an event, does not transfer. It is done to a company by an outsider, once, for a transaction, and it works only because the books were already there to be read. The officer's safety duty is continuous and internal, and its outsiders, the inspector after the incident and the court after the death, arrive to find no record and reconstruct one from interviews and papers. In *Gibson* the CEO's own reports to the board were located in a board member's files while he was under cross-examination (*Gibson* [274], n 187). The record has to exist before anyone comes to read it, and in safety nobody comes until it is too late to write it.

Applied to safety's conventional artefacts, the seven tests fail early and at different points; each artefact is a fragment of a ledger, stopped at a layer, and the pattern is the diagnostic finding. Risk registers name the control and stop before its deployment; reviewed periodically, they cannot specify what has to go into the field. Bowties reach the specification of controls and stop before the task; when used to guide frontline decisions, they generate no signal beyond a sampled verification. Procedures set the specification and are not designed to receive a monitoring signal, so an implementation problem and a design problem look the same. Monitoring is present and points upward: bolted on, generic, unlinked to the artefacts above it, demanded as evidence that all is well and returning nothing to the site. It is active monitoring attempted without a record to write to. Safety reports one line of a performance statement with no books beneath it, and never states its position. The finding is not that safety lacks data. It is that safety lacks entries.

4.0 The form of the ledger

4.1 The entry

The transaction is the planned and executed task. A task is an event, not a category: when a crew plans and executes a job, the work order, the assets and vehicles in use, the people assigned, the location, the activity and the outcome required are bound together, because the work itself binds them. Within the task steps sits the application of controls for critical risks, which at this level present mostly as energy hazards.

Operations already runs every task through a process. Work is approved, planned, scheduled, resourced and executed, a sequence this paper takes from the Business Process Framework developed for AngloGold Ashanti under Project ONE (AngloGold Ashanti, 2011; M. McAlear, personal communication, 2011), and the process organises decisions, materials and people to get the work done.

The operational ledger is the record of that process being applied, and it is also confirmation that what the process assembled was present when the work was done: the people and their competence, the equipment and its checks, the isolation, the materials, the controls. The control is specified for an energy; it is applied in conditions, and conditions are more than weather: the ground, the light, the traffic, and the public walking past a work site in a town, whose safety is part of the task.

Where work is recurrent rather than discrete, such as driving between jobs or working in a public corridor, it is booked as a practice at the level of its phases rather than decomposed into an unbounded set of steps, a distinction the loss control tradition drew decades ago (Bird & Germain, 1996, pp. 129–156).

The conditions can change during the task, so assumptions are entered at planning and adjusted if required during execution. And because many of the controls that matter most are people-dependent and transitory, the record must be continuously written, not annually compiled. The same control is a fixed feature of planned work in a substation and a decision made in the dark, in the rain, beside a road, when a fault is repaired in a storm.

4.2 Double entry applied to work

What the sector has now is instruction and hope: day planning, procedures and task instructions that are invitations to do the right thing, and workers approving their own start-of-day hazard assessment. Without double-entry verification they remain invitations. Single entry is not dishonest but it is a record that cannot detect its own errors, and the equivalent in financial terms is not knowing your position until you can no longer meet your obligations.

Double entry, applied to work: the first entry is the crew's record of execution, authored at the task. The second is the requirement it is booked against: the specification, authored in advance by the organisation. The task records the work; the specification is what it is booked against, and divergence surfaces from the record itself. That divergence is work-as-documented against work-as-done, and it appears as a matter of course rather than as a finding in a serious incident investigation.

Two further layers sit above the entry. Independent records that must agree are the reconciliation, finance's cash book against the bank statement. For example, in an electricity distribution business the available pairs include control's isolation log against the crew's workflow record, and the vehicle pre-start check against the vehicle's telematics. Together they establish the denominator that a single record cannot: control's log says how many isolations were issued, so the workflow record can be tested for the jobs with no entry, and the two accounts of each job are triangulated rather than trusted. And the reading returns to the author: photographs and an after-action narrative of how the job went are not counter-entries, they are what makes the record worth writing for the person who wrote it.

4.3 Whose record it is

The ledger's owner follows from its readers. There is no such thing as a safety ledger. There is an operational ledger, and safety is one of its readings: whether the controls for critical risks were applied, on every task, and not only on the ones somebody watched.

The reason the rest of the record does not behave that way is not neglect. Capacity for several readings is the thing safety never had, and never demanded. Operations demands enough to do operations, and safety takes the crumbs. What a line mechanic crew traditionally delivers is that the job is done: the power is on, the crew has been out and come back. It is really just outcomes, with the major outcome being that service to consumers continues. An operational ledger is the opposite: built to be read many ways, by maintenance for equipment condition, by logistics for what was drawn from stores, by training for competence in use and owned by none of its readers.

