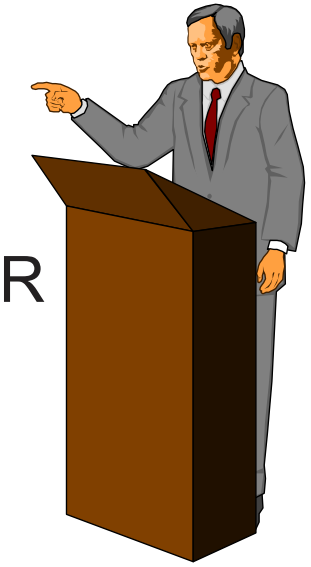
DPO Appeal on DPV Concerning Modeling Chemical Consequence Effects for the Proposed MOX Facility

Alex Murray
NMSS/FCSS/SPB

Overview

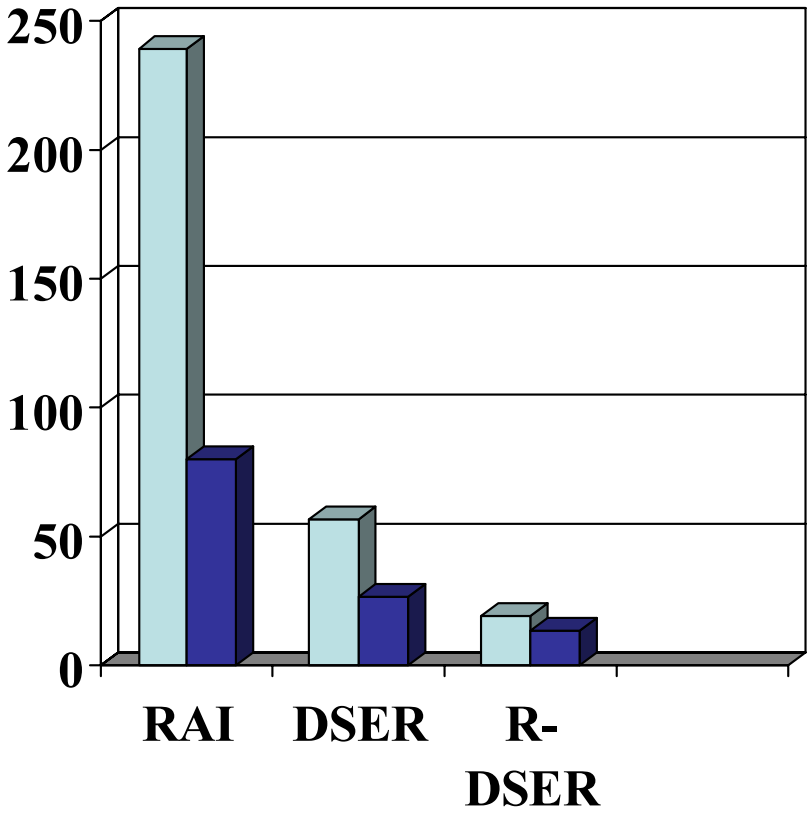
- Discuss MOX and this Open Item/DPV
- Present ARCON96 concerns
- NMSS/FCSS response
- My assessment
- Safety issue remains – no V&V, QA
- <u>Recommendation:</u>
  - Require more realistic conservatism for CAR
  - Allow revision for operating license



MOX Open Items

- Many open items during course of MOX CAR review
- Many potential hazards accrue from chemical processing
- Use of Aqueous Polishing (AP)
- Reactor background of applicant's staff
- Modeling chemical releases part of Open Item CS-05

Importance of Chemical Safety Review



High percentage of Questions and Open Items from Chemical and Process Safety

RAI = Request for Additional Information (by NRC, 2001)
DSER = Draft Safety Evaluation Report (by NRC, 2002 and 2003)

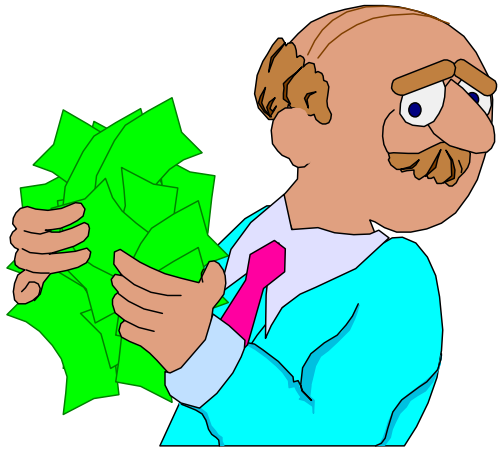
Summary of DPV/DPO on Chemical Modeling (I)

