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REPOSITORY INEL

COLLECTION SNAPTRAN
D-10419 FRC#1 934971

BOX No. 434 850067
4-2-1-5-56 SNAP Mass Releases

FOLDER SNAPTRAN-3 Destructive Test Fact Sheet

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UNCLAS SECTION 1 OF 2.

FOR DUNCAN CLARK CMM PI INFO JAMES D LYMAN CMM PI FROM MACK C CORBETT. REOUR TELECON CMM HEREWITH FOR HEADQUARTERS NOTIFICATION IS TRANSCRIPT OF LANGUAGE ADOPTED BY ID FOR SNAPTRAN-3 DESTRUCTIVE TEST FACT SHEET TO BE MADE AVAILABLE WITH FILM CLIPS AND TO MEDIA REPRESENTATIVES AT TEST BRIEFING. TEXT FOLLOWS CLN

FACT SHEET--SNAPTRAN-3 DESTRUCTIVE TEST

/FOR USE IN CONNECTION WITH THE FIRST IN A SERIES OF SNAP-10A AEROSPACE REACTOR DESTRUCT TESTS PLANNED DURING 1964 AND 1965 AT THE ATOMIC ENERGY COMMISSION/S NATIONAL REACTOR

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TESTING STATION IN IDAHO. SNAP STANDS FOR SYTEMS NUCLEAR AUXILIARY POWER/.

PURPOSE OF TEST

SNAPTRAN-3 /SNAP TRANSIENT NO. 3/ IS ONE OF SEVERAL EXPERIMENTS FOR OBTAINING DATA TO ASSESS THE SAFETY OF NUCLEAR REACTORS IN SPACE. ALL TOLD CMM THE SNAPTRAN TESTS WILL SIMULATE CONDITIONS OF UNLIKELY POWER EXCURSIONS THAT COULD DESTROY A REACTOR OF THE SNAP-10A TYPE. THE CONDITIONS TO BE INVESTIGATED ARE THOSE THAT CONCEIVABLY COULD OCCUR /1/ DURING LAUNCH BY PREMATURE CRITICALITY /START-UP/ FROM INADVERTENT MOVEMENT OF THE CONTROL DRUMS /BERYLLIUM-REFLECTING MECHANISMS FOR CONTROLLING REACTOR OPERATION/ CMM OR /2/ BY ACCIDENTAL CRITICALITY SHOULD THE REACTOR FALL INTO WATER. SPECIFIC TECHNICAL AIMS ARE TO OBTAIN DATA FOR ASSESSING THE AMOUNT OF ENERGY RELEASED UNDER ABNORMAL CONDITIONS INVOLVING AEROSPACE REACTORS CMM AND THE PHYSICAL CMM CHEMICAL CMM AND NUCLEAR PHENOMENA ASSOCIATED WITH SUCH POWER EXCURSIONS.

NATURE OF TEST

SNAPTRAN-3 CMM THE INITIAL TERMINAL EXCURSION OF THE

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SERIES OF EXPERIMENTS WITH SNAP-10A CMM IS THE WATER IMMERSION TEST. FOR THIS EXPERIMENT CMM THE BERYLLIUM CONTROL DRUMS HAVE BEEN REPLACED BY A SLEEVE OF NEUTRON ABSORBING METAL WHICH CMM AS LONG AS IT STAYS IN PLACE AROUND THE REACTOR CMM SOAKS UP NEUTRONS THAT HYDROGEN ATOMS IN THE WATER WOULD OTHERWISE REFLECT BACK INTO THE REACTOR CORE CMM CAUSING A CHAIN REACTION. A GEYSERLIKE PLUME OF WATER COULD RESULT FROM METAL-WATER REACTION AND SUDDEN TRANSFER OF HEAT ENERGY TO THE SURROUNDING WATER SHOULD RUPTURE OF THE FUEL ELEMENTS AND BREACHING OF THE REACTOR VESSEL WALL OCCUR. HOWEVER CMM THERE WOULD BE NO NO EJECTION OF WATER AND POSSIBLE LITTLE IF ANY CORE DAMAGE IF SELF-SHUTDOWN MECHANISMS INHERENT IN THE REACTOR DESIGN WERE TO PREVENT OR LIMIT AN UNCONTROLLED CHAIN REACTION.

NOT LIKE ATOM BOMB

SUCH A DELIBERATE TERMINAL EXCURSION DOES NOT TYPIFY WHAT MIGHT BE EXPECTED TO HAPPEN IN NORMAL OPERATION OF SNAP-10A DURING A SPACE MISSION. POWER REACTORS HAVE SO MANY INHERENT SHUTDOWN MECHANISMS AND BUILT-IN SAFETY DEVICES THAT AN UNCONTROLLED CHAIN REACTION SUCH AS MAY

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BE INDUCED WITH SNAP-10A IS HIGHLY IMPROBABLE. IN ANY CASE CMM THERE COULD BE NO ATOM-BOMB-LIKE DESTRUCTION CMM AS THE DESIGN OF NUCLEAR REACTORS PRECLUDES THIS.

THE REACTOR

THE SNAP-10A REACTOR CMM EXPECTED TO BE THE FIRST NUCLEAR REACTOR IN SPACE CMM IS ABOUT THE SIZE OF A FIVE-GALLON CAN AND WEIGHS ABOUT 220 POUNDS. THE CYLINDRICAL REACTOR CORE /APPROXIMATELY 9 INCHES IN DIAMETER AND 12 INCHES DEEP/ CONTAINS 37 URANIUM-ZIRCONIUM HYDRIDE FUEL ELEMENTS ENCLOSED BY A REACTOR VESSEL WHICH CONTAINS SODIUM-POTASSIUM /NAK/ LIQUID METAL COOLANT. NORMALLY CMM MOVABLE BERYLLIUM METAL DRUMS SERVE TO CONTROL THE REACTOR THROUGH NEUTRON REFLECTION. /BERYLLIUM REFLECTS RATHER THAN ABSORBS NEUTRONS./ WITH ITS TERMOELECTRIC SYSTEM FOR DIRECT CONVERSION OF HEAT INTO ELECTRICITY CMM THE REACTOR CAN PRODUCE 500 WATTS OF AUXILIARY POWER FOR EQUIPMENT AND INSTRUMENTATION IN SPACE VEHICLES AND SATELLITES.

