

# ROOT CAUSE EXPERT

FOR PRACTITIONERS AND THE MANAGERS WHO DEPEND ON THEM

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## Notes From the Road

*“Decisions generally reflect a strong priority on nuclear safety, although the site has not always recognized and then acted upon, issues which, in retrospect, required closer line management oversight.*

*“Decision makers have not always made their reasoning explicit and transparent, e.g., for eliminating items from out-of-age scope or taking no action on a condition report.*

*“This has led to possible misinterpretations by the workforce.”*

Quote from a recent independent safety culture assessment submitted to NRC.

How does decision making at your station compare?

Read suggestions on how to assess decision making inside this issue (page 2).

## LOCK IN DURABLE CORRECTIVE ACTIONS

Last winter a site vice president requested a review of the corrective actions resulting from about 100 condition reports (CR) in two functional areas. Like many nuclear executives, he was seasoned from plant turnarounds, and he was especially interested in the sustainability of actions proposed by CR evaluators, accepted by implementers, and endorsed by the corrective action review board.

As I worked through the batch of CRs, I reflected on other safety culture-related assignments from the preceding year or so, and I realized that long-term corrective action viability had a strong correlation with safety culture.

Plants with robust – or improving – nuclear safety culture tended to implement **durable** corrective actions that stood on their own legs.



Stations (or departments within stations) that needed improvement seemed to shy away from such responses.

In this case, only about 20 to 50% of the implemented corrective actions were **durable**. The rest had the potential to wither, shrink, erode, fade, or be forgotten entirely. It was

not surprising that performance in these functional areas had attracted the regulator’s attention.

If even the pyramids of Egypt can wear down, what do I mean by non-durable and **durable** corrective actions?

Please turn the page...

## PREVENT PERFORMANCE ERRORS? YES, YOU CAN.

Many clients and workshop participants believe you cannot prevent recurrence of a human performance-related event (error). Nothing could be farther from the truth.

Human fallibility can never be reduced to zero, and error precursors are tough to eliminate completely. However, savvy root cause practitioners have a battery of options that can prevent a repeat of the

same human-initiated adverse condition.

- Take the human out of the system. Let machines or computers do the work or make the decisions.
- Make the error reversible. Change the process to give the human a chance to discover and recover.
- Divide the consequences into tolerable chunks. Test

completed work in stages before a big failure counts against you.

- Eliminate the task. Regulators and insurers will listen to reason. They want fewer errors as much as you do.

Don’t waste time reinforcing expectations, training all hands, or hoping for miracles from peer involvement. Redesign the task or remove human involvement.

# LOCK IN DURABLE

(Continued from Page 1.)

## Non-durable actions:

1. Add issue to station “top ten” list. The next revision could displace it without closure.
2. Coach. Little or no impact on balance of susceptible population. No lasting process improvement.
3. Create “standing request” and “scheduler note.” Likely to recede into the background.
4. Initiate engineering work request. No benefit unless accomplished.
5. Add new task without revising schedule. Burden could undermine benefit.
6. Assign a collateral duty. No assessment of skills or current workload.
7. Add task to next scheduled evolution. No assurance of sustained performance.
8. Evaluate in future self-assessment. Prolongs agony/delays resolution.
9. Issue direction to “improve.” No criteria for judging success.
10. Publish a “policy memo.” See No. 3.

In contrast, other corrective actions have a strong likelihood of surviving on their own and—very significantly—influencing station performance long after currently involved persons move on.

## Much more durable:

1. Revise fleet procedure. Benefits many plants. Receives corporate oversight.
2. Update drawings and safety analysis/basis. Little possibility of backsliding here.
3. Revise preventive maintenance strategy. High-level, controlled document.

*“We use few of these other words in professional writing, because we know our emotional brain is programmed to react with hostility.”*

## FAILURE—WHAT’S IN A WORD?

Condition reports and evaluations frequently use the phrase “Xxx failed to...” For some reason, even if valid, these three words inspire profound resentment, while a simple “Yyy did not...” is tolerable.

Looking up “fail” and “failure” in a dictionary reveals some clues. Inability to perform or deliver is only half the story. The words’ early Latin and Medieval roots are all about

deceit and disappointment. It seems failure carries quite a strong connection with shame.

I started a page in my notebook with “F-word” at the top.

So far, the list has grown to 26 words beginning with “F” that connote weakness, incompetence, or falsehood—wait, make that 27!

Here they are: fault, flop, flimsy, fallible, fumble, frayed,

flaw, faint, fake, falter, fool, fall, feign, fudge, flounder, flub, flag, flaccid, fallacious, foible, flail, flat, fib, foil, fracture, and founder.

We use few of these other words in professional writing, because we know our emotional brain is programmed to react with hostility.

Stick with the facts, but choose less inflammatory alternatives to “fail” and “failure” also. Your analysis and actions will be easier to sell.

