Distribution:
Subj
Circ
Chron
Branch r/f
CRyder
CRyder r/f
MSilberberg

Dr. Simon Goren
231 F. Gilman
Department of Chemical Engineering
University of California
Berkeley, CA 94720

Dear Dr. Goren:

At the request of Kamal Araj, I have enclosed the OECD/CSNI report SEN/SIN (84) 30, Group of Experts on the Source Term (Brest).

Sincerely,

Christopher Ryder
Accident Source Term Program Office
Office of Nuclear Regulatory Research

Enclosure: As stated

213

OFFICE	RES:ASTPO	RES:ASTPO
SURNAME	Ryder:md	Silberberg
DATE	11/29/84	11/ /84

Rosenthal

PARTICIPANTS
STEAM EXPLOSION REVIEW MEETING
NOVEMBER 27-28, 1984

G. BANCOFF	NORTH WESTERN
M. BERMAN	SNL
W. BOHL	LANL
A. BRIGGS	WINFRITH
T. BUTLER	LANL
I. CATTON	UCLA
D. CHO	ANL
M. CORRADINE (1)	WISCONSON
P. CYBULSKIS	BCL
H. FAUSKE	FAUSKE ASSOC.
T. GINSBERG (1)	BNL
F. MAYINGER (2)	FRG
D. SQUARER	W
T. THEOFANOUS	PURDUE

(1) Co-Chair Person

(2) Written Responses Only, Munich Technical University

DELPHI EXERCISE

QUESTION #1

WHAT, IN YOUR JUDGMENT, IS THE BEST ESTIMATE VALUE FOR THE PROBABILITY OF CONTAINMENT FAILURE ARISING FROM A STEAM EXPLOSION, GIVEN A CORE MELT, THAT WE SHOULD BE USING IN THE SEVERE ACCIDENT PROGRAM. AS PART OF YOUR RESPONSE, PLEASE PROVIDE THE BASES (EXPERIMENTAL AND/OR ANALYTICAL) AND THE APPROACH USED IN REACHING YOUR CONCLUSIONS.

QUESTION #2

PLEASE PROVIDE WRITTEN COMMENTS ON THE SANDIA STUDY DESCRIBED IN NUREG/CR-3369 AND ANY ADDITIONAL INPUTS AND ANALYSES WHICH YOU FEEL ARE RELEVANT TO THIS STUDY. AS POINTED OUT ABOVE THE SNL REPORT IS BASED ON ASSUMED UNIFORM DISTRIBUTIONS AND SOME ADDITIONAL CALCULATIONS, ASSUMING OTHER DISTRIBUTIONS, MAY BE REQUIRED.

QUESTION #3

COMMENTS ON STEAM EXPLOSION RESEARCH PROGRAM...

PRELIMINARY

INVESTIGATOR	FAILURE PROBABILITY	
	BEST ESTIMATE	UPPER LIMIT
BOHL/BUTTER	3×10^{-4}	.1
BRIGGS	$< 10^{-2}$	
CATTON	5×10^{-5}	
CHO	VERY UNLIKELY	
CORRADINI	10^{-4}	10^{-2}
FAUSKE	WILL NOT OCCUR	
GINSBERG	4×10^{-3}	4×10^{-2}
MAYINGER	INTEGRITY OF GERMAN PWR WOULD NOT BE ENDANGERED	
SQUARER	10^{-4}	
THEOFANOUS	10^{-6}	10^{-4}
BERMAN		1

- ENERGY IMPARTED TO STRUCTURE FOR ALPHA FAILURE .5GJ

MISSILE KINETIC ENERGY	120MJ
ENERGY TO FRACTURE BOTTS	150MJ
ENERGY TO RUSH INTERNALS	250MJ

- EXPLOSIVE ENERGY (TO SLUG) 1-2GJ

- TOTAL THERMAL ENERGY AVAILABLE ~100GJ

- CONVERSION RATIO 3-15%

- ALL INVESTIGATORS PRESENT LIMIT TO MIXING OR COHERENT PARTICIPATION ARGUMENTS

- INVESTIGATORS ANALYZED MELT PARTICIPATION PROCESS AND CONCLUDED THAT SEVERAL 1000KG COULD INTERACT COHERENTLY WITH EFFICIENCIES UP TO 15% TO PROVIDE ESTIMATES OF EXPLOSIVE YIELDS LESS THAN 500MJ

TASK II INDEPENDENT AUDIT

- BNL, T. PRATT, G. GREEN, ET AL
- SURRY TMLB' - 8
- INDEPENDENT APPLICATION OF CODE SUITE
  - INPUT/BOUNDARY CONDITIONS OBTAINED FROM BCL
  - MODELLING/NODING/DATA TRANSFER INDEPENDENT
  - MARCH, MERGE, CORSOR, TRAPMELT, CORCON, VANESSA, MAUA
- OBJECTIVE
  - SHOW LIKE VALUES OF AIRBORNE CONCENTRATION WITHIN CONTAINMENT VS. TIME
  - DEMONSTRATE TRANSFERABILITY

GESSAR

- GE STANDARD PLANT APPLICATION BWR-6, MARK III
- NEW METHODS EMPLOYED
- RANGE OF VALUES OF RELEASE FRACTIONS REPORTED REFLECT DECADES UNCERTAINTY FOR SOME NUCLIDES
- CENTRAL ISSUE FOR THIS DESIGN IS POOL SCRUBBING AND POOL BYPASS
- STAFF ABLE TO MAKE DECISIONS
- COST/BENEFIT ANALYSES USED AS A SCREENING TOOL FOR POTENTIAL DESIGN ENHANCEMENTS. BECAUSE UNCERTAINTIES LARGE COST/BENEFIT CANNOT BE USED FOR FINE DISCRIMINATION
- HYDROGEN CONTROL SYSTEMS REQUIRED BASED ON DEFENSE IN DEPTH AND UNCERTAINTY OF PHENOMENOLOGY

NRR APPLICATION

- MUST RELY ON INFORMED USERS QUESTIONING UNDERLYING PHYSICAL UNDERSTANDING SUPPORTING BOTTOM LINE NUMBERS

- SPECIFIC APPLICATIONS OF NECESSITY MORE DELIBERATE NATURE THAN DEVELOPMENTAL NATURE OF BMI-2104

- IN ANY SPECIFIC APPLICATION WE WILL STRESS IMPORTANT ASPECTS OF PROBLEM AT HAND (FCI, CCI, FAILURE MODES AND LOCATION)

- WORK TO BE COMMENSURATE WITH IMPORTANCE TO SAFETY (GDC-1)

    . CODE V&V
    . TRACEABILITY OF CODE AND CODE MOD
    . STANDARDIZED MODELING
    . QC OF INPUT

- CHECKS

    . APPLICANT/LICENSEE WORK SUBJECT TO Q/A PROCESS

    . NRR REVIEWS APPLICANTS WORK AND APPLICANT REVIEWS NRR SPONSORED INDEPENDENT CALCULATIONS

    . WORK SUBJECT TO SCRUTINY OF HEARING PROCESS AND ACRS