KINETIQ ANALYTICS

WHITEPAPER SERIES

MINING / 30 CFR PART 50 / ROOT CAUSE ANALYSIS

Auto-RCA Grounded in the Regulation

How structured root cause analysis actually satisfies an MSHA inspector reading 30 CFR Part 50 against your record.

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SECTION 01

The frontlines you didn't get to inspect

An MSHA inspector arrives on a Wednesday morning. The supervisor pulls the binder. The reportable accident from six months back is the one the inspector wants to walk.

The Form 7000-1 was filed on time. The fields are populated. Date of accident, mine ID, classification, body part, days lost. The quarterly submission for that quarter closed out without a flag.

What the inspector asks for is the underlying record. Who took the initial call. What the miner said in the first hour. The photographs from before the equipment was moved. The corrective action that was supposed to close the loop, and the citation it was written against.

The supervisor who took the report is at a different pit now. The shift foreman who saw the equipment before it was moved retired in February. The corrective-action narrative was typed up two weeks after the accident by someone who was reconstructing it from a text-message thread. The thread itself is on a phone that was reset when the foreman's line was reassigned.

The 7000-1 column was right. The reasoning behind the corrective action was not on the form.

The inspector's next question is the one that decides how the day goes:

> "Walk me through how you arrived at that corrective action. Where does it come from."

This paper is about that question. It walks through what 30 CFR Part 50 actually requires, where most operators get audited, why the root-cause work that is supposed to anchor corrective action so often fails to anchor it, and what a regulation-grounded approach to RCA looks like in the field. The product appears late. The regulation is the spine.

SECTION 02

What 30 CFR Part 50 actually requires

Part 50 is short by federal-regulation standards. It is also one of the rules an MSHA-regulated operator is evaluated against every single quarter, whether or not a reportable accident occurs. The structure is worth reading once a year, the way an inspector will read it.

The reporting and recordkeeping framework, at section level

CITATION	WHAT IT COVERS
30 CFR § 50.2	The definitions. What counts as an accident, an occupational injury, and an occupational illness. The boundary cases are decided here.
30 CFR § 50.10	Immediate notification. The operator notifies MSHA within 15 minutes of the time the operator knows or should know that an accident, as defined at § 50.2, has occurred.
30 CFR § 50.11	Investigation of accidents. The operator investigates and prepares a written report of each accident not later than 10 working days after the accident.
30 CFR § 50.12	Preservation of evidence. The accident scene is preserved until MSHA releases it, with narrow exceptions for rescue, recovery, and prevention of further injury.
30 CFR § 50.20	Reporting of accidents, injuries, and illnesses. The operator files Form 7000-1 for each reportable event, generally within 10 working days.
30 CFR § 50.30	Quarterly employment report. The operator files Form 7000-2 within 15 working days after the end of each calendar quarter, covering employment and production at each mine.
30 CFR § 50.40	Maintenance of records. The operator keeps a copy of each report at the mine office closest to the mine for five years.
30 CFR § 50.41	Verification. The operator allows MSHA representatives to verify reports by examining underlying records, including payroll, medical, and personnel files relevant to the events reported.

None of this is exotic. It is the spine every EHS director at an MSHA-regulated operation already carries in their head. The question for an operator is not whether the framework is known. It is whether the underlying records will hold together the day MSHA asks to see them under § 50.41.

SECTION 03

Where most operators get audited

Quarterly submission and the 15-minute notification line are the visible parts of Part 50. They get attention because they have clocks. The places operators most often get caught sit one layer down.

The “is this reportable” judgment

Section 50.2 sets the categories. The boundary cases — a strain that becomes a restricted-duty entry the next morning, an illness whose work-relatedness is contested, a near-miss that an inspector later classifies as a reportable accident under the definitions — are decided on the operator’s side. An inspector who finds an event that should have been reported and was not will work backward through the underlying records to understand why.

The 10-working-day window on Form 7000-1

Section 50.20 sets the filing window. The operator who waits until day nine is the operator whose record is being reconstructed from text messages and supervisor recollection. The narrative quality suffers in proportion to the gap between the event and the writing.

