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INDEXED BIBLIOGRAPHY OF CURRENT NUCLEAR SAFETY LITERATURE - 8

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IN NUCLEAR SCIENCE ABSTRACTS

NUCLEAR SAFETY INFORMATION CENTER

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Nuclear Safety is a quarterly Technical Progress Review prepared by the Nuclear Safety Information Center and sponsored by the U.S. Atomic Energy Commission's Division of Technical Information. The Review is intended to assist interested persons in keeping abreast of significant developments in the field of nuclear safety. It is not a comprehensive abstract of all literature published in this field during a given quarter, but rather it is a mechanism for presenting concise reviews of selected subjects as prevailing interest and available information warrant.

Coverage of the Review is limited to topics relevant to the analysis and control of hazards associated with nuclear reactors, operations involving fissionable materials, and the products of nuclear fission. Primary emphasis is on safety in reactor design, construction, and operation; however, safety considerations in reactor fuel fabrication, spent-fuel processing, nuclear waste disposal, and related operations are also treated. Safety in the use of radioisotopes in industry, medicine, and research is excluded, as are most topics considered to be the province of health physics. Even with these exclusions, the nuclear safety field overlaps such diverse fields as nuclear physics, solid-state physics, mechanics, chemistry, meteorology, geology, seismology, metallurgy, law, and nearly all branches of engineering. The authors will therefore review material from these fields that, in their opinion, has a direct bearing on nuclear safety.

Three types of articles appear in Nuclear Safety. First, there are frequent feature articles, which are solicited monographs written by nationally recognized specialists on particular topics of interest selected by the editors. Second, there are special review articles, usually written by invited authors, that are concerned with special topics and permit discussion of pertinent subjects that cannot be adequately considered by reference to only the current literature. Current review articles, which constitute the major portion of the journal, make up the third type; these articles are generally written by permanent reviewers who are senior staff specialists at Oak Ridge National Laboratory and summarize the literature and occurrences in the specialists' fields on roughly a yearly rotating basis.

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MARCH 1967

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FOREWORD

THE INDEXED BIBLIOGRAPHY OF CURRENT NUCLEAR SAFETY LITERATURE IS PUBLISHED FOUR TIMES ANNUALLY UNDER THE AUSPICES OF THE NUCLEAR SAFETY INFORMATION CENTER. THE CENTER WAS ESTABLISHED IN MARCH 1963 AT THE OAK RIDGE NATIONAL LABORATORY UNDER THE SPONSORSHIP OF THE U. S. ATOMIC ENERGY COMMISSION AND SERVES AS A FOCAL POINT FOR THE COLLECTION, STORAGE, EVALUATION, AND DISSEMINATION OF NUCLEAR SAFETY INFORMATION. IT CONTAINS AN EXTENSIVE COLLECTION OF MATERIAL FILED IN A MANUAL RAPID-ACCESS SYSTEM TO PROVIDE READY ANSWERS TO QUESTIONS ARISING IN THE FIELD OF NUCLEAR SAFETY.

BIBLIOGRAPHIC DATA AND ABSTRACTS HAVE BEEN STORED IN BOTH A COMPUTER AND A MANUAL FILE SINCE SEPTEMBER 1964. THE PRODUCTION OF THIS BIBLIOGRAPHY WAS MADE POSSIBLE THROUGH IBM-7090 COMPUTER PROGRAMS DEVELOPED BY THE INFORMATION SYSTEMS DEPARTMENT OF THE COMPUTER SCIENCES CENTER AT OAK RIDGE.

BIBLIOGRAPHIC ITEMS HAVE BEEN SORTED INTO 19 CATEGORIES OF NUCLEAR SAFETY INFORMATION. ITEMS MAY APPEAR IN AS MANY AS THREE CATEGORIES. A SELECTOR INDEX AND AN AUTHOR INDEX ARE PROVIDED FOR THE CONVENIENCE OF THE USER.

EACH BIBLIOGRAPHIC ITEM CONSISTS OF AUTHOR(S), TITLE, CORPORATE AUTHOR(S), NUMBER OF PAGES, TABLES, FIGURES, REFERENCES, DATE, DOCUMENT NUMBER(S), AVAILABILITY (IF NOT OBVIOUS), AN INFORMATIVE ABSTRACT OF LESS THAN 100 WORDS, AND SEVERAL SELECTOR TERMS. THE SELECTOR TERMS OR KEYWORDS ARE ASSIGNED BY NSIC PERSONNEL TO SERVE AS COORDINATE INDEXING TERMS FOR STORAGE AND FUTURE RETRIEVAL OF INFORMATION. THE MOST SIGNIFICANT SELECTOR TERMS FOR EACH BIBLIOGRAPHIC ENTRY ARE ASTERISKED AS WEIGHTING FACTORS. SELECTOR TERMS ARE INCLUDED WITH THIS BIBLIOGRAPHY SINCE THEY CAN, THROUGH THE SELECTOR INDEX, BE OF AID TO THE READER IN LOCATING ITEMS OF INTEREST. MANY READERS, HOWEVER, WILL PREFER TO SCAN THE CATEGORIES MOST RELATED TO THEIR FIELD OF INTEREST.

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ORNL-NSIC-12	INDEXED BIBLIOGRAPHY OF CURRENT NUCLEAR SAFETY LITERATURE - 3	NOVEMBER, 1965
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ORNL-NSIC-20	INDEXED BIBLIOGRAPHY OF CURRENT NUCLEAR SAFETY LITERATURE - 7	NOVEMBER, 1966

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CATEGORY SCOPE NOTES

A BRIEF EXPLANATION OF THE COMPOSITION OF EACH CATEGORY WITHIN THE SCOPE OF THE NUCLEAR SAFETY INFORMATION CENTER FOLLOWS

1. GENERAL SAFETY CRITERIA

THIS CATEGORY ENCOMPASSES ALL SAFETY ASPECTS OF RADIATION PHILOSOPHY, STANDARDS, CODES, COST, FINANCIAL LIABILITY AND INSURANCE. OTHER ITEMS OF INTEREST ARE CRITICALITY SAFETY AND THE COMPARATIVE RISK TO THE PUBLIC HEALTH AND SAFETY FROM NUCLEAR AND NONNUCLEAR HAZARDS.

2. SITING OF NUCLEAR FACILITIES

THIS CATEGORY DEALS WITH DOCUMENTS RELATED TO THE FACTORS USED IN EVALUATING SITES SUCH AS CHARACTERISTICS OF THE FACILITY DESIGN, PROPOSED OPERATION, POPULATION DENSITY, USE CHARACTERISTICS OF THE SITE ENVIRONS, PHYSICAL CHARACTERISTICS OF THE SITE, AND THE RELATIONSHIP OF ENGINEERED SAFEGUARDS TO NUCLEAR FACILITY SITING.

3. TRANSPORTATION AND HANDLING OF RADIOACTIVE MATERIALS

THIS CATEGORY CONTAINS ARTICLES DEALING WITH SHIPPING CONTAINERS, SHIPPING REGULATIONS, CRITICALITY SAFETY AS RELATED TO SHIPPING AND HANDLING, TRANSPORTATION ACCIDENTS, AND ALL OTHER ITEMS DEALING WITH SAFETY DURING THE TRANSPORTATION AND/OR HANDLING OF RADIOACTIVE MATERIALS.

4. AEROSPACE SAFETY

THIS CATEGORY COVERS SAFETY CONSIDERATIONS SUCH AS LAUNCH AND REENTRY PROBLEMS THAT ARE UNIQUE TO NUCLEAR SYSTEMS USED IN AEROSPACE VEHICLES.

5. ACCIDENT ANALYSIS

ALL FACETS OF THE ANALYSIS OF POSTULATED ACCIDENTS ARE CONSIDERED IN THIS CATEGORY. INCLUDED ARE BURNOUT HEAT FLUX, CRITICAL HEAT TRANSFER, RELIABILITY ANALYSIS, IN PILE EXPERIMENTS, COOLANT ACTIVITY BUILDUP, PIPE RUPTURE, AND EXPERIMENTS, I.E. LOFT. EXPERIMENTS RELATED TO REACTOR KINETICS ARE CATALOGED IN CATEGORY 6.

6. REACTOR TRANSIENTS, KINETICS, AND STABILITY

THIS CATEGORY INCLUDES THE VARIOUS STUDIES, BOTH ANALYTICAL AND EXPERIMENTAL, SUCH AS TREAT AND SPERT IN WHICH THE TRANSIENT BEHAVIOR OF REACTORS AND CRITICALITY ACCIDENTS ARE EXAMINED.

7. FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

THE RELEASE OF FISSION PRODUCTS FROM VARIOUS MATERIALS AND THEIR MOVEMENT WITHIN A NUCLEAR FACILITY CONTAINMENT SYSTEM ARE INCLUDED IN THIS CATEGORY. TRANSPORT OF THE FISSION PRODUCT INVOLVES THE PHYSICAL AND CHEMICAL CHARACTERIZATION OF THE RELEASED RADIOACTIVE MATERIALS, AS WELL AS THE VARIOUS MECHANISMS SUCH AS DEPOSITION, ADSORPTION, FILTRATION, FALLOUT, ETC., THAT WOULD ATTENUATE THEIR CONCENTRATION WITHIN THE CONTAINMENT SYSTEM.

8. SOURCES OF ENERGY RELEASE UNDER ACCIDENT CONDITIONS

SOURCES OF ENERGY CONSIDERED IN THIS CATEGORY INCLUDE NUCLEAR, WIGNER, AND GAMMA ENERGIES, AS WELL AS CHEMICAL REACTIONS, METAL-WATER REACTIONS, AND ANY OTHER TYPES OF ENERGY THAT MIGHT BE RELEASED AS THE RESULT OF A NUCLEAR ACCIDENT.

9. NUCLEAR INSTRUMENTATION, CONTROL, AND SAFETY SYSTEMS

THE DESIGN OF CONTROL AND SAFETY SYSTEMS FOR VARIOUS NUCLEAR PROCESSES, AS WELL AS THE REQUIRED INSTRUMENTATION AND HARDWARE, ARE INCLUDED IN THIS CATEGORY. THE PROBLEMS INVOLVED ARE THE PERFORMANCE REQUIRED OF SAFETY SYSTEMS THE SPECIFICATION OF INSTRUMENTATION THE CONCEPTS OF COINCIDENCE, REDUNDANCE, FAILURE MODES, AND RELIABILITY THE ADEQUACY OF SHUTDOWN MARGINS THE DESIGN FEATURES OF DIFFERENT MECHANICAL DEVICES AND RELATED SUBJECTS.

10. ELECTRICAL POWER SYSTEMS

INFORMATION RELATED TO ROUTINE AND EMERGENCY MEANS OF SUPPLYING ELECTRICAL POWER TO NUCLEAR FACILITIES IS COVERED IN THIS CATEGORY.

11. CONTAINMENT OF NUCLEAR FACILITIES

THIS CATEGORY ENCOMPASSES ALL ASPECTS OF PRESSURE CONTAINMENT, PRESSURE RELEASE CONTAINMENT, AND MULTIPLE BARRIER CONTAINMENT FOR REACTORS, RADIOCHEMICAL PLANTS, HOT CELLS, SOURCES, ETC., AND WILL INCLUDE SUCH ASPECTS AS DESIGN CONSIDERATIONS, LEAKAGE, PENETRATIONS, STRUCTURAL INTEGRITY, AND TEST TESTING.

12. PLANT SAFETY FEATURES

THE SAFETY ASPECTS OF MAINTENANCE, DECONTAMINATION, REACTOR SYSTEMS, URANIUM MINING AND MILLING, AND FUEL FABRICATION AND STORAGE ARE COVERED IN THIS CATEGORY. ENGINEERING DEVICES SUCH AS PRESSURE AND TEMPERATURE REDUCING SYSTEMS, AIR CLEANING SYSTEMS, AND CORE SPRAY AND SAFETY INJECTION SYSTEMS THAT ARE DESIGNED TO MINIMIZE THE CONSEQUENCES OF NUCLEAR ACCIDENTS ARE INCLUDED.

13. RADIOCHEMICAL PLANT SAFETY

NUCLEAR SAFETY INFORMATION RELATED SPECIFICALLY TO RADIOCHEMICAL PLANTS IS COVERED IN THIS CATEGORY.

14. RADIONUCLIDE RELEASE AND MOVEMENT IN THE ENVIRONMENT

ALL ASPECTS OF THE INTENTIONAL OR ACCIDENTAL RELEASE OF RADIOACTIVITY TO THE ENVIRONMENT ARE INCLUDED IN THIS CATEGORY. RADIOACTIVE WASTE MANAGEMENT, INCLUDING WASTE TRANSPORTATION, TREATMENT, DISPOSAL AND EFFLUENT CONTROL IS OF PRIMARY IMPORTANCE AS IS RADIONUCLIDE OCCURRENCE AND MOVEMENT. THE LATTER INCLUDES FALLOUT, GEOLOGICAL CONSIDERATIONS, COUNTERMEASURES, ANALYTICAL TECHNIQUES, HYDROLOGIC CONSIDERATIONS, AND RADIONUCLIDE MOVEMENT IN SOIL AND WATER.

15. ENVIRONMENTAL SURVEYS, MONITORING, AND RADIATION EXPOSURE OF MAN

THIS CATEGORY INCLUDES ITEMS RELATED TO (1) ENVIRONMENTAL AND PERSONNEL MONITORING DURING ROUTINE AND ACCIDENTAL RADIONUCLIDE RELEASE, (2) MONITORING METHODS AND TECHNIQUES, (3) DOSE MEASUREMENT AND CALCULATION, (4) DETERMINATION OF MAXIMUM PERMISSIBLE DOSE AND CONCENTRATION, AND (5) INTERNAL AND EXTERNAL EXPOSURE TO RADIONUCLIDES.

16. METEOROLOGICAL CONSIDERATIONS

THIS CATEGORY CONSIDERS NOT ONLY DIFFUSION AND DEPOSITION OF RADIOACTIVE MATERIAL NEAR THE EARTH'S SURFACE IN CONNECTION WITH REACTOR OPERATIONS BUT ALSO THE ATMOSPHERIC TRANSPORT AND FALLOUT IN THE TROPOSPHERE AND STRATOSPHERE AS A RESULT OF NUCLEAR WEAPONS TESTS.

17. OPERATIONAL SAFETY AND EXPERIENCE

THIS CATEGORY INCLUDES COVERAGE OF THE SAFETY ASPECTS OF ROUTINE REACTOR OPERATION AND OF INCIDENTS OR UNUSUAL OPERATING OCCURRENCES, LARGE OR SMALL. POWER, RESEARCH, AND TEST REACTORS AND FUEL REPROCESSING PLANTS WILL BE COVERED. ALL AVAILABLE OPERATING, INCIDENTS, SAFEGUARDS, AND INSPECTION REPORTS WILL BE COLLECTED AND INDEXED.

18. SAFETY ANALYSIS AND DESIGN REPORTS

ROUTINE LISTINGS OF THE LATEST NUCLEAR FACILITY SAFETY ANALYSIS AND DESIGN REPORTS ARE TO BE FOUND IN THIS CATEGORY. INCLUDED ARE BOTH ANALYSES AND REPORTS BY FACILITY DESIGNERS AND BY THE AEC REGULATORY STAFF.

19. BIBLIOGRAPHIES

THIS CATEGORY CATALOGUES DOCUMENTS ON NUCLEAR SAFETY TOPICS THAT ARE EXCLUSIVELY BIBLIOGRAPHIES AS WELL AS THOSE THAT INCLUDE EXTENSIVE BIBLIOGRAPHIES WITH OTHER MATERIAL.

CATEGORY 1
GENERAL SAFETY CRITERIA

1-08441 FOX TA + MUELLER RA + FORD CH + ALGER DL
CRITICAL MASS STUDIES WITH NASA ZERO POWER REACTOR II. I - CLEAN HOMOGENEOUS CONFIGURATIONS
LEWIS RESEARCH CENTER, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, CLEVELAND, OHIO
NASA-TN-D-3097 +. 19 PAGES, 6 FIGURES, 2 TABLES, 6 REFERENCES- NOVEMBER 1965, CFSTI \$1.00 CY, \$0.50 MN

THE NASA ZERO POWER REACTOR II (ZPR-II) HAS BEEN USED TO DETERMINE EXPERIMENTALLY THE CRITICAL MASSES FOR MORE THAN A TENFOLD RANGE OF HIGHLY ENRICHED (93.2 PERCENT U-235) AQUEOUS URANYL FLUORIDE FUEL CONCENTRATIONS IN CLEAN CYLINDRICAL GEOMETRIES. IN ADDITION TO THE CRITICAL MASSES, DATA ARE PRESENTED ON THE TEMPERATURE COEFFICIENT OF REACTIVITY WORTH AT CRITICALITY FOR A SIMILAR RANGE OF CONCENTRATIONS. A BRIEF DESCRIPTION OF THE ZPR-II AND THE EXPERIMENTAL PROCEDURES USED ARE ALSO INCLUDED.

CRITICALITY EXPERIMENT + CRITICALITY SAFETY + REACTIVITY COEFFICIENT + TEMPERATURE COEFFICIENT + URANIUM

1-08716 CORNELL DC
SAFE-PCRS. A COMPUTER PROGRAM FOR THE STRESS ANALYSIS OF COMPOSITE BODIES OF REVOLUTION. INPUT INSTRUCTIONS
GENERAL ATOMIC
GA-6588 +. 40 PAGES, FIGURES, TABLES, 2 REFERENCES- AUGUST 1, 1965- CFSTI, \$2.00 CY, \$0.75 MN.

A COMPUTER PROGRAM FOR THE STRESS ANALYSIS OF COMPOSITE BODIES OF REVOLUTION. INPUT INSTRUCTIONS.

*COMPUTER PROGRAM + *STRESS ANALYSIS + DESIGN STUDY + PROPERTY, PHYSICAL

1-08719 MORGAN KZ
PRESENT STATUS OF RECOMMENDATIONS OF THE INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION, NATIONAL COUNCIL ON RADIATION PROTECTION AND FEDERAL RADIATION COUNCIL
OAK RIDGE NATIONAL LABORATORY
32 PAGES, TABLES, 35 REFERENCES, JUNE 14, 1965, PUBLISHED IN PROGRESS IN NUCLEAR ENERGY SERIES XII, VOL. 2, PERGAMON PRESS, LONDON

THE HISTORICAL BACKGROUNDS OF THE INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION (ICRP), THE NATIONAL COUNCIL ON RADIATION PROTECTION (NCRP) AND THE FEDERAL RADIATION COUNCIL (FRC) ARE DISCUSSED AS WELL AS MANY CURRENT RECOMMENDATIONS MADE BY THESE ORGANIZATIONS AS THEY APPLY TO RADIATION PROTECTION IN MAN. THIS INCLUDES WORKERS IN THE RADIATION INDUSTRY, BUT ALSO THE POPULATION AT LARGE.

*RADIATION PROTECTION, ORGANIZATION + PERSONNEL EXPOSURE, RADIATION + RADIATION IN PERSPECTIVE + RADIATION SAFETY AND CONTROL

1-09662 BRINKMANN G + SCHENK W + SCHULZ W + STOCKSCHLADER F
IMPROVING ECONOMY WITH THE USE OF STANDARDIZED, MOVABLE, IN-CELL BOXES, AND THE DECONTAMINATION OF THEIR EQUIPMENT AT THE CENTRAL DECONTAMINATION FACILITY
KERNFORSCHUNGSANLAGE JULICH, GERMANY
13 PAGES, 7 FIGURES, 5 REFERENCES- 1965- PP. 654-667 OF THE PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENoble, JUNE 15-18, 1965, VOL. 2- ENEA, OECD, PUBLISHERS

WHEN A NUCLEAR RESEARCH CENTER HAS SEVERAL HOT LABORATORIES, ALL OF WHICH USE IN-CELL BOXES, IT IS DESIRABLE TO STANDARDIZE THE CELLS AND BOXES AS FAR AS POSSIBLE TO ACHIEVE MAXIMUM ECONOMY, EFFICIENCY, AND CONVENIENCE. THE FOLLOWING REPORT SHOWS THE PRINCIPLES OF PLANNING WHICH ARE LAID DOWN AT KFA-JULICH, IN CONNECTION WITH THE CONSTRUCTION OF SEVERAL PLANTS. IT ENUMERATES THE ADVANTAGES AND DESCRIBES THE CONDITIONS WHICH MUST BE OBSERVED DURING PLANNING. THE SECTION ON THE DECONTAMINATION FACILITY IS INCLUDED AS AN IMPORTANT PART OF THE ENTIRE BOX-EXCHANGE SYSTEM. IN ADDITION, SOME OF THE MORE INTERESTING POINTS CONCERNING EQUIPMENT AND TECHNIQUES, ESPECIALLY A NEW MANIPULATOR EXCHANGE TECHNIQUE, ARE DESCRIBED.

*ADMINISTRATIVE CONTROLS AND PRACTICES + *DECONTAMINATION + *GERMANY + ECONOMICS + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + HOT CELL

1-09664 WATSON CD + BERRETH EA + DUMMER JE + FULLER RK + STEARNS RF
POLICY AND PROCEDURES USED IN THE UNITED STATES FOR DECONTAMINATING HOT CELLS
OAK RIDGE NATIONAL LABORATORY + BATTELLE NORTHWEST + LOS ALAMOS SCIENTIFIC LABORATORY
36 PAGES, 7 FIGURES, 5 REFERENCES- 1965- PP. 678-705 OF THE PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENoble, JUNE 15-18, 1965, VOL. 2- ENEA, OECD, PUBLISHERS

IN THE UNITED STATES, HOT CELLS AND EQUIPMENT FOR HANDLING RADIOACTIVE SOLIDS OR LIQUIDS ARE SUCCESSFULLY DECONTAMINATED AS REQUIRED. THE FREQUENCY VARIES FROM ABOUT THREE TIMES A YEAR TO ONLY ONCE IN THREE YEARS FOR THE LARGER PILOT-PLANT UNITS. THE NORMAL TIME REQUIRED TO DECONTAMINATE A FACILITY IS ABOUT TWO TO SIX WEEKS. DECONTAMINATION IS USUALLY DONE REMOTELY, THROUGH APPROPRIATE DESIGN, PRECONTAMINATION APPLICATION OF PROTECTIVE COATINGS, EXPENDABLE EQUIPMENT, THE PROPER CHOICE OF CLEANING REAGENTS (DETERGENTS, ORGANIC SOLVENTS, ACIDS, ALKALIES, CHELATING AGENTS) AND PHYSICAL METHODS (GRINDING, ULTRASONIC CLEANING, BLASTING, AND ABRADING). METHODS HAVE BEEN DEVELOPED AND ARE PRESENTED IN THIS PAPER FOR DECONTAMINATING HOT CELLS AND ADJACENT AREAS SUBJECTED TO THE UNCONTROLLED RELEASE OF RADIOACTIVITY.

*ADMINISTRATIVE CONTROLS AND PRACTICES + *DECONTAMINATION + *HOT CELL + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + UNITED STATES

CATEGORY 1
GENERAL SAFETY CRITERIA

1-09852 RENGEL JC
SAFETY RELATED ASPECTS OF LOCATING NUCLEAR POWER PLANTS IN CITIES
WESTINGHOUSE ELECTRIC CORPORATION, PITTSBURGH, ATOMIC POWER DIV.
5 PAGES, PRESENTED AT THE ANS SYMPOSIUM ON LOCATING NUCLEAR POWER PLANTS IN CITIES, MARCH 22, 1966, NEW YORK CITY

PUTS RELIABILITY AND ACCIDENT-PREVENTION SAFEGUARDS AHEAD OF CONSEQUENCE-LIMITING SAFEGUARDS.
RELIABILITY ENSURED BY DESIGN, INTEGRITY OF MANUFACTURER, INSPECTION, TEST, AND OPERATION
CRITERIA FOR URBAN SITING.

*SITING, REACTOR + CODES AND STANDARDS + DESIGN CRITERIA + ENGINEERED SAFEGUARD

1-09854 SZAWLEWICZ SA
THE AEC REACTOR SAFETY PROGRAM
U. S. ATOMIC ENERGY COMMISSION
7 PAGES, PRESENTED AT THE ANS SYMPOSIUM ON LOCATING NUCLEAR POWER PLANTS IN CITIES, MARCH 22, 1966, NEW YORK CITY

STEERING COMMITTEE ON SAFETY RESEARCH. ACCIDENT-PREVENTING AND CONSEQUENCE-LIMITING
SAFEGUARDS. ENGINEERED SAFEGUARDS. LOSS-OF-COOLANT ACCIDENT AND MECHANICAL LOAD IT CREATES,
IN-CORE SPRAY AND EMERGENCY COOLING SYSTEM, METAL-WATER REACTION, FUEL MELTDOWN,
FISSION-PRODUCT RELEASE, RELIABILITY OF PIPING. LIST OF PLANNED ORNL SUMMARY REPORT BUDGET.
IN-PLANT TEST PROGRAM. NUCLEAR SAFETY PILOT PLANT, CONTAINMENT SYSTEMS EXPERIMENT, LOFT,
POWER BURST FACILITY.

CSE (CONTAINMENT SYSTEMS EXPERIMENT) + EMERGENCY COOLING + ENGINEERED SAFEGUARD +
FISSION PRODUCT RELEASE, GENERAL + FUEL MELTDOWN + LOFT (LOSS OF FLUID TEST) + METAL WATER REACTION +
NSPP (NUCLEAR SAFETY PILOT PLANT) + PBF (POWER BURST FACILITY) + REACTOR, PRESSURIZED WATER

1-09855 BECK CK
CURRENT TRENDS AND PERSPECTIVES IN REACTOR LOCATION AND SAFETY REQUIREMENTS
U. S. ATOMIC ENERGY COMMISSION, WASHINGTON
14 PAGES, PRESENTED AT THE ANS SYMPOSIUM ON LOCATING NUCLEAR POWER PLANTS IN CITIES, MARCH 22, 1966, NEW YORK CITY

SAFETY RECORD OF NUCLEAR PLANTS. HIGH STANDARDS. ACCIDENT PREVENTION AND
CONSEQUENCE-LIMITING SAFEGUARDS. MCA ANALYSIS. ISOLATED SITES. REVIEWS BY EXPERTS.
INCREASE IN FISSION INVENTORY. STANDARDIZATION. TREND TOWARD MORE CENTRAL LOCATION.
REQUIREMENTS FOR LESS-ISOLATED LOCATION - HIGH STANDARDS, DEFINITION OF TECHNICAL AREAS OF
UNCERTAINTY, ESTABLISHMENT OF ADEQUACY OF SAFEGUARD SYSTEM, SUFFICIENT EXPERIENCE. THESE
REQUIREMENTS HAVE NOT YET BEEN FULLY MET.

*SITING, REACTOR + ACCIDENT, MAXIMUM CREDIBLE (MCA) + ACCIDENT, PROBABILITY OF + ENGINEERED SAFEGUARD +
REGULATION, AEC + REVIEW + SAFETY PRINCIPLES AND PHILOSOPHY

1-09856 CAHILL WJ
REMARKS BY WILLIAM J. CAHILL, JR. MECHANICAL PLANT ENGINEER CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
AT THE SYMPOSIUM ON LOCATING NUCLEAR POWER PLANTS IN CITIES, AMERICAN NUCLEAR SOCIETY, MARCH 22, 1966
CONSOLIDATED EDISON COMPANY, NEW YORK
2 PAGES, PRESENTED AT THE ANS SYMPOSIUM ON LOCATING NUCLEAR POWER PLANTS IN CITIES, MARCH 22, 1966

BRIEF DESCRIPTION OF ENGINEERED SAFEGUARDS, SITES, LICENSING EXPERIENCE, AND PUBLIC ACCEPTANCE
OF INDIAN POINT 1 AND 2, AND RAVENSWOOD.

*INDIAN POINT I + *INDIAN POINT II + *RAVENSWOOD + *SITING, REACTOR + ENGINEERED SAFEGUARD +
REACTOR, PRESSURIZED WATER + REGULATION, AEC

1-09971 SAUER MC
A METHOD FOR AUTOMATIC ANALYSIS OF DATA ON THE KINETICS OF FAST CHEMICAL REACTIONS IN THE FORM OF PICTURES
OF OSCILLOSCOPE TRACES
ARGONNE NATIONAL LABORATORY
ANL-7113 +. 15 PAGES, 10 FIGURES- OCTOBER 1965- CFSTI, \$1.00 CY, \$0.50 MN

THE CHLOE SYSTEM FOR DIRECT DIGITIZATION OF PHOTOGRAPHIC DATA WAS USED IN CONJUNCTION WITH THE
CONTROL DATA CORPORATION 3600 COMPUTER SYSTEM TO ANALYZE DATA, IN THE FORM OF PICTURES OF
OSCILLOSCOPE TRACES, ON THE KINETICS OF FAST CHEMICAL REACTIONS. ALL MEASUREMENTS AND
ANALYTICAL PROCESSES WERE DONE BY MACHINE IN A COMPLETELY AUTOMATIC METHOD.

