



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

June 16, 1997

MEMORANDUM TO: ACRS and Staff

MEMORANDUM #: AWC-112.97

FROM: August W. Cronenberg

SUBJECT: Slides for 442nd ACRS Meeting:
AP600 Containment Spray Policy Issue

Summary: Per request by Richard Savio and John Larkins, an introductory presentation was made at the 442nd meeting of the ACRS on the AP600 Containment Policy Issue. The attached overheads were used for said presentation and summarize the essence of my comments to the committee.



AP600 CONTAINMENT SPRAY POLICY ISSUE

**August W. Cronenberg
ACRS Fellow
442nd Meeting of the ACRS
June 13, 1997**

AP-600 CONTAINMENT SPRAY SYSTEM-?

- **Prior ACRS Position/Statements**
- **Relevant Issues to Consider**
- **Commission Request:
ACRS Opinion and Basis for that Opinion**

433 ACRS MEETING (LTR. AUG 15/96)

- **Conclusion**

We endorse the positions of the staff in addressing the 3 policy issues on AP600—

- **Prevention & Mitigation of Severe Accidents**

The staff is seeking approval of non-safety systems to address uncertainties associated with passive fission product removal for DBA analysis and balance between prevention and mitigation of severe accidents.—The applicant's submittals provide some support for demonstrating fission product removal using only passive mechanisms. Nonetheless, we are persuaded by the staff position that systems beyond passive removal mechanisms should be evaluated to provide greater confidence—in mitigating DBA and severe accidents. We recommend Commission approval (of the staff position).

422 ACRS MEETING (LTR: JUNE 15/95)

- **Item-7: Containment Performance**

The staff intends to use deterministic and probabilistic containment performance goals to review AP600—We believe the staff position is appropriate

- **Item-10: Long Term Severe Accident Consequences**

Post accident pressure in containment will remain positive longer than for a plant with active cooling—removal of radioactive species is expected to be less with passive means than using active sprays or filters—The staff believes this situation calls for additional means,—a nonsafety spray. —We believe—that radioactive removal should be considered with respect to risk and the safety goal.

- **Caveat:**

Arguments on radionuclide concentrations would be unnecessary if a performance-based criterion were derived

COMMISSION STATEMENT ON AP600 ACCIDENT MITIGATION SYSTEM

The Commission agrees it is important that the AP600 design include adequate means for accident management and long term mitigation. However, the Commission does not support the staff's request for the inclusion of additional system(s) for accident management and long term mitigation following a severe accident as presented, not because it may be inappropriate, but because the basic design and performance requirements have not been bounded or specified, and the requested additional system(s) do not appear to be consistent with the concept of a passive design. The Commission is open to reconsideration of this issue if the staff can be more specific in terms of what additional system(s) are contemplated, including the design and performance requirements.

PRIMARY QUESTIONS FOR ACRS CONSIDERATION

- **Defense-In-Depth View:**
Is a spray system needed to provide defense-in-depth and to ensure adequate protection for severe accidents ?
- **Risk Informed View:**
Would a spray system provide sufficient reduction in risk for severe accidents to justify its costs?
- **What is the technical basis for ACRS recommendation to the commission question**

DETERMINISTIC PERSPECTIVE

(Defense-in-Depth/Prescriptive Regulation)