Narrative quality on the corrective action

Part 50 does not require a corrective-action narrative on the face of the form. The investigation report under § 50.11 is where the operator’s reasoning lives. An inspector reading that report wants to see a corrective action that connects, in plain language, to the specific condition or practice that produced the accident. A corrective action that reads “additional training” without anchoring to a section of the regulation, an operator standard, or a documented hazard is the corrective action that produces follow-up questions.

Citation provenance

Part 50 does not require corrective actions to cite the specific section of 30 CFR Part 56, 57, 75, 77, or 90 that the operator is acting under. Inspectors notice when they do. A corrective action that grounds itself in a specific subsection reads as the work of an operator who knows what they are protecting the miner under. A corrective action that does not, reads as a checkbox.

> The 7000-1 column was right. The reasoning behind the corrective action was reconstructed two weeks after the event by someone who was not there. That is the audit problem.

SECTION 04

How RCA typically fails to satisfy an inspector

Root cause analysis is the work product that produces the corrective action. When the corrective action is contested in a federal review, the RCA is what is asked for. Four failure modes are common enough to be worth naming.

Free-form prose RCA

The investigation report is written as a paragraph. The paragraph contains the immediate cause and a corrective action. The contributing factors and the underlying conditions are folded into the narrative or omitted. An inspector reading the report cannot tell which finding generated which corrective action. The structure that would have made the reasoning legible is not there.

Structured causal analysis done as a checkbox exercise

The operator's template asks the investigator to walk back through layers of cause. The investigator fills the layers because the template demands it. The same phrase appears in three of the four layers. The last layer reads "human error." The corrective action is unrelated to any of the layers. The structure is there on the page; the analysis is not.

Corrective actions without regulatory grounding

The corrective action is written in the operator's internal voice — "retrain on housekeeping," "tighten supervision," "review the JSA." None of these is wrong. None of them connects to a specific obligation the miner is protected under. When the inspector asks which standard the corrective action is satisfying, the operator's answer is constructed in the moment.

The hand-off problem

The EHS director who wrote the RCA leaves the company. The new director inherits a corrective action with no recoverable reasoning behind it. The next inspector asks the same question and gets a different answer. The reproducibility problem is structural: if the operator cannot answer "would you write this the same way today," the corrective action is harder to defend.

None of these failure modes is about effort. The operators we see most often have invested heavily in investigation. The problem is structural — the format the analysis is captured in does not survive the things that happen to records over time.

SECTION 05

A better approach: structured RCA, regulation-grounded

A root cause analysis that satisfies a federal inspector is built on two ideas. Structure beats prose. And every corrective action cites the section of the regulation the operator is acting under.

Structure beats prose

The analysis is captured in four named layers, the same four layers every time, with findings explicit at each:

LAYER	WHAT IT CAPTURES
`Immediate cause`	The condition or act that produced the injury, in the words of the people who were there.
`Contributing factors`	The conditions, practices, or omissions that allowed the immediate cause to develop.
`Underlying cause`	The system, procedure, or culture issue that allowed the contributing factors to persist.
`Corrective action`	The action the operator is taking, the section of the regulation it is satisfying, and the closure criteria.

An inspector reading a record laid out this way can see which finding produced which action. A new EHS director inheriting the record can see the reasoning. A reviewer asking “would you write this the same way today” has a structured answer rather than a paragraph.

Grounding the corrective action in the regulation

The corrective action cites the specific subsection of 30 CFR — Part 56 for surface metal/non-metal, Part 57 for underground metal/non-metal, Part 75 for underground coal, Part 77 for surface coal, Part 50 for the recordkeeping and reporting obligation itself — that the action satisfies. The citation comes out of the operator’s own regulatory knowledge base: the MSHA book the safety department already maintains, the internal SOPs the operator has written, the federal indicator data the operator already tracks. The grounding is not a database lookup against a generic regulation index. It is an output of the operator’s own documented program.

The draft-and-review model

Structured templates and regulatory grounding do not replace the EHS director. They produce a defensible draft. The EHS director reviews the draft, edits it, and signs it. The reviewer is still the judgment layer. The reproducibility — the answer to “would you write this the same way today” — comes from the structure being identical across investigations, not from the draft being mechanical.