Safety is not the transaction. Nor is critical control verification, or task planning, or the recording of work execution. But they constitute how the transaction was performed, and captured in an operational ledger they answer questions from every function that needs to know how the work was actually done. When demanded through bolted-on processes, each delivering a fragment unlinked to the operational record, they are resisted by the people in operations who have to deliver what they consider their main outcome. The solution is to help them deliver that outcome in a way that makes their job easier, and which captures other metrics and demands. That is the transition to a ledger approach.

For the person at the energy interface the transition is concrete. For that line mechanic it connects task planning and execution: recording the equipment in use, confirming the competencies of the people operating it, checking with control about isolating power sources in a disciplined way, and replacing paper checklists with their actual workflow. It provides reminders of key controls, such as using chocks, managing a crane where you cannot put all the jacks out and maintaining distance from live conductors, and uses photographs and speech-to-text to record conditions. Notably, it replicates the digital processes they already use in their personal lives.

At a task level the person becomes both a sensor and a local processor, and providing that the workflows are co-designed, accepted, and can be improved by field staff, this people-centric design introduces the capacity to self-monitor and record that tasks are being completed to standard, while providing precise and contextual information to decision makers at supervisor, manager, senior manager and director levels (Boyle et al., 2024).

The first phrase carries more weight than it appears to. The first reader of an entry is the person who wrote it. The crew member checks their own work against the standard, at the moment, before anyone else sees anything. A check that begins with the self is not directed at anyone, which is why the design does not read as surveillance to the people inside it. Nobody is watched as an asset to be controlled; field personnel are supported to make good decisions, and the trustworthy record is a by-product of doing exactly that. For fixed, non-discretionary controls a sensor is better than a self-report; the claim here is about people-dependent controls, where the control reliability pivots on judgment, experience and consistent decisions.

4.4 Fragments, and what digital connects

Ledgers, or fragments of ledgers, are already deployed in operations, and there are two points to make. The first is that safety's own artefacts are fragments of a ledger, each stopped at a layer. The risk register identifies controls but without specifying field deployment. The bowtie considers events but is not operationally integrated with the task. The procedure sets the specification and is not built to receive a monitoring signal. Monitoring is present and points upward. Laid end to end they are the layers of one record, and nobody has joined them. The second is that operations already keeps books as part of doing the work: the isolation log, the maintenance record, the work order, the stores count, the vehicle check, the competence record. Each is kept by a different function, and none of them by safety. Mining keeps a complete operational ledger for one energy source, the explosives magazine reconciliation, kept by the people doing the work, and nobody calls it bureaucracy. The question is why chemical energy earned books and gravity did not. The operational leader already runs these processes and the capability sits with operations; the challenge and opportunity is to capture and log task sequence details.

What paper-based segmented systems could not do, and digital can, is to connect the fragments. The entry can be made at the point of work, by the person doing it. The specification can be carried into the workflow, so that the second entry exists and the first is booked against it. The reading can return at the tempo of the work, at day's end, to the people who wrote it. And records never designed to speak to each other can be reconciled, which is the reconciliation described above. Digital does not add a fragment. It connects the fragments that operations already keeps, and the connected record is what meets the properties in Table 1. It is why the gap is closable now and was not before.

4.5 What an operational ledger must deliver

Ten minimum characteristics follow from the assessments and the benchmark. Each is an exclusion test: it identifies what is not a ledger, however good. Table 1 rows are referenced where a characteristic answers a requirement directly.

What an entry must be.

1. **Produced while doing the work.** Contemporaneity and authorship together. (Finance: the entry standard. Table 1, row 7.)
2. **Carries its own derivation.** Who, when, where, under what conditions, against which version of the standard. (Finance: the journal reference. Row 2.)
3. **Cannot be re-authored on the way up.** (Finance: segregation of duties. Row 2, *Bekier*.)

What the record must do.

4. **Links to operational standards.** Every entry traces to a requirement. (Finance: the chart of accounts and the three-way match. Row 1.)
5. **Absence is itself a signal.** The record shows what should have been done and was not. (Finance: recording the normal. Row 8.)
6. **Reconcilable against independent records.** (Finance: reconciliation. Row 1.)
7. **Built-in energy and conditions status.** Energy status and the conditions the control meets, carried in the workflow as the task proceeds. (Row 5; the task-out test.)

Who it must serve.