*ANALYTICAL MODEL + *CHEMICAL KINETICS + *CHEMICAL REACTION + *COMPUTER PROGRAM + *COMPUTER, DIGITAL

1-10310 SHAW AE
THE SAFE TRANSPORT OF RADIOACTIVE MATERIALS. A KEY TO THE 1964 REVISION OF THE INTERNATIONAL ATOMIC
ENERGY AGENCY REGULATIONS
UNITED-KINGDOM ATOMIC ENERGY AUTHORITY, RISLEY
TRG-1073 (D) +. 21 PAGES, 1 FIGURE, 4 TABLES, JULY 1965, BIS, \$0.70 CY

A KEYED INDEX TO HELP THE DAY-TO-DAY USER OF THE INTERNATIONAL ATOMIC ENERGY AGENCY DOCUMENT
REGULATIONS FOR THE SAFE TRANSPORT OF RADIOACTIVE MATERIALS (1964 REVISION OF MAY 1961
REGULATIONS). IF IT IS KNOWN WHAT RADIOACTIVE MATERIAL HAS TO BE TRANSPORTED (IN TERMS OF
ELEMENT, ISOTOPE, ITS TOTAL AND SPECIFIC ACTIVITIES ITS CHEMICAL AND PHYSICAL FORM, AND

CATEGORY 1
GENERAL SAFETY CRITERIA

1-10310 *CONTINUED*

DETAILS OF THE PACKAGE TYPE ALONG WITH SURFACE CONTAMINATION AND EXTERNAL RADIATION DOSE-RATE MEASUREMENTS), STEP-BY-STEP USE OF THE KEY WILL INDICATE THE CORRECT PROCEDURE. THIS KEY DOES NOT AVOID THE NEED TO UNDERSTAND THE DETAIL OF THE IAEA DOCUMENT BUT IS INTENDED AS A SUMMARY FOR DAY-TO-DAY USAGE BY THE CONSIGNOR. ANY REFERENCE IN THE KEY TO THE REGULATIONS IMPLIES THE REVISED IAEA REGULATIONS.

*REGULATION, IAEA + *SHIPPING CONTAINER + *TRANSPORTATION AND HANDLING

1-10335 BARON S

ENGINEERING FOR COMMUNITY ACCEPTANCE - THE ARCHITECT-ENGINEER ROLE
BURNS AND ROE, INC.

13 PAGES, 1 FIGURE, PRESENTED AT THE AMERICAN POWER CONFERENCE 28TH ANNUAL MEETING, APRIL 26-28, 1966, CHICAGO, APC

COMMENTS ON AEC DESIGN CRITERIA AND TURNKEY CONTRACTS. SUGGESTS TIGHT CONTRACT PRICE LEAVES LITTLE LEeway FOR AEC - REQUIRED MODIFICATIONS, TURNKEY CONTRACT A-E CANNOT SERVE AS SUBCONTRACTOR AND STILL ENGINEER PLANT FOR COMMUNITY ACCEPTANCE. LITTLE OR NO STANDBY CAPACITY AVAILABLE FOR MAJOR COMPONENT FAILURE, CHEAPER BUT LESS RELIABLE EQUIPMENT INEVITABLE. CONCENTRATION ON ACCIDENT ANALYSES, CONTAINMENT, AND SAFETY SYSTEMS REDUCE EFFORT ON MAINTAINABILITY AND LOCAL RADIATION CONTROL. SUGGESTS ELIMINATION OF FIXED-PRICE CONTRACTS TO ALLOW CONTINUED ENGINEERING RATHER THAN TOO-EARLY STANDARDIZATION, TO MEET ECONOMIC CHALLENGE.

*DESIGN CRITERIA + *SAFETY PRINCIPLES AND PHILOSOPHY + RADIATION, PUBLIC EDUCATION/ACCEPTANCE

1-10337 LONGSON B

THE HYDROGEN EMBRITTLEMENT OF NIOBIUM
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, CULCHETH

TRG-REPORT-1035 +. 40 PAGES, 37 FIGURES, 2 TABLES, REFERENCES, JULY 27, 1965, UKAEA

HYDROGEN IN SOLID SOLUTION EMBRITTLING NIOBIUM IN THE TEMPERATURE RANGE -196 TO 400C. SUSCEPTIBILITY TO EMBRITTLEMENT WAS NOT STRAIN-RATE DEPENDENT AT ROOM TEMPERATURE, BUT, AT THE TEMPERATURES INVESTIGATED, SUSCEPTIBILITY WAS INCREASED BY INCREASED OXYGEN CONTENT (ROOM TEMPERATURE TO 400C), INCREASED GRAIN SIZE (ROOM TEMPERATURE TO 200C), AND BY COLD WORKING (ROOM TEMPERATURE TO 100C). A HYDRIDE PHASE, FORMED BY A SHEAR PROCESS ACCOMPANIED BY HYDROGEN DIFFUSION, WAS FOUND FROM -74C TO ABOUT 200C. THE ACTIVATION ENERGY OF BOTH EMBRITTLEMENT AND HYDRIDE FORMATION WAS 3 KCAL PER GRAM-ATOM FOR A GRAIN SIZE OF 0.0022 CM AND WAS GRAIN-SIZE DEPENDENT.

*EMBRITTLEMENT + *HYDROGEN + *NIOBIUM + CHEMICAL REACTION + HYDRIDE

1-10409 PETRENKO LI + SAVITSKII PS + SINITSIN VI + KOLOTYRKIN YM + SYRKUS NP + ROMM RF
THE USES OF RADIOACTIVE ISOTOPES AND NUCLEAR RADIATION IN THE U.S.S.R. PROCEEDINGS OF THE ALL-UNION CONFERENCE HELD IN RIGA, 12-16 APRIL 1960. VOLUME ONE. GENERAL PROBLEMS CONNECTED WITH THE USE OF ISOTOPES. DEVICES INCORPORATING RADIOACTIVE OIL INDUSTRIES
AEC-TR-6466-1 + CONF-600 402 (VOL I) +. 339 PAGES, FIGURES, TABLES, 1961, CFSTI, \$7.00 CY

AN ALL-UNION CONFERENCE WAS HELD IN RIGA IN 1960 ON THE USES OF RADIOACTIVE ISOTOPES AND NUCLEAR RADIATION IN THE U.S.S.R. PROCEEDINGS WERE REPORTED IN FOUR VOLUMES. THIS ONE (VOL. I) INCLUDES GENERAL PROBLEMS CONNECTED WITH THE USE OF ISOTOPES (6 PAPERS), DEVICES INCORPORATING RADIOACTIVE SOURCES (17 PAPERS), RADIATION CHEMISTRY (13 PAPERS), AND CHEMICAL AND OIL INDUSTRIES (14 PAPERS). NO BIBLIOGRAPHY OR REFERENCES ARE GIVEN.

*RADIOISOTOPE + ECONOMIC STUDY + INSTRUMENTATION, GENERAL + RADIOCHEMICAL PROCESSING + SOURCE, RADIATION + UNION OF SOVIET SOCIALIST REPUBLICS

1-10525 BUCHANAN JR + HUTTON TC

ANALYSIS AND AUTOMATED HANDLING OF TECHNICAL INFORMATION AT THE NUCLEAR SAFETY INFORMATION CENTER
OAK RIDGE NATIONAL LABORATORY + OAK RIDGE GASEOUS DIFFUSION PLANT, UNION CARBIDE

TID-22972 +. 14 PAGES, 1 FIGURE, 3 TABLES, 15 REFERENCES, JUNE 1966, PP. 29-43 OF INFORMATION FOR NUCLEAR TECHNOLOGY, PANEL DISCUSSION, PRESENTED AT ANS ANNUAL MEETING, JUNE 20-23, 1966, DENVER, COLORADO

THE NUCLEAR SAFETY INFORMATION CENTER SERVES THE NUCLEAR COMMUNITY BY COLLECTING, STORING, EVALUATING AND DISSEMINATING SAFETY INFORMATION RELEVANT TO THE DESIGN AND OPERATION OF NUCLEAR FACILITIES. IN 1964 AFTER ABOUT A YEAR OF OPERATION, THE INFORMATION HANDLING SYSTEM WAS COMPUTERIZED IN ORDER TO BROADLY INCREASE THE SCOPE OF THE CENTERS SERVICES AND ENABLE IT TO EFFICIENTLY FUNCTION IN THE FUTURE. COMPUTER PROGRAMS HAVE BEEN DEVELOPED FOR THE PREPARATION OF A BIBLIOGRAPHY, COMPLETE WITH KEYWORDS AND PERSONAL AUTHOR INDEXES, THAT IS ISSUED QUARTERLY AND FOR A PROGRAM OF SELECTIVE DISSEMINATION OF INFORMATION (SDI) THAT IS PRODUCED ON 5- BY 8-IN CARDS. THESE PROGRAMS AND OTHER SERVICES OF THE CENTER ARE DISCUSSED.

*INFORMATION RETRIEVAL + *SAFETY PRINCIPLES AND PHILOSOPHY + COMPUTER PROGRAM

1-10565 SMITH CB

UCLA REQUESTS RE-EVALUATION OF REQUEST TO ALLOW VISITORS OPERATE REACTOR DURING OPEN HOUSE
UNIVERSITY OF CALIFORNIA, LOS ANGELES, CALIFORNIA

2 PAGES, JUNE 13, 1966, DOCKET 50-142, ATOMIC ENERGY CLEARING HOUSE, 12(27), PAGES 23-24, (JULY 4, 1966)

UCLA REQUESTS THAT AEC ALLOW VISITORS TO PUSH REACTOR CONTROL BUTTONS UNDER CLOSE SUPERVISION

CATEGORY 1
GENERAL SAFETY CRITERIA

1-10565 *CONTINUED*

TO ADJUST POWER LEVEL AND TO INCREASE POWER TO THE (LOWERED) SCRAM LEVEL. UCLA BELIEVES THAT SUCH CAREFULLY CONTROLLED DEMONSTRATIONS OF REACTOR SAFETY MAY LESSEN PUBLIC MISUNDERSTANDING AND FEAR. UCLA INVITES AEC REPRESENTATIVE TO PRESENT BRIEF TV DISCUSSION DURING DEMONSTRATION.

*RADIATION, PUBLIC EDUCATION/ACCEPTANCE + REACTOR, RESEARCH

1-10618 CHALMERS JH + WALKER G + PUGH J
HANDBOOK OF CRITICALITY DATA. VOLUME I
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, RISLEY
AHSB(S)-HANDBK-1(1ST. REV)+. 142 PAGES, 3 REFERENCES, 1965, BIS \$8.40

COLLECTION OF CRITICALITY DATA ON URANIUM SYSTEMS, PLUTONIUM SYSTEMS, MIXED PLUTONIUM SYSTEMS, AND MISCELLANEOUS DATA.

*CRITICALITY SAFETY + CRITICALITY EXPERIMENT + PLUTONIUM + URANIUM

1-10619 BRUNA JG + BRUNET JP + CAIZERGUES R + CLOUET D ORVAL C + KREMSEY J + TELLIER H + VERRIERE P
ALECTO - RESULTS OBTAINED WITH HOMOGENEOUS CRITICAL EXPERIMENTS ON PLUTONIUM 239, URANIUM 235 AND URANIUM 233
COMMISSARIAT A L ENERGIE ATOMIQUE, FRANCE, CENTRE D ETUDES NUCLEAIRES, SACLAY
CEA-R-2814 +. 130 PAGES, 37 FIGURES, 24 TABLES, OCTOBER 1965, DEP. MN

IN THIS REPORT ARE GIVEN THE RESULTS OF THE HOMOGENEOUS CRITICALITY EXPERIMENTS ALECTO, MADE ON PLUTONIUM-239, URANIUM-235 AND URANIUM-233. AFTER A BRIEF DESCRIPTION OF THE EQUIPMENT, THE CRITICAL MASSES FOR CYLINDERS OF DIAMETERS VARYING FROM 25 TO 42 CM ARE GIVEN AND COMPARED WITH OTHER VALUES (FOREIGN RESULTS, CRITICALITY GUIDE). EXPERIMENTS RELATING TO CROSS SECTIONS AND CONSTANTS TO BE USED ON THESE MATERIALS ARE PRESENTED. LASTLY, KINETIC EXPERIMENTS ALLOW ONE TO COMPARE PULSED-NEUTRON METHODS WITH FLUCTUATION METHODS.

*CRITICALITY EXPERIMENT + CRITICALITY SAFETY + NOISE ANALYSIS + PLUTONIUM + PULSED NEUTRON TECHNIQUE + URANIUM

1-10656 MALAKHOV V + SIMON W
CRITICALITY OF FUEL REPROCESSING EQUIPMENT
GENERAL ATOMIC
GAMD-6623 +. 20 PAGES, AUGUST 17, 1965, CFSTI, \$1.00 CY, \$0.50 MN

A STUDY OF THE CRITICALITY OF FUEL-PARTICLE STORAGE CONTAINERS AND OF ARRAYS OF SUCH CONTAINERS WAS CARRIED OUT. THE OBJECTIVE WAS TO COMPUTE THE MULTIPLICATION FACTOR AS A FUNCTION OF LENGTH AND DIAMETER FOR CYLINDRICAL CONTAINERS AND TO COMPUTE MASS LIMITS FOR VARIOUS KINDS OF FUEL PARTICLES THAT HAVE BEEN COATED WITH PYROLYTIC CARBON.

*CARBON + *CRITICALITY SAFETY + *PYROLYTIC + *URANIUM + COMPUTER, DIGITAL + THORIUM

1-10687 PAXTON HC
THE CRISIS IN CRITICALITY
2 PAGES, NUCLEAR NEWS 9(8)- 27-28 (AUGUST 1966)

REASON FOR NATIONAL TOPICAL ANS MEETING ON CRITICALITY SAFETY, LAS VEGAS, DECEMBER 13-15, 1966. MAINLY TO BRING INDUSTRY INTO DISCUSSION WITH AEC AND ITS CONTRACTORS AND TO RESOLVE THE DOUBLE STANDARD OF REGULATION WHICH REGULATES LICENSEES AND AEC PRODUCTION PLANTS DIFFERENTLY.

*CRITICALITY SAFETY + *REGULATION, AEC

1-10695 LONG JK + MCVEAM RL + REYNOLDS AB + STEWART SL + WEITZBERG A + LERIDON A
CRITICAL MASS OF SEFOR MOCKUP IN ZPR-III
ARGONNE NATIONAL LABORATORY, IDAHO FALLS, IDAHO + GENERAL ELECTRIC COMPANY, SAN JOSE, CALIFORNIA + CENTRE D ETUDES NUCLEAIRES DE CADARACHE, FRANCE
2 PAGES, 1 FIGURE, 1 TABLE, 12 REFERENCES, NUCLEAR SCIENCE AND ENGINEERING 25 (4)- 442-443 (1966)

CRITICALITY OF THE MOCKUP OF THE SOUTHWEST EXPERIMENTAL FAST OXIDE REACTOR (SEFOR) IN THE ZPR-III FACILITY WAS ACHIEVED NOVEMBER 17, 1965. THE NEUTRON SPECTRUM AND URANIUM-TO-PLUTONIUM RATIO OF THIS ALL-PLUTONIUM CRITICAL IS CHARACTERISTIC OF LARGE, FAST, CERAMIC POWER REACTORS. THE CRITICAL LOADING WAS THE FIRST IN A SERIES OF EXPERIMENTS.

*SEFOR (SOUTHWEST EXP. FAST OXIDE REACTOR) + CRITICAL ASSEMBLY FACILITY + CRITICALITY EXPERIMENT + REACTOR, BREEDER + REACTOR, FAST + ZPR III (ANL ZERO POWER REACTOR)

1-10703 CLARK HK
CRITICAL AND SAFE MASSES AND DIMENSIONS OF LATTICES OF U AND UO2 RODS IN WATER
SAVANNAH RIVER LABORATORY, AIKEN, SOUTH CAROLINA
DP-1014 + CONF-651103-29 +. 60 PAGES, 1 FIGURE, 8 TABLES, 11 REFERENCES, FEBRUARY 1966, CFSTI, \$3.00 CY, \$0.75 MN

A SURVEY IS GIVEN OF CRITICAL AND EXPONENTIAL DATA OBTAINED WITH WATER-REFLECTED LATTICES OF

CATEGORY 1
GENERAL SAFETY CRITERIA

1-10703 *CONTINUED*

SLIGHTLY ENRICHED URANIUM AND URANIUM OXIDE RODS. CALCULATIONS ARE MADE FOR THESE LATTICES BY AN ASYMPTOTIC MULTIGROUP BUCKLING CODE AND BY A TWO-GROUP DIFFUSION THEORY CODE EMPLOYING PARAMETERS GENERATED IN THE FIRST CODE. COMPARISON BETWEEN CALCULATIONS AND EXPERIMENTS IS MADE IN TERMS OF A K-SUB-EFF, WHICH IS THE RATIO OF THE CALCULATED K TO THAT CALCULATED FROM THE EXPERIMENTAL DIMENSIONS AND FLUX TRAVERSES AND FROM THE CALCULATED MIGRATION AREAS AND EXTRAPOLATION DISTANCES. FOR SOME OF THE DATA, COMPARISONS ARE ALSO MADE BETWEEN THE PRESENT METHOD OF CALCULATION AND A MORE COMPLICATED METHOD.

*CRITICALITY SAFETY + *URANIUM + *URANIUM DIOXIDE + RADIOCHEMICAL PLANT SAFETY + SAVANNAH RIVER PLANT

1-10705 SMILEY SH + BRATER DC + PASHLEY JH
ORGP FUEL REPROCESSING STUDIES - SUMMARY PROGRESS REPORT - JULY THROUGH DECEMBER, 1965
OAK RIDGE GASEOUS DIFFUSION PLANT, OAK RIDGE, TENNESSEE
K-1669 +. 56 PAGES, 9 FIGURES, 11 TABLES, JUNE 28, 1966, CFSTI, \$6.00 CY, \$0.50 MN

AMONG OTHER FLUORIDE VOLATILITY STUDIES, THE REPORT CONTAINS CRITICALITY CALCULATIONS FOR 2NAF-UF6 MATERIALS (6 PERCENT URANIUM-235) REQUIRED FOR DESIGN OF MODERATED SODIUM FLUORIDE FLUID-BED SORBERS.

*CRITICALITY SAFETY + *URANIUM HEXAFLUORIDE + EQUIPMENT DESIGN + RADIOCHEMICAL PROCESSING

1-10718 BROWN CL
CRITICALITY SAFETY OF PUO2-SS DRIVER FUEL IN THE FFTF
BATTELLE-NORTHWEST, PACIFIC NORTHWEST LABORATORY, RICHLAND, WASHINGTON
BNWL-222 +. PAGES 10-11 OF PHYSICS RESEARCH QUARTERLY REPORT - OCTOBER, NOVEMBER, DECEMBER 1965. JANUARY 14, 1966, CFSTI, \$2.00 CY, \$0.50 MN

UPDATES, IN THE LIGHT OF SLIGHT DESIGN CHANGES, THE REACTIVITY SAFETY CALCULATIONS OF THE PLUTONIUM OXIDE-STAINLESS STEEL DRIVER IN THE FFTF.

*FAST NEUTRON + *HANFORD SITE + REACTIVITY, EXCESS + REACTOR, TEST

1-10805 BIERMAN SR
PULSED NEUTRON SOURCE MEASUREMENTS OF THE Z-9 CRIB
HANFORD ATOMIC PRODUCTS OPERATION
HW-80913 +. 9 PAGES, MARCH 16, 1964, CFSTI, \$1.00 CY

THE PULSED-NEUTRON TECHNIQUE IS THOUGHT OF AS A DEVICE TO MEASURE THE SURCRITICALITY OF COMPONENTS OF PLANTS WHICH HANDLE FISSIONABLE MATERIAL. THE ACTUAL EXPERIMENTS IN THE HANFORD CRITICAL MASS LABORATORY WERE DONE IN CONJUNCTION WITH MEASUREMENTS OF CRITICAL MASS, CONTROL AND SAFETY ROD WORTH, AND NEUTRON LIFETIMES. INCLUDES ANALYSIS OF THE EXPERIMENTS.

*FUEL HANDLING + *PULSED NEUTRON TECHNIQUE + *SHUTDOWN MARGIN + CONTROL ROD WORTH + CRITICALITY SAFETY + PROMPT NEUTRON LIFETIME + RADIOCHEMICAL PROCESSING

1-10932 WHITESIDES GE + MORRISON GW + CRUME EC
FEW-GROUP MONTE CARLO CRITICALITY CALCULATIONS
UNION CARBIDE CORPORATION, OAK RIDGE, TENNESSEE
2 PAGES, 1 TABLE, 10 REFERENCES, ANS TRANSACTIONS 9(1), PAGES 133-134 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

A GENERAL-PURPOSE MONTE CARLO NEUTRON-TRANSPORT CODE WAS ALTERED TO ACCEPT THE 16-GROUP ENERGY STRUCTURE OF HANSEN AND ROACH. THE TRANSPORT, SCATTERING, AND FISSION CROSS SECTIONS FOR THE GROUPS ARE INPUT FOR EACH ELEMENT IN A MEDIUM. NEUTRON SLOWING DOWN IS TREATED BY SAMPLING FROM THE TRANSFER MATRIX CROSS SECTIONS.

*COMPUTER, DIGITAL + *CRITICALITY SAFETY + MONTE CARLO

1-11161 TUTTLE RJ
A SUMMARY OF THE CALCULATED CHARACTERISTICS OF THE EPITHERMAL CRITICAL ASSEMBLIES 1 THROUGH 13
ATOMICS INTERNATIONAL, CANOGA PARK
NAA-SR-MEMO-11799 +. 92 PAGES, JANUARY 12, 1966, CFSTI \$3.00 CY, \$0.75 MN

PROBLEM - SUMMARIZE THE RESULTS OF CALCULATIONS PERFORMED FOR THE CRITICAL ASSEMBLIES AT THE EPITHERMAL CRITICAL EXPERIMENT LABORATORY TO FACILITATE ANALYSIS OF THE EXPERIMENTAL RESULTS AND AID FUTURE EXPERIMENTAL PLANNING. RESULTS - CRITICALITY CALCULATIONS AND PERTURBATION THEORY CALCULATIONS OF THE PROMPT-NEUTRON LIFETIME, EFFECTIVE DELAYED-NEUTRON FRACTION AND AVERAGE FISSION IMPORTANCE ARE TABULATED FOR THE ECEL CORES 1-13. THE FLUX AND ADJOINT SPECTRA ARE TABULATED AND PRESENTED IN GRAPHICAL FORM. MATERIAL SPECIFICATIONS AND THE CROSS-SECTION LIBRARY USED IN THE CALCULATIONS ARE ALSO RECORDED. A BIBLIOGRAPHY OF THE EXPERIMENTAL PROGRAM IS PROVIDED.

*CRITICALITY EXPERIMENT + DELAYED NEUTRON + PROMPT NEUTRON LIFETIME + ROSSI ALPHA

CATEGORY 2
SITING OF NUCLEAR FACILITIES

2-09680 KOUTS HJ
SITE SELECTION IN RELATION TO ENGINEERED SAFEGUARDS. AN AMERICAN VIEW
BROOKHAVEN NATIONAL LABORATORY
BNL-10137 + CONF-660312-3 +. 15 PAGES, APRIL, 1966, ATOOMFORUM CONFERENTIE, UTRECHT, MARCH 2-28, 1966,
CFSTI, \$1.00 FS, \$0.50 MN

THE AUTHOR DESCRIBES THE EVOLUTION OF THE EVALUATION OF REACTOR SITES IN THE UNITED STATES AND
GIVES A PERSONAL VIEW OF SOME OF THE TRENDS.

*SITING, GENERAL + UNITED STATES

2-09851 COUSINS N
REMARKS BY NORMAN COUSINS EDITOR, SATURDAY REVIEW AT THE SYMPOSIUM ON LOCATING NUCLEAR POWER PLANTS IN
CITIES.
5 PAGES, PRESENTED AT THE ANS SYMPOSIUM ON LOCATING NUCLEAR POWER PLANTS IN CITIES, MARCH 22, 1966, NEW
YORK CITY

LAYMANS VIEW AT THE SAFETY OF NUCLEAR PLANTS (AUTHOR IS EDITOR OF SATURDAY REVIEW). THE PAPER
IS VERY GENERAL.

*SITING, REACTOR

2-09852 RENGEL JC
SAFETY RELATED ASPECTS OF LOCATING NUCLEAR POWER PLANTS IN CITIES
WESTINGHOUSE ELECTRIC CORPORATION, PITTSBURGH, ATOMIC POWER DIV.
5 PAGES, PRESENTED AT THE ANS SYMPOSIUM ON LOCATING NUCLEAR POWER PLANTS IN CITIES, MARCH 22, 1966, NEW
YORK CITY

PUTS RELIABILITY AND ACCIDENT-PREVENTION SAFEGUARDS AHEAD OF CONSEQUENCE-LIMITING SAFEGUARDS.
RELIABILITY ENSURED BY DESIGN, INTEGRITY OF MANUFACTURER, INSPECTION, TEST, AND OPERATION
CRITERIA FOR URBAN SITING.

*SITING, REACTOR + CODES AND STANDARDS + DESIGN CRITERIA + ENGINEERED SAFEGUARD

2-09853 PIERATTI A
AIR POLLUTION FROM CENTRAL POWER PLANTS
NEW YORK OPERATIONS OFFICE
7 PAGES, PRESENTED AT THE ANS SYMPOSIUM ON LOCATING NUCLEAR POWER PLANTS IN CITIES, MARCH 22, 1966, NEW
YORK CITY

AIR POLLUTANTS AND THEIR SOURCES. SULFUR DIOXIDE MOST GASEOUS AND DESTRUCTIVE. BITUMINOUS
COAL AND NUMBER-6 FUEL OIL MOST IMPORTANT SOURCES OF SULFUR DIOXIDE, MOSTLY IN UTILITY
PLANTS. ALTERNATIVES - USE NATURAL GAS, MINE-MOUTH PLANTS, OR HYDROELECTRICITY.

*ATMOSPHERIC POLLUTION + SULFUR

2-09855 BECK CK
CURRENT TRENDS AND PERSPECTIVES IN REACTOR LOCATION AND SAFETY REQUIREMENTS
U. S. ATOMIC ENERGY COMMISSION, WASHINGTON
14 PAGES, PRESENTED AT THE ANS SYMPOSIUM ON LOCATING NUCLEAR POWER PLANTS IN CITIES, MARCH 22, 1966, NEW
YORK CITY

SAFETY RECORD OF NUCLEAR PLANTS. HIGH STANDARDS. ACCIDENT PREVENTION AND
CONSEQUENCE-LIMITING SAFEGUARDS. MCA ANALYSIS. ISOLATED SITES. REVIEWS BY EXPERTS.
INCREASE IN FISSION INVENTORY. STANDARDIZATION. TREND TOWARD MORE CENTRAL LOCATION.
REQUIREMENTS FOR LESS-ISOLATED LOCATION - HIGH STANDARDS, DEFINITION OF TECHNICAL AREAS OF
UNCERTAINTY, ESTABLISHMENT OF ADEQUACY OF SAFEGUARD SYSTEM, SUFFICIENT EXPERIENCE. THESE
REQUIREMENTS HAVE NOT YET BEEN FULLY MET.

*SITING, REACTOR + ACCIDENT, MAXIMUM CREDIBLE (MCA) + ACCIDENT, PROBABILITY OF + ENGINEERED SAFEGUARD +
REGULATION, AEC + REVIEW + SAFETY PRINCIPLES AND PHILOSOPHY

2-09856 CAHILL WJ
REMARKS BY WILLIAM J. CAHILL, JR. MECHANICAL PLANT ENGINEER CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
AT THE SYMPOSIUM ON LOCATING NUCLEAR POWER PLANTS IN CITIES, AMERICAN NUCLEAR SOCIETY, MARCH 22, 1966
CONSOLIDATED EDISON COMPANY, NEW YORK
2 PAGES, PRESENTED AT THE ANS SYMPOSIUM ON LOCATING NUCLEAR POWER PLANTS IN CITIES, MARCH 22, 1966

BRIEF DESCRIPTION OF ENGINEERED SAFEGUARDS, SITES, LICENSING EXPERIENCE, AND PUBLIC ACCEPTANCE
OF INDIAN POINT 1 AND 2, AND RAVENSWOOD.

*INDIAN POINT I + *INDIAN POINT II + *RAVENSWOOD + *SITING, REACTOR + ENGINEERED SAFEGUARD +
REACTOR, PRESSURIZED WATER + REGULATION, AEC

2-09857 CRAWFORD WD
REMARKS BY W. DONHAM CRAWFORD, VICE PRESIDENT, CONSOLIDATED EDISON COMPANY, AT A SYMPOSIUM ON LOCATING
NUCLEAR POWER PLANTS IN CITIES, SPONSORED BY THE METROPOLITAN SECTION OF THE AMERICAN NUCLEAR SOCIETY,
MARCH 22, 1966

CATEGORY 2
SITING OF NUCLEAR FACILITIES

2-09857 *CONTINUED*

CONSOLIDATED EDISON COMPANY, NEW YORK

4 PAGES, PRESENTED AT THE ANS SYMPOSIUM ON LOCATING NUCLEAR POWER PLANTS IN CITIES, MARCH 22, 1966, NEW YORK CITY

ADVANTAGES OF SITING OF NUCLEAR PLANTS IN POPULATED CENTERS - LOW AIR POLLUTION, RELIABLE FUEL SUPPLY, A SHORT TRANSMISSION, STEAM FROM PLANTS MAY BE USED, ECONOMIC ADVANTAGES. LICENSING EXPERIENCE WITH RAVENSWOOD AND INDIAN POINT NO. 2.

