

# ROOT CAUSE EXPERT

FOR PRACTITIONERS AND THE MANAGERS WHO DEPEND ON THEM

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## Root Cause Vocab

*In his classic book Guns, Germs, and Steel author Jared Diamond explores why some human cultures survive while others wither or collapse.*

*Diamond uses the term **autocatalytic process**, one that exhibits positive feedback in a cycle that goes faster and faster once it has started.*

*For this reason Diamond believes that complex causation – whether it ends in success or failure – operates in two directions.*

*Our experience with significant adverse conditions in the energy business convinces us that Diamond is correct.*

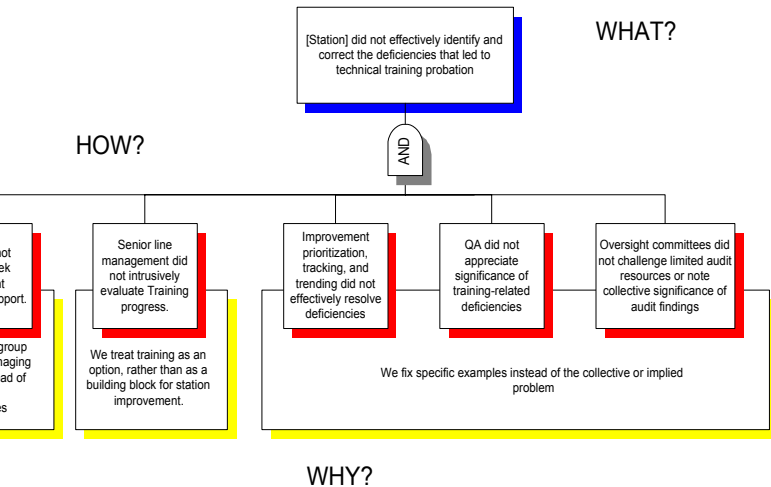
*Effective corrective actions must do more than break a linear “chain.” They must disable an entire autocatalytic cycle.*

## INVESTIGATING TRAINING ISSUES

No scram. No lost generation. No injury. But a massive list of actual and potential consequences.

We have led two multi-discipline root cause investigation teams in the training area – one for a technical program placed on probation, the other for excessive licensed operator exam failures (risk of losing accreditation).

Failure mechanisms (direct causes) were abundant, ranging from weak lesson plans to inconsistent attendance, from poor record keeping to instructors unfamiliar with the station. Painstaking document reviews and interviews revealed much deeper root causes, embedded in site culture. Unless the organization resolved them, the ambitious



training action plan would fail. The root causes lay in years of lackluster problem identification and resolution, aided by management focus on areas other than training. Beneath those shortcomings was a hierarchical approach to settling difficult intergroup issues, instead of a culture where speaking up and asking

for help was routine. Lastly, a “punch list” attitude toward corrective actions camouflaged the gradual trends that were weakening technical training. By the time of the accreditation meeting, it was much too late to prevent trouble.

## CAN LACK OF SOMETHING BE A ROOT CAUSE?

We believe so, in fact it is quite common. Here's a simple example:

**Failure Mechanism:** A spike on Channel 4 over temperature delta T (OTDT), most likely due to electrical noise from an intermittent ground on 24DC bus, completed the second of four trip channels. As a result, the reactor scrambled.

**Root Cause:** The station did not recognize the risk significance of signal spikes and intermittent grounds on DC logic circuits, which had been prevalent at the station in the early 1990s. The situation was corrected at that time, but it cropped up again in the reactor protection system in 2002. This time the station tolerated it.

As a result, this latent condi-

tion came to the surface on Channel 4 during Channel 3 maintenance.

When trouble happens, the organization often has let it through the door with oversights, omissions, or reduced vigilance.

**In effect, this station wrote failure a permission slip.**

## KEEP YOUR ROOT CAUSE

Root cause investigators can fall short of their goals for any of these reasons:

- Too narrow, broad, or vague initial charter
- Poorly chosen problem statement
- Reliance on an individual when the problem demands a team
- Not including independent members for important issues
- Treating root cause work as a collateral duty
- Being swayed by reporting requirements and other perceived constraints
- Analyzing “events” but not other unacceptable conditions
- Neglecting human performance issues beneath equipment failures and technical concerns
- Mingling the root cause investigation and analysis with return to service activities, which distorts thinking on the true issue
- Overlooking the causal roles of operating experience and independent oversight
- Shying away from “management issues”
- Failing to use *and document* a systematic root cause analysis process.

For managers and investigators who genuinely want to learn the fundamental weaknesses that caused, permitted, or worsened the outcome of an event, we

## ATTACK THE PROBLEM SOURCE!

*Health Physics didn't settle for stricter controls, better housekeeping, or more training.*

Why build more expensive barriers?

