Attachment 5

VIEWGRAPHS FOR PRESENTATION TO
THE ACRS SUBCOMMITTEE ON REACTOR RADIOLOGICAL EFFECTS

MAY 22, 1980

OCCUPATIONAL RADIATION EXPOSURE

SOURCE TERMS & ALARA	UNDES	CRUD BUILDUP & REMOVAL
	UNDES	EQUIPMENT DECONTAMINATION
	UNDES	POST-ACCIDENT EXPOSURES
DOSIMETRY	B-7259	QA & CALIBRATION TLDs
	B-0410	AGE-SPECIFIC METABOLIC MODELS
	UNDES	IMPROVED NEUTRON DOSIMETRY
HEALTH EFFECTS	B-3029	BIODOSIMETRY FOR DOSE RATE FACTORS
	B-3033	GENETIC & ENVIRONMENTAL FACTORS
	UNDES	NEUTRON RBE

ROUTINE RADIOLOGICAL EFFLUENTS

SOURCE TERMS	A-6075	TREATMENT SOURCE TERMS
	B-2281	DECONTAMINATION RADWASTE
	UNDES	IMPROVED GALE CODE
	UNDES	ASSESS ADVANCED TREATMENT
PATHWAYS TO MAN		
AIRBORNE	A-6288	IODINE PATHWAYS
LIQUID	B-7260	SUSQUEHANNA & CHESAPEAKE
	B-2271	NON-STREAM MODEL
	B-2275	RIVER FIELD DATA
	B-2295	RIVER-SEDIMENT MODEL
	B-5749	DISTRIBUTION COEFFICIENTS
HEALTH EFFECTS	A-2059	DEMPAK MODEL
	B-0188	BIOTRANSPORT MODELS
DECOMMISSIONING	B-2296	ACTIVATION PRODUCTS
	B-2299	CONTAMINATION FACTORS
	B-2303	DECOMMISSIONING/DECONTAMINATION
	UNDES	IN PLANT EVALUATION

ACCIDENTAL RADIOLOGICAL RELEASES

ACCIDENT SEQUENCE ANALYSIS, INCLUDING SOURCE TERM DEFINITION, TRANSPORT MODELING, AND CONSEQUENCE ASSESSMENT DONE BY PAS AND BRIEFED SEPARATELY.

SUPPORTING RESEARCH BY RSR AND SAFER:

SOURCE TERM	RSR IN PLANT PHENOMENA
TRANSPORT	
AIRBORNE	RSR METEOROLOGICAL
LIQUID	SAFER
HEALTH EFFECTS	SAFER B-2268 AND A1203 EARLY EFFECTS OF NUCLEAR ACCIDENTS

EMERGENCY RESPONSE

RELEASE SOURCE TERMS	RSR QUALIFICATION TESTING & SYSTEMS ANALYSIS
METEOROLOGICAL MODELS	RSR REAL-TIME MODELS TO GUIDE DECISIONMAKING
ENVIRONMENTAL MONITORS	SAFER PORTABLE IODINE INSTRUMENTS (B-6286, B-6287) AND FIELD INSTALLATIONS WITH TELEMETERED DATA (UNDES)
COUNTER MEASURES	PAS KI STUDIES (ALSO ASSISTANCE TO NRR)
POST ACCIDENT RECOVERY	NRR FORMULATING POLICY AND NEEDS

ATMOSPHERIC DISPERSION RESEARCH PROGRAM

- DISTANCES (0 - 80 KM)
- WIND SPEEDS (CALM - 10 MPS)
- ALL STABILITY CONDITIONS

A. TERRAIN EFFECTS
   1. FLAT, EVEN
   2. ROUGH, HILLY
   3. COASTAL SHORELINE ENVIRONMENT
   4. CHANNELED FLOW
   5. IMPINGEMENT

B. MODEL EVALUATION
   1. TRANSPORT (TRAJECTORY)
   2. DIFFUSION (TURBULENCE)
   3. DEPOSITION
   4. COMPUTER CAPABILITY FOR EMERGENCY RESPONSE

C. VERTICAL DISPERSION

D. BUILDING WAKE EFFECTS

OBJECTIVE: VERIFICATION OF CURRENT AND PROPOSED METHODS USED TO PREDICT THE TRANSPORT AND DIFFUSION OF AIRBORNE RADIOACTIVE EFFLUENTS FOR EMERGENCY RESPONSE AND SITE EVALUATION PURPOSES

Priority 1

APPROACH TO EVALUATION OF REAL-TIME ATMOSPHERIC DISPERSION MODELS

1. Identify atmospheric transport, diffusion, and deposition models appropriate to estimate concentration patterns of effluents to 80 km.
   Model characteristics:
   a. Gaussian (statistical)
   b. K-theory
   c. 2nd-order closure

2. Identify tracer concentration data sets from point sources with simultaneous meteorological measurements taken out to 80 km.
   a. terrain and surface conditions
   b. atmospheric stability
   c. transition conditions
   d. wind fields

3. Determine evaluation criteria by which to assess models identified in 1 using data in 2.
   a. downwind 1 hr. surface concentration patterns to 80 km
   b. cost/benefit
   c. real time capability
   d. sensitivity of meteorological data input

4. Evaluate models using 3 and data in 2.
   a. Models (not more than 6)
   b. experiments (not more than 50)

5. In consultation with NRC determine performance criteria for meteorological data needed, model output, and compatibility at plants.