*INDIAN POINT I + *INDIAN POINT II + *SITING, REACTOR + ECONOMICS + RAVENSWOOD + REACTOR, PRESSURIZED WATER

2-09858 STOLLER SM

ECONOMIC CONSIDERATIONS OF URBAN SITING

S. M. STOLLER ASSOCIATES

3 PAGES, PRESENTED AT THE ANS SYMPOSIUM ON LOCATING NUCLEAR POWER PLANTS IN CITIES, MARCH 22, 1966, NEW YORK CITY

HISTORY OF POWER COMPANIES. MOST CONVENTIONAL PLANTS CLOSER TO LOADS THAN SITING GUIDE WOULD PERMIT FOR NUCLEAR PLANTS. TREND TOWARD MANY CONVENTIONAL PLANTS BETWEEN LOAD CENTERS OR TO MINE MOUTH. COST OF LOCATING NUCLEAR PLANT WITHIN SITING GUIDES RATHER THAN MOST ECONOMICALLY, \$10-15 PER KILOWATT. TAX REVENUE TO CITIES. AIR POLLUTION VERSUS COST OF SAFEGUARDS. RELIABILITY MUST BE GREATER IN URBAN LOCATION.

*ECONOMICS + *SITING, REACTOR + ATMOSPHERIC POLLUTION + POWER DISTRIBUTION

2-11014 BRITTAN RO

REACTOR CONTAINMENT AND ENVIRONMENTAL CONDITIONS

ARGONNE NATIONAL LABORATORY, ILL.

2 PAGES, PROCEEDINGS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS, 92(UP1), PAGES 81-82 (MAY, 1966)

THE CONCLUDING DISCUSSION FOR A PAPER ON REACTOR CONTAINMENT BY R. O. BRITTAN THAT APPEARED IN SEPTEMBER 1964 IS PRESENTED. THE INFLUENCE OF SAFEGUARDS ON POPULATION DISTANCE IS BRIEFLY TREATED. ELEVEN ITEMS OF ERRATA FOR THE ORIGINAL PAPER ARE ALSO GIVEN.

*CONTAINMENT, GENERAL + CONTAINMENT, MULTIPLE + ENGINEERED SAFEGUARD + SITING, REACTOR

2-11091 ELLMER M

SITE SELECTION

2 PAGES, ATOMWIRTSCHAFT, 10(11), PAGES 567-568 (NOVEMBER 1965), IN GERMAN

FOR THE POWER PLANT RWE-BAYERNWERK (KRB), THE MOST FAVORABLE SITE ORIGINALLY SEEMED TO BE ONE NEAR BERTOLDSHEIM. HOWEVER, THE WATER AUTHORITIES REJECTED IT FOR TECHNICAL AND EMOTIONAL-POLITICAL REASONS, ALTHOUGH ATTEMPTS WERE MADE TO DEMONSTRATE THAT DRINKING WATER AND NUCLEAR POWER ARE NOT MUTUALLY EXCLUSIVE. THE ATOMIC PLANT WILL BE BUILT IN GUNDREMMINGEN. A METEOROLOGICAL TOWER 118 M HIGH WILL BE ERECTED. A SMALLER DESIGN OF THE PLANT WAS REQUIRED. WE STUDIED THE COOLING-WATER REMOVAL AND RECYCLE TO FIND THE OPTIMUM COMPROMISE BETWEEN WATER ECONOMY AND ENERGY ECONOMY.

*GERMANY + METEOROLOGY + WATER POLLUTION + WATER, DRINKING

2-11154 BLAINE RA

REACTOR KINETICS AND REACTOR SAFETY STUDIES

ATOMICS INTERNATIONAL, CANOGA PARK

NAA-SR-MEMO-9837 +. 32 PAGES, REFERENCES, APRIL 24, 1964, CFSTI \$2.00 CY

THE GOALS AND ACCOMPLISHMENTS IN REACTOR KINETICS AND REACTOR SAFETY STUDIES OF THE ATOMICS INTERNATIONAL REACTOR SAFETY PROGRAM ARE REVIEWED. PRESENT DIRECTIONS AND FUTURE REQUIREMENTS ARE PRESENTED. SUBJECTS RELEVANT TO NUCLEAR SAFETY INCLUDE - AIPEC EQUATIONS, NOISE ANALYSIS, POISON MIXTURES TO ENHANCE REACTOR SAFETY, BUBBLE GROWTH, MULTICHANNEL FLOW STABILITY, REACTOR SITING, SPACE-DEPENDENT KINETICS, AND MULTIREGION-MULTIGROUP KINETICS.

*REACTOR DYNAMICS + *SITING, REACTOR + HYDRAULIC ANALYSIS + KEWB (KINETIC EXPERIMENT ON WATER BOILERS) + NOISE ANALYSIS + POISON, SOLUBLE + REACTOR, HOMOGENEOUS + REACTOR, RESEARCH + SPACE DEPENDENT DYNAMICS + THERMAL ANALYSIS + VOID COEFFICIENT

2-11158 BLAINE RA + JARRETT AA

AN EXAMPLE OF THE APPLICATION OF A DIGITAL COMPUTER PROGRAM FOR REACTOR SITING HAZARD EVALUATION

ATOMICS INTERNATIONAL, CANOGA PARK

NAA-SR-MEMO-10290 +. 68 PAGES, AUGUST 17, 1964, CFSTI \$5.00 CY

A DIGITAL COMPUTER PROGRAM FOR REACTOR SITING HAZARD EVALUATION - PARAMETRIC STUDIES OF EFFECT OF DESIGN VARIABLES (OR ENGINEERED SAFEGUARD MALFUNCTIONS) ON RADIOLOGICAL PERIL TO THE ENVIRONMENT. COMPUTER PROGRAM AISITE II (WITH SUPERScript ASTERISK) WAS USED TO CALCULATE ENVIRONMENTAL RADIATION DOSES AND USAEC REACTOR SITING CRITERIA, 10 CFR 100, RESULTING FROM ASSUMED ACCIDENT IN SODIUM-COOLED REACTOR. GRAPHICAL OUTPUTS OF TYPICAL PARAMETRIC SURVEYS WERE MADE TO DISPLAY DOSE VERSUS DISTANCE BY SPECIFIC ORGAN OR SPECIFIED CRITICAL DISTANCES VERSUS VARIABLE PARAMETER.

*COMPUTER, DIGITAL + *SITING, REACTOR + DOSE CALCULATION, EXTERNAL + DOSE CALCULATION, INTERNAL + ENGINEERED SAFEGUARD + SODIUM

CATEGORY 3
TRANSPORTATION AND HANDLING OF RADIOACTIVE MATERIALS

3-08719 MORGAN KZ
PRESENT STATUS OF RECOMMENDATIONS OF THE INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION, NATIONAL COUNCIL ON RADIATION PROTECTION AND FEDERAL RADIATION COUNCIL
OAK RIDGE NATIONAL LABORATORY
32 PAGES, TABLES, 35 REFERENCES, JUNE 14, 1965, PUBLISHED IN PROGRESS IN NUCLEAR ENERGY SERIES XII, VOL. 2, PERGAMON PRESS, LONDON

THE HISTORICAL BACKGROUNDS OF THE INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION (ICRP), THE NATIONAL COUNCIL ON RADIATION PROTECTION (NCRP) AND THE FEDERAL RADIATION COUNCIL (FRC) ARE DISCUSSED AS WELL AS MANY CURRENT RECOMMENDATIONS MADE BY THESE ORGANIZATIONS AS THEY APPLY TO RADIATION PROTECTION IN MAN. THIS INCLUDES WORKERS IN THE RADIATION INDUSTRY, BUT ALSO THE POPULATION AT LARGE.

*RADIATION PROTECTION, ORGANIZATION + PERSONNEL EXPOSURE, RADIATION + RADIATION IN PERSPECTIVE + RADIATION SAFETY AND CONTROL

3-10056 MALLETT AJ + WHEATLEY SJ
FISSILE-MATERIAL CONTAINER AND PACKAGING DEVELOPMENT AND TESTING PROGRAM
UNION CARBIDE CORPORATION, OAK RIDGE, ORGDP
K-1661 +. 41 PAGES, 10 FIGURES, APRIL 1966, CFSTI, \$2.00 CY, \$0.50 MN

PRESSURE TESTS (400 PSIG) WERE MADE ON THE 5-, 8-, 12-, AND 30-IN.-DIAM URANIUM HEXAFLUORIDE CYLINDERS. IN ADDITION, SIMILAR CONTAINERS WERE SUBJECTED TO DROP TESTS FROM HEIGHTS OF 4 AND 30 FT. TO OBTAIN ADDITIONAL STRUCTURAL DATA, A 30-IN.-DIAM CYLINDER WAS MOUNTED ON A QUARTER-SCALE-MODEL TRUCK BED AND DROPPED FROM VARIOUS HEIGHTS TO SIMULATE COLLISIONS. VARIOUS TIEDOWN COMPONENTS WERE ASSESSED. IN RELATED COMPONENT ASSESSMENT, A FOAM PLASTIC THAT HAS EXCELLENT SHOCK ABSORPTION, INSULATING, AND NEUTRON ATTENUATING PROPERTIES WAS DEVELOPED AT ORGDP AND TESTED. IT APPEARS SUPERIOR TO MANY OTHERS USED IN THESE APPLICATIONS.

*ACCIDENT ANALYSIS + *SHIPPING CONTAINER + *TRANSPORTATION AND HANDLING + *URANIUM HEXAFLUORIDE

3-10308 SPALLER AE + SHOBE LR
STRUCTURAL ANALYSIS OF SHIPPING CASKS VOL. I. ANALYSIS OF A SHIPPING CASK SUBJECTED TO INTERNAL PRESSURE
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE
ORNL-TM-1312 +. 58 PAGES, 19 FIGURES, 9 TABLES, MARCH 1966, CFSTI, \$3.00 CY, \$0.75 MN

FORMULAS TO BE USED BY THE DESIGN ENGINEER TO CALCULATE THE MAXIMUM STRESS PRODUCED IN A CASK USED TO SHIP RADIOACTIVE MATERIALS WHEN IT IS SUBJECTED TO INTERNAL PRESSURE ARE PRESENTED. THE FORMULAS WERE DEVELOPED FOR USE AS A GUIDE TO INDICATE COMPLIANCE WITH THE PROPOSED AEC REGULATION PERTAINING TO THE DESIGN REQUIREMENT FOR RESISTANCE TO INTERNAL PRESSURE. HOWEVER, USE OF THESE FORMULAS, WHICH TAKE INTO ACCOUNT THE ELASTIC NATURE OF THE LEAD SHIELDING, ARE DERIVED TO DETERMINE THE THICKNESS OF THE CAVITY WALL FOR CASKS OF BOTH PRISMATIC AND CYLINDRICAL CONFIGURATION, THE FORMULAS ARE TABULATED, AND EXAMPLE PROBLEMS ARE GIVEN. CREEP OF THE LEAD SHIELD IS EVALUATED, AND IT IS CONCLUDED THAT THE CREEP PROBLEM TENDS TO BE SELF-ALLEVIATING.

*PRESSURE, INTERNAL + *SHIPPING CONTAINER + *STRESS ANALYSIS + *TRANSPORTATION AND HANDLING

3-10309 SALMON R
ESTIMATION OF FUEL-SHIPING COSTS FOR NUCLEAR POWER COST-EVALUATION PURPOSES
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE
ORNL-3943 +. 67 PAGES, 23 FIGURES, 9 TABLES, 23 REFERENCES, MARCH 1966, CFSTI \$3.00 CY, \$0.75 MN

THE AEC GUIDE TO NUCLEAR POWER COST EVALUATION, TID-7025 (MARCH 1962), SUGGESTED THAT COSTS OF \$3 PER KG U FOR FRESH FUELS AND \$16 PER KG U FOR SPENT FUELS BE USED FOR EVALUATION PURPOSES. THE WORK REPORTED HERE IS AN ATTEMPT TO PROVIDE A MORE DETAILED BASIS FOR SHIPPING-COST ESTIMATION, SO THAT DIFFERENCES INHERENT IN THE REACTOR AND FUEL ASSEMBLY DESIGN MAY BE ACCOUNTED FOR. THE METHODS PRESENTED FOLLOW GENERALLY THE APPROACH USED BY THE AUTHOR IN COMPUTER CODES MYRA AND NORA. THE MAJOR NEW FEATURES ARE THAT (1) DESIGN CHARTS BASED ON DATA CORRELATIONS ARE USED AS A MEANS OF ARRIVING AT AN APPROXIMATE CASK DESIGN, WHEREAS THE PREVIOUS WORK DEPENDED ON THE USE OF COMPUTER CODES, (2) THE SCOPE OF THE WORK HAS BEEN ENLARGED TO COVER THE SHIPMENT OF FRESH FUELS, INCLUDING THOSE CONTAINING GAMMA-ACTIVE RECYCLED MATERIALS, AND (3) A SECTION ON THE SHIPMENT OF CERTAIN FUEL CHEMICALS HAS BEEN ADDED. RECENT CHANGES IN SHIPPING REGULATIONS (DECEMBER 1965) GOVERNING CASK DESIGN HAVE ALSO BEEN TAKEN INTO ACCOUNT. THIS REPORT WILL PROVIDE A RAPID MEANS OF ESTIMATING FUEL SHIPPING COSTS FOR THOSE WHO DO NOT HAVE ACCESS TO THE COMPUTER CODES MENTIONED.

*ECONOMIC STUDY + *TRANSPORTATION AND HANDLING + DESIGN STUDY + HEAT TRANSFER + SHIPPING CONTAINER

3-10310 SHAW AE
THE SAFE TRANSPORT OF RADIOACTIVE MATERIALS. A KEY TO THE 1964 REVISION OF THE INTERNATIONAL ATOMIC ENERGY AGENCY REGULATIONS
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, RISLEY
TRG-1073 (D) +. 21 PAGES, 1 FIGURE, 4 TABLES, JULY 1965, BIS, \$0.70 CY

A KEYED INDEX TO HELP THE DAY-TO-DAY USER OF THE INTERNATIONAL ATOMIC ENERGY AGENCY DOCUMENT REGULATIONS FOR THE SAFE TRANSPORT OF RADIOACTIVE MATERIALS (1964 REVISION OF MAY 1961 REGULATIONS). IF IT IS KNOWN WHAT RADIOACTIVE MATERIAL HAS TO BE TRANSPORTED (IN TERMS OF ELEMENT, ISOTOPE, ITS TOTAL AND SPECIFIC ACTIVITIES ITS CHEMICAL AND PHYSICAL FORM, AND DETAILS OF THE PACKAGE TYPE ALONG WITH SURFACE CONTAMINATION AND EXTERNAL RADIATION DOSE-RATE MEASUREMENTS), STEP-BY-STEP USE OF THE KEY WILL INDICATE THE CORRECT PROCEDURE. THIS KEY DOES NOT AVOID THE NEED TO UNDERSTAND THE DETAIL OF THE IAEA DOCUMENT BUT IS INTENDED AS A

CATEGORY 3
TRANSPORTATION AND HANDLING OF RADIOACTIVE MATERIALS

3-10310 *CONTINUED*

SUMMARY FOR DAY-TO-DAY USAGE BY THE CONSIGNOR. ANY REFERENCE IN THE KEY TO THE REGULATIONS IMPLIES THE REVISED IAEA REGULATIONS.

*REGULATION, IAEA + *SHIPPING CONTAINER + *TRANSPORTATION AND HANDLING

3-10311 MARKS RE + ROGERS LA

SHOCK FRONT STUDIES OF THE HANDCAR EVENT

LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA

PNE-801F +. 61 PAGES, 47 FIGURES, 13 TABLES, 9 REFERENCES, APRIL 1966- CFSTI, \$3.00 CY

CLOSE-IN SHOCK-WAVE AND SEISMIC EFFECTS WERE MEASURED SUBSEQUENT TO A 12-KT DETONATION IN A NEVADA TEST SITE DOLOMITE MEDIUM AND COMPARED WITH PRFDETONATION CODE-PREDICTED RESULTS. COMPARATIVE AGREEMENT OF EXPERIMENTAL STRESSES WITH CALCULATED STRESSES IN THE HYDRODYNAMIC PRESSURE REGION WAS WITHIN 13 PERCENT, WHEREAS SIMILAR COMPARISONS IN THE LOW-PRESSURE AREA INDICATED A MAXIMUM DISAGREEMENT OF 390 PERCENT. BRIEF DESCRIPTIONS OF THE CODE, CODE INPUT DATA, AND CODE-PREDICTED RESULTS ARE ALSO PRESENTED ALONG WITH MORE DETAILED DESCRIPTIONS OF THE SHOCK-WAVE INSTRUMENTATION, ITS INSTALLATION AND CHECKOUT, AND THE MEASURED RESULTS.

*COMPARISON, THEORY AND EXPERIENCE + *PLOWSHARE PROGRAM + *SHOCK WAVE + SEISMOLOGY

3-10806 REPORT OF INVESTIGATION OF THE AMERICIUM SHIPPING CONTAINER EXPLOSION IN BUILDING 71 ON SEPTEMBER 25, 1964

THE DOW CHEMICAL COMPANY, DENVER, COLORADO

15 PAGES, 12 FIGURES, OCTOBER 20, 1964, SOURCE

ON SEPTEMBER 25, 1964, A SHIPPING CONTAINER AT DOW CHEMICAL COMPANY, ROCKY FLATS SITE, CONTAINING 5 G OF AMERICIUM AQUEOUS CHLORIDE SOLUTION, EXPLODED. INVESTIGATION INDICATED THAT THERE WAS INSUFFICIENT DATA TO DETERMINE WHETHER THE SHIPPING CONTAINER FAILED DUE TO CHEMICAL EXPLOSION OR SLOW PRESSURE BUILDUP. EITHER IS POSSIBLE BECAUSE OF RADIOLYTIC DECOMPOSITION OF THE SOLUTION. THE MAIN RECOMMENDATION FOR FUTURE RADIOACTIVE SHIPMENTS IS TO AVOID SENDING THE MATERIAL IN SOLUTION FORM WHEN POSSIBLE.

*AMERICIUM + *EXPLOSION + *STORAGE CONTAINER

3-10807 AEC REVISES REGULATIONS ON TRANSPORT OF RADIOACTIVE MATERIAL

U. S. ATOMIC ENERGY COMMISSION

PRESS REL. NO. J-178 +. 2 PAGES, JULY 21, 1966, DPI

THE AEC APPROVED A REVISION OF ITS REGULATIONS ON THE SAFE TRANSPORTATION OF LICENSED RADIOACTIVE MATERIAL. IT IS REPORTED IN THE CODE OF FEDERAL REGULATIONS, TITLE 10 PART 71. THE STANDARDS INCLUDE A MINIMUM OF DETAIL ON REQUIRED PACKAGING SPECIFICATIONS. EMPHASIS WAS PLACED ON PERFORMANCE STANDARDS TO PROVIDE THE NEEDED FLEXIBILITY TO DEVELOP IMPROVED SHIPPING METHODS. THE PERFORMANCE STANDARDS ARE COMPATIBLE WITH THOSE DEVELOPED BY THE INTERNATIONAL ATOMIC ENERGY AGENCY DURING THE PAST FEW YEARS, BUT THIS NEW VERSION MUST BE USED IN CONJUNCTION WITH ORDER NO. 70 OF THE ICC.

*REGULATION, AEC + *SHIPPING CONTAINER + *TRANSPORTATION AND HANDLING + FUEL HANDLING

3-10808 DUGAN FA

BROOKHAVEN EXPERIENCE WITH HANDLING AND SHIPPING OF, AND CASK DESIGN FOR, REACTOR SPENT-FUEL ELEMENTS

BROOKHAVEN NATIONAL LABORATORY

CONF-651-110-22 + 65-WA/NE-7 +. 7 PAGES, 7 FIGURES, 3 REFERENCES, PRESENTED AT AMERICAN SOCIETY OF MECHANICAL ENGINEERS WINTER MEETING, CHICAGO, ILL., NOVEMBER 7-11, 1965, SOURCE, \$1.50 CY

THE GENERAL PROBLEMS OF HANDLING, SHIPPING, AND DESIGNING SPENT-FUEL SHIPPING CASKS ARE PRESENTED. SOLUTIONS TO SPECIFIC PROBLEMS AT BROOKHAVEN ARE DISCUSSED IN RELATION TO THE GENERAL PROBLEM. PRESENTATION COVERS (A) CANAL STORAGE FACILITIES, (B) METHODS OF SHIPMENT, (C) BRIEF REVIEW OF THE AEC AND ICC REGULATORY REQUIREMENTS, (D) OPTIMIZED DESIGN OF THE SHIPPING CONTAINER. SPECIFIC SOLUTIONS USED BY BNL OVER A SIX-YEAR PERIOD ARE DESCRIBED. THE NEED FOR COMPLETE AND EARLY ANALYSIS OF THE SPECIFIC PROBLEM IS INDICATED.

DESIGN STUDY + FUEL STORAGE + REGULATION, AEC + SHIPPING CONTAINER + TRANSPORTATION AND HANDLING

3-10839 A SUMMARY OF INCIDENTS INVOLVING USAEC SHIPMENTS OF RADIOACTIVE MATERIAL, 1963-1964

DIVISION OF OPERATIONAL SAFETY, USAEC

TID-16764 (SUPPL. 2) +. 23 PAGES, 8 TABLES, APRIL, 1966, GPO, \$0.20

THIS SUMMARY WAS PREPARED TO PRESENT INFORMATION PERTAINING TO INCIDENTS SUSTAINED BY THE AEC IN THE TRANSPORTATION OF RADIOACTIVE MATERIALS, COVERING THE PERIOD FROM JANUARY 1, 1963, THROUGH DECEMBER 31, 1964. IN THE PERIOD COVERED BY THIS REPORT, THERE WERE TWENTY-FOUR INCIDENTS REPORTED. THIRTEEN OF THE TWENTY-FOUR INCIDENTS DID NOT RESULT IN RELEASE OF RADIOACTIVE MATERIALS. OF THE REMAINING ELEVEN, WHICH DID INVOLVE RADIATION RELEASES, SIX WERE LIMITED TO THE CARRIER VEHICLE AND ONLY ONE INVOLVED COSTLY CLEANUP. OF THE TWENTY-FOUR INCIDENTS REPORTED, ONLY ONE INVOLVED IMPACT DAMAGE TO THE SHIPPING CONTAINER, WHILE THE VEHICLES INVOLVED SUFFERED DAMAGE RANGING FROM NONE TO TOTAL DESTRUCTION.

*ACCIDENT, CONSEQUENCES + *TRANSPORTATION AND HANDLING + RADIOACTIVITY, RELEASE + SHIPPING CONTAINER

CATEGORY 3
TRANSPORTATION AND HANDLING OF RADIOACTIVE MATERIALS

3-10840 CLARKE HG + DOSHI KD
STRUCTURAL INTEGRITY OF SHIPPING CONTAINERS FOR RADIOACTIVE MATERIALS. PART III. ANALYSIS OF CONTAINER
TIEDOWN DURING COLLISION OF HIGHWAY VEHICLES
FRANKLIN INSTITUTE RESEARCH LABORATORIES
NYO-2539-2 + I-A2412-3 +. 70 PAGES, FEBRUARY, 1966, CFSTI, \$3.00 CY, \$0.75 MN

ANALYTICAL AND GRAPHICAL PROCEDURES ARE PRESENTED FOR DETERMINING APPROXIMATELY THE DYNAMIC RESPONSE OF CONTAINER TIEDOWNS DURING LONGITUDINAL COLLISIONS OF HIGHWAY VEHICLES. THE METHOD IS BASED ON A SIMPLIFIED MODEL OF THE VEHICLE-CONTAINER-TIEDOWN SYSTEM AND ON AN ASSUMED FORCE PULSE. ILLUSTRATIVE EXAMPLES ARE GIVEN OF THE CALCULATED RESPONSE OF A FOUR-POINT TIEDOWN MADE FROM SEVERAL DIFFERENT MATERIALS. THE ANALYTICAL METHOD IS APPLICABLE TO OTHER TIEDOWN GEOMETRIES AND MATERIALS WITHIN THE LIMITS IMPOSED BY THE CONDITIONS OF THE DERIVATION. THE METHOD SHOULD BE USEFUL TO DESIGNERS AND SHIPPERS FOR COMPARATIVE EVALUATION OF VARIOUS TIEDOWNS.

*ACCIDENT ANALYSIS + *TRANSPORTATION AND HANDLING + ANALYTICAL MODEL + DYNAMICS, NONLINEAR + IMPACT SHOCK

3-10842 NEWLON CE + MALLETT AJ
HYDROGEN MODERATION - A PRIMARY NUCLEAR SAFETY CONTROL FOR HANDLING AND TRANSPORTING LOW-ENRICHMENT UF₆
OAK RIDGE GASEOUS DIFFUSION PLANT
K-1663 +. 20 PAGES, MAY 31, 1966, CFSTI, \$1.00 CY, \$0.50 MN

THE USE OF HYDROGEN MODERATION AS A PRIMARY NUCLEAR SAFETY CONTROL HAS BEEN IN EFFECT FOR MANY YEARS FOR LARGE-SCALE UF₆ SHIPMENTS AMONG AEC-OWNED CONTRACTOR OPERATED FACILITIES. THE EXTENSION OF THE USE OF MODERATION-CONTROLLED SHIPMENTS TO LICENSEES AS WELL AS CONTRACTOR ORGANIZATIONS IS DESIRABLE, AND THIS REPORT SUMMARIZES, IN SUPPORT OF THIS METHOD, THE WORK DONE IN DEVELOPING BASIC CRITICALITY DATA AND THE NECESSARY EQUIPMENT AND OPERATIONAL TECHNIQUES.

*TRANSPORTATION AND HANDLING + *URANIUM HEXAFLUORIDE + CONTROL, GENERAL + HYDROGEN +
SAFETY REVIEW (OPERATIONS, EXPERIMENTS)

3-11221 JAPAN RETURNING IRRADIATED FUEL ELEMENTS TO U.S. FOR REPROCESSING - FIRST TO BE SHIPPED FROM
ASIA
ATOMIC ENERGY COMMISSION, WASHINGTON, D.C.
PRESS REL. J-194 +. 1 PAGE, AUGUST 15, 1966, DPI

THE FIRST CONSIGNMENT OF IRRADIATED NUCLEAR FUEL FROM ASIA TO BE REPROCESSED IN THE UNITED STATES WILL ARRIVE FROM JAPAN AT SEATTLE, WASHINGTON, ON AUGUST 16, 1966. TWENTY-FOUR IRRADIATED FUEL ELEMENTS, CONTAINED IN TWO 11-TON CASKS, WILL BE REMOVED FROM THE NIKKEI-MARU OF THE JAPANESE SHOWA LINE AND SHIPPED DIRECTLY BY TRUCK TO THE AEC IDAHO CHEMICAL PROCESSING PLANT AT THE NATIONAL REACTOR TESTING STATION IN IDAHO. SEATTLE IS AMONG THE 44 U.S. PORTS THAT HAVE NOTIFIED THE U.S. COAST GUARD THAT THEIR PORT AND COMMUNITY FACILITIES ARE AVAILABLE FOR THE ACCEPTANCE AND TRANSIT OF SHIPMENTS OF RADIOACTIVE MATERIALS, PROVIDED THAT THERE IS COMPLIANCE WITH THE REGULATIONS OF THE U.S. AGENCIES EXERCISING JURISDICTION OVER THE ENTRY AND MOVEMENT OF SUCH MATERIALS INTO AND WITHIN THE COUNTRY.

*FUEL HANDLING + JAPAN + SHIPPING CONTAINER + TRANSPORTATION AND HANDLING

3-11222 GASKILL JR + TAYLOR RD
IMPROVED SHIPPING CONTAINER FOR FISSION MATERIAL
LAWRENCE RADIATION LAB., UNIV. OF CALIF., LIVERMORE
UCRL-14903 +. 26 PAGES, 14 FIGURES, 3 TABLES, JUNE 3, 1966, CFSTI \$2.00 CY, \$0.50 MN

BASED ON AN ORNL DESIGN, WHICH CALLED FOR A FOAM-GLASS SPACER IN A 55-GAL DRUM, AN IMPROVED SHIPPING CONTAINER FOR UNIRRADIATED FISSION MATERIALS WAS DEVELOPED. IT PASSED THE NORMAL AND ACCIDENT TESTS PROPOSED IN THE CURRENT REVISION OF AEC SAFETY STANDARDS. FURTHER, A CRITICALITY ANALYSIS BY THE LRL CRITICALITY SAFETY ADVISORY GROUP ESTABLISHED QUANTITATIVE LIMITS FOR SHIPPING SOLID FORMS OF ENRICHED URANIUM AND PLUTONIUM ACCORDING TO AEC CRITERIA FOR BOTH CLASS I AND CLASS II CATEGORIES.

