



A Comparison in Safety Culture

NASA on Challenger
NRC on Davis-Besse

By James F. Gleason. P.E.
Chairman IEEE Subcommittee SC2.1 IEEE Std 323
(Qualification)

Presented at IEEE Subcommittee on Qualification Meeting 06-1



Good Morning Mr. Phelps!

The enclosed Order prohibits your involvement in all NRC-licensed activities for a period of five years effective immediately.

How did they earn it!

- Davis-Besse

- largest fine in NRC history (\$5.45 million)
- Action also has been initiated against five individuals.
- Department of Justice Environmental Crimes Section
- NRC will not tolerate the failure of licensees and individuals to provide it with accurate and complete information.

Davis-Besse

- NRC Bulletin 01-01, "Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles,"
- Provide information on structural integrity of the reactor pressure vessel (RPV) head penetration nozzles.



September 4, 2001, response was materially incomplete and inaccurate

- Manager of Engineering stated, in part: “All CRDM [control rod drive mechanism] penetrations were **verified to be free from “popcorn” type boron deposits** using video recordings from 11RFO or 12RFO.



September 4, 2001, response was materially incomplete and inaccurate

- Mischaracterized the **accumulation of boric acid** on the RVP head
- Failed to indicate that the **build-up** of boric acid deposits was **so significant** that the licensee could not inspect all of the RVP head penetration nozzles.



Back to the Future

January 28, 1986

Seven astronauts were killed when the space shuttle they were piloting, the Challenger, exploded just over a minute into the flight.

The failure of the O-ring was attributed to several factors including

- faulty design of the solid rocket boosters
- Insufficient low-temperature testing of the O-ring material
- Lack of proper communication between different levels of NASA management.

January 27, 1986

(Day before the accident)



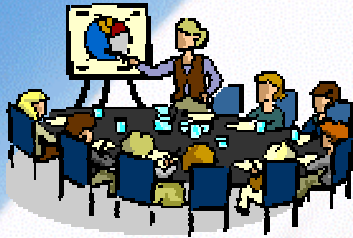
Thiokol

Since launch conditions were anticipated to be 32F, Thiokol prepared a written recommendation advising against the launch at temperatures below 53 degrees Fahrenheit.
Problem:
O-ring's on booster may fail to seat.



NASA
Marshall SFC

January 27, 1986 3 Hours Later



Thiokol

In spite of the continuing opposition of the engineers at Thiokol.

Management reversed its position.



NASA

Marshall SFC

The background of the slide is a photograph of a space shuttle launch. The shuttle is angled upwards, with a large plume of white smoke and fire from its engines. The sky is a clear, pale blue. The shuttle's nose and side are visible in the foreground, showing the blue and white stripes of the orbiter. The overall scene is dynamic and captures the power of the launch.

Presidential Commission on the Space Shuttle Challenger Accident

- The Presidential Commission concluded that there was a **serious flaw** in the decision making process.
- A well structured and managed system **emphasizing safety** would have flagged the rising doubts about the Solid Rocket Booster joint seal.
- Flight readiness process did not reflect the views of most of the **Thiokol engineers** and at least some of the **Marshall engineers**.

THE CONTRIBUTING CAUSE OF THE ACCIDENT

- The joint test and certification program was inadequate.
- There was no requirement to **configure the qualifications test motor as it would be in flight,**
- the motors were **static tested in a horizontal position, not in the vertical flight position.**

These are basic test requirements, simulating the actual installed configurations:

EQ 101

Who Gets it?

- Challenger
- 7 People Died
- Lost \$1B Shuttle
- No one in the decision chain lost their job
- No one was fined
- Davis Besse Reactor Head
- No one was injured
- Plant still operating
- Utility Fined \$5.4Milion
- Actions against 5 individuals
- Banned from nuclear for 5 years
- DOJ indictments