

YUCCA MOUNTAIN VISIT NOTES

EXPLORATORY STUDIES FACILITY (ESF) :

FIVE-MILE U-SHAPED, 25 FOOT DIAMETER TUNNEL

THIS WAS DESIGNED FOR STUDY AT REPOSITORY DEPTH BUT COULD SERVE AS A REPOSITORY ACCESS TUNNEL FOR CONSTRUCTION AND WASTE EMPLACEMENT

STUDIES FOUND EVIDENCE OF FAST PATHWAYS FOR WATER INFILTRATION - CHLORINE-36, FROM PACIFIC ATMOSPHERIC WEAPONS TESTING FOUND AT REPOSITORY DEPTH INDICATING WATER INFILTRATION WITHIN THE PAST 50 YEARS - SIGNIFICANCE IS NOT THE AMOUNT OF WATER BUT RATHER THAT THE PROCESS IS OPERATIVE.

IN ALCOVE 1, WHERE WATER INFILTRATION EXPERIMENTS WERE DONE, LOOK AT THE ROOF WHERE THERE ARE WHITE MINERAL RESIDUES FROM LATERAL (RATHER THAN COMPLETELY VERTICAL) WATER TRANSPORT IN FRACTURES - MORE EVIDENCE OF THE DOMINANT WATER TRANSPORT MODE. ONLY ABOUT 11% OF THE WATER APPLIED ON THE SURFACE WAS RECOVERED IN THE EXPERIMENT, INDICATING A HIGH DEGREE OF LATERAL TRANSPORT DURING INFILTRATION. SOME OF THE WATER WAS INVOLVED IN WETTING THE FRACTURE SURFACES AS IT INFILTRATED, BUT IN THE SECOND EXPERIMENT, AGAIN, MOST OF THE WATER WAS NOT RECOVERED.

LOOK AT THE REACTOR FUEL ASSEMBLY ON DISPLAY IN ALCOVE 1 - IT SHOWS CORROSION FROM WATER VAPOR IN THE AIR. COMPARE ITS SURFACE CONDITION TO THE DISPLAY FUEL ASSEMBLY IN THE VISITOR ROOM AT THE ESF PAD. WHENEVER THE MINE VENTILATION IS SHUT DOWN, WATER ENTRAPPED IN THE ROCK CAUSES THE RELATIVE HUMIDITY TO RISE TO NEAR 100% IN A MATTER OF HOURS. EVEN THOUGH THE ROCK IS SITUATED FAR ABOVE THE WATER TABLE, ON AVERAGE, THE TINY PORE SPACES IN THE ROCK ARE FILLED WITH WATER TO ABOUT 80% OF THEIR CAPACITY.

IN ALCOVE 2, NOTE THE FRACTURED ROCK - THESE ARE ALL POTENTIAL INFILTRATION PATHWAYS.

THE PURPOSE OF ALCOVE 2 WAS TO PROVIDE ACCESS FOR DRILL HOLES INTO THE ADJACENT FAULT TO TEST FLUID TRANSMISSION IN THIS FAST PATHWAY - REMEMBER, WATER INFILTRATION IS THE PERSISTENT FAILURE MECHANISM AT YUCCA MOUNTAIN.

NOTE THE HIGH ROOF IN ALCOVE 2. THIS IS A RESULT OF UNSTABLE ROCK FALLING DURING MINING. THIS ROCK IS SOMEWHAT WEATHERED BECAUSE IT IS NEAR THE SURFACE, BUT UNSTABLE ROCK ALSO IS LOCALLY ENCOUNTERED AT GREATER DEPTHS.