*SHIPPING CONTAINER + *TEST, DROP + CRITICALITY SAFETY + FIRE + TEST, DESTRUCTIVE

3-11223 STETSON FT
AN ANALYSIS OF STEADY-STATE HEAT TRANSFER IN A SPRING-LOADED DRY SHIPPING CASK
KNOLLS ATOMIC POWER LABORATORY, SCHENECTADY, NEW YORK
KAPL-M-6106 +. 18 PAGES, 6 FIGURES, FEBRUARY 11, 1964, CFSTI, \$1.60 FS, \$0.80 MN

THIS REPORT PRESENTS THE RESULTS OF AN ANALYSIS OF HEAT REMOVAL FROM A KAPL SPRING-LOADED DRY SHIPPING CASK. THE INTERNAL HEAT GENERATION IS PROVIDED BY DECAY HEAT FROM TEST SPECIMENS IRRADIATED IN THE MTR AND ETR. THE RESULTS REPRESENT MAXIMUM TEMPERATURES OF THE SPECIMENS, TEMPERATURE DISTRIBUTIONS, AND THE TEMPERATURE DISTRIBUTION OF THE HOLDERS. THE VARIABLES WERE THE INTERNAL HEAT GENERATION RATES, THE METAL-TO-METAL CONTACT RESISTANCES, AND THE SPECIMEN LOADING IN THE HOLDER.

*HEAT TRANSFER ANALYSIS + *SHIPPING CONTAINER + ETR (ENGINEERING TEST REACTOR) +
MTR (MATERIAL TESTING REACTOR) + REACTOR, TEST

3-11505 MINOR JE + RASTRELLI LU
INVESTIGATION OF LOW-LEVEL RADIOACTIVE WASTE CONTAINERS IN AN ACCIDENT ENVIRONMENT. PART I - SURVEY OF

CATEGORY 3
TRANSPORTATION AND HANDLING OF RADIOACTIVE MATERIALS

3-11505 *CONTINUED*
TRANSPORT AND DISPOSAL PROCEDURES. PART II - STRUCTURAL INTEGRITY OF TYPICAL LOW-LEVEL RADIOACTIVE WASTE CONTAINERS
SOUTHWEST RESEARCH INSTITUTE, SAN ANTONIO, HOUSTON, TEXAS
SWRI-1262-4 +. 155 PAGES, 25 FIGURES, 13 TABLES, 23 REFERENCES, OCTOBER 1965, SOURCE

THE DISCUSSIONS IN PART I CONSTITUTE A TIMELY, COMPREHENSIVE SURVEY OF CURRENT DISPOSAL PRACTICES AND PROVIDE A BASIS FOR CONTAINER STRUCTURAL INTEGRITY EVALUATIONS PRESENTED IN PART II. IN PART II, AN ANALYSIS OF THE ACCIDENT ENVIRONMENT, BASED ON PREVIOUSLY ACCOMPLISHED STATISTICAL AND EXPERIMENTAL INVESTIGATIONS, IS PRESENTED. IDENTIFICATION OF THE DYNAMIC FORCES THAT MAY BE EXPERIENCED BY A LOW-LEVEL RADIOACTIVE MATERIAL CONTAINER IN A HIGHWAY ACCIDENT LEAD TO THE DEVELOPMENT OF ANALYTICAL PROCEDURES FOR PREDICTING THE DYNAMIC RESPONSE OF TYPICAL CONTAINERS. A COMPARISON OF STRUCTURAL-INTEGRITY PROPERTIES OF TYPICAL CYLINDER AND BOX CONTAINERS IS PRESENTED, AND CONCLUSIONS RELATING THE EFFECTIVENESS WITH WHICH THE TWO CONTAINER TYPES CAN WITHSTAND AN ACCIDENT ARE ADVANCED.

ACCIDENT ANALYSIS + FIRE + IMPACT SHOCK + REGULATION, GENERAL + STRESS ANALYSIS + STRUCTURAL INTEGRITY + WASTE TRANSPORTATION

CATEGORY 4
AEROSPACE SAFETY

4-09601 ELLIOTT RD
METHODS FOR PREDICTING AERODYNAMIC HEATING RATES TO HIGH-VELOCITY BODIES IN THE UPPER ATMOSPHERE
ATOMICS INTERNATIONAL
NAA-SR-11704 +. 39 PAGES, 22 FIGURES, 1 TABLE, REFERENCES, JANUARY 15, 1966, CFSTI \$2.00 CY, \$0.50 MN

THE BASIC PHYSICAL PHENOMENA ASSOCIATED WITH AERODYNAMIC HEATING ARE DESCRIBED. THE METHODS NOW USED AT ATOMICS INTERNATIONAL FOR PREDICTING HEATING RATES OF BODIES MOVING AT HIGH VELOCITIES THROUGH THE ATMOSPHERE ARE SUMMARIZED. THE METHODS DESCRIBED PROVIDE THE PRINCIPAL INPUT DATA FOR THE ANALYTICAL STUDIES OF SNAP REENTRY DISINTEGRATION IN THE AEROSPACE NUCLEAR SAFETY PROGRAM.

*AEROSPACE SAFETY + *HEAT GENERATION, NONUNIFORM + *HIGH TEMPERATURE +
*SNAP, GENERAL (SYSTEMS FOR NUCLEAR AUX. POWER) + *THERMAL ANALYSIS + ATMOSPHERIC CHEMISTRY +
TEST, PHYSICS

4-09603 THOMPSON RC
SNPO AND SNAP BIOLOGICAL STUDIES. SUMMARY TECHNICAL REPORT
BATTELLE NORTHWEST, PACIFIC NORTHWEST LABORATORY, RICHLAND
BNWL-182 +. 19 PAGES, 3 TABLES, JANUARY 3, 1966, CFSTI \$1.00, \$0.50 MN

A SHARP DISTINCTION CANNOT BE MADE BETWEEN THOSE PHASES OF OUR INVESTIGATIONS WHICH WERE PRIMARILY CONCERNED WITH SNPO (SPACE NUCLEAR PROPULSION OFFICE) PROBLEMS AND THOSE PHASES CONCERNED WITH SNAP (SYSTEMS FOR NUCLEAR AUXILIARY POWER) PROBLEMS BECAUSE THE OBJECTIVES WERE VERY SIMILAR. THEREFORE, WE ARE NOT SEPARATING THIS REPORT INTO SNPO AND SNAP SECTIONS. HOWEVER, IF SUCH DISTINCTION IS NECESSARY, THE PU-238 FEEDING STUDY IS PRIMARILY RELATED TO SNAP, AND THE STUDIES WITH THE OAK RIDGE-PREPARED SIMULATED FUEL PARTICLES ARE PRIMARILY RELATED TO SNPO. THE LARGE-PARTICLE INHALATION STUDIES AND THE SOLUBILITY STUDIES CLEARLY HAVE APPLICATION TO BOTH SNPO AND SNAP PROBLEMS. EXPERIMENTAL WORK CONSISTED OF SEVERAL SEPARATE INVESTIGATIONS. IN MANY INSTANCES, THESE INVESTIGATIONS ARE STILL CONTINUING, AND FINAL CONCLUSIONS CANNOT BE DRAWN.

*AEROSPACE SAFETY + *BIOMEDICAL + *PARTICLE, RADIOACTIVE +
*SNAP, GENERAL (SYSTEMS FOR NUCLEAR AUX. POWER) + EXPERIMENT, GENERAL + INGESTION + INHALATION + PLUTONIUM

4-10037 BARSSELL AW + MONTGOMERY LD + ARNOLD JE
THERMAL BEHAVIOR OF SNAP REACTOR FUEL ELEMENTS DURING ATMOSPHERIC REENTRY
ATOMICS INTERNATIONAL, CANOGA PARK
NAA-SR-11502 +. 123 PAGES, 57 FIGURES, 20 TABLES, 67 REFERENCES, MARCH 1966, CFSTI, \$4.00 CY, \$1.00 MN

AN ANALYTICAL MODEL IS DEVELOPED TO DESCRIBE THE THERMO-CHEMICAL BEHAVIOR OF SNAP FUEL ELEMENTS DURING ATMOSPHERIC REENTRY. THE AERODYNAMIC HEATING, TRANSPIRATION COOLING, AND THE CHEMICAL REACTIONS OF THE FUEL WITH AIR ARE INVESTIGATED. A DETAILED EVALUATION OF ZIRCONIUM-URANIUM HYDRIDE FUEL MATERIAL PROPERTIES IS PRESENTED. RESULTS OF THE USE OF THE ANALYTICAL MODEL ARE PRESENTED AND COMPARED WITH EXPERIMENTAL DATA. A STATISTICAL PROBABILITY ANALYSIS OF INITIAL FUEL ABLATION IS CONDUCTED FOR SNAP 10A ELEMENTS. THE STATISTICAL PROCEDURE IS CONCLUDED TO BE A VALID, OPTIMUM APPROACH. PARAMETER INFLUENCE IS PRECISELY FIXED AND RANKED, PROVIDING DIRECTION FOR EXPERIMENTAL SUPPORT INVESTIGATIONS. THE PROCEDURE ALSO ENABLES AN ORGANIZED, REITERATIVE NARROWING OF THE ACCURACY ATTRIBUTED TO THE STUDY RESULTS.

*AEROSPACE SAFETY + *CHEMICAL REACTION + *COMPARISON, THEORY AND EXPERIENCE + *FUEL ELEMENT +
*FUEL INTEGRITY + *SNAP 10A (SYSTEMS FOR NUCLEAR AUXILIARY POWER) + *URANIUM HYDRIDE + *ZIRCONIUM

4-10520 AHLQUIST AJ + SANDERS FW
GAMMA DOSE RATE MEASUREMENTS ON THE PHOEBUS 1A-321 REACTOR
LOS ALAMOS SCIENTIFIC LABORATORY
LA-3448-MS +. 22 PAGES, 14 FIGURES, 1 TABLE, REFERENCES, MAY 10, 1966, CFSTI \$2.00 CY, \$0.50 MN

GAMMA-RAY DOSE-RATE MEASUREMENTS WERE MADE ON EXPERIMENTAL PLANS 2, 3, AND 4 OF THE PHOEBUS 1A-321 REACTOR-TESTING SERIES. EXTRAPOLATION OF DATA FROM 180 FEET GAVE A DOSE RATE OF 36.0 R/MIN-MW AT THE 60-FOOT STATION DURING THE FULL-POWER RUN (EXPERIMENTAL PLAN 4). THE AVERAGE GAMMA-RAY DOSE RATE OF THE EIGHT KIWI REACTORS AT THE 60-FOOT STATION WAS 35.1 R/MIN-MW. INSTRUMENT DIFFICULTIES NECESSITATED USING XYLENE (GAMMA-NEUTRON SENSITIVE) DETECTORS AS GAMMA DETECTORS. INTEGRAL DOSES SHOW THAT THEY GIVE A REASONABLE APPROXIMATION OF GAMMA DOSE RATES.

*AEROSPACE SAFETY + *DOSE MEASUREMENT, EXTERNAL + *KIWI TNT (TRANSIENT NUCLEAR TEST) + DOSE +
DOSE CALCULATION, EXTERNAL

4-10521 CULOTTA AJ + FERNANDEZ I + ANDERSON DC
RFD-2 FLIGHT TEST PROGRAM, SUPPLEMENTARY ANALYSIS REPORT
MARTIN MARIETTA CORPORATION, BALTIMORE
MND-3283-3 +. 30 PAGES, 35 FIGURES, 3 TABLES, 22 REFERENCES, JANUARY 1966

THIS REPORT PRESENTS THE RESULTS OF A STUDY WHOSE OBJECTIVE WAS TO CALCULATE IN A DETAILED MANNER THE REENTRY BEHAVIOR OF SIMULATED RADIOISOTOPIC FUEL ELEMENTS RELEASED DURING REENTRY FLIGHT DEMONSTRATION NUMBER TWO, CONDUCTED IN THE FALL OF 1964, AND, THEREUPON, TO COMPARE CALCULATED BURNUP TIMES AND ALTITUDES WITH THOSE OBSERVED IN THE REENTRY EXPERIMENT.

*AEROSPACE SAFETY + *FUEL ELEMENT + *TESTING + HEAT TRANSFER

CATEGORY 4
AEROSPACE SAFETY

4-11053 CONARD RA
HERMATOLOGICAL EFFECTS OF SPACE RADIATION
BROOKHAVEN NATIONAL LABORATORY
BNL-10221 +. 31 PAGES, 1965, CFSTI, \$2.00 CY, \$0.50 MN

THE HEMATOLOGICAL RESPONSES OF MAN TO SHORT-TERM EXPOSURE OF CONVENTIONAL RADIATION ARE REASONABLY WELL KNOWN. LESS IS KNOWN ABOUT EFFECTS OF PROTRACIION, FRACTIONATION, AND QUALITY OF RADIATIONS TO WHICH MAN MAY BE SUBJECTED IN SPACE. USEFUL DATA ON THE HUMAN BEING IS EXTREMELY LIMITED, AND MUCH OF IT THAT IS AT ALL HELPFUL IS DERIVED FROM ANIMAL STUDIES, MOST OF WHICH ARE NOT DESIGNED WITH SPACE PROBLEMS IN MIND. ONE IS FORCED, THEREFORE, TO ATTEMPT SOME DEGREE OF EXTRAPOLATION OF ANIMAL DATA TO MAN, WHICH IS, NEEDLESS TO SAY, FRAUGHT WITH UNCERTAINTY. THEREFORE, MANY QUESTIONS CAN BE ONLY PARTLY ANSWERED AT THIS TIME.

*AEROSPACE SAFETY + *BIOMEDICAL

4-11054 CURET HD
STEP PROJECT. QUARTERLY TECHNICAL REPORT, JANUARY 1965 - MARCH 1965
PHILLIPS PETROLEUM COMPANY, IDAHO FALLS, IDAHO
IDO-17126 +. 59 PAGES, 29 FIGURES, REFERENCES, MARCH 1966, CFSTI, \$3.00 CY, \$0.75 MN

THE NUCLEAR SAFETY TECHNOLOGY ENGINEERING AND TEST BRANCH CONDUCTED SNAPTRAN-1 TRANSIENT TESTS, PERFORMED ANALYTICAL STUDIES FOR SNAPTRAN-1, -2, AND LOFT, AND DETERMINED THE DESIGN CHARACTERISTICS FOR A ZIRCALOY-CLAD CORE.

*AEROSPACE SAFETY + *LOFT (LOSS OF FLUID TEST) + *SNAPTRAN (SNAP TRANSIENT REACTOR TEST SERIES) + *STEP (SAFETY TEST ENGINEERING PROGRAM) + *TESTING + RELIABILITY, COMPONENT

4-11055 WOOD GM
STATUS OF SNAP-50/SPUR PUMP DEVELOPMENT PROGRAM
PRATT AND WHITNEY AIRCRAFT, MIDDLETOWN, CONN.
CNLM-63C8 +. 60 PAGES, FIGURES, MAY 27, 1965, CFSTI, \$3.00 CY, \$0.75 MN

WORK ON THE SNAP-50 PROGRAM WAS STARTED AT CANEL DURING MAY 1962. FOR THE CURRENT SNAP-50/SPUR POWERPLANT, CANEL HAS THE RESPONSIBILITY FOR THE DESIGN AND DEVELOPMENT OF ALL PUMPS IN BOTH THE REACTOR COOLANT AND THE POWER-CONVERSION SYSTEMS. AS PRESENTLY CONCEIVED FOR THE 300-KWE POWERPLANT, THIS WORK ENTAILS THE DEVELOPMENT OF A REACTOR COOLANT PUMP CIRCULATING LITHIUM, A CONDENSATE PUMP CIRCULATING POTASSIUM, AND A CONDENSER COOLANT PUMP CIRCULATING NAK. THESE PUMPS MUST OPERATE WITH A HIGH DEGREE OF RELIABILITY FOR PERIODS IN EXCESS OF 10,000 HR WITHOUT MAINTENANCE. HERMETICALLY SEALED CENTRIFUGAL PUMPS POWERED BY CANNED ELECTRIC MOTOR DRIVES HAVE BEEN SELECTED FOR ALL THREE PUMPING APPLICATIONS. A DISCUSSION OF THE SNAP-50/SPUR PUMP DEVELOPMENT PROGRAM IS PRECEDED BY A SHORT DESCRIPTION OF THE DESIGN CONCEPTS OF THE HERMETICALLY SEALED CENTRIFUGAL PUMPS.

*AEROSPACE SAFETY + *PUMP

4-11163 CAMPANA RJ
DESIGN OF THE SNAP-15A GENERATOR
GENERAL ATOMIC
GA-5296 +. 34 PAGES, 9 FIGURES, 12 TABLES, JUNE 1964, CFSTI \$2.00 CY, \$0.50 MN

THIS REPORT SUMMARIZED THE CONSIDERATIONS AND ANALYSIS LEADING TO THE DESIGN OF A PU-238 FUELED, METAL-THERMOCOUPLE GENERATOR PROVIDING ABOUT 1 MW AT GREATER THAN 4.5 V FOR 5 YEARS WITH VERY HIGH RELIABILITY EVEN UNDER EXTREME ENVIRONMENTAL CONDITIONS. BEFORE THE DESIGN WAS COMPLETED, A FEW EXPERIMENTAL GENERATORS WERE BUILT AND TESTED. THEY INFLUENCED THE FINAL DESIGN, ESPECIALLY WITH RESPECT TO THE TRANSIENT RESPONSE OF THE GENERATOR LOAD VOLTAGE TO STEP CHANGES IN THE AMBIENT TEMPERATURE. THE PRESENTATION OF THE WORK IS MADE IN THE CHRONOLOGICAL SEQUENCE IN WHICH THE DESIGN EVOLVED.

*DESIGN STUDY + *PLUTONIUM + *THERMOELECTRIC CONVERSION + SNAP 15 (SYSTEMS FOR NUCLEAR AUXILIARY POWER)

4-11252 HENDERSON RW + LARSON OW + FULTYN RV
RADIATION MEASUREMENTS OF THE EFFLUENT FROM THE PHOEBUS 1A-321 REACTOR
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS
LA-3396-MS +. 62 PAGES, 22 FIGURES, 9 TABLES, 2 REFERENCES, FEBRUARY 1966, CFSTI \$3.00 CY, \$0.75 MN

PRESENTED ARE THE RESULTS OF DOCUMENTATION STUDIES ON THE EFFLUENT FROM THE FULL-POWER TEST OF THE PHOEBUS 1A-321 REACTOR. A DESCRIPTION OF PROCEDURES AND EQUIPMENT IS GIVEN. AN ANALYSIS OF THE ENVIRONMENTAL EFFECTS DUE TO THE PASSAGE AND DEPOSITION OF THE RELEASED MATERIAL IS GIVEN, AS WELL AS DEPOSITION VELOCITIES MEASURED AT VARIOUS LOCATIONS. APPENDIX A GIVES THE RESULTS OF THE STUDY OF SELECTED RESIN-COATED TRAYS BY THE LASL INDUSTRIAL HYGIENE GROUP (H-5).

*AEROSPACE SAFETY + *EFFLUENT + *TEST, PROOF + LOSS OF COOLANT + SAMPLING

CATEGORY 5
ACCIDENT ANALYSIS

5-08969 HELM JW
EFFECT OF NEUTRON IRRADIATION ON UHTREX GRAPHITE AND CARBON
BATTELLE-NORTHWEST, RICHLAND
BNWL-191 +. 17 PAGES, 3 FIGURES, 5 TABLES, 7 REFERENCES, FEBRUARY 1966, CFSTI, \$1.00 CY, \$0.50 MN

THE DIMENSIONAL STABILITY OF THE GRAPHITE AND CARBON MATERIALS USED IN UHTREX WAS DETERMINED TO NEUTRON EXPOSURES EQUAL TO EXPECTED LIFETIME EXPOSURES, AND THE BEHAVIOR OF THESE MATERIALS WAS COMPARED WITH A CONVENTIONAL NUCLEAR GRAPHITE. IRRADIATIONS WERE CONDUCTED IN THE ETR TO MAXIMUM NEUTRON EXPOSURES OF 7×10 TO THE 20 NVT , E GREATER THAN 0.18 MEV AT SAMPLE TEMPERATURES BETWEEN 900 AND 1800 DEGREES C. AT IRRADIATION TEMPERATURES OF 1000 AND 1800 DEGREES C, CGL GRAPHITE BEHAVES ABOUT THE SAME AS CSF, AND THE LENGTH CHANGES ARE LESS THAN -0.06 PERCENT IN BOTH ORIENTATIONS AT THE MAXIMUM EXPOSURES.

*GRAPHITE + *RADIATION DAMAGE + *RADIATION EFFECT + CARBON + IN PILE LOOP + PROPERTY, PHYSICAL

5-09385 KOEISCIN JJ
PRESSURE DROP, HEAT TRANSFER, AND MAXIMUM DISCHARGE IN FORCED-CONVECTION, HORIZONTAL BOILING
LEHIGH UNIVERSITY
2 PAGES, DISSERTATION ABSTRACTS, 26(5), PAGES 2627-2628 (1965), ORDER NO. 65-11,304

A FORCED-CONVECTION BOILING STUDY WAS CONDUCTED IN A HORIZONTAL CHANNEL WITH SCALED AND POLISHED SURFACES AT ATMOSPHERIC PRESSURE. THE OBJECTIVES WERE TO OBTAIN FORCED-CONVECTION-BOILING CURVES DESCRIBING PRESSURE-DROP--MASS-VELOCITY CHARACTERISTICS, TO STUDY THE RANGE OF VARIABLES WHERE FLOW, PRESSURE, AND TEMPERATURE INSTABILITIES APPEAR, TO DETERMINE WHETHER CRITICAL DISCHARGE PHENOMENA ARE IN ANY WAY ASSOCIATED WITH SUCH INSTABILITIES. PRESSURE-DROP--HEAT-TRANSFER CORRELATIONS ARE PRESENTED.

*CONVECTIVE BOILING + *FLOW, TWO PHASE + *HEAT TRANSFER + *HEAT TRANSFER CORRELATION +
*HEAT TRANSFER, BOILING + HEAT TRANSFER EXPERIMENT + HEAT TRANSFER, CONVECTION + HYDRAULIC EXPERIMENT

5-09558 PRESLER AF
AN EXPERIMENTAL INVESTIGATION OF HEAT TRANSFER TO TURBULENT FLOW IN SMOOTH TUBES FOR THE REACTING N2O4-NO2 SYSTEM
LEWIS RESEARCH CENTER, CLEVELAND, OHIO
NASA-TN-D-3230 +. 49 PAGES, 24 FIGURES, 4 TABLES, JANUARY 1966, CFSTI, \$2.00

LOCAL TURBULENT-HEAT-TRANSFER COEFFICIENTS WERE OBTAINED EXPERIMENTALLY FOR THE DISSOCIATING SYSTEM NITROGEN TETROXIDE--NITROGEN DIOXIDE FLOWING THROUGH AN ELECTRICALLY HEATED TUBE. MODIFIED LOCAL HEAT-TRANSFER COEFFICIENTS, BASED ON WALL- TO BULK-ENTHALPY DIFFERENCES, WERE CORRELATED VERY WELL AS A SIMPLE POWER OF THE MASS AVERAGE VELOCITY. THE LOCAL MODIFIED HEAT-TRANSFER COEFFICIENTS WERE CORRELATED WITH A DITTUS-BOELTER-COLBURN-TYPE RELATION WITH ALL EQUILIBRIUM TRANSPORT AND THERMAL PROPERTIES EVALUATED ON A MEAN-TEMPERATURE INTEGRAL BASIS. THE BEST CURVE THROUGH THE DATA WAS ABOUT TEN PERCENT BELOW THE CURVE FROM CONSTANT-PROPERTY ANALYSES.

*CHEMICAL REACTION + *HEAT TRANSFER + *HEAT TRANSFER ANALYSIS + *HEAT TRANSFER EXPERIMENT + FLOW, TUBE + FLOW, TURBULENT

5-09605 LAWRENCE RA
AN INVESTIGATION OF THE THERMAL RESPONSE OF THE AEROSPACE SHIELD TEST REACTOR TO LOSS OF COOLANT
GENERAL DYNAMICS, FORT WORTH
WL-TR-64-137 + FZK-209 +. 106 PAGES, APRIL 1965, CFSTI

THE PRIMARY PURPOSE OF THIS EXPERIMENT WAS TO DETERMINE THE POSSIBLE CONSEQUENCE OF A COMPLETE LOSS OF COOLANT FROM THE INTERIOR OF A REACTOR, SPECIFICALLY THE ASTR (AEROSPACE SYSTEMS TEST REACTOR). A HEAT-TRANSFER MODEL WAS DEVELOPED AND COMPARED WITH EXPERIMENTAL DATA. THIS COMPARISON REVEALED THAT THE MODEL WAS CONSERVATIVE AND THAT THE HEATING RATE AND HEAT-LOSS RATE WERE EXCESSIVE. THE DATA WERE ACQUIRED FROM THE ASTR IN SERIES OF TESTS THAT INVOLVED REMOVAL OF THE COOLANT FROM THE REACTOR FOLLOWING OPERATION AT VARIOUS POWER LEVELS AND OPERATING TIMES. IT IS CONCLUDED THAT OVER-HEATED FUEL ELEMENTS CAN BE COOLED BY ADDING WATER, WITH RELATIVELY LITTLE HAZARD OF RUPTURING A FUEL PLATE.

*LOSS OF COOLANT + *REACTOR COOLANT + HEAT TRANSFER + HEAT TRANSFER ANALYSIS + HEAT TRANSFER EXPERIMENT + REACTOR TEST FACILITY

5-09622 LARKIN BK
SOME FINITE DIFFERENCE METHODS FOR PROBLEMS IN TRANSIENT HEAT FLOW
MARTIN COMPANY, DENVER
11 PAGES, 6 FIGURES, 10 REFERENCES, PP 1-11 OF HEAT TRANSFER - CLEVELAND, (CHEMICAL ENGINEERING PROGRESS SYMPOSIUM SERIES 59(61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, \$15.00 CY, SOURCE

FOUR METHODS FOR DIGITAL SOLUTION OF TRANSIENT HEAT FLOW PROBLEMS ARE COMPARED. THE FIRST STEP IN DEVELOPING THESE METHODS IS TO REPLACE SPATIAL DERIVATIVES BY FINITE-DIFFERENCE QUOTIENTS. THE RESULT IS A SYSTEM OF FIRST-ORDER DIFFERENTIAL EQUATIONS. BY USING FOUR METHODS FOR NUMERICAL INTEGRATION, ONE OBTAINS FOUR COMPUTING PROCEDURES. PROBLEMS IN TRANSIENT CONDUCTION, CONVECTION, AND RADIATION IN ANY NUMBER OF SPACE DIMENSIONS WITH ARBITRARY BOUNDARY AND INITIAL CONDITIONS ARE CONSIDERED. EULERS METHOD IS THE SIMPLEST ONE FOR NUMERICAL INTEGRATION OF A SYSTEM OF DIFFERENTIAL EQUATIONS, AND IT LEADS TO THE WELL-KNOWN METHOD OF DUSINBERRE. HOWEVER, THIS METHOD OFTEN EXHIBITS POOR STABILITY PROPERTIES. TWO, AND PERHAPS ALL THREE, OF THE OTHER METHODS HAVE UNCONDITIONAL STABILITY. ESTIMATES ARE MADE OF CUMULATIVE TRUNCATION ERROR IN TIME. THE WELL-KNOWN METHOD AND ONE OF THE NEWER ONES YIELD ERRORS PROPORTIONAL TO THE TIME INCREMENT. THE OTHER METHODS YIELD

CATEGORY 5
ACCIDENT ANALYSIS

5-09622 *CONTINUED*

ERRORS PROPORTIONAL TO THE INCREMENT SQUARED. APPLICATION OF THE METHODS IS ILLUSTRATED BY USE OF AN EXAMPLE PROBLEM WHERE THE SUPERIOR STABILITY PROPERTIES OF THE NEWER METHODS ARE NOTED.

*COMPUTER, DIGITAL + *HEAT CONDUCTION + *HEAT TRANSFER + *HEAT TRANSFER ANALYSIS + *TEMPERATURE TRANSIENT

5-09623 OLCER NY + MILLER D + SUNDERLAND JE
UNSTEADY TEMPERATURE DISTRIBUTIONS IN FINITE REGIONS
ARGONNE NATIONAL LABORATORY + ORDNANCE ENGINEERING ASSOCIATES, INC., DFS PLAINES, ILLINOIS + GEORGIA
INSTITUTE OF TECHNOLOGY
7 PAGES, 2 REFERENCES, PP 12-18 OF HEAT TRANSFER - CLEVELAND, (CHEMICAL ENGINEERING PROGRESS SYMPOSIUM
SERIES 59(61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, SOURCE, \$15.00 CY

THE PROBLEM OF UNSTEADY HEAT CONDUCTION IN A FINITE HOMOGENEOUS REGION OF ARBITRARY CONFIGURATION AND INITIAL CONDITIONS WITH INHOMOGENEOUS BOUNDARY CONDITIONS IS SOLVED ANALYTICALLY. SOLUTIONS ARE GIVEN IN A CONVENIENT FORM THAT ELIMINATES CONVOLUTION INTEGRALS WHEN INTERNAL AND SURFACE HEAT SOURCES CAN BE EXPRESSED BY SERIES EXPANSIONS IN TIME. THE METHOD IS ILLUSTRATED BY SOLUTION OF THE PROBLEM OF AN INFINITE SLAB WITH A HEAT FLUX GIVEN AS A POLYNOMIAL IN TIME.