## FOCUS ON DECISION MAKING

Root cause practitioners and their managers must look at any decisions that preceded a significant event or condition, and they must determine if flawed decision making was a cause. Frequently they stop at “operational” decision making, which most stations handle capably with formal procedures and worksheets.

There are many other relevant decisions to consider. People are always making choices, including whether to do anything at all.

Once you have identified the persons involved, you must inter-

view them sensitively to learn how they arrived at their chosen course of action.

Here are some useful questions for your next cause evaluation:

- What qualifications did the deciders have in the subject area?
- What process did they use?
- What information did the decision consider?
- What connection did the people have with internal

and external experience and experts, including vendors?

- What had other fleet plants, including fossil stations, done?
- What pre-event data gave clues about what was to follow? Were they undervalued?
- What pressures influenced the decision?
- Did the decision override anyone’s instincts or better judgment? Why?

# CORRECTIVE ACTIONS

4. Add detail to model work order. Ensures wide application of lesson-learned.
5. Use CAP to track specific component overhauls. Guarantees coverage of potential extent of condition.

**Durable** corrective actions remove failure opportunities—“how the problem happened—and they close loopholes in defenses—“why” it incubated and emerged later as an adverse condition.

Actions that are only “sustainable” may require care and feeding for life. **Durable** actions give you a chance to nail the problem permanently, even at the apparent cause or “broke-fix” level.



*“Actions that are only ‘sustainable’ may require care and feeding for life. **Durable** actions give you a chance to nail the problem permanently...”*

## MOST FREQUENT CROSS-CUTTING ISSUES

Under the NRC reactor oversight program there are 12 human performance (H) and 10 problem identification and resolution (P) safety culture aspects whose repeated citation could roll up to a substantive cross-cutting issue.

Of these, four have been the most frequent in NRC mid-cycle and annual assessment letters through March 2009:

- H.2(c): Complete, accurate documents, procedures, work packages, labeling,
- H.4(a): Communication and use of error prevention techniques,
- P.1(d): Timely, appropriate corrective actions on safety issues and trends,
- P.1(c): Thorough problem evaluations

Citations refer to NRC Inspection Manual Chapter 0305.

The wise practitioner will look for evidence of causes in these aspects, and the prudent manager will respond to any hint of their presence.

**To subscribe to our complimentary twice-yearly cross-cutting issue summary, email [seastate@verizon.net](mailto:seastate@verizon.net).**

## ROOT CAUSE REPORT CHECKLIST

Your root cause guideline and report “grading” criteria require certain topics and specify acceptable detail in them. Compare your list with ours. You may have left something out or be spending time on unproductive writing. We strongly believe there should be no report grade less than perfect. These are the attributes we strive for:

- Title Does it capture the problem and briefly mention its consequences?
- Problem Statement Is it clear, does it detail the consequences, and does it avoid “leading” the evaluator to preconceived causes?
- Method of Discovery Is it clear, especially if others discovered the problem? If the latter, does scope require determining why the organization didn’t see it coming?
- Scope Does it promote fresh thinking about the event and consequences, or is it just boilerplate? Are evaluators encouraged to search broadly?
- Setting Can the reader tell what else was going on, e.g., plant status, potential distractions like outage activity, organizational changes?

Please turn to Page 4.

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## 2008-2009: A Busy Year

- Led successful NRC-required independent safety culture assessment.
- Trained domestic and international plant staffs in cause evaluation.
- Evaluated CAP performance in physical protection cornerstone area.
- Assessed cause evaluations against safety culture components.
- Facilitated seven-station plant status control improvement initiative.
- Taught relationships between safety culture and "latent" organizational weaknesses to cause evaluators and CAP personnel.
- Provided root cause analysis services for BWR MSIV performance issue.

## ROOT CAUSE REPORT CHECKLIST

Article Begins on Page 3

- Significance Does it include environmental, industrial safety, and business? Can a reader tell what the significance might have been under different conditions?
- Extent of Condition Is it specific? Ideally it lists affected equipment, people, or processes. Can the reader tell how the search was performed?
- Summary Graphic or Chart Is there a diagram or chart where author and reviewers can see all the causes and check for logic flaws?
- Internal Operating Experience (OE) and Previous Corrective Actions Is it clear how and why earlier events did not lead to effective defenses against this one?
- External OE and Benchmarking Is it clear how and why earlier problems did not lead to effective defenses against this one?
- Direct Cause ("How") Are the sequence of events and failure mechanism clear? Supported by facts?
- Root Causes Are there more than one? Do they address eliminating the failure mechanism and detecting/controlling it in the future ("Why")? Supported by facts?
- Organizational and Programmatic Factors Are they clear, relevant? Can the reader tell who the participants were and what they did or failed to do? Are one or more expressed as root causes, when justified?
- Safety Culture Components Is the discussion inclusive, not exclusive? Does it search for cultural insights or merely justify the status quo?
- Corrective Action Plan Are there vigorous, specific, durable actions aimed at each cause? Are there specific actions for testing future effectiveness? Does it tell what will become of any immediate and interim actions? Never let them dangle.



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