THE HEATED DRIFT EXPERIMENT, IN ALCOVE 5, IS NOT REPRESENTATIVE OF REPOSITORY CONDITIONS BECAUSE IT IS NOT IN ROCK INCLUDED IN THE REPOSITORY HORIZON. IT PRIMARILY INDICATES THAT DOE CAN MODEL HEAT CONDUCTIVITY IN A HOMOGENEOUS ROCK BODY, WHICH YUCCA MOUNTAIN IS NOT. IN ALCOVE 2 SEE THE POSTER ABOUT THE HEATED DRIFT EXPERIMENT AND NOTE THE DIFFERENCES BETWEEN "PREDICTED" AND "ACTUAL". THE DIFFERENCES ARE DUE TO UNPREDICTED LOCAL DIFFERENCES IN THE ROCK CHARACTERISTICS. ABOUT 80% OF THE REPOSITORY HORIZON IS IN ROCK WITH

VOID SPACES, FROM GAS BUBBLES DURING COOLING, RANGING FROM THE SIZE OF MARBLES UP TO ABOUT 6 FEET IN THE ELONGATED DIMENSION. SOME SMALL VOIDS CAN BE SEEN IN THE ROCK IN ALCOVE 2, BUT THEY ARE MORE DENSELY SPACED IN THE REPOSITORY HORIZON.

IF THE SITE IS SO DRY, AND THE WASTE CONTAINERS ARE SO CORROSION RESISTANT, WHAT IS THE NEED FOR THE EXPENSIVE DRIP SHIELDS?

YUCCA MOUNTAIN CREST:

IN AMARGOSA VALLEY, TO THE SOUTH, THERE ARE 1,200 TO 1,500 RESIDENTS WHO DEPEND ON THE GROUNDWATER THAT FLOWS UNDER YUCCA MOUNTAIN.

ABOUT 5,000 ACRES OF LAND ARE AVAILABLE FOR IRRIGATED FARMING. AMARGOSA VALLEY IS ALSO HOME TO NEVADA'S LARGEST DAIRY THAT SHIPS ABOUT 50,000 GALLONS OF MILK A DAY FOR PROCESSING AND DISTRIBUTION IN SOUTHERN NEVADA AND CALIFORNIA. ABOUT 30% OF THE DAIRY'S PRODUCTION IS ORGANIC, USING LOCALLY GROWN ORGANIC ALFALFA.

AT THE SOUTH END OF YUCCA MOUNTAIN, AND TO THE SOUTHWEST, IN CRATER FLAT, SEE THE VOLCANIC CONES THAT RANGE IN AGE FROM ABOUT 80,000 YEARS TO 2 MILLION YEARS. THE PROBABILITY OF RECURRENCE AND CONSEQUENCE OF VOLCANIC ACTIVITY AFFECTING THE REPOSITORY IS A MATTER OF CONTINUING STUDY. THE PROBABILITY OF VOLCANIC ACTIVITY DIRECTLY IMPACTING THE REPOSITORY IN THE NEXT 10,000 YEARS IS CURRENTLY ESTIMATED BY DOE AT ABOUT ONE CHANCE IN 70 MILLION PER YEAR (ABOUT THE ODDS OF HITTING THE POWERBALL LOTTERY). THE DOSE CONSEQUENCE OF AN ERUPTION (TO AN INDIVIDUAL 11 MILES TO THE SOUTH IS ON THE ORDER OF TENS OF REMS. THE 1 MILLION YEAR PROBABILITY ESTIMATE IS NOT COMPLETED.

SIGNIFICANTLY EXPANDING THE CURRENT 70,000 MTU CAPACITY OF THE REPOSITORY WOULD REQUIRE CHARACTERIZATION OF AREAS THAT HAVE NOT YET BEEN STUDIED. EXPANSION WOULD GO INTO ROCKS SIMILAR TO THE ROCKS OF YUCCA MOUNTAIN, THAT LIKELY HAVE THE SAME FRACTURE CHARACTERISTICS RESULTING IN FAST INFILTRATION OF WATER AND RADIONUCLIDE RELEASES TO THE ACCESSIBLE ENVIRONMENT - THE SAME PROBLEM AS AT YUCCA MOUNTAIN.

LOOKING WEST, ACROSS CRATER FLAT, A GOLD MINE CAN BE SEEN IN BARE MOUNTAIN. MINERAL EXPLORATION IN THE FAR FUTURE COULD RESULT IN DISTURBANCE OF THE REPOSITORY IF INSTITUTIONAL MEMORY DECLINES OR FAILS.