*COMPUTER, DIGITAL + *HEAT CONDUCTION + *HEAT TRANSFER + *HEAT TRANSFER ANALYSIS + *TEMPERATURE TRANSIENT

5-09624 ZEH DW + GILL WN
BINARY DIFFUSION AND HEAT TRANSFER IN LAMINAR BOUNDARY LAYERS ON VERTICAL SURFACES
SYRACUSE UNIVERSITY + CLARKSON COLLEGE OF TECHNOLOGY
17 PAGES, 10 FIGURES, 30 REFERENCES, PP 19-35 OF HEAT TRANSFER - CLEVELAND, (CHEMICAL ENGINEERING PROGRESS
SYMPOSIUM SERIES 59(61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, SOURCE \$15.00 CY

COMBINED FREE AND FORCED CONVECTION IN LAMINAR BOUNDARY LAYERS WITH COUPLED MOMENTUM, HEAT, AND BINARY MASS TRANSFER IS INVESTIGATED. MASS-TRANSFER RATE, BUOYANCY, DISSIPATION, AND SPECIES ENTHALPY DIFFERENCES ARE CONSIDERED IN DETAIL. THE IMPORTANT EFFECTS OF ENTHALPY DIFFERENCES AND MASS-TRANSFER RATES ARE DESCRIBED BY EXACT SOLUTIONS AND AN APPROXIMATE CLOSED FORM.

*BOUNDARY LAYER + *DIFFUSION + *FLOW, LAMINAR + *HEAT TRANSFER + *HEAT TRANSFER ANALYSIS + *MASS TRANSFER

5-09625 SINGER RM
UNSTEADY CONVECTIVE MAGNETOHYDRODYNAMIC CHANNEL FLOW
ARGONNE NATIONAL LABORATORY
14 PAGES, 13 FIGURES, 13 REFERENCES, PP 36-49 OF HEAT TRANSFER - CLEVELAND, (CHEMICAL ENGINEERING PROGRESS
SYMPOSIUM SERIES 59(61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, SOURCE \$15.00 CY

THE UNSTEADY, COMBINED FREE AND FORCED CONVECTIVE FLOW OF AN ELECTRICALLY CONDUCTING FLUID THROUGH A TRANSVERSE MAGNETIC FIELD IS ANALYZED. ALLOWING THE CHANNEL-WALL TEMPERATURE TO VARY LINEARLY WITH THE AXIAL COORDINATE OF THE DUCT ALLOWS A FULLY DEVELOPED FLOW SITUATION THAT LINEARIZES THE GOVERNING EQUATIONS AND PERMITS AN ANALYTICAL SOLUTION. THE UNSTEADINESS MAY OCCUR BECAUSE OF VARIATIONS IN THE AXIAL PRESSURE GRADIENT, WALL TEMPERATURE, OR INTERNAL ENERGY-GENERATION RATE. THE EFFECTS OF THE THERMAL AND MAGNETIC PRANDTL NUMBERS, THE HARTMANN NUMBER, THE RAYLEIGH NUMBER, AND INTERNAL ENERGY GENERATION UPON THE FLOW AND HEAT TRANSFER ARE STUDIED. OSCILLATORY BEHAVIOR IS OBSERVED FOR LARGE VALUES OF RA AND M AND FOR PR NEAR UNITY, AND THE LENGTH OF THE TRANSIENT PERIOD IS FOUND TO DEPEND STRONGLY ON THESE FACTORS.

*HEAT TRANSFER ANALYSIS + FLOW, PULSATING + FLUCTUATION + HEAT TRANSFER + HEAT TRANSFER, CONVECTION + HEAT TRANSFER, NATURAL CONVECTION

5-09628 STEIN RP
THE GRAETZ PROBLEM IN CONCURRENT FLOW DOUBLE PIPE HEAT EXCHANGERS
ARGONNE NATIONAL LABORATORY
12 PAGES, 6 FIGURES, 7 REFERENCES, PP 76-87 OF HEAT TRANSFER - CLEVELAND, (CHEMICAL ENGINEERING PROGRESS
SYMPOSIUM SERIES 59(61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, SOURCE \$15.00 CY

THE GRAETZ PROBLEM PERTAINING TO THE CONCURRENT-FLOW DOUBLE-PIPE HEAT EXCHANGER CAN BE STUDIED ANALYTICALLY BY EXTENSIONS OF FAMILIAR MATHEMATICAL TECHNIQUES. NUMERICAL RESULTS ARE OBTAINED ILLUSTRATING THE FOLLOWING - 1. THE VALUES OF FULLY DEVELOPED LAMINAR FLOW HEAT-TRANSFER (FILM) COEFFICIENTS IN CONCURRENT-FLOW DOUBLE-PIPE HEAT EXCHANGERS CAN BE SIGNIFICANTLY LESS THAN THE VALUE CORRESPONDING TO THE BOUNDARY CONDITION OF UNIFORM WALL TEMPERATURE. 2. USE OF THE CUSTOMARY DESIGN EQUATION APPLIED TO LAMINAR FLOW HEAT EXCHANGERS CAN RESULT IN LARGE ERRORS EVEN WHEN THE HEAT TRANSFER IS FULLY DEVELOPED. A NEW HEAT-EXCHANGER DESIGN QUANTITY, CALLED THE EFFECTIVENESS COEFFICIENT, IS INTRODUCED, AND ITS SIGNIFICANCE IS ILLUSTRATED.

*FLOW, LAMINAR + *HEAT TRANSFER ANALYSIS + *HEAT TRANSFER, CONVECTION + ANNULUS + HEAT EXCHANGER + HEAT TRANSFER

5-09629 BURGE HL
HIGH HEAT FLUX REMOVAL BY LIQUID METAL SPRAY COOLING OF SURFACES
ROCKETDYNE, CANOGA PARK, CALIFORNIA
12 PAGES, 13 FIGURES, 9 REFERENCES, PP 115-126 OF HEAT TRANSFER - CLEVELAND, (CHEMICAL ENGINEERING

CATEGORY 5
ACCIDENT ANALYSIS

5-09629 *CONTINUED*

PROGRESS SYMPOSIUM SERIES 59 (61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, SOURCE \$15.00 CY

RESULTS OF LIQUID-METAL-SPRAY COOLING STUDIES ARE REPORTED FOR LITHIUM, SODIUM, AND MERCURY. THE RESULTS SHOW THAT SUCH TECHNIQUES OF COOLING CAN ACCOMMODATE HEAT FLUXES FAR IN EXCESS OF CALCULATED POOL-BOILING LIMITS. IMPORTANT FACTORS, SUCH AS DROPLET SIZE, IMPINGEMENT VELOCITY, AND ANGLE ARE DISCUSSED, ALONG WITH A HYPOTHESIZED EXPLANATION FOR THE INCREASED HEAT-TRANSFER CAPABILITY. THEORETICAL CONSIDERATIONS SHOW THAT A SATURATED-TEMPERATURE DROPLET ACTUALLY RESIDES ON A HOT SURFACE AS A SUBCOOLED DROPLET FOR A TIME, DURING WHICH THE DROPLET ABSORBS ENERGY AS SENSIBLE HEAT. UPON RELIEF OF HIGH LOCAL SURFACE PRESSURES, THE DROPLET FLASHES TO VAPOR, THUS PROVIDING THE MECHANISM FOR HIGH-HEAT-FLUX CAPABILITY.

*HEAT TRANSFER ANALYSIS + *HEAT TRANSFER EXPERIMENT + *METAL, LIQUID + *SPRAY, GENERAL + HEAT TRANSFER + LITHIUM + MERCURY + SODIUM + SURFACE, GENERAL

5-C9630 NURICK WH + SEADER JD + COULTAS TA

TRANSIENT HEAT TRANSFER FROM A LIQUID METAL SPRAY IMPINGING ON A VERTICAL SURFACE
ROCKETDYNE, CANOGA PARK

11 PAGES, 22 FIGURES, 6 TABLES, 6 REFERENCES, PP 127-137 OF HEAT TRANSFER - CLEVELAND, (CHEMICAL ENGINEERING PROGRESS SYMPOSIUM SERIES 59(61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, SOURCE

THE OBJECTIVE WAS TO OBTAIN DATA TO DEVELOP AN EMPIRICAL CORRELATION FOR DETERMINING HEAT TRANSFER FROM A HOT SODIUM SPRAY IMPINGING ON A VERTICAL PLATE. SODIUM WAS USED BECAUSE IT IS EASILY HANDLED IN THE LIQUID STATE OVER A WIDE TEMPERATURE RANGE. THE MAJOR VARIABLES WERE DROPLET SIZE, ANGLE OF IMPINGEMENT, FLOW RATE PER UNIT AREA, SODIUM TEMPERATURE, AND IMPINGEMENT VELOCITY. RESULTS FROM EXPERIMENTS WITH SODIUM AT TEMPERATURES FROM 645 DEGREES TO 1,130 DEGREES F, SPRAYED ONTO A VERTICAL PLATE, INDICATE THAT AFTER A FILM WAS DEVELOPED ON THE SURFACE THE HEAT-TRANSFER COEFFICIENT VARIED FROM ABOUT 275 TO 725 BTU/(HR) (SQ. FT) (DEGREE F) WHEN THE IMPINGING VELOCITY WAS VARIED FROM ABOUT 150 TO 250 FT/SEC. A CORRELATION OF THE HEAT-TRANSFER DATA WAS DEVELOPED WITH CONVENTIONAL DIMENSIONLESS PARAMETERS. THE RESULTING EQUATION FOR SODIUM VS NU EQUALS 0.0034 RE TO THE 0.407 POWER.

*HEAT TRANSFER EXPERIMENT + *METAL, LIQUID + *SODIUM + *SPRAY, GENERAL + SURFACE, GENERAL + TEMPERATURE TRANSIENT

5-09631 DESOTO S

THE RADIATION FROM AN AXISYMMETRIC, REAL GAS SYSTEM WITH A NONISOTHERMAL TEMPERATURE DISTRIBUTION
ROCKETDYNE, CANOGA PARK

17 PAGES, 13 FIGURES, 3 REFERENCES, PP 138-154 OF HEAT TRANSFER - CLEVELAND, (CHEMICAL ENGINEERING PROGRESS SYMPOSIUM SERIES 59(61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, SOURCE

A METHOD WAS DEVELOPED TO DETERMINE THE RADIANT FLUX TO THE BASE REGION OF A GAS SYSTEM WITH AN AXISYMMETRIC GEOMETRY AND ANY AXISYMMETRIC PROPERTY DISTRIBUTION. THE GRAY-GAS SIMPLIFICATION IS NOT MADE, AND INTERLAYER ABSORPTION IS ACCOUNTED FOR. THAT IS, NO SIMPLIFYING ASSUMPTION IS MADE AS TO THE MAGNITUDE OF THE OPTICAL THICKNESS. THE EFFECT OF THE SHADOW OR SILHOUETTE OF ANY AXISYMMETRIC OCCLUSION IS ALSO ACCOUNTED FOR. AN EXAMPLE OF THE ANALYSIS IS GIVEN USING SMOOTHED VALUES OF THE SPECTRAL ABSORPTION COEFFICIENT OF CARBON DIOXIDE FOR THE 2.7-, 4.3-, AND 15-MICRON BANDS. OWING TO THE COMPLEXITY OF THE FUNCTIONAL RELATIONSHIPS OF THE PERTINENT PARAMETERS, A NUMERICAL INTEGRATION TECHNIQUE IS NECESSARY IN GENERAL.

*HEAT TRANSFER ANALYSIS + *HEAT TRANSFER, RADIANT + HEAT TRANSFER + HIGH TEMPERATURE

5-09632 TIEN LC + CHURCHILL SW

AN EVALUATION OF APPROXIMATIONS FOR RADIANT TRANSPORT WITH ISOTROPIC SCATTERING
THE UNIVERSITY OF MICHIGAN, ANN ARBOR

7 PAGES, 7 FIGURES, 2 TABLES, 15 REFERENCES, PP 155-161 OF HEAT TRANSFER - CLEVELAND, (CHEMICAL ENGINEERING PROGRESS SYMPOSIUM SERIES 59(61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, SOURCE

THE INTEGRO-DIFFERENTIAL EQUATION THAT DESCRIBES THE TRANSPORT OF RADIATION THROUGH DISPERSED MATERIAL HAS BEEN SOLVED EXACTLY ONLY FOR A FEW LIMITING AND IDEALIZED CONDITIONS. BECAUSE OF THE GREAT IMPORTANCE OF THIS PROBLEM IN A WIDE VARIETY OF APPLICATIONS, MANY APPROXIMATE SOLUTIONS HAVE BEEN PROPOSED. THE APPROXIMATE MODELS ARE USEFUL FOR UNDERSTANDING AS WELL AS FOR CALCULATIONS, SINCE THE COMPLEX NUMERICAL INTEGRATION USED FOR THE EXACT CALCULATIONS PROVIDES ONLY SPECIFIC TABULATED VALUES. THE APPROXIMATIONS ARE COMPARED WITH THE EXACT SOLUTION FOR THE REFLECTION AND TRANSMISSION OF PARALLEL-PLANE RADIATION OBLIQUELY INCIDENT ON AN ABSORBING AND ISOTROPICALLY SCATTERING MEDIUM. THE MODIFIED DIFFUSIONAL MODELS OF CHU, CHURCHILL, AND PANG AND OF GROSJEAN WERE QUITE ACCURATE FOR ALL CONDITIONS. THE APPROXIMATION OF RICHARDS IS GENERALLY QUITE POOR, AND THE CLASSICAL DIFFUSION MODEL IS GENERALLY OF FAIR ACCURACY. THE P-SUB-3 APPROXIMATION IS QUITE ACCURATE FOR WEAKLY ABSORBING DISPERSIONS.

*COMPARISON, THEORY AND EXPERIENCE + *HEAT TRANSFER, RADIANT + *TRANSPORT THEORY + HEAT TRANSFER + HEAT TRANSFER ANALYSIS + HIGH TEMPERATURE

5-09633 HOWELL JR

DETERMINATION OF COMBINED CONDUCTION AND RADIATION OF HEAT THROUGH ABSORBING MEDIA BY THE EXCHANGE FACTOR APPROXIMATION

LEWIS RESEARCH CENTER, CLEVELAND

10 PAGES, 4 FIGURES, 1 TABLE, 11 REFERENCES, PP 162-171 OF HEAT TRANSFER - CLEVELAND, (CHEMICAL ENGINEERING PROGRESS SYMPOSIUM SERIES 59(61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, SOURCE

CATEGORY 5
ACCIDENT ANALYSIS

5-09633 *CONTINUED*

A SIMPLE SOLUTION FOR A GROUP OF PROBLEMS INVOLVING THE COMBINED MODES OF RADIATION AND CONDUCTION HEAT EXCHANGE THROUGH RADIANT MEDIA IS PROPOSED. CONSIDERING THE RADIANT EXCHANGE FACTORS INVOLVED IN THE EQUATIONS OF TRANSFER TO BE INDEPENDENT OF THE CONDUCTION PROCESS REPLACES THE INTEGRALS IN THESE EQUATIONS BY CONSTANTS THAT CAN BE DETERMINED EITHER FROM PURE RADIATION SOLUTIONS AVAILABLE IN THE LITERATURE OR BY AN INDEPENDENT SOLUTION. COMPARISON OF APPROXIMATE RADIATION-CONDUCTION SOLUTIONS IS MADE WITH EXACT SOLUTIONS OF THE INTEGRO-DIFFERENTIAL EQUATIONS PRESENT IN THE LITERATURE, AND AGREEMENT IS FOUND OVER A LARGE RANGE OF PARAMETERS.

*COMPARISON, THEORY AND EXPERIENCE + *HEAT TRANSFER ANALYSIS + *HEAT TRANSFER, RADIANT + HEAT TRANSFER + RADIATION MODEL

5-09634 HRYCAK P + HELGANS RE
EQUILIBRIUM TEMPERATURE OF LONG THIN-WALLED CYLINDERS IN SPACE
BELL TELEPHONE LABORATORIES, INC., MURRAY HILL + NEWARK COLLEGE OF ENGINEERING, NEWARK
7 PAGES, 4 FIGURES, 12 REFERENCES, PP 172-178 OF HEAT TRANSFER - CLEVELAND, (CHEMICAL ENGINEERING PROGRESS SYMPOSIUM SERIES 59(61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, SOURCE

A FORMULA FOR STEADY-STATE TEMPERATURE DISTRIBUTION IS DERIVED FOR CYLINDRICAL SHELLS UNDER SPACE CONDITIONS, AND THE EFFECT OF INTERNAL RADIATION AND OF SURFACE COATINGS IS CALCULATED. EXPERIMENTS INDICATE THAT THIS TEMPERATURE DISTRIBUTION LEADS TO CONSERVATIVE RESULTS IN CALCULATIONS OF MAXIMUM DEFLECTIONS OF LONG TUBES MADE FROM TWISTED TAPE IN SPACE.

*COMPARISON, THEORY AND EXPERIENCE + *HEAT TRANSFER, RADIANT + *SPACECRAFT + HEAT TRANSFER + HEAT TRANSFER ANALYSIS + HEAT TRANSFER EXPERIMENT

5-09635 SEIDER WD + CHURCHILL SW
THE EFFECT OF INSULATION ON FREEZING FRONT MOTION
THE UNIVERSITY OF MICHIGAN, ANN ARBOR
6 PAGES, 7 FIGURES, 4 REFERENCES, PP 179-184 OF HEAT TRANSFER - CLEVELAND, (CHEMICAL ENGINEERING PROGRESS SYMPOSIUM SERIES 59(61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERING, SOURCE

A NUMERICAL METHOD OF SOLUTION IS PRESENTED FOR THE MOTION OF A FREEZING FRONT THROUGH A SEMI-INFINITE REGION, INITIALLY AT UNIFORM TEMPERATURE, ADJACENT TO AN INSULATED ISOTHERMAL SURFACE. AN ANALYTICAL SOLUTION DOES NOT APPEAR TO BE FEASIBLE FOR THIS PROBLEM. ILLUSTRATIVE CALCULATIONS WERE CARRIED OUT WITH A DIGITAL COMPUTER. THE RESULTS ARE COMPARED WITH THE ANALYTICAL SOLUTIONS FOR THE LIMITING CASES OF NO INSULATION AND NO LATENT HEAT AND WITH A PREVIOUSLY PROPOSED APPROXIMATE SOLUTION.

*PHASE CHANGE + *THERMAL INSULATION + COMPARISON, THEORY AND EXPERIENCE + COMPUTER, DIGITAL + HEAT TRANSFER + HEAT TRANSFER ANALYSIS + THERMODYNAMICS

5-09636 TELLER AS + CHURCHILL SW
FREEZING OUTSIDE A SPHERE
THE UNIVERSITY OF MICHIGAN, ANN ARBOR
5 PAGES, 5 FIGURES, 1 TABLE, PP 185-189 OF HEAT TRANSFER - CLEVELAND, (CHEMICAL ENGINEERING PROGRESS SYMPOSIUM SERIES 59(61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERING, SOURCE

A NUMERICAL METHOD OF SOLUTION IS PRESENTED FOR THE MOTION OF A FREEZING FRONT THROUGH A REGION, INITIALLY AT UNIFORM TEMPERATURE, SURROUNDING AN ISOTHERMAL SPHERE. A GENERAL ANALYTICAL EQUATION DOES NOT APPEAR TO BE FEASIBLE FOR THIS PROBLEM. NUMERICAL CALCULATIONS WERE CARRIED OUT WITH A DIGITAL COMPUTER FOR A WIDE RANGE OF THE IMPORTANT DIMENSIONLESS PARAMETERS. STABILITY AND CONVERGENCE WERE TESTED EXPERIMENTALLY. ILLUSTRATIVE VALUES OF THE HEAT FLUX DENSITY AND THE FREEZING FRONT LOCATION ARE PRESENTED GRAPHICALLY IN FORMS CHOSEN TO ASSIST INTERPOLATION. THE RESULTS ARE COMPARED WITH THE ANALYTICAL SOLUTIONS FOR THE LIMITING CASES OF NO LATENT HEAT, NO HEAT CAPACITY, STEADY STATE, AND THE FLAT PLATE.

*PHASE CHANGE + *SPHERE + COMPUTER, DIGITAL + HEAT TRANSFER + HEAT TRANSFER ANALYSIS

5-09637 ROSSON HF + MYERS JA
POINT VALUES OF CONDENSING FILM COEFFICIENTS INSIDE A HORIZONTAL PIPE
UNIVERSITY OF KANSAS + VILLANOVA UNIVERSITY
10 PAGES, 9 FIGURES, PP 190-199 OF HEAT TRANSFER - CLEVELAND, (CHEMICAL ENGINEERING PROGRESS SYMPOSIUM SERIES 59(61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERING, SOURCE

POINT VALUES OF THE CONDENSING-FILM COEFFICIENTS FOR METHANOL AND ACETONE WERE MEASURED FOR CONDENSATION INSIDE A HORIZONTAL PIPE. THE HEAT FLUX AT A POINT WAS MEASURED WITH A HEAT METER, AN ELECTRICAL ANALOG DEVICE COUPLED DIRECTLY TO THE HEAT TRANSFER MEDIUM. COEFFICIENTS VARIED GREATLY FROM THE TOP OF THE PIPE TO THE BOTTOM. NEAR THE TOP, THE COEFFICIENT IS PREDICTED BY INCLUDING THE EFFECT OF VAPOR SHEAR IN NUSSELT'S EQUATION. NEAR THE BOTTOM, AN ANALOGY BETWEEN HEAT AND MOMENTUM TRANSFER IS USED TO PREDICT THE COEFFICIENT. INTERVENING COEFFICIENTS ARE CORRELATED WITH REYNOLDS NUMBERS OF VAPOR AND LIQUID, TEMPERATURE DROP, AND GRAVITY.

*CONDENSATION + *FILM, GENERAL + *HEAT TRANSFER CORRELATION + FLOW, TUBE + HEAT TRANSFER + HEAT TRANSFER EXPERIMENT + PHASE CHANGE

5-09638 LEE J
REMARKS ON THE LIQUID METAL CONDENSATION

CATEGORY 5
ACCIDENT ANALYSIS

5-09638 *CONTINUED*
AEROSPACE RESEARCH LABORATORIES, OHIO
10 PAGES, 6 FIGURES, PP 200-209 OF HEAT TRANSFER - CLEVELAND, (CHEMICAL ENGINEERING PROGRESS SYMPOSIUM SERIES 59(61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERING, SOURCE

A TWO-PHASE TURBULENT CONDENSATION WAS FORMULATED WITH THE EDDY VISCOSITIES OF DEISSLER AND VON KARMAN. THE PREDICTED CONDENSATION HEAT-TRANSFER COEFFICIENTS ARE STILL HIGHER THAN THE LIQUID-METAL DATA OF MISRA AND BONILLA. HOWEVER, IT WAS SHOWN THAT THE UPWARD VAPOR FLOW CAN DECREASE THE HEAT-TRANSFER COEFFICIENT GREATLY, AND THE SCATTER OF DATA MAY BE ATTRIBUTED TO THE VARIATION OF VAPOR VELOCITY.

*CONDENSATION + *FILM, GENERAL + *FLOW, TURBULENT + *METAL, LIQUID + HEAT TRANSFER + HEAT TRANSFER ANALYSIS

5-09639 FAUSKE HK
THE DISCHARGE OF SATURATED WATER THROUGH TUBES
ARGONNE NATIONAL LABORATORY, ARGONNE
7 PAGES, 2 FIGURES, 2 TABLES, PP 210-216 OF HEAT TRANSFER - CLEVELAND (CHEMICAL ENGINEERING PROGRESS SYMPOSIUM SERIES 59(61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERING, SOURCE

A NEW HIGH-PRESSURE FACILITY DESIGNED FOR MEASURING DISCHARGE RATES OF WATER FROM VARIOUS TUBE CONFIGURATIONS UP TO 2000 LB/SQ. IN. IS BRIEFLY DESCRIBED. DATA ARE REPORTED ON DISCHARGE RATES OF SATURATED WATER FROM TUBES OF LENGTH-TO-DIAMETER (L/D) RATIO FROM 0 TO 40, WITH INITIAL PRESSURE UP TO 2000 LB/SQ. IN. PRESSURE PROFILES IN THE TUBES WERE MEASURED FOR VARIOUS UPSTREAM CONDITIONS, AND THE CRITICAL PRESSURE RATIO WAS DETERMINED AS A FUNCTION OF L/D RATIO AND FOUND INDEPENDENT OF INITIAL CONDITIONS.

*FLOW, TUBE + *FLOW, TWO PHASE + HEAT TRANSFER + HEAT TRANSFER EXPERIMENT + LOSS OF FLOW

5-09640 JACKSON BW + TROUPE RA
LAMINAR FLOW IN A PLATE HEAT EXCHANGER
NORTHEASTERN UNIVERSITY, BOSTON
5 PAGES, 5 FIGURES, 1 TABLE, 16 REFERENCES, PP 220-224 OF HEAT TRANSFER - CLEVELAND (CHEMICAL ENGINEERING PROGRESS SYMPOSIUM SERIES 59(61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERING, SOURCE

A CORRELATION IS PRESENTED FOR THE LAMINAR-FILM HEAT-TRANSFER COEFFICIENT OF STREAMS WITH VISCOSITIES UP TO 1400 CENTIPOISES UNDERGOING HEATING OR COOLING IN A PLATE HEAT EXCHANGER. DATA IN THE TRANSITION AND TURBULENT REGIONS ARE GIVEN. LOG-MEAN TEMPERATURE CORRECTION FACTORS ARE NEEDED FOR DESIGNING COMPLICATED FLOW PATTERNS.

*FLOW, LAMINAR + *HEAT EXCHANGER + *HEAT TRANSFER CORRELATION + FILM, GENERAL + HEAT TRANSFER + HEAT TRANSFER EXPERIMENT

5-09641 CUMO M + LOPEZ S + PINCHERA GC
NUMERICAL CALCULATION OF EXTENDED SURFACE EFFICIENCY
COMITATO NAZIONALE ENERGIA NUCLEARE (CNEN) ITALY
9 PAGES, 9 FIGURES, 14 REFERENCES, PP 225-233 OF HEAT TRANSFER - CLEVELAND (CHEMICAL ENGINEERING PROGRESS SYMPOSIUM SERIES 59(61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERING, SOURCE

THE PAPER PRESENTS THE NUMERICAL CALCULATION OF EXTENDED-SURFACE TWO-DIMENSIONAL TEMPERATURE DISTRIBUTION AND EFFICIENCY WITH AND WITHOUT INTERNAL HEAT GENERATION AND WITH UNIFORM AND NONUNIFORM HEAT-TRANSFER COEFFICIENT. FORCED CONVECTION AND NUCLEATE BOILING COOLING ARE TREATED. THE INTEGRATION SYSTEM IS THE ENTIRE EXTENDED SURFACE OF ANY FORM, INCLUDING THE BASE OF SOLID-FLUID CONDITIONS AND FIN DIMENSIONS.

*COMPARISON, THEORY AND EXPERIENCE + *FIN + *HEAT TRANSFER AUGMENTATION + *HEAT TRANSFER, CONVECTION + COMPUTER, DIGITAL + HEAT CONDUCTION + HEAT TRANSFER + HEAT TRANSFER ANALYSIS + HEAT TRANSFER, BOILING

5-09642 COLVER CP + BALZHISER RE
A STUDY OF SATURATED POOL BOILING POTASSIUM UP TO BURNOUT HEAT FLUXES
THE UNIVERSITY OF MICHIGAN + THE UNIVERSITY OF OKLAHOMA
11 PAGES, 13 FIGURES, 30 REFERENCES, PP 253-263 OF HEAT TRANSFER - CLEVELAND (CHEMICAL ENGINEERING PROGRESS SYMPOSIUM SERIES 59(61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERING, SOURCE

POTASSIUM POOL BOILING FROM THE OUTER SURFACE OF A HORIZONTAL 3/8-IN-DIAM BY 1.25-IN. LONG HAYNES-25 TUBE WAS STUDIED AT HEAT FLUXES UP TO AND INCLUDING BURNOUT. THE SCOPE OF THE INVESTIGATION INCLUDED OPERATING OVER A PRESSURE RANGE OF 0.23 TO 45 LB/SQ. IN. ABS. BURNOUT MEASUREMENTS WERE MADE AT PRESSURES UP TO 22 LB/SQ. IN. ABS. AN EMPIRICAL FIT OF THE BURNOUT RESULTS CAN BE REPRESENTED BY AN EQUATION. PRONOUNCED TEMPERATURE FLUCTUATIONS BETWEEN 10 AND 150 DEGREES F EXISTED IN THE HEAT-TRANSFER SURFACE DURING THE BOILING OF POTASSIUM. BELOW 250,000 BTU/(HR)(SQ. FT.), TEMPERATURE FLUCTUATIONS WERE COMMON IN THE BULK LIQUID AND WERE ACCOMPANIED WITH NOTICEABLE PRESSURE FLUCTUATIONS.