> An RCA that an inspector can follow is an RCA that does not require the original investigator to be in the room.

SECTION 06

What this looks like in the workflow

One reportable accident, walked end to end.

1. CAPTURE. The reportable event comes off the field tablet. The miner who was there or the shift foreman who responded first describes what happened, in their own words, while it is fresh. Voice or form. The structured fields populate from the narrative.
2. NOTIFICATION. If the event meets the § 50.10 definition of an accident, the 15-minute notification path is flagged at intake. The notification is logged against the record, not against the inbox of the person who placed the call.
3. INVESTIGATION. The investigation under § 50.11 builds the structured record across the four layers: immediate cause, contributing factors, underlying cause, corrective action. Photographs and witness statements attach to the layer they support, not to a generic incident folder.
4. GROUNDING. The corrective action draft cites the relevant subsection of the operator's applicable Part (56, 57, 75, 77, or 90) and the operator's own SOP. The citation is reviewable against the operator's internal regulatory knowledge base.
5. REVIEW. The EHS director edits the draft, signs it, and routes the corrective action to closure. The closure criteria are explicit.
6. FORM 7000-1. The reportable fields populate from the structured record. The filing window under § 50.20 is tracked against the date of the event, not against the date the form was started.
7. AUDIT LEDGER. Every view, every edit, every escalation is captured against the record. When the supervisor changes, when the EHS director leaves, when the corrective action is closed — each is a logged event. The chain of custody under § 50.41 is preserved.

The output the inspector sees is the Form 7000-1, the investigation report, and the corrective action. The output the operator sees is a record that survives the people who produced it leaving the company.

The Part 50 reports stop being a quarterly fire drill. They become a continuous output of the work the operator was already doing.

SECTION 07

What this is

A few boundaries worth being explicit about.

This is a structured way to capture root cause analysis that an MSHA inspector can read. The structure makes the operator's reasoning legible. The grounding makes the corrective action defensible against the section of the regulation it satisfies. Together they make the record

reproducible — the next investigator, the next director, and the next inspector can all reach the same understanding from the same record.

The judgment about whether an event meets the § 50.2 definitions belongs to the operator's qualified safety professional. The judgment about which subsection of Part 56, 57, 75, 77, or 90 a corrective action is satisfying belongs to a person reading the regulation, not to the form. The interpretation of any specific event against the rule belongs to that person and, ultimately, to MSHA.

What a structured, regulation-grounded RCA does is make those judgments easier to capture, easier to review, and easier to defend. The operator's safety program is still the operator's safety program. The platform supports the program. It does not replace it.

The forms generate from the structured record. The structured record is the asset.

SECTION 08

About Kinetiq Nexus

INDUSTRIAL EHS / MINING

Built for the frontlines, grounded in the regulation.

Kinetiq Nexus is an industrial EHS platform built for operators whose safety record is evaluated against the federal regulation. Auto-RCA produces a structured immediate / contributing / underlying / corrective draft for every reportable event, with each corrective action cited against the operator's own regulatory knowledge base. Federal Safety Indicators ship out of the box, with MSHA Part 50 production-rate and incidence indicators filterable by mine type, so the operator's benchmark view is ready on day one. Voice-to-incident capture happens on the frontlines on a field tablet, so the miner's own words go on the record. The audit ledger captures the chain of custody and survives the supervisor leaving.

Single-tenant deployment in the United States or Canada. Patent-backed field hardware. A platform built because the existing tools were not meeting the operators who needed them most.

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DISCLAIMER. This document is intended as a general regulatory-education reference for mining safety and compliance leaders. It is not legal advice and does not constitute a per-site regulatory determination. References to 30 CFR Part 50, Form 7000-1, Form 7000-2, and the underlying definitions are paraphrased for clarity; the controlling text is the public regulation itself, available at ecfr.gov. Operators are responsible for their own compliance program and should consult qualified safety counsel and the Mine Safety and Health Administration for site-specific application. Nothing in this paper should be read as a representation that Kinetiq Analytics or its software brings any operator into compliance with any regulation. Issued May 2026.

Kinetiq Analytics. Industrial EHS software for the frontlines.