



Union of
Concerned
Scientists

Citizens and Scientists for Environmental Solutions

NUCLEAR REVIVAL

OR

NUCLEAR RE-RUN?

October 16, 2006

David Lochbaum

Director, Nuclear Safety Project

ACRONYMS

AEC – Atomic Energy Commission

**AEOD – Office of Analysis and
Evaluation of Operational Data**

**ASP – Accident Sequence
Precursor (i.e., “near-miss”)**

BL – Bulletin

EA – Enforcement Action

FPC – Federal Power Commission ²

ACRONYMS (cont)

LER – Licensee Event Report

LLTF – Lessons Learned Task Force

GL – Generic Letter

H&I – Harassment and intimidation

IN – Information Notice

NEI – Nuclear Energy Institute

ACRONYMS (cont)

NRC – Nuclear Regulatory Commission

QA – Quality Assurance (e.g, 10 CFR 50, App. B stuff)

ROP – reactor oversight process

SALP – systematic assessment of licensee performance

ACRONYMS (cont)

TVA – Tennessee Valley Authority

**UCS – Union of Concerned
Scientists**

REGULATORY VIEW

NRC, and AEC, did an excellent job of establishing regulations and expectations.

NRC, and AEC, did an inadequate job of enforcing regulations and expectations.

VIEW BASIS

Example: Davis-Besse LLTF

Total of 51 recommendations for revised/expanded NRC processes

Overwhelming majority (43) involved enforcement, rather than establishment, of appropriate regulatory requirements.

REGULATORY GOAL

NRC must match its high level of performance in establishing regulatory requirements with equal capability in enforcing those requirements.

CONSTRUCTION PHASE QUALITY MIRROR

**US House hearing 11-19-1981 on
“Quality Assurance in
Nuclearplant Construction”**

**Chairman Udall chronicled the
quality assurance breakdowns
at Diablo Canyon, South Texas
Project and Zimmer and posed
four questions.**

CONSTRUCTION PHASE QUALITY QUESTIONS

- 1) How did these quality assurance failings occur?**
- 2) Why did these failings go so long undetected by the owner utilities and the NRC?**

CONSTRUCTION PHASE QUALITY QUESTIONS

3) What is being done to minimize the likelihood of future failings of this kind?

4) How are we to be sure that completed plants have in fact been constructed in accordance with the Commission's regulations?

CONSTRUCTION PHASE QUALITY ANSWERS

1) How did these quality assurance failings occur?

Ineffective management.

CONSTRUCTION PHASE QUALITY ANSWERS

2) Why did these failings go so long undetected by the owner utilities and the NRC?

Ineffective management and ineffective oversight.

CONSTRUCTION PHASE QUALITY ANSWERS

3) What is being done to minimize the likelihood of future failings of this kind?

Failings were minimized by the phase-out of nuclear plant construction programs. Last nuclear plant licensed (Watts Bar) had failings.

WATTS BAR RETROSPECTIVE

**NRC issued operating license
for Watts Bar on 02/07/1996.**

**TVA certified to NRC on
02/20/1985 that Watts Bar was
ready to license.**

**TVA “missed” by 4,004 days:
longer than the desired
licensing and construction time
for new reactors.**

CONSTRUCTION PHASE QUALITY ANSWERS

4) How are we to be sure that completed plants have in fact been constructed in accordance with the Commission's regulations?

**No such assurance. Sources:
SECY-90-365, IN 92-65,
AEOD/T97-01, IN 98-22, SECY-
00-0141, NUREG-1275, RG 1.186**

VIEW BASIS REVISITED

The serious problems encountered at Diablo Canyon, South Texas Project, and Zimmer did not result from NRC having inadequate regulations, but from NRC have inadequate enforcement of adequate regulations.

REGULATORY GOAL

NRC must match its high level of performance in establishing regulatory requirements with equal capability in enforcing those requirements.

DESIGN & CONSTRUCTION ISSUES

- **BWR offgas explosions BL 78-03**
- **Environmental qualification BL 79-01b**
- **Piping supports BL 79-02**
- **Counterfeit parts BLs 83-07 & 88-05**
- **Maine Yankee EA-96-299**

MORE DESIGN & CONSTRUCTION ISSUES

- Fire barrier systems BL 92-01**
- ECCS pump clogging BLs 93-02, 95-02, 96-03, and 03-01, IN 96-59**
- Steam generators IN 79-27, IN 80-36, IN 82-06, IN 82-14, IN 84-49, IN 85-65, BL 88-02, IN 88-31, IN 88-99, BL 89-01, IN 89-33, IN 89-65, GL 95-03, GL 97-06, IN 98-27, IN 01-16, IN 02-02**

CONSTRUCTION PHASE INSPECTIONS

NUREG-1789: “Since the NRC has limited resources and uses a sampling inspection methodology, reduction in inspection effort may occur when reviews have identified effective program implementation that provides high confidence in the license’s quality control process.”

CONSTRUCTION PHASE INSPECTIONS (CONT)

NO!