8. **Designed to support the field.** If it does not help the person doing the work, it competes with the transaction and loses. (The field-staff questions in 2.0.)
9. **Serves multiple functions and inquiries** beyond the immediate management outcome. (Finance: two derived statements from one ledger.)
10. **The reading returns to the author.** A record that pays nothing back results in malicious compliance. (Rows 3 and 6.)

Consistent categories and recognition rules are essential to all of this, but they are not a property of the ledger. Specifying them is the safety profession's contribution, and section 6.2 returns to it.

5.0 Demonstrability

The officer's duty stands on its own footing. The PCBU's primary duty and the officer's duty under s 44 are separate duties, separately prosecuted, and they can be decided differently on the same facts: an organisation may be convicted where an officer is not (*Kenoss*), and an officer may be convicted where the organisation's systems were extensive and well resourced (*Gibson*). That is what makes the record personal. If the officer's conduct is examined on its own terms, the officer needs evidence of their own diligence, and no organisational safety report supplies it.

Three grounds follow from Table 1: contemporaneity answers row 7, aggregation rows 1 and 8, and traceability row 4.

Contemporaneity is the first ground. It is not archaeology; it is a record made at the time.

The second is aggregation. Across many records, a process can be shown to have been absent in the one instance where someone was injured, and applied, monitored and corrected everywhere else. This is not aggregate performance offered in place of a specific failure; *Gibson* is clear that the charge is per risk and that conformity is no defence. It is evidence about the state of the officer's assurance, which is what the duty asks about.

The third is traceability. The record comes from a workflow that traces backwards into company requirements, standards and procedures, and beyond that to the legal expectations. The entry does not merely say what was done; it says which requirement it was done against.

The obvious objection is that the same record which shows the system working also records every gap it detected. The difficulty of obtaining presence-of-controls data has long been recognised (Conklin, 2012). An organisation that finds gaps and closes them is discharging the duty, and the record shows it doing so. The alternative, a record in which nothing can be discovered, is not a defence but the absence of one.

The real exposure is therefore not the recorded gap but the recorded gap left unactioned, and the design has to answer for it: dashboards that drill down to the operational record, drift reporting, and the same data serving reports at every level. A dashboard number that cannot be opened is a report; a number that can be opened to the operational record that produced it is a balance. In *Gibson* the CEO's observation figures came from a dashboard, and the reports carried counts and no analysis of what the observations revealed ([274]).

The officer's own entry follows the same rules. It is their verification, and it has three parts: field checks captured in the workflows; logging in and reading the aggregated record across many tasks; and, most particularly, confirming that their supervisors are reading the operational logs and acting on crew performance. The officer verifies the system, not the control. Their entry records that the process which confirms the controls are applied is in use, and that is the honest scope of a reasonable officer of a distributed business.

6.0 What it delivers, and for whom

The gap was never intent; it was systems architecture. A business whose people work dispersed across complex industrial environments has a management challenge before it has a due diligence challenge. Solving the management challenge largely serves the due diligence outcome. That order matters: the record is built for operational reasons, and the demonstration falls out of it.

The bureaucracy objection has to be met on the same ground. Preparing frontline digital workflows declutters procedures: you still need the outcomes, but you deliver them in a format that matches the digital age and the life experience of the users. Trust and verify are not in tension when the record is the worker's own; the verification is theirs before it is anyone else's. The paperwork already exists, in procedures nobody reads at the point of use and in monitoring that feeds the beast; this is substitution, not addition. Mature verification products exist and are widely deployed, and the discipline they have brought to critical control verification is real. But the checklist is a record of its own, kept alongside the work rather than booked into it, which is why the output is a compliance rate and never a position. That is the checklist feeding it. The explosives magazine reconciliation settles the principle: burden is not a question of volume but of whether the record serves the person writing it.

The burden objection deserves further examination. Almost nothing proposed here is new collection: the isolation log, the vehicle check and the competence record are already required, and an exclusion zone under a suspended load is already specified in advance of the lift. Their absence has been tolerated rather than remedied. What is new is that the records connect, and connection is the one thing paper could never deliver.

The test that matters is whether operations would keep the ledger if the duty were repealed. In the author's experience, senior operations managers describe the approach as helping them sleep at night. Nobody sleeps better for having discharged a duty; they sleep better for knowing what happened today across an operation they cannot see.

6.1 The ladder

For the person at the energy, the ledger is an aide-mémoire, a prompt for working the right way, and a way of demonstrating their professionalism. There is pride in developing workflows for their peers, and in capturing decades of know-how that no procedure holds. It is also something to demand: the support that lets them show, through task planning and execution, that the energies which can kill, maim and compromise their health are managed.