*BURNOUT HEAT FLUX + *HEAT TRANSFER EXPERIMENT + *METAL, LIQUID + *POOL BOILING + *POTASSIUM + HEAT TRANSFER

5-09643 YOUNG RK + HUMMEL RL
IMPROVED NUCLEATE BOILING HEAT TRANSFER
UNIVERSITY OF TORONTO, TORONTO, ONTARIO, CANADA
7 PAGES, 7 FIGURES, 19 REFERENCES, PP 264-270, OF HEAT TRANSFER - CLEVELAND (CHEMICAL ENGINEERING PROGRESS SYMPOSIUM SERIES 59(61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERING, REPRINTED FROM CHEMICAL

CATEGORY 5
ACCIDENT ANALYSIS

5-09643 *CONTINUED*
ENGINEERING PROGRESS SYMPOSIUM SERIES 60(7) 1964, PP 53-58, SOURCE

HEAT TRANSFER SURFACES THAT GIVE RISE TO HIGH COEFFICIENTS THROUGHOUT THE LOWER REGION OF THE NUCLEATE BOILING REGIME HAVE BEEN DEVELOPED. THE SURFACES ARE CHARACTERIZED BY A LARGE DENSITY OF SPOTS OF POORLY WETTED MATERIAL ON A SURFACE THAT IS WETTED BY THE BOILING LIQUID. BUBBLING AT SUCH SITES DURING POOL BOILING OF WATER AT THE SATURATION TEMPERATURE UNDER ATMOSPHERIC PRESSURE HAS BEEN OBSERVED AT AVERAGE SURFACE SUPERHEATS OF ONLY 2 TO 4 DEGREES F. HEAT-TRANSFER COEFFICIENTS OF UP TO 6500 BTU/(HR.)(SQ. FT.) (DEGREE F) AT A SURFACE HEAT FLUX OF 70,000 BTU/(HR.)(SQ. FT.) ARE REPORTED. AT A HEAT FLUX OF 10,000 BTU/(HR.)(SQ. FT.), THE COMMON FLUX FOR EVAPORATOR USAGE, THE HEAT-TRANSFER COEFFICIENT WAS 2600 BTU/(HR.)(SQ. FT.)(DEGREE F), AND THE TEMPERATURE DIFFERENCE WAS ONLY 3.8 DEGREES F.

*COATING, SURFACE + *NUCLEATE BOILING + *STEAM + *WATER, GENERAL + HEAT TRANSFER + HEAT TRANSFER EXPERIMENT

5-09644 COSTELLO CP + BOCK CO + NICHOLS CC
A STUDY OF INDUCED CONVECTIVE EFFECTS ON SATURATED POOL BOILING BURNOUT
UNIVERSITY OF WASHINGTON, SEATTLE
10 PAGES, 5 FIGURES, 1 TABLE, 13 REFERENCES, PP 271-280 OF HEAT TRANSFER - CLEVELAND (CHEMICAL ENGINEERING PROGRESS SYMPOSIUM SERIES 59(61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERING, SOURCE

EARLIER EXPERIMENTAL STUDIES SHOWING APPRECIABLE SIZE AND SURFACE EFFECTS ON POOL-BOILING BURNOUT ARE EXTENDED TO CASES OF VERY LARGE FLAT-PLATE HEATERS. IT IS SHOWN THAT IT MAY BE POSSIBLE TO ASCRIBE THE SIZE EFFECT TO CONVECTIVE ENERGY TRANSFER TO LIQUID WHICH FLOWS IN FROM THE SIDES OF THE HEATERS TOWARD THE CENTER LINE. THE FLOW IS NATURALLY INDUCED BY THE BOILING PROCESS. IT IS POSTULATED THAT THE IMMEDIATE CAUSE OF BURNOUT IS DRYOUT UNDER VAPOR PATCHES WHICH OCCUR UPON THE HEATER SURFACES. BURNOUT IS BELIEVED TO OCCUR WHEN AN AMOUNT OF ENERGY LIMITED BY SURFACE WETTABILITY MUST BE REMOVED FROM THE HEATER BY LATENT-HEAT TRANSPORT. SUPERIMPOSED UPON THE AMOUNT OF ENERGY REMOVABLE BY LATENT-HEAT TRANSPORT IS COMPONENT OF ENERGY REMOVED BY THE INDUCED CONVECTIVE EFFECTS. THE CONVECTIVE COMPONENT VARIES WITH THE HEATER SIZE. DATA FROM THE PRESENT TESTS SEEM TO BE EXPLAINABLE ON THE BASIS OF THE PROPOSED MODEL OF BURNOUT, WHICH IS SUBJECT TO CONSIDERABLE REFINEMENT.

*BURNOUT HEAT FLUX + *CONVECTIVE BOILING + *HEAT TRANSFER EXPERIMENT + *HEAT TRANSFER, BOILING + *POOL BOILING + COMPARISON, THEORY AND EXPERIENCE + HEAT TRANSFER + HEAT TRANSFER, CONVECTION

5-09645 CARNE M
SOME EFFECTS OF TEST SECTION GEOMETRY IN SATURATED POOL BOILING ON THE CRITICAL HEAT FLUX FOR SOME ORGANIC LIQUIDS AND LIQUID MIXTURES
CHALK RIVER, AECL + M. W. KELLUGG COMPANY, NEW YORK
9 PAGES, 14 FIGURES, 1 TABLE, 14 REFERENCES, PP 281-289 OF HEAT TRANSFER - CLEVELAND (CHEMICAL ENGINEERING PROGRESS SYMPOSIUM SERIES 59(61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERING, SOURCE

CRITICAL HEAT FLUX DATA ARE PRESENTED FOR SIX ORGANIC LIQUIDS AND FIVE WATER-ORGANIC PAIRS BOILING AT ATMOSPHERIC SATURATED POOL CONDITIONS ON HORIZONTAL STEEL ELEMENTS. THE DIAMETERS OF THE ELEMENTS RANGED FROM 0.8 TO 6.4 MM, AND THE WALL THICKNESSES FROM 0.15 TO 3.2 MM. THE CRITICAL HEAT FLUXES OF THE PURE ORGANICS WERE INDEPENDENT OF THE ELEMENT DIAMETER, D, FOR SOLID ELEMENTS WITH D EQUAL TO OR GREATER THAN 2.4 MM., BUT 15 TO 40 PERCENT HIGHER FOR D EQUAL TO OR LESS THAN 1.6 MM. THIS BEHAVIOR OF THE SMALL-DIAMETER ELEMENTS IS IN CONTRAST WITH THE DATA REPORTED BY BERNATH AND IVEY AND MORRIS FOR WATER. THE DIFFERENCES IN RESULTS ARE EXPLAINED ON THE BASIS OF A GEOMETRY EFFECT ON CRITICAL HEAT FLUX AT HIGH WATER CONCENTRATIONS. THE DATA FOR THE MIXTURES ARE USED TO DEMONSTRATE THAT THE FORM OF THE CORRELATION EQUATION ORIGINALLY PROPOSED BY KUTATELADZE IS NOT ADEQUATE FOR PREDICTING THE CRITICAL HEAT FLUXES FOR MIXTURES.

*HEAT TRANSFER, BOILING + *POOL BOILING + HEAT TRANSFER + HEAT TRANSFER EXPERIMENT

5-09646 HSU WY
GRADUAL TRANSITION OF NUCLEATE BOILING FROM DISCRETE BUBBLE REGIME TO MULTIBUBBLE REGIME
LEWIS RESEARCH CENTER, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, CLEVELAND
9 PAGES, 7 FIGURES, 1 TABLE, 22 REFERENCES, PP 290-298 OF HEAT TRANSFER - CLEVELAND (CHEMICAL ENGINEERING PROGRESS SYMPOSIUM SERIES 59(61) 1965), AMERICAN INSTITUTE OF CHEMICAL ENGINEERING, SOURCE

A PHOTOGRAPHIC STUDY WAS MADE OF OVER 5000 BUBBLES IN THE NUCLEATE BOILING OF METHANOL AND WATER ON A NARROW HEATING STRIP AT VARIOUS HEAT FLUXES AND DEGREES OF SUBCOOLING. THE RESULTS SHOWED THAT TRANSITIONS FROM THE DISCRETE-BUBBLE REGIME TO THE MULTIBUBBLE REGIME WAS GRADUAL. THE FRACTION OF HEATING AREA COVERED BY MULTIBUBBLES INCREASES WITH THE INCREASING HEAT FLUX AND IS PREDICTABLE. THE AREA FRACTION IS A POISSON FUNCTION OF THE PRODUCT OF THE MEAN AREA OF INFLUENCE OF SINGLE BUBBLES AND THE INSTANTANEOUS POPULATION DENSITY.

*HEAT TRANSFER, BOILING + *NUCLEATE BOILING + HEAT TRANSFER + HEAT TRANSFER ANALYSIS + HEAT TRANSFER CORRELATION + HEAT TRANSFER EXPERIMENT

5-09647 HOFFMAN HW + KEYES JJ
STUDIES IN HEAT TRANSFER AND FLUID MECHANICS, PROGRESS REPORT FOR PERIOD OCTOBER 1, 1963 - JUNE 30, 1964
OAK RIDGE NATIONAL LABORATORY
ORNL-TM-1148 +. 129 PAGES, 60 FIGURES, 5 TABLES, REFERENCES, AUGUST, 1965, CFSTI

THIS REPORT IS A SUMMARY OF WORK IN THE FOLLOWING AREAS - BOILING-POTASSIUM HEAT TRANSFER, FORCED-CONVECTION SYSTEMS AND SUPERHEAT PHENOMENA, BOILING IN MULTIROD GEOMETRIES, CRITICAL HEAT FLUX FOR NATURAL CONVECTION OF WATER IN BLOCKED VERTICAL CHANNELS, SWIRL-FLOW HEAT TRANSFER, EXPERIMENTAL AND THEORETICAL STUDIES OF HYDROMAGNETIC STABILIZATION IN VORTEX FLUID

CATEGORY 5
ACCIDENT ANALYSIS

5-09647 *CONTINUED*

MECHANICS, POTENTIAL VORTEX FLOW NEAR A STATIONARY DISK, BOUNDARY-LAYER TRANSIENT PHENOMENA, TURBULENT TRANSPORT STUDIES, AND THERMOPHYSICAL PROPERTIES OF LIQUID LITHIUM AND POTASSIUM.

*HEAT TRANSFER + *HEAT TRANSFER, BOILING + *HEAT TRANSFER, CONVECTION + *LITHIUM + *METAL, LIQUID + *POTASSIUM + *THERMAL PROPERTY + BOUNDARY LAYER + FLOW THEORY AND EXPERIMENTS + HEAT TRANSFER ANALYSIS + HEAT TRANSFER CORRELATION + HEAT TRANSFER EXPERIMENT

5-09917 GROZIN BD + CHERNENKO VS

POSSIBILITY OF STRENGTHENING STEEL BY ELECTRON BOMBARDMENT

JPRS-32107 + TT-65-32600 +. 7 PAGES, SEPTEMBER 22, 1965, TRANSLATED FROM DOPOVIDI AKADEMIYI NAUK UKRAYINSKOYI RSR, (2), PAGES 202-5 (1963), CFSTI, \$1.00 CY, \$0.50 MN

THEORETICAL CONSIDERATIONS PERMIT THE POSSIBILITY OF STRENGTHENING STEEL BY ELECTRON BOMBARDMENT. EXPERIMENTS HAVE CONFIRMED THE CORRECTNESS OF THIS PREMISE. THE HARDNESS OF STEEL IS RAISED TO 900-950 KG/MM SQUARED BY ELECTRON BOMBARDMENT. THE IRRADIATED ZONE HAS A SPECIFIC MICROSTRUCTURE.

*RADIATION EFFECT + *STEEL + *TENSILE PROPERTY + ALLOY + CREEP PROPERTY + RADIATION DAMAGE + X-RAY

5-09918 SMITH BE

AN X-RAY STUDY OF FISSION FRAGMENT DAMAGE IN STEELS

UNITED KINGDOM ATOMIC ENERGY AUTHORITY, HARWELL

5 PAGES, 4 TABLES, 1 FIGURE, 11 REFERENCES, JOURNAL OF NUCLEAR MATERIALS, 17(1), PAGES 167-171 (1965)

LATTICE-PARAMETER MEASUREMENTS WERE MADE ON STEELS BOMBARDED WITH FISSION FRAGMENTS AT ABOUT 60 C. THE RESULTS FOR ONE AUSTENITIC STEEL (CR, 20 WT PERCENT, NI, 20 WT PERCENT, NR, 0.44 WT PERCENT) ARE DISCUSSED IN CONJUNCTION WITH PUBLISHED RESULTS OBTAINED BY ELECTRON MICROSCOPY AND ARE CONSIDERED CONSISTENT WITH THE HYPOTHESIS THAT THE PROPORTION OF SMALL DEFECTS IN THIS STEEL IS GREATEST WHEN IRRADIATION DOSE RATES ARE HIGH. IN TWO OTHER AUSTENITIC STEELS (CR, 18 WT PERCENT, NI, 37 WT PERCENT) AND (CR, 18 WT PERCENT, NI, 12 WT PERCENT) AND A FERRITIC STEEL (CR, 15 WT PERCENT, NI, 5 WT PERCENT), A MEASURABLE PROPORTION OF SMALL DEFECTS WAS PRESENT AFTER IRRADIATION AT A DOSE RATE INTERMEDIATE BETWEEN THE TWO USED FOR THE 20/20 AUSTENITE.

*ALLOY + *RADIATION DAMAGE + *STEEL + ELECTRON MICROSCOPY + RADIATION EFFECT + X-RAY

5-C9920 COWAN A

METALLURGICAL TESTING AT CULCHETH

UNITED KINGDOM ATOMIC ENERGY AUTHORITY, REACTOR MATERIALS LABORATORY, CULCHETH

4 PAGES, 3 FIGURES, ATOM(112), PAGES 33-36 (FEBRUARY, 1966)

A LARGE PROPORTION OF THE WORK AT THE REACTOR MATERIALS LABORATORY IS METALLURGICAL, AND EXTENSIVE FACILITIES HAVE BEEN DEVELOPED TO ALLOW FULL-SCALE INVESTIGATIONS OF THE BEHAVIOUR OF METALS RANGING IN SECTION FROM THIN FOIL TO THICK STEEL PLATES. IN ADDITION TO CONVENTIONAL TESTS, EQUIPMENT HAS BEEN DEvised TO GIVE BETTER SIMULATION OF ACTUAL SERVICE CONDITIONS, ESPECIALLY WHERE APPLICATION OF NORMAL TEST DATA IS INADEQUATE OR EVEN UNREALISTIC. IN SEVERAL CASES THIS INCLUDED TESTS ON EITHER THE FULL-SIZE COMPONENT OR LARGE SAMPLES, NECESSARY TO BE REASONABLY REPRESENTATIVE OF THE FINAL PRODUCT. CREEP TESTING. BRITTLE FRACTURE TESTS. TESTS ON MODEL VESSELS. POSTIRRADIATION TESTING FACILITIES. OTHER FACILITIES.

*EQUIPMENT DESIGN + *METAL + *TESTING + BRITTLE FRACTURE + CORROSION + CREEP PROPERTY + IMPACT PROPERTY + RADIATION EFFECT + TENSILE PROPERTY + TEST, PRESSURE VESSEL

5-09921 JABLONOWSKI EJ + RITZMAN RL + DEMASTRY JA

FISSION-FRAGMENT EFFECTS IN STRUCTURAL MATERIALS. QUARTERLY PROGRESS REPORT, JULY-SEPTEMBER 1965

BATTELLE MEMORIAL INSTITUTE

BMI-X-10146 + EURAEC-1527 +. 7 PAGES, OCTOBER 1, 1965, CFSTI, \$1.00 CY, \$0.50 MN

THE OBJECTIVE OF THIS PROGRAM IS TO DETERMINE THE TYPE AND MAGNITUDE OF MECHANICAL-PROPERTY CHANGES PRODUCED ANNEALED AISI TYPE 304 STAINLESS STEEL AND ANNEALED ZIRCALOY-2 BY FISSION-FRAGMENT IRRADIATIONS. TESTING OF TUBE-BURST AND BEND SPECIMENS OF RECOIL-IMPREGNATED ZIRCALOY-2 AND TYPE 304 STAINLESS STEEL WAS COMPLETED. NOMINAL INCREASES OF 8 TO 10 PERCENT IN AVERAGE PROPORTIONAL LIMIT AND YIELD-STRENGTH VALUES OF FISSION-FRAGMENT-DAMAGED OVER NEUTRON-DAMAGED MATERIALS WERE NOTED FROM BOTH THE BEND AND TUBE-BURST DATA. LIGHT AND ELECTRON METALLOGRAPHIC ANALYSES OF THE RECOIL-IMPREGNATED MATERIALS WERE COMPLETED. NO STRUCTURAL CHANGES WERE NOTED AS THE RESULT OF FISSION-FRAGMENT OR NEUTRON DAMAGE. FRACTURE ANALYSIS OF RUPTURES PRODUCED IN THE TUBE-BURST EXPERIMENTS INDICATED NO CHANGE IN FRACTURE MODE (DUCTILE) AS A RESULT OF FISSION-FRAGMENT IRRADIATION. THE MAXIMUM RADIATION-INDUCED TENSILE AND COMPRESSIVE STRESSES IN ZIRCALOY-2 AND TYPE 304 STAINLESS STEEL WERE CALCULATED ON THE BASIS OF EXPERIMENTALLY DETERMINED VALUES OF RADIATION EXPANSION COEFFICIENTS AND FISSION-FRAGMENT CONCENTRATIONS. ALTHOUGH CALCULATED TENSILE STRESSES WERE NOMINAL, COMPRESSIVE STRESSES OF 14,300 PSI (STAINLESS STEEL) AND 42,400 PSI (ZIRCALOY-2) WERE OBTAINED.

*RADIATION DAMAGE + *STEEL, STAINLESS + *TENSILE PROPERTY + ALLOY + ELECTRON MICROSCOPY + FAILURE, PIPE + TESTING + ZIRCONIUM

5-09926 STEELE LE

CATEGORY 5
ACCIDENT ANALYSIS

5-09926 *CONTINUED*
RADIATION EMBRITTLEMENT OF REACTOR PRESSURE VESSEL STEELS
U.S. NAVAL RESEARCH LABORATORY, WASHINGTON, D.C.
12 PAGES, 6 TABLES, 7 FIGURES, 8 REFERENCES, NUCLEAR ENGINEERING AND DESIGN, 3(2), PAGES 287-298 (1966)

THE PROBLEM OF RADIATION EMBRITTLEMENT OF REACTOR PRESSURE VESSEL STEELS IS CONSIDERED WITHIN THE FRAMEWORK OF NEW NAVAL RESEARCH LABORATORY CONCEPTS OF FRACTURE ANALYSIS AND IN REFERENCE TO THE PRIMARY VARIABLES, COMPOSITION OF THE STEEL, NEUTRON EXPOSURE, AND EXPOSURE TEMPERATURE. THIS PAPER SUMMARIZES THE STATUS OF THE NRL EMBRITTLEMENT STUDY, WITH EMPHASIS ON MAJOR FACTORS SUCH AS THE EFFECTS ON DIFFERENT STEELS AND THE EFFECTS OF NUCLEAR AND THERMAL ENVIRONMENT DURING IRRADIATION. IN ADDITION, POSTIRRADIATION HEAT TREATMENT TO RESTORE NOTCH DUCTILITY WAS INVESTIGATED OVER A RANGE OF IRRADIATION AND ANNEALING CONDITIONS. CURRENT AND PLANNED PROGRAMS ARE REVIEWED WITH REFERENCE TO SUMMARY OBSERVATIONS.

*BRITTLE FRACTURE + *EMBRITTLEMENT + *FAILURE, PRESSURE VESSEL + *IMPACT PROPERTY + *RADIATION DAMAGE + *RADIATION EFFECT + *STEEL + ALLOY + ANALYTICAL TECHNIQUE, CALIBRATION + CONTAINMENT, PRESSURE VESSEL + FLAW + IMPACT SHOCK + NDT DATA (NIL DUCTILITY TRANSITION) + REACTOR, PRESSURIZED WATER + STRESS + STRESS ANALYSIS + TENSILE PROPERTY + TEST, DESTRUCTIVE

5-09953 ERICKSON LE + FAN LT + FOX VG
HEAT AND MASS TRANSFER ON A MOVING CONTINUOUS FLAT PLATE WITH SUCTION OR INJECTION
KANSAS STATE UNIVERSITY
7 PAGES, 7 FIGURES, 1 TABLE, 10 REFERENCES, IND. AND ENG. CHEM., FUNDAMENTALS, 5(1), PAGES 19-25 (FEBRUARY, 1966)

THE LAMINAR BOUNDARY LAYER ON A MOVING, CONTINUOUS, FLAT SURFACE WITH SUCTION AND INJECTION IS INVESTIGATED FOR CASES WHERE THE NONZERO TRANSVERSE VELOCITY PROFILE AT THE SURFACE IS SUCH THAT SIMILAR SOLUTIONS MAY BE OBTAINED. UNDER THESE CONDITIONS, THE THERMAL AND CONCENTRATION BOUNDARY LAYERS ARE INVESTIGATED FOR THE CASE OF CONSTANT TEMPERATURE AND CONCENTRATION AT THE FLAT SURFACE. NUMERICAL SOLUTIONS OF THE BOUNDARY-LAYER MOMENTUM, ENERGY, AND DIFFUSION DIFFERENTIAL EQUATIONS ARE PRESENTED FOR A WIDE RANGE OF THE INJECTION PARAMETER, $F(0)$, AT PRANDTL AND SCHMIDT NUMBERS OF 1, 10, AND 100.

*BOUNDARY LAYER + *FLOW, LAMINAR + HEAT TRANSFER + HEAT TRANSFER ANALYSIS + MASS TRANSFER

5-09954 MILLER D
HIGHLIGHTS OF THE 8TH NATIONAL HEAT TRANSFER CONFERENCE
GENERAL NUCLEAR ENGINEERING CORPORATION
17 PAGES, 3 FIGURES, POWER REACTOR TECHNOLOGY, 8(4), PAGES 228-244 (FALL, 1965)

MANY PAPERS OF FUNDAMENTAL AND APPLIED INTEREST FOR REACTOR TECHNOLOGY WERE PRESENTED AND DISCUSSED AT THE 8TH NATIONAL HEAT TRANSFER CONFERENCE, LOS ANGELES, AUGUST 9-11, 1965. TOPICS DISCUSSED RANGED FROM APPLICATIONS SUCH AS HEAT EXCHANGERS, PACKED BEDS, DESALINIZATION, AND LOSS-OF-COOLANT ACCIDENTS IN REACTORS TO MORE FUNDAMENTAL STUDIES OF BOILING AND CONDENSATION, TWO-PHASE FLOW AND PRESSURE DROP, AND RADIATION AND THERMOPHYSICAL PROPERTIES.

*FLOW, TWO PHASE + *HEAT TRANSFER, BOILING + *POOL BOILING + CONDENSATION + FIN + FLOW, TUBE + FOG + HEAT EXCHANGER + HEAT TRANSFER + HEAT TRANSFER ANALYSIS + HEAT TRANSFER EXPERIMENT + LOSS OF COOLANT + METAL, LIQUID + THERMAL PROPERTY

5-09956 ROGERS JT
HEAT TRANSFER FAILURE MECHANISMS IN SIMULATED ORGANIC-COOLED FUEL BUNDLES
CANADIAN GENERAL ELECTRIC COMPANY, LTD.
86 PAGES, 88 FIGURES, TABLES, REFERENCES, MAY, 1965, DEP/MN

EXPERIMENTS IN TWO-ELEMENT TEST SECTIONS WITH HB-40 AND WITH SANTOWAX OM PLUS 30 PERCENT HIGH BOILERS SHOW THAT THE HEAT TRANSFER MECHANISM MAY BE EITHER TRUE, LOCALIZED, DNB OR COKE-OUT. THE COKE-OUT PHENOMENON IS EXPLAINED AND CONDITIONS FOR ITS OCCURRENCE ARE EXAMINED. THE ADEQUACY OF THE WR-1 FUEL DESIGN FAILURE CRITERION IS SHOWN.

*ORGANIC COOLANT + DNB (DEPARTURE FROM NUCLEATE BOILING) + FILM, GENERAL + HEAT TRANSFER + HEAT TRANSFER EXPERIMENT

5-09957 BERGLES AE + SUO M
INVESTIGATION OF BOILING WATER FLOW REGIMES AT HIGH PRESSURE. REPORT NO. 621
DYNATECH CORPORATION, CAMBRIDGE, MASS.
NYO-3304-8 +. 61 PAGES, REFERENCES, FEBRUARY 1, 1966, CFSTI, \$3.00 CY, \$0.75 MN

AN EXPERIMENTAL SYSTEM HAS BEEN DEVELOPED FOR THE STUDY OF BOILING FLOW REGIMES AT HIGH PRESSURE. FLOW REGIME INFORMATION WAS OBTAINED FOR BOILING WATER FLOWING VERTICALLY UPWARD IN CIRCULAR TUBES OF 0.4 IN. DIAMETER AND LENGTHS OF TWO TO EIGHT FEET. INLET CONDITIONS WERE SUBCOOLED, PRESSURES WERE 500 AND 1000 PSIA, AND MASS VELOCITIES RANGED FROM 0.4 X 10 TO THE 6 TO 4.0 X 10 TO THE 6 LBM/HR-FT SQUARED. UNIFORM HEAT FLUXES WERE OBTAINED BY DIRECT-CURRENT RESISTANCE HEATING. THE TRENDS IN THE DATA CAN BE QUALITATIVELY RELATED TO AGGLOMERATION LENGTH, NUCLEATE BOILING AGITATION, AND NONEQUILIBRIUM VOIDS.

*FLOW, TUBE + *HEAT TRANSFER, BOILING + FLOW THEORY AND EXPERIMENTS + FLOW, TWO PHASE + HEAT TRANSFER + HEAT TRANSFER CORRELATION + HEAT TRANSFER EXPERIMENT + PRESSURE, INTERNAL

CATEGORY 5
ACCIDENT ANALYSIS

5-09958 TURNER JM + WALLIS GB
TWO-PHASE FLOW AND BOILING HEAT TRANSFER. AN ANALYSIS OF THE LIQUID FILM IN ANNULAR FLOW. INTERIM REPORT
DARTMOUTH COLLEGE, THAYER SCHOOL OF ENGINEERING, HANOVER, NEW HAMPSHIRE
NYO-3114-13 + EURAEC-1572 +. 117 PAGES, FIGURES, TABLES, REFERENCES, DECEMBER, 1965, CFSTI, \$4.00 CY,
\$0.75 MN

AN ANALYSIS OF THE LIQUID FILM IN ANNULAR FLOW HAS BEEN CARRIED OUT FROM WHICH THE PRESSURE
DROP CAN BE PREDICTED EXPLICITLY IN TERMS OF THE VOID FRACTION, THE ENTRAINMENT, AND KNOWN
QUANTITIES SUCH AS THE FLOW RATES, FLUID PROPERTIES, AND PIPE DIAMETER. EQUATIONS SUMMARIZE
THE FINAL RESULTS. THE ANALYSIS IS BASED ON THE PRINCIPAL HYPOTHESIS THAT THE LIQUID FILM
BEHAVES AS THOUGH IT WERE PART OF A SINGLE-PHASE FLOW OF LIQUID FILLING THE WHOLE PIPE.

*FILM, GENERAL + *FLOW THEORY AND EXPERIMENTS + *FLOW, TWO PHASE + ANNULUS + FLOW, TUBE

5-09960 BROWN AR + THOMAS MA
COMBINED FREE AND FORCED CONVECTION HEAT TRANSFER FOR LAMINAR FLOW IN HORIZONTAL TUBES
ENGLISH ELECTRIC COMPANY, LTD., WHETSTONE
9 PAGES, 9 FIGURES, 1 TABLE, 7 REFERENCES, JOURNAL MECHANICAL ENGINEERING SCIENCE, 7(4), PAGES 440-448
(DECEMBER, 1965)

THIS PAPER DESCRIBES AN INVESTIGATION INTO COMBINED FREE AND FORCED CONVECTION HEAT TRANSFER
FOR LAMINAR WATER FLOW IN HORIZONTAL TUBES. THE EXPERIMENTAL DATA OBTAINED DO NOT AGREE WITH
EXISTING CORRELATIONS, WHICH RELATE MAINLY TO OILS. A NEW CORRELATION HAS BEEN DERIVED WHICH
FITS THE WATER DATA TO WITHIN PLUS OR MINUS 8 PERCENT.

*FLOW, LAMINAR + *FLOW, TUBE + *HEAT TRANSFER CORRELATION + HEAT TRANSFER + HEAT TRANSFER ANALYSIS +
HEAT TRANSFER EXPERIMENT + HEAT TRANSFER, CONVECTION

5-09961 BECK JV
TRANSIENT DETERMINATION OF THERMAL PROPERTIES
MICHIGAN STATE UNIVERSITY
9 PAGES, 5 FIGURES, 4 TABLES, 18 REFERENCES, NUCLEAR ENGINEERING AND DESIGN, 3(3) PAGES 373-381 (APRIL
1966)

A POWERFUL STATISTICAL PROCEDURE CALLED NONLINEAR ESTIMATION CAN BE USED TO SIMULTANEOUSLY
DETERMINE SEVERAL PROPERTIES APPEARING IN CERTAIN PARTIAL DIFFERENTIAL EQUATIONS IF
APPROPRIATE MEASUREMENTS ARE MADE. THESE PROPERTIES MIGHT INCLUDE A NUMBER OF THOSE OF
PARTICULAR INTEREST IN NUCLEAR ENGINEERING. THE METHOD IS ILLUSTRATED, HOWEVER, FOR
DETERMINING THERMAL CONDUCTIVITY AND SPECIFIC HEAT, GIVEN TRANSIENT TEMPERATURE MEASUREMENTS.
THE PROPERTIES ARE FOUND BY MAKING THE CALCULATED TEMPERATURES MATCH THE MEASURED
TEMPERATURES IN A LEAST-SQUARES SENSE. THE METHOD UTILIZES FINITE DIFFERENCES FOR THE
SOLUTION OF THE HEAT-CONDUCTION EQUATION AND FOR MINIMIZING A SUM-OF-SQUARES FUNCTION. THE
METHOD IS WELL-ADAPTED FOR USE WITH A DIGITAL COMPUTER. CERTAIN EXPERIMENTS ARE DISCUSSED
FOR WHICH THE THERMAL PROPERTIES CAN BE ACCURATELY DETERMINED. THE USE OF THE METHOD TO
CALCULATE THERMAL PROPERTIES FROM EXACT AND EXPERIMENTAL DATA IS DESCRIBED.

