U.S. DEPARTMENT OF ENERGY
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

PRESENTATION TO THE NUCLEAR WASTE TECHNICAL REVIEW BOARD

SUBJECT: INTRAVAL PERSPECTIVE

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INTRAVAL IS THE THIRD PROJECT IN A SERIES OF INTERNATIONAL STUDIES AIMED AT EVALUATING CONCEPTUAL AND MATHEMATICAL MODELS FOR GROUNDWATER AND RADIONUCLIDE TRANSPORT

- INTRACOIN (1981 - 1986)
- HYDROCOIN (1984 - 1990)

PURPOSE OF INTRAVAL

- INCREASE THE UNDERSTANDING OF HOW VARIOUS GEOPHYSICAL, GEOHYDROLOGICAL AND GEOCHEMICAL PHENOMENA IMPORTANT TO RADIONUCLIDE TRANSPORT CAN BE DESCRIBED BY MATHEMATICAL MODELS

APPROACH

- SYSTEMATICALLY USE INFORMATION FROM LABORATORY AND FIELD EXPERIMENTS AS WELL AS FROM NATURAL ANALOGUE STUDIES AS INPUT TO AND COMPARISON WITH MATHEMATICAL MODELS

INTRAVAL PARTICIPANTS

AUSTRALIA
BELGIUM
CANADA
FINLAND
FRANCE
GERMANY
JAPAN
NETHERLANDS
SPAIN
SWEDEN
SWITZERLAND
UNITED KINGDOM
UNITED STATES

INTRAVAL

INTRAVAL CONSISTS OF A GROUP OF LABORATORY AND FIELD EXPERIMENTS AS WELL AS NATURAL ANALOGUE STUDIES. NUMERICAL MODELS ARE USED TO PREDICT THE BEHAVIOR OF THE SYSTEMS INVOLVED. DISCREPANCIES BETWEEN THE OBSERVED AND PREDICTED BEHAVIOR ARE DISCUSSED AND ANALYZED.

INTRAVAL PHASE I TEST CASES (1987 - 1990)

LEAD ORGANIZATION	SCALE	ROCK TYPE
HARWELL LAB, U.K.	LABORATORY	CLAY
KTH, SWEDEN	LABORATORY	GRANITE
BATTELLE PNL, U.S.	**FIELD**	**BASALT**
SKB, SWEDEN	FIELD	GRANITE
SKI, SWEDEN	FIELD	GRANITE
NRC, U.S.	**SYNTHETIC**	**CRYSTALLINE**
SKB, SWEDEN	ANALOGUE	CRYSTALLINE
ANSTO, AUSTRALIA	**ANALOGUE**	**QUARTZ SCHIST**
AECL, CANADA	**LABORATORY**	**GRANITE**
UNM/NRC, U.S.	FIELD	SUPERFICIAL SOIL
UAZ/NRC, U.S.	LAB/FIELD	TUFF
USGS/DOE, U.S.	**FIELD**	**TUFF**

G-TUNNEL EXPERIMENT - TEST CASE 12

- A SUBSET OF ACTIVITIES THAT SUPPORTED THE DRY-DRILLING PROTOTYPE STUDIES

- INVESTIGATED:
  - EFFECT OF DRILLING ON THE INTRINSIC HYDROLOGIC CONDITIONS
  - THE REPRESENTATIVENESS OF CORE SPECIMEN DATA OF THE FIELD-SCALE PROCESSES AND CONDITIONS
  - THE SPATIAL VARIABILITY OF THE HYDROLOGIC CONDITIONS AT THE FIELD-SCALE
  - THE VARIABILITY OF MOISTURE CONTENT - CONDUCTIVITY AND SUCTION POTENTIAL RELATIONSHIPS

CONCLUSIONS AND RECOMMENDATIONS FROM PHASE 1

- MODELERS NEED TO BE INTIMATELY INVOLVED IN THE DESIGN OF EXPERIMENTS
- EXPERIMENTS SHOULD BE ONGOING DURING VALIDATION PHASES
- MODELING SHOULD BE DONE "BLIND"

INTRAVAL PHASE 2 TEST CASES (1991 - 1993)

LEAD ORGANIZATION	ROCK TYPE
AECL, CANADA	SAND/GRAVEL
ANSTO, AUSTRALIA	**QUARTZ SCHIST**
BGR, GERMANY	CRYSTALLINE
KTH, SWEDEN	GRANITE
SKB, SWEDEN	CRYSTALLINE
SNL/DOE, U.S.	SALT
SNL/DOE, U.S.	CARBONATE
SCK/CEN, BELGUM	CLAY
SGC, SWEDEN	GRANITE
UNM/NRC, U.S.	SOIL/GRAVEL
UAZ/NRC, U.S.	**TUFF**

SCOPE OF OCRWM/YMPO PARTICIPATION IN THE APACHE LEAP HEATER EXPERIMENT

- SUPPORT THE DESIGN PHASE OF THE EXPERIMENT
- DEVELOP AN INTEGRATED DATA SET FOR THE RELEVANT G-TUNNEL EXPERIMENTS
- MODEL G-TUNNEL HEATER TEST(S) WITH INTEGRATED DATA SET
- PERFORM LABORATORY MEASUREMENTS TO CALIBRATE MODELS FOR APACHE LEAP SITE
- FORECAST RESULTS OF HEATER EXPERIMENT - COMPARE WITH EXPERIMENTAL RESULTS

YMPO PARTICIPANTS IN PHASE 2

- U.S. GEOLOGICAL SURVEY
- LAWRENCE BERKELEY LABORATORY
- LAWRENCE LIVERMORE NATIONAL LABORATORY
- PACIFIC NORTHWEST LABORATORY
- GOLDER ASSOCIATES INC.
- SANDIA NATIONAL LABORATORY
- LOS ALAMOS NATIONAL LABORATORY

FLOW OF INFORMATION BETWEEN YMPO AND INTRAVAL

- INTRAVAL WORKSHOPS
- PRESENTATIONS
- U.S. INTRAVAL PARTICIPANT WORKSHOPS
- YMPO INTRAVAL PARTICIPANT MEETINGS
- REPORTS