For the supervisor, who is the leverage point, the value is reach. The supervisor knows intimately what the field crew should be doing, and reviewing the operational logs generated when crews sync their tablets extends their span of management: whether a new starter or new supervisor is delivering to the quality they should, and where performance is drifting off the standard. That is active monitoring as it was specified decades ago: routine, systematic, and against a reference specification. The supervisor always had the judgement; what was missing was the reach.

For the manager, it is data to challenge processes, supervisors made effective years earlier than by traditional means, and cross-connection with the other business processes they oversee, because the record aggregates without being re-entered. Through their own use of field workflows they build their own record evidencing officer due diligence.

For the officer, the difference is what can be said to the board: "This is the count and analysis of how controls for our critical risks are being applied. This is what we see and what we have fixed. This is how we support our people to work the right way."

The readers of an operational ledger are not only these. Asset management reads the same entries as a record of what was done to the asset, by whom, and under what conditions, which is the basis of condition assessment and maintenance planning. It wants that record for its own reasons entirely, and would keep it if safety never read a line.

6.2 The safety profession's contribution

Building this is not a safety task. It is an operational and information systems task, sitting with the people who own the work and the data, and it requires safety people who understand how operations think, because the record they read is an operational one, not a safety one. The profession's own position follows from the assessments: an organisation cannot verify its way to high performance and cannot sustain it through leadership alone.

The profession's contribution is specifying what the record must show, the recognition rules: what counts as an entry, when a control is present, and what good looks like against a critical risk. That is the same relationship the accounting profession has to standards rather than to journal entries, and it is skilled work that nobody else in the organisation can do.

Two extensions follow: designing for absence detection, since knowing what should be there is the profession's expertise; and assurance over the record once it exists: reading it, testing it, challenging it. That is the auditor's position, not the bookkeeper's.

6.3 The close

The failure is one of completeness. The systems were built and the record beneath them was not. Completeness is not a lesser charge: in *Gibson* the systems were present, and the officer could not know they were adhered to in fact. The conviction stands; the diagnosis changes. Safety has never lacked ideas; it has lacked infrastructure to lay them on, which is why forty years of programmes have replaced one another rather than accumulated.

What was missing has already been built in adjacent domains. No board accepts that it believes the books balance. No board now accepts that it believes its emissions are within tolerance. Safety is the one place where the answer is still a belief — and safety never demanded otherwise. Safety fought for a seat at the top table and won it. The seat comes with an obligation the discipline has not yet met: it has to arrive with books.

The price of arriving without them is paid in a particular currency: in financial terms we are forever paying the interest and never the capital, and the blood price is paid at the frontline. Who cares enough? The question came to the author from an operational leader, not from safety, and it sits under everything in this paper.

The question travels the whole organisation, and changes its words at each rung of the ladder, because each asks it of the one below who can answer. The director asks the senior leadership team: can we show how controls for our critical risks are being applied, or only that nothing has been reported? The senior leadership team asks managers: what do we see, and what have we fixed? The manager asks supervisors: are you reading the logs, and what did they change? The supervisor asks the crew: does this help you do the work, and what would make it better? It travels outward as well, to the bodies whose guidance names the requirement, and there it becomes what the guidance would now ask officers to hold.

This review argues that the gap is closable. It does not demonstrate closure. The specification in Table 1 and the characteristics in section 4.5 are testable against any deployed instance, and that test, scored on a stated method with the operator's consent, is the next piece of work.

Every question on the ladder has a second half, and it is the one that demands a date: why do we not have this, and when will we have it?

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The author is principal of a consultancy whose professional and commercial position is that the technical fix for the gaps identified in this review is abundant, contextual, structured and trustworthy field data applied to improve decision making. The assessments and the benchmark cite public documents only.

Role of authors

The author is solely responsible for the conception, argument, drafting and conclusions of this work.

Declaration on the use of artificial intelligence

An AI assistant (Claude, Anthropic) was used between July and September 2026 under the author's direction for background research, citation identification and verification, structural options, editorial assembly and compression of the author's dictated text, and drafting of connective prose and table entries from the author's material. The argument, assessments, findings and conclusions are the author's, and every sentence was reviewed and approved by the author before submission.

Submission declaration

This work has not been published elsewhere and will not be published elsewhere in the same or any other form without the written consent of the NZJHSP. Elements of the underlying case study will be presented at the AusIMM Global Health and Safety Conference, Perth, October 2026. No paper accompanies that presentation, and the journal's guidelines permit presentation of the work as part of an abstract or lecture.

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