- Multiple codes available for dispersion and consequence estimation
- Applicant initially selected ARCON96, MACCS2, and ALOHA codes
- Applicant subsequently used only ARCON96 code

ARCON96 (coincidentally) produces lowest consequence results

Summary of DPV/DPO on Chemical Modeling (II)

- Applicant provided input meteorology info
- No verification and validation info provided
- No QA/qualification info provided



Fundamentally, no data
On docket to support
Site specific safety code
Use at SRS MOX site

Summary of DPV/DPO on Chemical Modeling (III)

<u>Accepted by staff:</u>

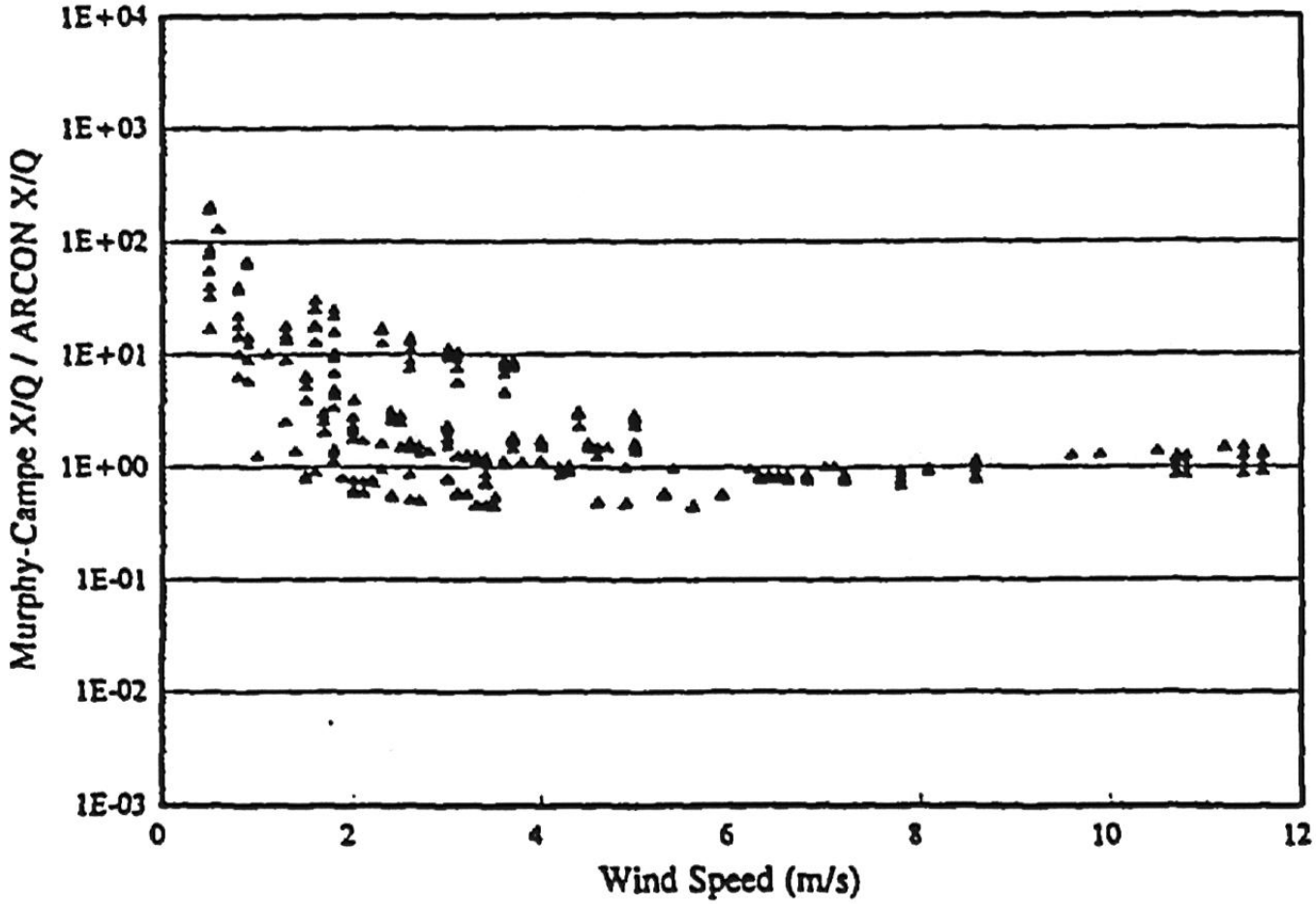
- Code listed in Accident Analysis Handbook (one of many)
- Voted as acceptable based on listing in NUREG/CR-6410 (again, one of many)
- Voting used some unqualified reviewers – “David Besse - like”
- Another dispersion modeler agreed with me