TIME OF TEST

ORIGINALLY SCHEDULED FOR NOVEMBER 1963 CMM THE FIRST OF THE SNAP-10A DESTRUCT TEST SERIES WAS DELAYED BY ADDITIONAL

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INSTRUMENTATION REQUIREMENTS AND OTHER FACTORS UNTIL THE FIRST FAVORABLE WEATHER OPPORTUNITY IN MARCH 1964.

LOCATION.

SNAPTRAN-3 WILL BE CONDUCTED IN THE INITIAL ENGINEERING TEST /IET/ FACILITY AT TEST AREA NORTH CMM NATIONAL REACTOR TESTING STATION CMM IN IDAHO. THE REACTOR BUILDING IS A FOUR-STORY SHEET METAL STRUCTURE MOUNTED ON RAILS FOR MOVABILITY DURING CERTAIN EXPERIMENTS. THE NRTS IS AN 894-SQUARE-MILE EXPANSE OF LARGELY PUBLIC DOMAIN LAND IN SOUTHEASTERN IDAHO CMM WHERE A MAJOR PART OF THE COMMISSION/S QUEST FOR ECONOMIC NUCLEAR POWER HAS BEEN CENTERED SINCE 1948. START-UP AND OPERATION OF 35 NUCLEAR REACTOR EXPERIMENTS HAVE MARKED THE 15-YEAR HISTORY OF THE IDAHO TESTING STATION TO DATE.

PROCEDURE

FOR THE SNAPTRAN-3 /WATER IMMERSION/ DESTRUCTIVE TEST CMM A SNAP-10A REACTOR CMM STRIPPED OF ITS BERYLLIUM REFLECTOR DRUMS AND SURROUNDED CMM FOR CONTROL PURPOSES CMM BY A POISON /NEUTRON ABSORBING/ SLEEVE CMM IS MOUNTED ON AN

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UNCLAS SECTION 2 OF 2.

FOR DUNCAN CLARK CMM PI INFO JAMES D LYMAN CMM PI FROM

MACK C CORBETT.

PEDESTAL IN A 14-FOOT-DIAMETER CONCRETE TANK FILLED WITH WATER. THE TANK RESTS ON A FOUR-RAIL DOLLY WHICH HAS BEEN PUSHED INTO THE IET FACILITY BY MEANS OF A SHIELDED LOCOMOTIVE. PRIOR TO THE DESTRUCTIVE TEST CMM THE LOCOMOTIVE WILL PULL THE SHEET METAL BUILDING AWAY FROM THE TEST TANK ALONG RAILS PROVIDED FOR THE PURPOSE. TO ACHIEVE THE REQUIRED REACTIVITY /NEUTRON/ INSERTION RATE CMM THE POISON SLEEVE WILL BE ACCELERATED UPWARDS AND OUT

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OF THE TANK BY AN EXPLOSIVE CHARGE. SUDDEN REMOVAL OF THE SLEEVE IN THIS MANNER CMM WITHOUT INHIBITING OR ABORTING THE CHAIN REACTION IN OTHER WAYS CMM IS EXPECTED TO INDUCE IMMEDIATE REACTOR CORE DESTRUCTION DUE TO WATER REFLECTION OF NEUTRONS CMM THUS SIMULATING THE MAXIMUM CREDIBLE ACCIDENT THAT COULD OCCUR IN WATER. ON THE OTHER HAND CMM NONDESTRUCTIVE CMM SELF-SHUTDOWN MECHANISMS INHERENT IN THE REACTOR DESIGN COULD PREVENT THE VIOLENT DISASSEMBLY OF THE REACTOR BY DAMPING OFF THE CHAIN REACTION. REGARDLESS OF THE OUTCOME AND THE CONDITION OF THE REACTOR CMM ALL WATER WILL BE DRAINED FROM THE TANK AFTER THE TEST TO SAFELY SHUT DOWN THE REACTOR CMM MAKING IT IMPOSSIBLE TO BECOME SUPERCRITICAL A SECOND TIME.

EXCURSION ENERGY RELEASE

THE ENERGY RELEASE IS EXPECTED TO BE IN THE 20 TO 30 MEGAWATT-SECOND RANGE CMM WHICH IS EQUIVALENT TO THE ENERGY RELEASED BY THE FIRING OF APPROXIMATELY 200 ELECTRONIC FLASH BULBS USED BY COMMERCIAL PHOTOGRAPHERS.

CONTRACTORS

THE SNAPTRAN TESTS ARE BEING CONDUCTED FOR THE AEC BY

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PHILLIPS PETROLEUM COMPANY CMM IDAHO FALLS CMM IDAHO THE AEC/S PRIME CONTRACTOR FOR NUCLEAR SAFETY TESTING. ATOMICS INTERNATIONAL CMM CANOGA PARK CMM CALIFORNIA CMM IS THE AEC/S PRIME CONTRACTOR FOR DESIGN AND CONSTRUCTION OF SNAP-10A. EDGERTON CMM GERMESHAUSEN AND GRIER CMM LAS VEGAS CMM NEVADA CMM WILL PARTICIPATE IN THE TECHNICAL PHOTOGRPHIC COVERAGE OF THE EXPERIMENT.

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