History of AEC/NRC oversight of nuclear plant construction and operation is a recurring theme of misplaced, unjustified confidence in licensee's processes.

Quit pinching pennies and losing millions!

ITAAC NOTHING BETTER

AEOD/T97-01, “Design Errors in Nuclear Power Plants”

- 3,439 LERs with design errors between 1985 and 1995**
- 2% of LERs contained design errors significant enough to be reviewed under the ASP program**

ITAAC NOTHING BETTER

NUREG-1275 v14, “Causes and Significant of Design-Basis Issues at U.S. Nuclear Power Plants”

- 70% of design errors 1985-1997 date back to original licensing**
- 60% of ASP events in 1997 involved design errors**

CONSTRUCTION PHASE OVERSIGHT

Regulatory oversight for existing reactors during their construction was conducted under SALP and its predecessors.

NRC tossed SALP and went to ROP for existing reactors. NRC needs construction phase ROP.

CONSTRUCTION PHASE ROP

Because irradiated fuel won't yet be on site, a risk-based ROP would be all Green all the time. Thus, a performance-based ROP is needed during the construction phase to differentiate between adequate and inadequate outcomes.

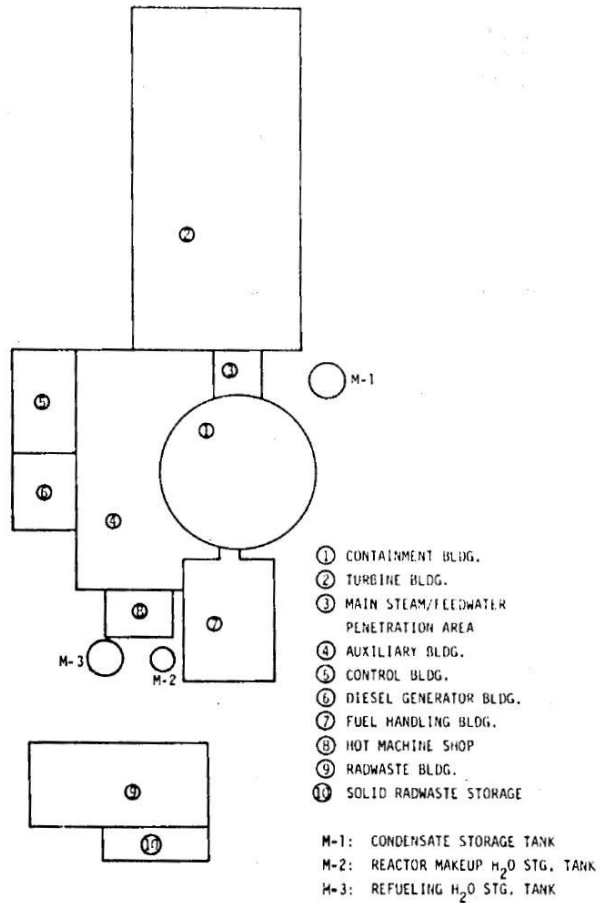
CONSTRUCTION PHASE GENERIC COMMUNICATIONS

Problems with generic implications identified along the frenetic, no-holds-barred construction schedules must be promptly communicated by NRC to all applicable entities.

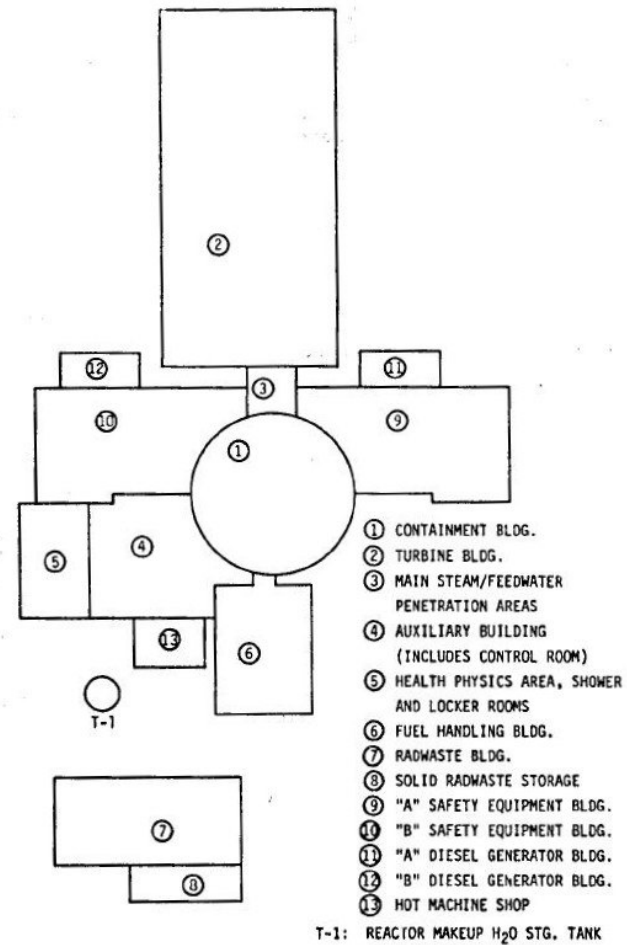
CONSTRUCTION PHASE SECURITY

At reactors under construction adjacent to operating reactor(s), NRC must require personnel and vehicle access controls long before fuel arrives onsite.