Summary of DPV/DPO on Chemical Modeling (IV)

Authored DPV/DPO because:

- Matter closed – no reconsideration by local mgmt
- Safety significant:
  - potentially underestimate consequences by 1-2 orders of magnitude
  - Safety controls may be unidentified
- Submitted December 2002

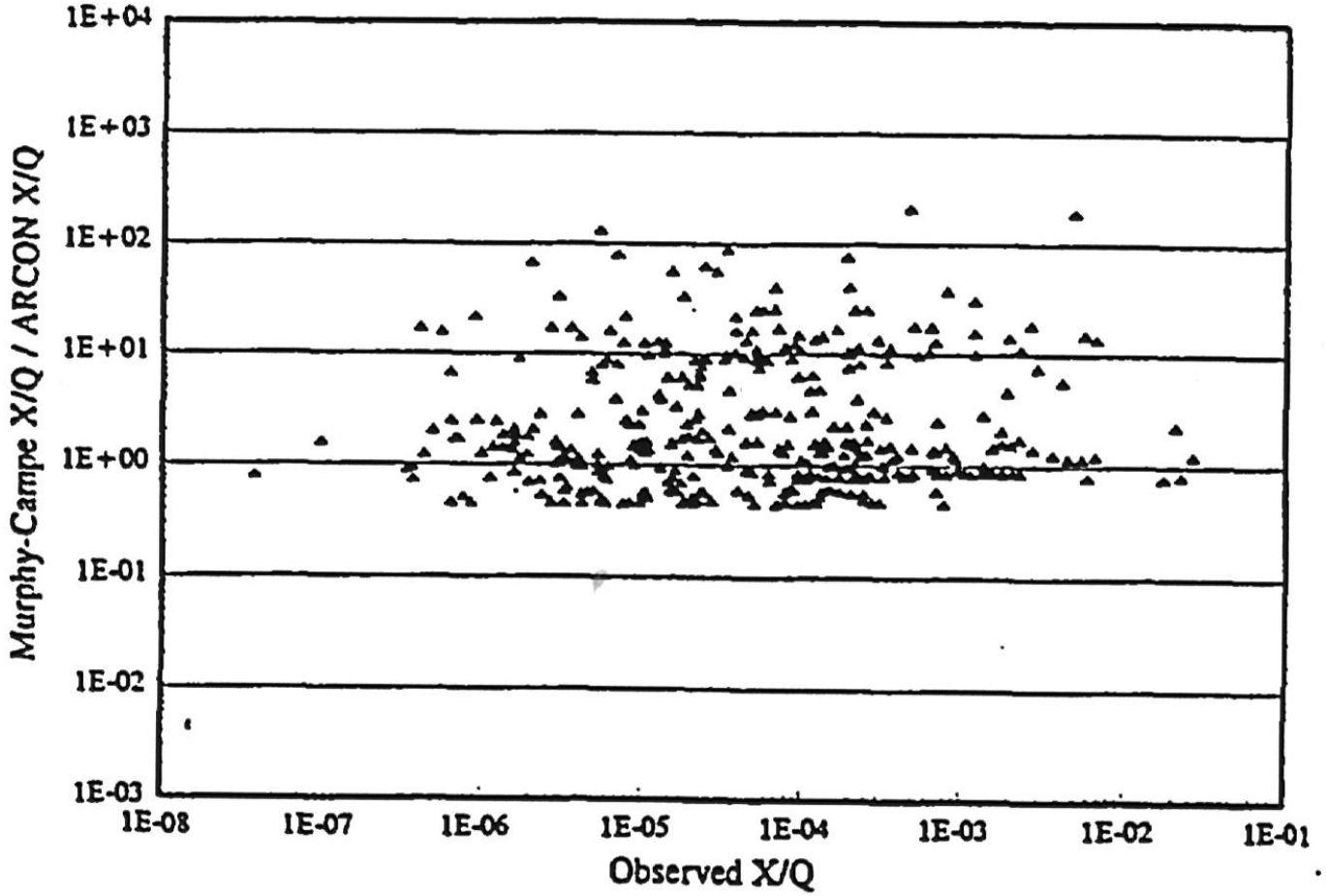
Model/Data Comparisons (I)