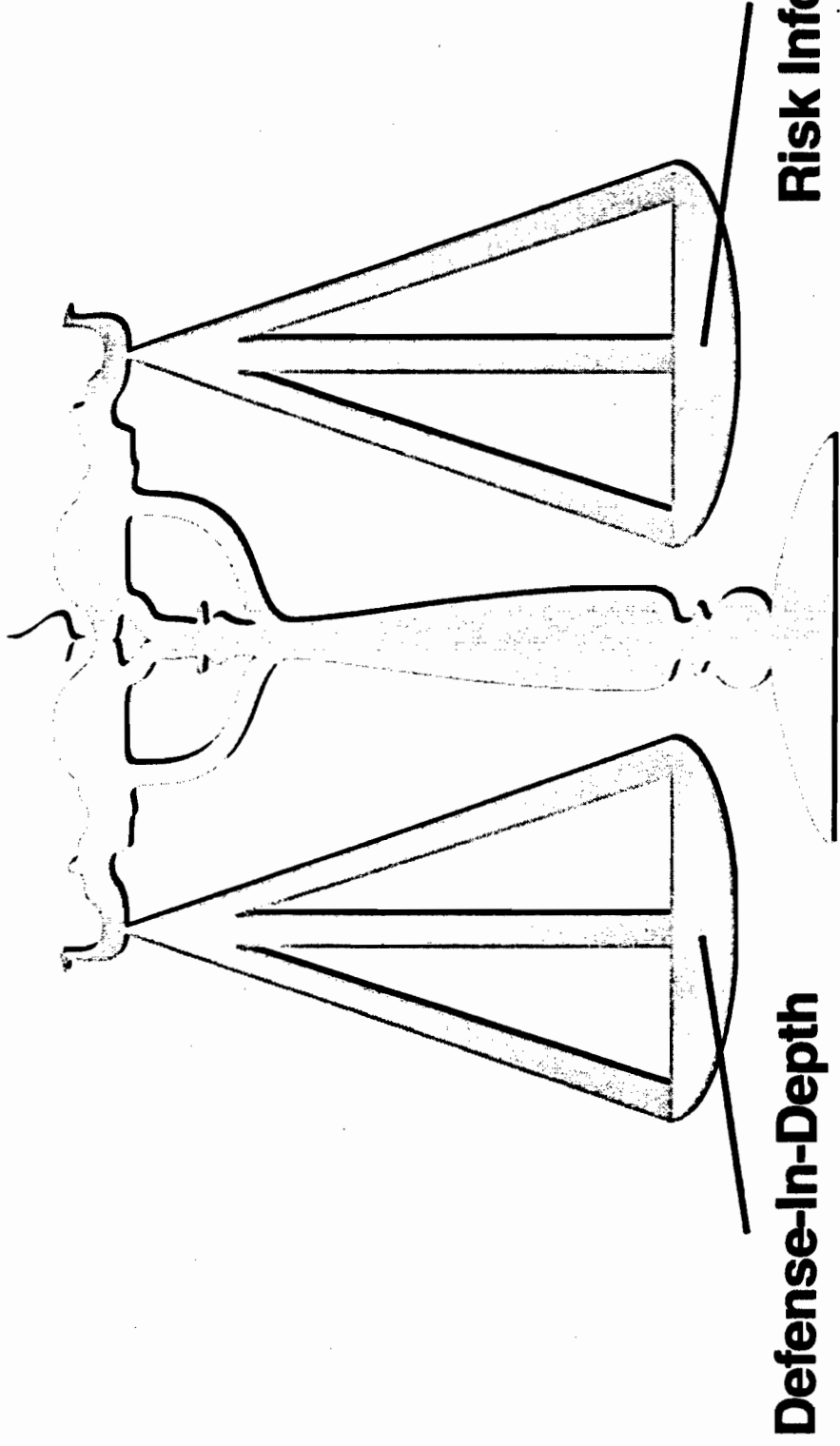
- **Aerosol Depletion Estimates (Models)**
 - **$> 1 \mu$ diffusiophoresis dominant**
 - **1-100 μ sprays dominant**
 - **$> 100 \mu$ gravitational settling dominant**
- **Aerosol source term/timing?**
- **Containment leakage/pressure history?**
- **Validation of aerosol depletion mechanisms for AP600 containment conditions?**

RISK INFORMED PERSPECTIVE

<u>AP-600 Release Mode</u>	<u>Risk Contribution*</u>
Containment Isolation Failure	9.6-%
Early Containment Failure	83.9-%
Containment Bypass	5.8-%
Other	0.7-%

*population boundary dose risk -72 hr; PRA-Rev. 9

AP-600 CONTAINMENT SPRAY SYSTEM-?



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Defense
In
Depth

Risk
Informed