*TEMPERATURE TRANSIENT + *THERMAL PROPERTY + HEAT TRANSFER + HEAT TRANSFER ANALYSIS +
HEAT TRANSFER EXPERIMENT

5-09978 ORR WL + STERNBERG HI + DERAMAIX P + CHASTAIN RH + BINDLER L + IMPINK AJ
SAXTON PLUTONIUM PROGRAM. NUCLEAR DESIGN OF THE SAXTON PARTIAL PLUTONIUM CORE
WESTINGHOUSE ELECTRIC CORPORATION, PITTSBURGH, ATOMIC POWER DIV.
WCAP-3385-51 +. 350 PAGES (APPROX.), 108 FIGURES, 70 TABLES, DECEMBER 1965, CFSTI \$7.00 CY, \$1.75 MN.

REPORTS PARAMETER STUDIES ON PERFORMANCE IN SAXTON SPECIFIC-DESIGN CALCULATION TO SET
ENRICHMENT AND PERFORMANCE, AND CRITICALITY EXPERIMENTS TO CONFIRM DESIGN. PLUTONIUM
ELEMENTS ARE EXPECTED TO REACH 13,600 MW/D/METRIC TON (AV), WITHIN A LINEAR POWER LIMIT OF 16
KW/FT. NINE UO2-PUO2 ELEMENTS WERE SURROUNDED BY 12 UO2 ELEMENTS. INITIAL STUDIES SHOWED A
2.6 PERCENT DELTA K/K DISCREPANCY BETWEEN CALCULATION AND HANFORD EXPERIMENTS. ANALYSIS ALSO
UNDERESTIMATED ROD WORTH IN PLUTONIUM REGIONS. MORE-SEVERE LOCAL POWER PEAKING NEAR WATER
SLOTS OCCURRED IN PLUTONIUM REGIONS.

*COMPARISON, THEORY AND EXPERIENCE + *CRITICALITY EXPERIMENT + *FUEL ELEMENT + *HOT SPOT +
*PLUTONIUM OXIDE + *REACTIVITY EFFECT + *SAXTON + *URANIUM DIOXIDE

5-09999 MACBETH RV
BURN-OUT ANALYSIS. PART 5. EXAMINATION OF PUBLISHED WORLD DATA FOR ROD BUNDLES
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, WINFRITH
AEEW-R-358 +. 99 PAGES, JUNE, 1964, DEP/MN

BURN-OUT DATA AND DESCRIPTIVE DETAILS OF 24 DIFFERENT ROD-BUNDLE GEOMETRIES HAVE BEEN COMPILED
AND SUBJECTED TO ANALYSIS. THE MAJORITY ARE AT ABOUT 1,000 PSIA, AND THE CONCLUSIONS REACHED
REFER MAINLY TO THIS PRESSURE WITH FORCED CONVECTION AND WITH LIQUID WATER INLET. THE MOST
IMPORTANT CONCLUSION IS THAT DETAILS OF THE INTERNAL STRUCTURE OF A BUNDLE IN GENERAL HAVE NO
EFFECT ON BURN-OUT, AND THIS IS SUBSTANTIATED BY A WIDE VARIETY OF ROD SUPPORTS AND SPACERS
USED. THE ONLY IMPORTANT CROSS-SECTIONAL GEOMETRY PARAMETER HAS BEEN IDENTIFIED AS THE
HEATED EQUIVALENT DIAMETER (4 X FLOW AREA/HEATED PERIMETER).

*BURNOUT HEAT FLUX + DNB (DEPARTURE FROM NUCLEATE BOILING) + FUEL ELEMENT + HEAT TRANSFER +
HEAT TRANSFER ANALYSIS + HEAT TRANSFER CORRELATION

CATEGORY 5
ACCIDENT ANALYSIS

5-10120 SCHNEIDER GA + STOKER DJ
STEAM CYCLE INFLUENCE ON FAST BREEDER REACTOR DESIGN
ATOMICS INTERNATIONAL, CANOGA PARK
25 PAGES, 7 FIGURES, 7 TABLES, APRIL 1966, PRESENTED AT THE AMERICAN POWER CONFERENCE 28TH ANNUAL MEETING,
APRIL 26-28, 1966, CHICAGO, ILLINOIS

PROBLEM - DETERMINE EFFECT OF STEAM CYCLE ON FAST-BREEDER-REACTOR DESIGN USING SODIUM COOLANTS. SOLUTION - SODIUM FROM THE REACTOR EXCHANGES HEAT IN AN INTERMEDIATE HEAT EXCHANGER WITH A SECOND UN-RADIOACTIVE SODIUM STREAM. PARAMETERS STUDIED ARE - REACTOR SODIUM OUTLET TEMPERATURES, SECONDARY SODIUM HOT LEG TEMPERATURE, REACTOR (PRIMARY) SODIUM TEMPERATURE RISE, SECONDARY SODIUM TEMPERATURE RISE, MAIN/REHEAT TEMPERATURES. RESULTS - INCREASING STEAM PRESSURE REDUCES COST PER KW. ALLOWABLE COSTS OF STEAM GENERATOR INCREASE WITH STEAM MEASURE. REACTOR SODIUM TEMPERATURE RISE OPTIMIZES AT APPROXIMATELY 275-300 DEGREES F DEPENDING ON SECONDARY RADIUM TEMPERATURE RISE. CONCLUSIONS - 3500 PSIG OR 2400 PSIG STEAM PRESSURE IS NEAR OPTIMUM. WITHIN RANGE OF PRIMARY SODIUM OUTLET TEMPERATURE OF 1050 F TO 1200 F, STEAM TEMPERATURE OF 850 F TO 950 F APPEAR OPTIMUM. FUTURE REACTORS SHOULD BE DESIGNED FOR REACTOR SODIUM OUTPUT TEMPERATURE OF 1150 F TO 1200 F FROM STANDPOINT OF SYSTEM EQUIPMENT COST. RECOMMENDED PRIMARY SODIUM TEMPERATURE RISE IS 250-325 F. RECOMMENDED SECONDARY SODIUM TEMPERATURE RISE IS 300-375 F.

*SODIUM + *THERMODYNAMICS + ECONOMIC STUDY + HEAT TRANSFER + METAL, LIQUID + REACTOR COOLANT + STEAM

5-10121 FALCON JA + JACOBSON J
STEAM CYCLE CONSIDERATIONS FOR LARGE HEAVY WATER MODERATED, ORGANIC-COOLED REACTOR PLANTS
ATOMICS INTERNATIONAL
24 PAGES, 7 FIGURES, 3 TABLES, 8 REFERENCES, APRIL 1966, PRESENTED AT THE AMERICAN POWER CONFERENCE 28TH ANNUAL MEETING, APRIL 26-28, 1966, CHICAGO, ILLINOIS

THIS PAPER DELVES INTO ONE ASPECT OF A 1000-MWE DESIGN OF A HEAVY WATER MODERATED ORGANIC COOLED REACTOR PLANT, THE SELECTION OF STEAM CYCLE PARAMETERS. IN A SENSE, THIS MIGHT BE CONSIDERED THE FIRST IN A SERIES OF PROGRESS REPORTS ON THE DESIGN OF THE PLANT. AS SUCH, THE FINAL DESIGN MAY DIFFER FROM THE PARAMETERS NOTED HEREIN- THE CONSIDERATIONS INVOLVED, HOWEVER, AND THE TECHNIQUES USED WILL BE AS REVIEWED IN THIS PAPER.

*STEAM + *THERMODYNAMICS + ENERGY SOURCE + HEAT TRANSFER + REACTOR POWER

5-10272 BOLDMAN DR + SCHMIDT JF + FORTINI A
TURBULENCE, HEAT-TRANSFER, AND BOUNDARY LAYER MEASUREMENTS IN A CONICAL NOZZLE WITH A CONTROLLED INLET VELOCITY PROFILE
NASA, LEWIS RESEARCH CENTER, CLEVELAND
NASA-TN-D-3221 +. 26 PAGES, 13 FIGURES, 5 TABLES, REFERENCES, MARCH 1966, CFSTI \$0.40 CY

TURBULENCE, HEAT-TRANSFER, AND BOUNDARY-LAYER MEASUREMENTS WERE OBTAINED IN A CONICAL NOZZLE OPERATING IN AIR AT A NOMINAL TOTAL TEMPERATURE AND PRESSURE OF 960R AND 300 PSIA, RESPECTIVELY. EXPERIMENTAL HEAT-TRANSFER COEFFICIENTS WERE COMPARED TO VALUES DETERMINED BY THREE PREDICTION TECHNIQUES, NAMELY, (1) NUSSELT NUMBER CORRELATION, (2) A COMPRESSIBLE-BOUNDARY-LAYER THEORY, AND (3) AN INCOMPRESSIBLE-BOUNDARY-LAYER THEORY. METHODS (1) AND (2) YIELDED NOZZLE HEAT-TRANSFER COEFFICIENTS THAT WERE APPRECIABLY HIGHER THAN EXPERIMENTAL VALUES, HOWEVER, METHOD (3) PREDICTED THE NOZZLE HEAT-TRANSFER COEFFICIENTS VERY WELL, YIELDING RESULTS THAT WERE WITHIN ABOUT 2 PERCENT OF THE EXPERIMENTAL VALUES AT THE THROAT. IN PART OF THE INVESTIGATION, A SIMULATED NUCLEAR REACTOR-CORE TURBULENCE GENERATOR INSTALLED 3 INCHES UPSTREAM OF THE CYLINDRICAL INLET FAILED TO ALTER THE NOZZLE HEAT-TRANSFER COEFFICIENTS. IN ADDITION, THE TURBULENCE GENERATOR HAD ESSENTIALLY NO EFFECT ON THE BOUNDARY-LAYER TEMPERATURE PROFILES IN THE NOZZLE.

*BOUNDARY LAYER + *NOZZLE + *TURBULENCE, CONVECTIVE + HEAT TRANSFER + HEAT TRANSFER EXPERIMENT

5-10273 GRIMES JH + MORRIS JR
URANIUM CORROSION STUDIES. PART 2. THE RATE OF REACTION OF POLISHED URANIUM AND WATER VAPOUR AT VARIOUS TEMPERATURES
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, ALDERMASTON
AWRE-O-68/65 +. 22 PAGES, 10 FIGURES, 6 TABLES, REFERENCES, SEPTEMBER 1965, BIS \$0.65 CY

THE RATE OF REACTION OF URANIUM AND WATER VAPOUR WAS DETERMINED USING AN OPTICAL-INTERFEROMETRIC METHOD AT TEMPERATURES IN THE RANGE 30 TO 80C. AN ACTIVATION ENERGY OF 9 KCAL/G MOLE WAS DERIVED. COMPARISONS ARE MADE BETWEEN THE RATE OF CORROSION OF URANIUM FOUND BY THE MEASUREMENT OF OXIDE FILM GROWTH AND THAT FOUND BY OTHER METHODS.

*CHEMICAL KINETICS + *CHEMICAL REACTION + URANIUM + URANIUM DIOXIDE + WATER, GENERAL

5-10316 MULVIHILL RJ
A PROBABILISTIC METHODOLOGY FOR THE SAFETY ANALYSIS OF NUCLEAR POWER REACTORS, VOLUME 1 AND 2
PLANNING RESEARCH CORPORATION, LOS ANGELES, CALIFORNIA
SAN-570-2 + PRC-R-657 +. 430 PAGES, FEB. 1966 CFSTI \$7.30 CY, \$2.00 MN

THE PRC METHODOLOGY SUPERIMPOSES PROBABILITIES ON A DETERMINISTIC ANALYSIS WHICH INCLUDES THE BEST AVAILABLE ANALYTICAL MODELS FOR THE SEVERAL STAGES INVOLVED IN AN ACCIDENT SEQUENCE (E.G., REACTOR KINETICS, HEAT TRANSFER, FISSION PRODUCT TRANSPORT WITHIN THE CONTAINMENT, ATMOSPHERIC TRANSPORT OUTSIDE THE CONTAINMENT). IT IS ALSO ESSENTIAL TO UNDERSTAND THE LIMITATIONS OF THE PRC METHODOLOGY. WHEN FULLY IMPLEMENTED, THIS PROCEDURE WOULD THEORETICALLY YIELD A PROBABILITY VALUE FOR EACH CONCEIVABLE ACCIDENT INVOLVING THE RELEASE OF FISSION PRODUCTS, WITH THE SPECTRUM OF POTENTIAL DAMAGE FROM EACH ACCIDENT DISPLAYED IN

CATEGORY 5
ACCIDENT ANALYSIS

5-10316 *CONTINUED*

ASSOCIATION WITH THE APPROPRIATE PROBABILITY FOR EACH GIVEN LEVEL OF DAMAGE.

*ACCIDENT ANALYSIS + *MATHEMATICAL STUDY + *STATISTICAL CORRELATION + ANALYTICAL MODEL +
ATMOSPHERIC POLLUTION + COMPUTER PROGRAM + FISSION PRODUCT TRANSPORT + HEAT TRANSFER + REACTOR KINETICS

5-10428 KATTCHIE N + REYNOLDS WC

ARMY GAS-COOLED REACTOR SYSTEMS PROGRAM. HECTIC-II--AN IBM 7090 FORTRAN COMPUTER PROGRAM FOR HEAT
TRANSFER ANALYSIS OF GAS OR LIQUID COOLED REACTOR PASSAGES.

AEROJET-GENERAL NUCLEONICS

IDO-28595 (REV.) +. 79 PAGES, 7 FIGURES, 6 REFERENCES, DECEMBER 1965, CFSTI, \$2.00 CY, \$0.75 MN

HECTIC-II IS AN IBM 7090 FORTRAN COMPUTER PROGRAM FOR CALCULATING PRESSURE DROP, FLOW RATES,
HEAT TRANSFER RATES, AND TEMPERATURE IN HEAT EXCHANGERS SUCH AS FUEL ELEMENTS OF TYPICAL GAS-
OR LIQUID-COOLED NUCLEAR REACTORS. THE PROGRAM IS UNIQUE AND EXTREMELY VERSATILE IN THAT THE
EFFECTS OF TURBULENT MOMENTUM AND HEAT INTERCHANGE BETWEEN FLOW PASSAGES ARE CONSIDERED. THE
COMPUTATION AMOUNTS TO A NODAL OR LUMPED-PARAMETER TYPE OF CALCULATION. THE AXIAL MESH SIZE
IS AUTOMATICALLY SELECTED TO ENSURE THAT A PRESCRIBED ACCURACY OF RESULTS IS OBTAINED.
HECTIC-II SUPERSEDES HECTIC. THE WORK ON HECTIC-II WAS CARRIED OUT UNDER U. S. AEC CONTRACT
AT(10-1)-880.

*COMPUTER, DIGITAL + *HEAT TRANSFER ANALYSIS + *HYDRODYNAMIC ANALYSIS + FUEL ELEMENT + HEAT EXCHANGER +
HEAT TRANSFER + WATER, GENERAL

5-10430 ARGONNE NATIONAL LABORATORY PUBLICATIONS, JULY 1, 1964 - JUNE 30, 1965

ARGONNE NATIONAL LABORATORY, ARGONNE, ILLINOIS

ANL-7087 +. 328 PAGES, AUGUST 1965 CFSTI, \$7.00 CY, \$1.50 MN

THIS PUBLICATION LIST IS A BIBLIOGRAPHY OF SCIENTIFIC AND TECHNICAL ACCOUNTS ORIGINATED AT
ARGONNE AND PUBLISHED DURING FISCAL YEAR 1965. IT INCLUDES ITEMS PUBLISHED AS JOURNAL
ARTICLES, TECHNICAL REPORTS, BOOKS, ETC., ALL OF WHICH HAVE BEEN MADE AVAILABLE TO THE
PUBLIC. THE LIST IS DIVIDED INTO THREE PARTS - THE FIRST A LIST DIVISION, THE SECOND AN
ALPHABETICAL AUTHOR INDEX, AND THE THIRD PART A KWIC SUBJECT INDEX. INCLUDED ARE SECTIONS ON
RADIOLOGICAL PHYSICS, REACTOR PHYSICS, REACTOR ENGINEERING, INDUSTRIAL HYGIENE AND SAFETY,
FIRE PROTECTION, AND CHEMICAL ENGINEERING.

*BIBLIOGRAPHY + *BURNOUT HEAT FLUX + *CHEMICAL REACTION + *DOSE MEASUREMENT, EXTERNAL + *HEAT TRANSFER +
*REACTOR DYNAMICS + *REACTOR STABILITY + ACCIDENT ANALYSIS +
FARET (FAST ARGONNE REACTOR EXPERIMENT TEST) + METAL WATER REACTION + NOISE + REACTIVITY COEFFICIENT +
REACTOR KINETICS + REACTOR TRANSIENT + REACTOR, BREEDER + REACTOR, FAST + REACTOR, LIQUID METAL COOLED +
SPACE DEPENDENT DYNAMICS + VOID COEFFICIENT

5-10475 COATES RL + HORTON NR

RSAC--A RADIOLOGICAL SAFETY ANALYSIS COMPUTER PROGRAM

PHILLIPS PETROLEUM COMPANY, IDAHO

IDO-17151 +. 208 PAGES, 3 TABLES, 7 REFERENCES, MAY 1966, CFSTI, \$6.00 CY, \$1.25 MN

AN IBM 7040 PROGRAM WHICH COMPUTES THE POTENTIAL RADIOLOGICAL DOSES RESULTING FROM A
CONTINUOUS OR INSTANTANEOUS RELEASE OF FISSION PRODUCTS TO THE ATMOSPHERE. DEVELOPED AS PART
OF LOFT AND GENERAL NUCLEAR SAFETY PROGRAMS TO PROVIDE A GENERALIZED COMPUTER PROGRAM FOR A
COMPLETE PARAMETRIC INVESTIGATION OF RADIOLOGICAL HAZARDS. DOSES CONSIDERED ARE CLOUD GAMMA,
DEPOSITION GAMMA, INGESTION, AND INHALATION, AND ARE BASED UPON THE RELEASE OF UP TO 200
ISOTOPES, THE RELATIVE ABUNDANCE OF EACH ISOTOPE BEING DEPENDENT UPON THE OPERATING HISTORY
OF THE NUCLEAR REACTOR UNDER CONSIDERATION. INCLUDED ARE THE MATHEMATICAL MODELS, CONVERSION
FACTORS, ASSUMPTIONS, FLOW CHARTS, PROGRAM LISTINGS, AND OTHER DATA PERTINENT TO THE OVERALL
DEVELOPMENT OF THIS PROGRAM.

*COMPUTER PROGRAM + *DOSE CALCULATION, EXTERNAL + *DOSE CALCULATION, INTERNAL +
*FISSION PRODUCT RELEASE, GENERAL + SUTTON DIFFUSION FORMULA

5-10487 VAN DYKE M

THE BLUNT-BODY PROBLEM REVISITED

STANFORD UNIVERSITY

18 PAGES, 13 FIGURES, 25 REFERENCES, PP 52-59 OF FUNDAMENTAL PHENOMENA IN HYPERSONIC FLOW, J. GORDON HALL,
EDITOR, PROCEEDINGS OF THE INTERNATIONAL SYMPOSIUM SPONSORED BY CORNELL AERONAUTICAL LABORATORY, CORNELL
UNIVERSITY PRESS, 1966

WE SUGGEST THAT UNDUE RELIANCE HAS BEEN PLACED UPON MACHINE COMPUTATION IN SOLVING THE PROBLEM
OF SUPERSONIC FLOW PAST A BLUNT BODY, AND THAT ANALYTIC AND SEMI-ANALYTIC METHODS SHOULD BE
RE-EXAMINED IN AN EFFORT TO IMPROVE THE POOR CONVERGENCE THAT LED TO THEIR REJECTION. FOUR
METHODS ARE DISCUSSED - TAYLOR-SERIES EXPANSION FROM THE SHOCK WAVE, THE NEWTON-BUSEMANN
EXPANSION, EXPANSION IN POWERS OF TIME FOR AN IMPULSIVE START FROM REST, AND A TRUNCATED
SERIES EXPANSION FROM THE AXIS. IN EACH CASE, A TRANSFORMATION IS PROPOSED THAT
SIGNIFICANTLY IMPROVES THE CONVERGENCE, JUDGED BY COMPARISON WITH ACCURATE NUMERICAL
SOLUTIONS FOR THE TEST PROBLEM OF A PARABOLOIDAL SHOCK WAVE AT M EQUALS INFINITY AND GAMMA
EQUALS 7/5. WE CONCLUDE THAT THE IMPROVED TRUNCATION METHOD SHOWS THE GREATEST PROMISE FOR
EXTENSION TO SUCH NEW PROBLEMS AS THE BLUNT BODY AT ANGLE OF ATTACK.

*FLOW, HIGH SPEED + *HEAT TRANSFER + *HYDRODYNAMIC ANALYSIS + MATHEMATICAL STUDY + SHOCK WAVE

CATEGORY 5
ACCIDENT ANALYSIS

5-10532 JUDD AM
LOSS-OF-COOLANT ACCIDENTS IN A LARGE SODIUM-COOLED FAST REACTOR
U.K. ATOMIC ENERGY AUTHORITY, WINFRITH
ANL-7120 +. 15 PAGES, 11 FIGURES, 2 TABLES, 8 REFERENCES, PP. 67-81 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI \$9.25 CY

BASICALLY, THE APPROACH USED HERE IS TO CONSIDER A SERIES OF FAULT CONDITIONS WHICH MIGHT ARISE IN A TYPICAL OXIDE-FUELLED, SODIUM-COOLED FAST REACTOR. THE ACCIDENTS RESULTING FROM THESE FAULTS ARE THEN ANALYSED STEP-BY-STEP, USUALLY UNDER SOME PESSIMISTIC ASSUMPTIONS, SUCH AS THE FAILURE OF ONE OR MORE REACTOR TRIP CIRCUITS. THERE ARE, HOWEVER, SOME MECHANISMS WHICH ARE IMPORTANT FOR SEVERAL OF THE ACCIDENTS AND REQUIRE DETAILED CONSIDERATION, SUCH AS COOLANT AND FUEL REACTIVITY WORTH, THE BEHAVIOUR OF THE COOLANT AS IT BOILS, AND PARTICULARLY THE EFFECTS OF NUCLEATE BOILING, THE RELEASE OF FISSION-PRODUCT GAS FROM A BURST FUEL CAN. AS A RESULT OF THESE ANALYSES, CERTAIN PROBLEMS STAND OUT AS BEING PARTICULARLY IMPORTANT FOR THE SAFETY OF THE REACTOR, INCLUDING THE POSSIBILITY OF A SINGLE SUBASSEMBLY ACCIDENT SPREADING TO THE WHOLE CORE AND THE TIME FOR AVAILABLE FOR A TRIP MECHANISM TO OPERATE.

*ACCIDENT, MAXIMUM CREDIBLE (MCA) + *LOSS OF COOLANT + *REACTOR, FAST + FUEL ELEMENT + HEAT TRANSFER + METAL, LIQUID + RADIUM + REACTOR KINETICS + TEMPERATURE TRANSIENT + URANIUM DIOXIDE

5-10547 SANATHANAN CK + CARTER JC + BRITTAN RO
TRANSIENT TEMPERATURE DISTRIBUTIONS IN FAST REACTOR FUELS WITH WIDELY VARYING THERMAL DIFFUSIVITY
ARGONNE NATIONAL LABORATORY, ARGONNE
ANL-7120 +. 8 PAGES, 9 FIGURES, 29 REFERENCES, PP. 478-485 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

THE LIMITATIONS ON THE THERMAL PERFORMANCE OF REACTOR FUELS, STATICALLY AND DYNAMICALLY, ARE GOVERNED BY THE THERMAL DIFFUSIVITY OF THE FUEL MATERIAL. ESTIMATES OF THE PEAK CENTRAL TEMPERATURES ARE NECESSARY TO DETERMINE LIMITING POWER DENSITIES FOR NORMAL OPERATION AND OF PHYSICAL BEHAVIOR IN ABNORMAL CIRCUMSTANCES. ALSO, COMPLETE TEMPERATURE DISTRIBUTIONS ARE NECESSARY TO DETERMINE COUPLING BETWEEN HEAT GENERATION AND COOLING, STATICALLY AND DYNAMICALLY. IT HAS BEEN POSSIBLE TO MEET THIS PROBLEM IN THE PAST BECAUSE FUEL MATERIALS HAVE HAD HIGH THERMAL CONDUCTIVITY AND BECAUSE FUELS HAVE HAD OPERATING TEMPERATURES LIMITED BY LOW MELTING POINTS. NOW, UO₂ FUELS HAVE BEEN PROPOSED FOR LARGE FAST REACTORS. IN CALCULATING TEMPERATURE DISTRIBUTIONS FOR THESE FUELS, LARGE ERRORS WILL ENSUE IF SIMPLIFIED METHODS ARE EMPLOYED. BECAUSE OF THESE DESIGN AND TEST REQUIREMENTS, A STUDY HAS BEEN MADE IN WHICH NEW CALCULATIONAL METHODS FOR DETERMINING TRANSIENT TEMPERATURE DISTRIBUTIONS IN UO₂ FUEL ELEMENTS HAVE BEEN DEvised, AND DETERMINATION OF TRANSIENT TEMPERATURE AND HEAT FLOW BEHAVIOR UNDERTAKEN.

*FUEL ELEMENT + *HEAT TRANSFER ANALYSIS + *TEMPERATURE TRANSIENT + HEAT TRANSFER + REACTOR, FAST + THERMAL PROPERTY

5-10548 GODTS JE + RESTELLI EF
TRANSIENT TEMPERATURE DISTRIBUTION IN FUEL ELEMENTS
WESTINGHOUSE ELECTRIC CORPORATION, PITTSBURGH
ANL-7120 +. 8 PAGES, 10 FIGURES, 9 REFERENCES, PP. 486-493 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI \$9.25 CY

ALTERNATIVES TO THE NODAL APPROACH IN EVALUATING TEMPERATURE TRANSIENTS INVOLVE FINDING TRANSFORM SOLUTIONS, IN WHICH SPATIAL MODES DESCRIBE THE SPATIAL DEPENDENCY OF THE SOLUTION. AN ADVANTAGE OF THE TRANSFORM-SOLUTION METHOD IS THAT THE TEMPERATURE AND ITS DERIVATIVE MAY BE GIVEN DIRECTLY AT ANY POINT ON THE PROFILE. IN FAST REACTORS ESPECIALLY DUE TO THE HIGH POWER DENSITIES, FUEL AND CLAD MOTION (BY THERMAL EXPANSION) EXERT A DETERMINING EFFECT ON STABILITY AND CONTROL AND THUS HAVE A STRONG BEARING ON POWER DISTRIBUTION.

*FUEL ELEMENT + *HEAT TRANSFER + *REACTOR, FAST + *TEMPERATURE TRANSIENT + HEAT TRANSFER ANALYSIS + MATHEMATICAL STUDY

5-10549 PETERSON RE + GOLDSMITH S
FAST REACTOR SAFETY CONSIDERATIONS RELATED TO FUEL MACROSTRUCTURE
BATTELLE MEMORIAL INSTITUTE, RICHLAND
ANL-7120 +. 7 PAGES, 5 FIGURES, 3 TABLES, 11 REFERENCES, PP. 497-503 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

THE TRANSIENT RESPONSE OF THE FUEL TO A VERY FAST BURST, WHETHER IT BE ENTIRELY THERMAL OR THERMOELASTIC, DEPENDS UPON SUCH MACROSCOPIC PROPERTIES AS DENSITY, HOMOGENEITY, THERMAL CONDUCTIVITY, SPECIFIC HEAT, AND ELASTIC MODULUS. INVESTIGATIONS WERE MADE TO ASSESS THE IMPORTANCE OF HOMOGENEITY TO PROMPT DOPPLER FEEDBACK IN MIXED OXIDE FUELS. HOWEVER, NO EVALUATIONS OF THIS KIND HAVE BEEN PUBLISHED FOR OTHER CERAMIC FUELS OR FOR CERMETS. FURTHER, IT IS OF INTEREST TO INVESTIGATE THE IMPORTANCE OF OTHER MACROSCOPIC FUEL PROPERTIES TO INHERENT SAFETY AS WELL. THIS PAPER SUMMARIZES RECENT WORK RELATING THESE PROPERTIES TO FAST REACTOR SAFETY WHEN THE REACTOR UNDERGOES A PROMPT BURST ACCIDENT.