A nuclear station inventoried its radioactive sources and found that two of them had disappeared from a locker. A search turned up the missing sources in bags of contaminated trash about to be shipped.

Close call, but the real story was in the corrective actions.

Health Physics didn't settle for stricter controls, better housekeeping, or more training. They decided to track down every other unneeded source still on hand.

With cooperation from other departments, HP found 157

surplus, depleted, or otherwise useless sources just waiting to go AWOL!

All the sources got proper disposal and went off the station's books forever.

You can't lose something if you don't have it!

## PASSIVE VOICE – LANGUAGE OF VICTIMS

Do you see commercials that say, “Our product is considered the best and should be bought?”

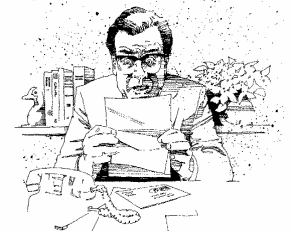
Of course not! They say “Buy Whamco, the choice of professionals – 10 to 1!”

Active, specific language indicates a writer or speaker who is in command of his or her subject. Simple and direct subject-verb-object sentences get their point

across with little room for interpretation and misunderstanding.

Compare: “The decision was made to operate the pump in manual” with “The shift supervisor and the system engineer conferred and agreed it was acceptable to operate the pump in manual until the day shift.”

Let the facts speak clearly and your root cause report will



come alive. You worked too hard to dig up crisp facts; don't present them in limp language.

# ANALYSIS ON TRACK

recommend the Fix-It-Once® process.

Fix-It-Once® is not software nor a complicated chart with branches, turns, and dead ends. It is a system of insightful, progressive questions that reveal systemic weaknesses behind important problems.

Your facts speak more clearly. Your solutions are tougher to challenge.



## SEASTATE GROUP PUBLISHES CROSS-CUTTING ISSUE SUMMARY

For the third time, SeaState Group, Inc, has published its semi-annual tabulation of NRC reactor oversight program (ROP) cross-cutting issues.

Congratulations are in order for Arkansas Nuclear One, Susquehanna, Three Mile Island, and Peach Bottom. Those stations closed prob-

lem identification and resolution (PI&R) issues. Columbia cleared one as well, but replaced it with a new cross-cutter in human performance.

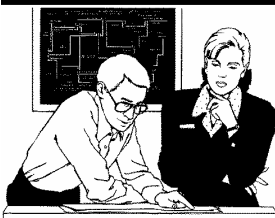
Only Diablo Canyon closed its human performance issue, while Callaway, Fermi, Palo Verde, and Perry picked up new citations in that area.

Stay abreast of ROP develop-

ments because the criteria for receiving and clearing cross cutting issues continue to evolve.

For a free electronic copy of the SeaState summary, log onto [www.fix-it-once.com](http://www.fix-it-once.com) and send us an email.

*If you choose new investigators with good leadership and influencing skills, be sure to ground them in root cause basics.*



## WHY DO ROOT CAUSE INVESTIGATORS DEMAND SO MUCH OF MY TIME?

Managers often complain that they need to coach root cause investigators much more often than the same people on ordinary assignments. "What's so different about root cause?"

The answer lies in a 1986 discovery by G.W. Dalton and P.H. Thompson. People de-

velop career competencies, in this case investigation, analysis, and reporting skills, during four stages:

**Acquiring:** Learns process under direction of senior practitioner.

**Applying:** Independently uses process to solve problems.

**Mastering:** Assumes leadership and develops others.

**Influencing:** Represents results and gains approvals and action.

If you choose new investigators with good leadership and

influencing skills, be sure to ground them in root cause basics before turning them loose. If you pick folks for their analytical skills, develop their talent for selling the conclusions and recommendations.

Treasure anyone who has all four competencies!

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ROOT CAUSE EXPERT

## DO THESE FINDINGS FIT?

Here are four observations from a corrective action program self assessment. Off the top of your head, which ones, if any, fit you?

Access to operating experience (OE) is difficult for most investigators, and they often need help from a specialist who is proficient.

External experience is not as thoroughly used as internal experience, especially to answer "Could this condition have been anticipated and prevented?"

Significant condition investigations tend to discount OE if it does not closely match the details of the current condition.

There is little identification of operating experience disuse, self-assessment deficiencies, or weak independent oversight as causal

factors of significant events.

If some of these findings look applicable to your facility, it's time to acquaint your root cause investigators to the importance of OE.

The organization should not take in OE and just pass it around to see what happens. People need to determine and embrace the meaning of OE while there is still time for action.



***"The calamity that comes is never the one we had prepared ourselves for."***

***Mark Twain – 1896***