- **Applicant Using SRS Wind speed Of 2.2 m/sec**
- **Which value to use?**

Figure 27 Murphy-Campe / ARCON concentration ratios by wind speed
(based upon data from 7 reactor sites in NUREG/CR-6331 on ARCON96)

Model/Data Comparisons (II)



Applicant Using Circa 3E-4

Which value to use?

Figure 28 Murphy-Campe / ARCON concentration ratios by observed concentration

(based upon data from 7 reactor sites in NUREG/CR-6331 on ARCON96)

Radiation Dose Estimates

- Same code used for estimating dispersion for radionuclides
- Same concern for potential underestimation of effects and regulatory compliance

MOX Application

Tables 5.5-26 and 5.5-27 of revised CAR:

- These values may be too close to the regulatory limits based upon accident analysis handbook (NUREG/CR-6410)
- Lack of site specific verification/validation of ARCON96 for MOX interjects more compliance concerns

Summary of CAR Bounding Mitigated Event Table

Bounding Accident	Max to site Worker, mr	Max to IOC/public, mr	Effluent Ratio
Internal Fire	< 100	< 30	< 0.2
Load Handling	< 150	< 50	< 0.2
Hypothetical Explosion	< 750	< 300	(prevented)
Hypothetical Criticality	< 2,200	< 900	(prevented)

Summary of CAR Mitigated Low Event Table

Bounding Accident	Max to site Worker, mr	Max to IOC/public, mr	Effluent Ratio
Internal Fire	< 900	< 400	< 0.5
Load Handling	< 500	< 200	< 0.9
Hypothetical Explosion	(No low consequence)	(No low consequence)	(No low consequence)
Hypothetical Criticality	(No low consequence)	(No low consequence)	(No low consequence)

DPV Panel Findings

Essentially agreed with DPV:

- Panel noted generic use of ARCON96 OK
- **but** site specific application for MOX not verified/validated against site test data
- NRC guidance on software not followed
- Staff guidance on code selection and user needs

NMSS/FCSS/MOX Responses

On DPV/DPO Appeal:

- Docketed information available
- MDs and NUREG/BR-0167 (Software QA Guidance) not useful
- Sufficient staff guidance available
- RES user-need memo for development/application of scientific codes

DPO Appeal

- Three Main Points
- Information cited is not V&V
- No adequate QA on applicant's code
- Safety issues remain

NMSS Comments on DPO Appeal

- Same technical comments as Slide16
- Appeal does not identify any procedural or technical weakness
- DPV author has not provided any specific info on non-conservative results in ARCON96
- NMSS “unchallenged” by appeal
- No involvement of/dialogue with DPV author

DPV Author's Response October 20, 2004

- Docketed information on input, not V&V
- Docketed information already reviewed by DPV Panel – not sufficient
- NRC Software Guidance not followed
- Procedural and technical weaknesses restated
- Non-conservatism concerns from DPV restated

Fundamentally …

Safety issue not addressed -

Level 1 software has been used to make a safety decision, without V&V, testing, and adequate QA

Recommendations

1. Require use of more conservative code results for MOX CAR - applicant provides V&V, test, and QA in operating application

   Or

2. Require applicant to provide info for CAR

   Or

3. Convene another Panel

Recommendation: Do number 1

DPV/DPO – Lessons Learned

- DPV/DPO basically only route to:
  - Elevate beyond local mgmt
  - Enter significant safety issues into public domain
- Significant time periods involved
- Ostracism
  - Reduced opportunities/mgmt access
  - Essentially no MOX Team or mgmt communication on the subject