SECURITY BY DESIGN



Baseline Standard Plant



Modified Plant Layout: Separated Safety Buildings and Containment Penetrations

CONSTRUCTION PHASE DRUG-FREE WORKPLACES

Energy Policy Act provided subsidies for reactors, not opium dens. The drug and alcohol provisions of 10 CFR Part 26 must apply during construction to prevent recurrence of the ...

CONSTRUCTION PHASE DRUG CULTURE

Huge and preventable problems afflicted Seabrook, Shearon Harris, and others during construction because lots of temporary workers with lots of cash lacked appropriate adult supervision.

CONSTRUCTION PHASE SAFETY CULTURE

Huge and preventable problems afflicted Wolf Creek, Comanche Peak, Watts Bar, and others during construction because allegations were handled retrospectively rather than forthrightly.

CONSTRUCTION PHASE ALLEGATIONS

**NRC's investigations of H&I
allegations are untimely.**

**Investigations into H&I
allegations during construction
need to be completed before
startup, not by decommissioning.**

BACK TO THE FUTURE

To dispel any notion that these “sins of the past” have been corrected, consider:

- vibration problems afflicting Quad Cities and Palo Verde**
- pressurizer heater design errors at Palo Verde and Waterford**
- faked surveillance tests at Byron**

REGULATORY GOAL

NRC must match its high level of performance in establishing regulatory requirements with equal capability in enforcing those requirements.

BACKUP SLIDES

NUCLEAR NUMBERS

Nuclear reactors ordered	253
Construction permits issued	175
Operating licenses issued	130
Operating licenses ended	26

Sources: NEI & NRC

NUCLEAR NUMBERS

Nuclear Power Plants Cancelled Since 1970

<p>1972 (4 PLANTS) Perryman 1&2 Verplank 1&2</p> <p>1974 (7 PLANTS) Tyrone 2 Quanicassee 1&2 Vidal 1&2 Vogtle 3&4 (0%, 0%)</p> <p>1975 (14 PLANTS) Fermi 3 Pilgrim 3 Barton 3&4 Fulton 1&2 Orange 1&2 St. Rosalie 1&2 Somerset 1&2 Summit 1&2</p> <p>1976 (1 PLANT) Allens Creek 2</p> <p>1977 (10 PLANTS) Ft. Calhoun 2 Sears Isle Barton 1&2 Douglas Point 1&2 South Dade 1&2 Surry 3&4 (0%, 0%)</p> <p>1978 (14 PLANTS) Haven 2 North Coast 1 Zimmer 2</p>	<p>1978 - CONT'D Blue Hills 1&2 Sundesert 1&2 South River 1, 2 & 3 Atlantic 1, 2, 3 & 4</p> <p>1979 (8 PLANTS) Greene County Tyrone 1 (0%) New England 1&2 Palo Verde 4&5 Stanislaus 1&2</p> <p>1980 (16 PLANTS) Forked River (6%) Haven 1 North Anna 4 (4%) Sterling (0%) Davis-Besse 2&3 (0%, 0%) Erie 1&2 Greenwood 2&3 Jamesport 1&2 (0%, 0%) Montague 2&3 New Haven 1&2</p> <p>1981 (6 PLANTS) Bailey (1%) Callaway 2 (1%) Hope Creek 2 (18%) Pilgrim 2 Harris 3&4 (1%, 1%)</p> <p>1982 (18 PLANTS) Allens Creek 1 North Anna 3 (9%)</p>	<p>1982 - CONT'D Vandalia Black Fox 1&2 (0%, 0%) Cherokee 2&3 (0%, 0%) Hartsville B1&2 (17%, 7%) Pebble Springs 1&2 Phipps Bend 2&3 (25%, 5%) WNP 4&5 (24%, 16%) Perkins 1, 2 & 3</p> <p>1983 (6 PLANTS) Cherokee 1 (18%) Clinch River (1%) Clinton 2 (0%) Harris 2 (4%) Skagit 1&2</p> <p>1984 (10 PLANTS) River Bend 2 (0%) Zimmer 1 (97%) Hartsville A1&2 (44%, 34%) Marble Hill 1&2 (60%, 37%) Midland 1&2 (85%, 85%) Yellow Creek 1&2 (35%, 3%)</p> <p>1988 (2 PLANTS) Carroll 1&2</p> <p>1989 (1 PLANT) Seabrook 2 (23%)</p> <p>1990 (1 PLANT) Grand Gulf 2 (33%)</p>
---	--	---

PUBLIC PARTICIPATION

“No evidence has been found to support industry statements that citizen opposition and regulatory changes have been the primary causes for rising costs, and construction delays.”

**US House Committee on
Government Operations**

INDUSTRY PARTICIPATION

“To the contrary, FPC statistics show that mismanagement is more of a determinant than regulatory changes and citizen opposition.”

**US House Committee on
Government Operations**