6. Perform 1, 2, 3, and 4 with precipitation scavenging models.

7. Evaluate minicomputer capabilities that currently exist which may be applicable or easily adaptable to on-site emergency planning and response functions.

ATMOSPHERIC DISPERSION FIELD EXPERIMENT AT INDIAN POINT

PROJECT DIRECTOR: Robert F. Abbey, Jr., NRC/RES

FIELD DIRECTOR: C. Ray Dickson
Air Resources Laboratory, NOAA-ID

PARTICIPANTS: NOAA/ARL
SRI International
Battelle-Pacific Northwest Laboratories
Consolidated Edison
State of New York

OBJECTIVE: To obtain high quality tracer concentration and coincident meteorological data in order to verify and evaluate ARAC and other dispersion models.

TEST PERIOD: Two weeks commencing May 1, 1981

TEST CHARACTERISTICS:

1. Gaseous tracers released either concurrently from two different locations or consecutively to distinguish between day and night releases (SF_6, 72B2).
2. 50 km X 50 km square grid or 25 km X 70 km grid centered at Indian Point.
3. 200 portable samplers with four samples at each of 50 locations.
4. Continuous releases for two weeks with samplers changed every six hours.
5. Radiosondes released every six hours.
6. Tetroons tracked by radar, released every three hours for trajectory determination.
7. 6-8 150 ft instrumented towers.
8. Pibal stations and radar for wind field definition.
9. Mark IX mobile lidar system for concentration measurements in the vertical.
10. Acoustic sounder for stability and mixing height determinations.
11. Oil fog and plume photography.

OTHER OPTIONS:

1. ALPHA-1 airborne lidar.
2. Aircraft sampling.

Ns	CONTRACTORS	TITLE	DESCRIPTION	$ 400K	$ 300K
690	NOAA/Air Resources Lab.	Priority 1 Evaluation of Real-Time Dispersion Models	Utilizing known atmospheric transport, diffusion, and deposition models appropriate to estimate concentration patterns of effluents to 80 km and previously developed high quality tracer concentration data sets, an objective evaluation of selected models will be performed. This evaluation will demonstrate the range of models applicable to different meteorological/ topographical regimes, identify needed input data, and quantify model uncertainties. Such an assessment will provide a basis for selecting a given model for use in emergency planning and environmental effects resulting from postulated accidental releases of radioactive effluents for site evaluation purposes. An evaluation of existing minicomputer capabilities for on-site dispersion modeling as well as the Atmospheric Release Advisory Capability (ARAC) centered at LLL is being made.		
333	NOAA/ Atmospheric Turbulence and Diffusion Laboratory				
829	Colorado State Univ.				
606	Aeronautical Research Associates of Princeton				
6222	SRI International				
268	Battelle - Pacific Northwest Laboratories				
0446	Oak Ridge National Lab.				
15690	NOAA/Air Resources Lab.	Priority 2 Intermediate Range Atmospheric Transport Experiments	A continuous two week field program will be conducted at Indian Point, NY, to obtain high quality concentration measurements with 400 fixed point samples located in a 20 km x 50 km grid. Concurrent meteorological measurements will be made and used as data input to selected atmospheric transport and diffusion models. The model evaluation effort will be conducted independently in order to assess objectively the performance of each model in predicting the maximum concentration and spread of the tracer. Additional field programs are contemplated at Zion, IL and Rancho Seco, CA.	$ 500	$ 700
36222	SRI International				
B6606	Aeronautical Research Associates of Princeton				
B0446	Oak Ridge National Lab.				

ts	CONTRACTOR	TITLE	DESCRIPTION	FY 1981	FY 1982
590	NOAA/Air Resources Lab.	Priority 3 Dispersion in Shoreline Environments	To quantify the spread of effluents from ground-level, point sources in shoreline environments during postulated accident conditions, a field program has been initiated to obtain high quality concentration measurements under controlled conditions. Tests are planned for the Texas Gulf Coast, Florida Atlantic Coast, and the shores of Lake Michigan. The measurements program will utilize state-of-the-art tracer technology and remote sensing techniques to determine the spread of the effluent in the horizontal and vertical, over water as well as over land. The data thus collected will be used to evaluate existing and proposed models of dispersion during accident conditions in coastal zones, both for emergency planning and site evaluation purposes.	$ 200K	$ 300K	$ 500K
222	SRI International				
081	Battelle-Pacific Northwest Laboratories				
240	The Research Corporation of New England				