*FUEL ELEMENT + *HEAT TRANSFER + *REACTOR, FAST + REACTOR KINETICS + TEMPERATURE TRANSIENT + THERMAL PROPERTY

5-10550 STACHURA SJ + SILBERBERG M
THE APPLICATION OF EXPERIMENTAL DATA FROM TREAT MELTDOWN STUDIES TO REACTOR ACCIDENT ANALYSIS
ATOMICS INTERNATIONAL, CANOGA PARK
ANL-7120 +. 10 PAGES, 7 FIGURES, 2 TABLES, 3 REFERENCES, PP. 514-523 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

CATEGORY 5
ACCIDENT ANALYSIS

5-10550 *CONTINUED*

RESULTS OF RECENT TREAT MELTDOWN STUDIES OF CERAMIC FUEL IN SODIUM ARE PRESENTED, AND THE SIGNIFICANCE OF THESE RESULTS WITH RESPECT TO LARGE CORE MELTDOWN IS INDICATED. THE COURSE OF FUEL MOTION IN A LARGE CORE WAS ESTIMATED FOR A SIMPLIFIED CASE, AND THE ASSOCIATED REACTIVITY EFFECTS WERE DETERMINED. THESE REACTIVITY EFFECTS WERE THEN INCORPORATED INTO THE AIRES REACTOR KINETICS CODE TO ESTIMATE CORE BEHAVIOR AFTER GROSS FUEL MELTING IN CENTRAL REGIONS OF THE CORE. A DISCUSSION OF THOSE FACTORS WHICH CAN INFLUENCE MELTDOWN BEHAVIOR WAS PRESENTED.

*ACCIDENT, GENERAL + *CORE MELTDOWN + *FUEL MELTDOWN + *REACTOR, FAST +
*TREAT (TRANSIENT TEST REACTOR FACILITY) + FUEL ELEMENT + HEAT TRANSFER

5-10551 DICKERMAN CE + ROBINSON LE + WILLIS FL + STEPHANY W + AUGUST C

STATUS OF RECENT MELTDOWN STUDIES
ARGONNE NATIONAL LABORATORY, ARGONNE

ANL-7120 + 6 PAGES, 8 FIGURES, 12 REFERENCES, PP. 534-539 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

ANALYSIS OF THE CONSEQUENCES OF A MELTDOWN-TYPE INCIDENT IN A FAST REACTOR REQUIRES KNOWLEDGE OF THE PHENOMENA GOVERNING THE MOVEMENT OF CORE MATERIALS--COOLANT, AS WELL AS FUEL AND STRUCTURE--RESULTING FROM ABNORMAL OPERATING CONDITIONS. INFORMATION NEEDED INCLUDES MODES OF FUEL FAILURE AND THE CONDITIONS WHICH PRODUCE THE VARIOUS TYPES OF FAILURE, TYPES AND VELOCITIES OF FUEL MOVEMENT, AND COOLANT EFFECTS. PRE-FAILURE MOVEMENTS OF COOLANT OR FUEL MAY ALSO BE INVOLVED. EVEN IN THE CASE OF THE MOST WIDELY STUDIED SYSTEM, EBR-II, MELTDOWN-RELATED DATA ARE INCOMPLETE. THIS PAPER REVIEWS THE CURRENT STATUS OF MELTDOWN STUDIES, EMPHASIZING RECENT WORK. RESTRICTED TO THE ARGONNE NATIONAL LABORATORY PROGRAM.

*CORE MELTDOWN + *FUEL ELEMENT + *FUEL MELTDOWN + *REACTOR, FAST + HEAT TRANSFER

5-10553 MILLER D

A CRITICAL REVIEW OF THE PROPERTIES OF MATERIALS AT THE HIGH TEMPERATURES AND PRESSURES SIGNIFICANT FOR FAST REACTOR SAFETY

ARGONNE NATIONAL LABORATORY, ARGONNE

ANL-7120 + 13 PAGES, 17 FIGURES, 5 TABLES, PP. 641-653 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

THE EQUATION OF STATE PLAYS AN IMPORTANT ROLE IN CALCULATIONS OF THE COURSE OF A HYPOTHETICAL FAST-REACTOR EXCURSION, FOR IT SERVES AS THE LINK BETWEEN THE NEUTRONIC REACTIONS AND THE DYNAMIC BEHAVIOR OF A CORE WHICH LEADS TO ULTIMATE SHUTDOWN. DETERMINATION OF THE ENERGY APPEARING AS KINETIC ENERGY PROVIDES INSIGHT INTO THE POTENTIAL DAMAGE THAT MIGHT RESULT FROM SUCH AN EXCURSION. THE PRINCIPAL RELATIONS NECESSARY FOR SUCH CALCULATIONS ARE THE PRESSURE AS A FUNCTION OF ENERGY AND VOLUME FOR HYDRODYNAMICS CALCULATIONS, WHICH GIVE THE TIME VARIATION OF GEOMETRY (INCLUDING PURELY ELASTIC DEFORMATIONS SUCH AS THERMAL EXPANSION), AND THE TEMPERATURE AS A FUNCTION OF ENERGY AND VOLUME, TO GIVE THE PROPER TEMPERATURE DEPENDENCE OF NUCLEAR CROSS SECTIONS (WITH SPECIAL EMPHASIS ON THE DOPPLER COEFFICIENT). SEVERAL TECHNIQUES FOR DETERMINING THESE RELATIONS HAVE BEEN USED AND WILL BE CRITICALLY REVIEWED AND COMPARED. IN ADDITION, SOME FUTURE DIRECTIONS WILL BE INDICATED.

*EQUATION OF STATE + *REACTOR, FAST + *SAFETY PRINCIPLES AND PHILOSOPHY + *THERMODYNAMICS +
CHEMICAL KINETICS + OXIDE + REACTOR KINETICS + URANIUM + VAPOR, VAPOR PRESSURE

5-10554 HICKS EP + MENZIES DC

THEORETICAL STUDIES ON THE FAST REACTOR MAXIMUM ACCIDENT
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, DOUNREAY

ANL-7120 + 17 PAGES, 8 FIGURES, 2 TABLES, 12 REFERENCES, PP. 654-670 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

THREE MAIN PROBLEMS ARE DISCUSSED. THE FIRST IS THE CALCULATION OF THE TOTAL AMOUNT OF ENERGY GENERATED IN THE ASSUMED HYPOTHETICAL EXCURSION, AND THE LESSER AMOUNT AVAILABLE TO DO MECHANICAL WORK ON THE REACTOR STRUCTURE. THE SECOND IS A SEMI-QUANTITATIVE DISCUSSION OF A MECHANISM INVOLVING SODIUM BOILING, WHICH COULD INCREASE THE AMOUNT OF ENERGY AVAILABLE TO DO WORK. THE THIRD IS A MAINLY QUALITATIVE COMPARISON OF THE IMMEDIATE MECHANICAL EFFECTS OF THE NUCLEAR EXCURSION AND OF AN EQUIVALENT CHEMICAL EXPLOSION, TOGETHER WITH SOME BRIEF COMMENTS ON LONGER-TERM MECHANICAL EFFECTS.

*ACCIDENT ANALYSIS + *ACCIDENT, GENERAL + *ACCIDENT, MAXIMUM CREDIBLE (MCA) + *REACTOR, FAST +
HEAT TRANSFER ANALYSIS + TEMPERATURE TRANSIENT

5-10555 JANKUS VZ

A MODIFIED EQUATION OF STATE FOR HYDRODYNAMIC CALCULATION IN AXI NUMERICAL PROGRAM
ARGONNE NATIONAL LABORATORY, ARGONNE

ANL-7120 + 6 PAGES, 4 REFERENCES, PP. 686-691 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

AN INVESTIGATION OF A HYPOTHETICAL EXCURSION IN A FAST REACTOR IS CONCERNED NOT ONLY WITH THE TOTAL ENERGY YIELD BUT ALSO WITH THE FRACTION OF IT AVAILABLE FOR THE DAMAGE OF REACTOR CONTAINMENT STRUCTURE. THIS FRACTION DECREASES QUITE RAPIDLY WITH DECREASING ENERGY YIELD AND USUALLY IS BETWEEN ONE AND TEN PERCENT FOR THE ACCIDENTS PRESENTLY CONSIDERED. EVEN REMOTELY POSSIBLE WORK AVAILABLE ADIABATICALLY AND EVENTUAL KINETIC ENERGY YIELD IN AN UNCONTAINED REACTOR ARE OFTEN CONSIDERED TO BE PESSIMISTIC OR OPTIMISTIC ESTIMATES OF DESTRUCTIVE EFFECTIVENESS OF AN EXCURSION. BOTH ESTIMATES DEPEND STRONGLY UPON THE BEHAVIOR OF THE EQUATION OF STATE AT LARGE VOLUMES. FROM THIS POINT OF VIEW, THE EQUATION OF STATE

CATEGORY 5
ACCIDENT ANALYSIS

5-10555 *CONTINUED*

PRESENTLY USED IN AXI PROGRAM WAS EXAMINED. FOR LARGE PRESSURES, THE EQUATION OF STATE IS ASSUMED TO BE IN GENERALIZED BETHE-TAIT FORM. FOR LOWER PRESSURES, UTILIZATION OF EQUATION OF STATE FOR SATURATED VAPOR SEEMS NECESSARY.

*ACCIDENT, GENERAL + *HEAT TRANSFER + *HYDRODYNAMIC ANALYSIS + ACCIDENT, MAXIMUM CREDIBLE (MCA) + TEMPERATURE TRANSIENT

5-10556 DALLE-DONNE M
COMPARISON OF HE, CO₂, AND STEAM AS COOLANTS OF A 1000-MWE FAST REACTOR
KERNFORSCHUNGSZENTRUM KARLSRUHE, GERMANY
ANL-7120 +. 18 PAGES, 13 FIGURES, 4 TABLES, 25 REFERENCES, PP. 797-814 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

THE SAFETY PROBLEMS ARISING BECAUSE OF THE SODIUM-VOID COEFFICIENT IN BIG FAST-REACTOR CORES MAKE THE POSSIBILITY OF USING A MUCH LESS DENSE COOLANT, SUCH AS A GAS, VERY INTERESTING. THE RECENT DISCOVERY OF THE EXPLOSIVE CHARACTER OF SODIUM BOILING ALSO MAKES THESE PROBLEMS EVEN MORE SERIOUS. IN THIS PAPER, THE PERFORMANCES OF THREE FLUIDS - HELIUM, CARBON DIOXIDE, AND STEAM, AS COOLANT OF A BIG FAST-REACTOR CORE ARE COMPARED.

*CARBON DIOXIDE + *HEAT TRANSFER + *HELIUM + *REACTOR COOLANT + *REACTOR, FAST + *STEAM + HEAT TRANSFER CORRELATION

5-10560 FISCHER M + HAFELE W
SHOCK FRONT CONDITIONS IN TWO-PHASE FLOW INCLUDING THE CASE OF DESUPERHEAT
KERNFORSCHUNGSZENTRUM KARLSRUHE, GERMANY
ANL-7120 +. 13 PAGES, 4 FIGURES, 10 REFERENCES, PP. 895-907 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

THE INVESTIGATION OF THE SAFETY OF LARGE, FAST, SODIUM-COOLED REACTORS LEADS TO THE PROBLEM OF COOLANT BEHAVIOUR IN THE COOLING CHANNELS DURING A POWER EXCURSION, PRIMARILY A HYDRODYNAMIC PROBLEM, BUT LINKED TO THE NEUTRON BEHAVIOUR OF THE CORE VIA THE COOLANT-VOID EFFECT. THE TIME CHARACTERISTIC FOR THE EXPULSION OF COOLANT TOGETHER WITH THE REACTIVITY VALUE OF VOIDING THE COOLANT CHANNELS RESULT IN A RAMP RATE OF A POSITIVE REACTIVITY INSERTION. THE REACTIVITY VALUE OF VOIDING THE COOLANT CHANNELS WAS CALCULATED IN A RECENT STUDY. THE FIRST VALUE CALCULATED WAS \$3.00. MORE RECENT RESULTS INDICATE NEARLY \$7.00. BUT THE DURATION OF THE EXPULSION OF THE COOLANT IS PROBABLY EVEN MORE UNCERTAIN. ITS CALCULATION IS A PROBLEM OF TWO-PHASE SODIUM HYDRODYNAMICS. ATTACKING THIS PROBLEM, ONE REALIZES SOON THE CRUCIAL IMPORTANCE OF SHOCK-FRONT PHENOMENA, AND THE EFFECT OF THE VELOCITY OF SOUND. THEREFORE, BOTH THE INVESTIGATION OF THE SHOCK-FRONT CONDITIONS AND THE VELOCITY OF SOUND ARE NECESSARY AS FIRST STEPS FOR A MORE COMPLETE THEORETICAL ANALYSIS OF THE WHOLE PROCESS OF THE EXPULSION OF THE COOLANT.

*FLOW, TWO PHASE + *RADIUM + *REACTOR, FAST + *SHOCK WAVE + HEAT TRANSFER + HYDRODYNAMIC ANALYSIS + METAL, LIQUID

5-10573 WILLIS DR + TAUB P
AERODYNAMIC DRAG AND HEAT TRANSFER FOR FLOW PAST TWO-DIMENSIONAL BODIES AT HIGH KNUDSEN NUMBERS
AEROSPACE RESEARCH LABORATORIES, PRINCETON UNIVERSITY
ARL-66-0007 +. 37 PAGES, 6 FIGURES, 2 TABLES, 12 REFERENCES, JANUARY 1966, DOD

USING THE INTEGRAL ITERATION METHOD, THEORETICAL RESULTS ARE OBTAINED FOR AERODYNAMIC DRAG AND HEAT TRANSFER IN THE NEARLY FREE-MOLECULAR REGIME. THE CONFIGURATIONS CONSIDERED ARE - CIRCULAR CYLINDERS, INCLINED FLAT PLATES, AND WEDGES, ALL TWO-DIMENSIONAL. PERTURBATION TO THE FREE-MOLECULAR RESULTS ARE OBTAINED CORRECT TO ORDER (1/KN) IN KN ONLY (KN IS THE KNUDSEN NUMBER). THE FREE-STREAM SPEED RATIO IS GREATER THAN TWO, AND THE BODY TEMPERATURES RANGE FROM FREE-STREAM TO RECOVERY. THE RESULTS ARE SIMILAR TO THOSE OBTAINED PREVIOUSLY FOR A NORMAL FLAT STRIP, EXCEPT THAT FOR SMALL-ANGLE WEDGES AND FLAT STRIPS AT SMALL ANGLES OF ATTACK, THE DRAG COEFFICIENT IS PREDICTED TO EXCEED THE FREE-MOLECULAR VALUE.

*FLOW, KNUDSEN + *HEAT TRANSFER ANALYSIS + *HYDRODYNAMIC ANALYSIS + FLOW THEORY AND EXPERIMENTS + HEAT TRANSFER

5-10574 LEITZ FJ + IMHOFF DH + MCEWEN LH
TECHNOLOGICAL DEVELOPMENTS OF NUCLEAR SUPERHEAT
GENERAL ELECTRIC COMPANY, SAN JOSE, CALIFORNIA
19 PAGES, 7 FIGURES, 2 TABLES, 1966, PRESENTED AT AMERICAN POWER CONFERENCE, 28TH ANNUAL MEETING, CHICAGO, ILLINOIS, APRIL 26-28, 1966, APC

THIS PAPER DESCRIBES BRIEFLY THE EVESR (ESADA VALLECITOS EXPERIMENTAL SUPERHEAT REACTOR) DESIGN AND OPERATING EXPERIENCE. EVESR IS A HETEROGENEOUS, LIGHT-WATER MODERATED, THERMAL-NEUTRON-SPECTRUM, SUPERHEATING REACTOR OF 17 MW(T) OUTPUT, PRODUCING 900-PSI 900-F STEAM. SATURATED STEAM IS PRODUCED BY OIL FIRING AND IS NUCLEARLY SUPERHEATED. FUEL FAILURES AND FISSION-GAS RELEASE HAVE OCCURRED, BUT WITH NO MAJOR EFFECT ON PLANT OPERATION.

*REACTOR, SUPERHEAT + *STEAM + *VESR (VALLECITOS EXP. SUPERHEAT REACTOR-ESADA) + HEAT TRANSFER + REACTOR, BOILING WATER + REACTOR, THERMAL + REACTOR, WATER

5-10578 DICTZ KA
QUARTERLY TECHNICAL REPORT - STEP PROJECT, APRIL 1965-JUNE 1965

ACCESSION NUMBER 5-10555 TO 5-10578

CATEGORY 5
ACCIDENT ANALYSIS

5-10578 *CONTINUED*
PHILLIPS PETROLEUM COMPANY, IDAHO FALLS, IDAHO
IDO-17145 +. 104 PAGES, 69 FIGURES, 14 TABLES, 30 REFERENCES, MAY 1966, CFSTI, \$4.00 CY, \$0.75 MN

QUARTERLY PROGRESS REPORT ON SNAPTRAN-1 TEST PROGRAM, LOFT CORE DESIGN, LOFT FACILITY AND EXPERIMENTAL DESIGN, LOFT ANALYSIS, LOFT RADIOLOGICAL STUDIES, AND INSTRUMENTATION STUDIES.

*LOFT (LOSS OF FLUID TEST) + *SNAPTRAN (SNAP TRANSIENT REACTOR TEST SERIES) +
*STEP (SAFETY TEST ENGINEERING PROGRAM) + ANALYTICAL MODEL + CONTAINMENT DESIGN +
CONTAINMENT FILTERING SYSTEM + CONTAINMENT INSTRUMENTATION + FISSION PRODUCT TRANSPORT +
INSTRUMENTATION, GENERAL + IODINE + REACTOR KINETICS + REACTOR, PRESSURIZED WATER + SAMPLING

5-10700 PERRAIS JP + SCHROCK VE
AN EXPERIMENTAL STUDY OF BOILING BUBBLE DYNAMICS
UNIVERSITY OF CALIFORNIA, BERKELEY, CALIFORNIA
SAN 1012 +. 20 PAGES, 24 BIBLIOGRAPHY, 2 TABLES, 13 FIGURES- MARCH 1966, CFSTI, \$4.00 CY

AN EXPERIMENTAL INVESTIGATION OF BUBBLE-GROWTH RATES AND SHAPES WAS CONDUCTED BY USING A SYSTEM IN WHICH THE THERMAL ENVIRONMENT IS KNOWN. THIS WAS ACCOMPLISHED BY VIEWING FROM TWO DIRECTIONS THOSE BUBBLES WHICH WERE FIRST NUCLEATED ON A TRANSIENTLY HEATED SURFACE. WITH STEP AND EXPONENTIAL TRANSIENT HEATING, THE PURE CONDUCTION MODEL WAS SHOWN TO ACCURATELY PREDICT THE HEAT TRANSFER PRIOR TO BOILING. IN THIS WAY, TEMPERATURE DISTRIBUTION IN THE LIQUID AT THE TIME OF NUCLEATION MAY BE CALCULATED, AND SINCE THE BUBBLE-GROWTH CYCLE IS RAPID COMPARED WITH THE RATE OF CHANGE OF THIS DISTRIBUTION, IT MAY BE REGARDED AS THE THERMAL ENVIRONMENT FOR THE ENTIRE BUBBLE LIFETIME. CONCLUSIONS - 1. DATA WERE OBTAINED FOR BUBBLE-GROWTH AND COLLAPSE HISTORIES IN A KNOWN THERMAL ENVIRONMENT WHICH CLEARLY SHOW THAT THE THEORIES, BASED ON THE HEMISPHERICAL-ASYMPTOTIC MODEL, ARE INADEQUATE. 2. IMPROVEMENTS IN THE THEORY WILL BE POSSIBLE EITHER BY MODIFYING THE HEMISPHERICAL THEORY TO ACCOUNT FOR THE LIQUID FILM UNDER THE BUBBLE OR BY ACCOUNTING MORE PRECISELY FOR THE BUBBLE SHAPE. BECAUSE IT INVOLVES A VERY DIFFICULT HYDRODYNAMIC PROBLEM, THE LATTER DOES NOT APPEAR FRUITFUL AT THIS TIME. WE ARE STUDYING SPHERICAL BUBBLES AS ANOTHER IDEALIZED PROBLEM THAT MAY INCREASE OUR KNOWLEDGE OF THIS PHENOMENON. 3. THE TRANSIENT-HEATING EXPERIMENT PROVED VERY USEFUL IN STUDYING SUBCOOLED BOILING BUBBLE DYNAMICS. A VERY WIDE RANGE OF PARAMETERS WAS ACHIEVED WITH WATER, AND, BY USING OTHER FLUIDS, THIS RANGE CAN BE EXTENDED WITHOUT IMPROVING PHOTOGRAPHIC TECHNIQUES. 4. INERTIA AND SURFACE TENSION PLAY AN IMPORTANT ROLE IN SUBCOOLED BOILING BUBBLE DYNAMICS FOR MUCH LARGER SIZES OF BUBBLES THAN IN THE CASE OF VOLUME BOILING. 5. THE SPREAD OF DATA IN FIGURE 9A SUGGESTS THAT THERE MAY BE AN INFLUENCE, NOT YET UNDERSTOOD, THAT DETERMINES THE MAXIMUM SIZE OF SUBCOOLED BOILING BUBBLES.

*HEAT TRANSFER + *HEAT TRANSFER, BOILING + HEAT CONDUCTION + HEAT EXCHANGER + HEAT TRANSFER ANALYSIS +
HEAT TRANSFER EXPERIMENT + SURFACE, GENERAL + WATER, GENERAL

5-10701 TAGAMI T
INTERIM REPORT ON SAFETY ASSESSMENTS AND FACILITIES ESTABLISHMENT PROJECT IN JAPAN FOR PERIOD ENDING JUNE 1965 (NO. 1)
16 PAGES, 49 FIGURES, FEBRUARY 28, 1966, SOURCE

THIS REPORT IS A TRANSLATION OF A JAPANESE REPORT - REPORT ON EMERGENCY COOLING TEST IN THE LOSS OF COOLANT ACCIDENT - BY S. KAWAHARA, ET AL., DESCRIBING BLOWDOWN TESTS, PRESSURE AND TEMPERATURE TRANSIENTS, CONTAINMENT-PRESSURE, TRANSIENTS, EFFECTIVENESS OF CONTAINMENT-SPRAY SYSTEM, AND IN-CORE SPRAY TESTS IN THE SAFE PROJECT STARTED IN 1963.

*FLOW THEORY AND EXPERIMENTS + *HEAT TRANSFER, BOILING + *LOSS OF COOLANT + *LOSS OF PRESSURE +
CONTAINMENT ANALYSIS + HEAT TRANSFER

5-10708 HOPPNER G
THERMAL LOAD LIMITS OF NUCLEAR FUEL ELEMENTS
KARLSRUHE NUCLEAR RESEARCH CENTER, GERMANY
ORNL-TR-928 +. 14 PAGES, 8 FIGURES, 22 REFERENCES, TRANSLATED FROM ATOMKERNENERGIE 10 (5-6)- 163-168 (1965)

PARAMETERS INFLUENCING THE TEMPERATURE VARIATION, SUCH AS THE COEFFICIENT OF THERMAL CONDUCTIVITY OF THE FUEL AND THE CONTACT COEFFICIENT OF THE FUEL CAN ARE DISCUSSED. ONLY VERY LOW SURFACE LOADS AND POWER DENSITIES CAN BE OBTAINED WITH CYLINDRICAL FUEL ELEMENTS. VERY HIGH SURFACE LOADS AND POWER DENSITIES ARE ATTAINED WITH PLATE ELEMENTS, ALTHOUGH RESISTANCE AND COOLING PROBLEMS ARE ENCOUNTERED. THE PROPOSED SPHERICAL ELEMENTS PERMIT HIGH SURFACE LOADS, HEAT SOURCE DENSITIES, POWER DENSITIES, AND EXTREMELY HIGH SURFACE TEMPERATURES AS A RESULT OF THE EXTERNALLY APPLIED FUEL LAYER.

*FUEL ELEMENT + *HEAT CONDUCTION + *HEAT TRANSFER + FUEL INTEGRITY + HEAT GENERATION, INTERNAL

5-10844 ALEKSEYEV GV + ZENKEVICH BA + SUBBOTIN VI
CRITICAL HEAT FLUXES IN ANNULAR CHANNELS WITH HEAT SUPPLY FROM TWO SIDES
WAPD-TRANS-17 +. 4 PAGES, TRANSLATED FROM INZH.-FIZ. ZHURNAL, 7(9), 30-33 (1964), CFSTI, \$1.00 CY, \$1.00 MN

RESULTS ARE GIVEN COVERING THE EXPERIMENTAL INVESTIGATIONS OF CRITICAL HEAT FLUXES IN AN ANNULAR CHANNEL WITH A TWO-WAY HEAT SUPPLY FOR A FORCED FLOW OF WATER UNDERHEATED TO SATURATION TEMPERATURE AND A STEAM-WATER MIXTURE.

*ANNULUS + *BURNOUT HEAT FLUX + *HEAT TRANSFER EXPERIMENT + *HEAT TRANSFER, BOILING + HEAT TRANSFER

CATEGORY 5
ACCIDENT ANALYSIS

5-10845 EVANGELISTI R
WIEDEMANN-FRANZ-LORENZ LAW AND ITS APPLICATION IN THE HIGH-TEMPERATURE FIELD
LA-TR-66-22 +. 20 PAGES, RIV. ING. 14(8), PAGES 761-71, (1965), JCL, \$1.60 FS, \$0.80 MF

THIS REPORT DESCRIBES THE USE OF THE WIEDEMANN-FRANZ-LORENZ LAW TO ESTIMATE THERMAL PROPERTIES FROM ELECTRICAL RESISTANCE MEASUREMENTS. ELECTRICAL MEASUREMENTS CAN BE MADE MORE EASILY AND WITH HIGHER PRECISION THAN THERMAL MEASUREMENTS. A SIMPLIFIED CORRELATION IS PRESENTED.

*THERMAL PROPERTY + *TRANSPORT PROPERTY + HEAT TRANSFER + HEAT TRANSFER ANALYSIS + THERMODYNAMICS

5-10846 MUELLER JJ
LA CROSSE BOILING WATER REACTOR RADIO AND WATER CHEMISTRY MANUAL
ALLIS-CHALMERS MFG. CO., BETHESDA, MD.
ACNP-66538 +. 233 PAGES, JUNE 1, 1966, CFSTI, \$6.00 CY, \$1.25 MN

THIS MANUAL CONTAINS THE ESSENTIAL MATERIAL TO OPTIMIZE THE LACBWR POWER PLANT REQUIREMENTS BY INTERRELATING RADIOCHEMISTRY AND A WATER CHEMISTRY PROGRAM AS OUTLINED IN THIS REPORT. THE PROCEDURES ARE NUMBERED ACCORDING TO A PARTICULAR CATEGORY, SUCH AS RC SERIES (RADIOCHEMISTRY METHODS), WC SERIES (WATER CHEMISTRY METHODS), AND THE D SERIES (DISSOLUTION METHODS). THE MANUAL HAS EIGHT SECTIONS - I - SAFETY, II - STANDARDIZATION OF CARRIER SOLUTIONS, III - COUNTING TECHNIQUES AND DATA HANDLING, IV - WATER CHEMISTRY METHODS, V - RADIOCHEMISTRY METHODS, VI - DISSOLUTION METHODS, VII - SCHEDULE FOR RADIO AND WATER CHEMISTRY ANALYSES, AND VIII - APPENDIX.

*RADIOCHEMICAL ANALYSIS + *WATER TREATMENT + LACROSSE BOILING WATER REACTOR + REACTOR, BOILING WATER

5-10847 LOWE AL
STEAM COOLED BREEDER REACTOR. MECHANICAL AND PHYSICAL PROPERTIES OF SELECTED HIGH-TEMPERATURE MATERIALS
BABCOCK AND WILCOX COMPANY
BAW-237 +. 50 PAGES, 3 TABLES, JULY, 1965, CFSTI

THIS REPORT PRESENTS A DESCRIPTION AND ENUMERATION OF MECHANICAL PROPERTIES OF SEVEN ALLOYS NOW BEING CONSIDERED FOR USE AS FUEL CLADDING IN THE STEAM COOLED BREEDER REACTOR (SCBR). THE ALLOYS ARE - TYPES 304 AND 348 STAINLESS STEELS, 19-9 DL ALLOY, HASTELLOY-X-280, INCOLOY ALLOY-800, INCONEL ALLOY-625, AND IN-102 ALLOY. THE PROPERTIES MOST IMPORTANT TO THE SELECTION OF CLADDING MATERIAL IN THE SCBR ARE ELEVATED-TEMPERATURE, ULTIMATE, YIELD, AND STRESS-RUPTURE STRENGTHS, IN COMBINATION WITH LOW NEUTRON-CAPTURE CROSS SECTION. SINCE NO SINGLE ALLOY MEETS ALL THE REQUIREMENTS FOR THE IDEAL CLADDING, THE ALLOYS ARE DESCRIBED SO THAT THEIR PROPERTIES CAN BE COMPARED. IN THIS WAY, THE ALLOY(S) HAVING THE BEST COMBINATION OF PROPERTIES FOR A PARTICULAR DESIGN APPLICATION CAN BE SELECTED.

*MATERIAL + *PROPERTY, PHYSICAL + *STEEL, STAINLESS + CREEP PROPERTY + IMPACT PROPERTY + STEAM

5-10848 BURNOUT FOR FLOW INSIDE ROUND TUBES WITH NONUNIFORM HEAT FLUXES - TOPICAL REPORT
THE BABCOCK AND WILCOX COMPANY
BAW-3238-9 + EURAEC-1640 +. 114 PAGES, 5 TABLES, MAY, 1966, CFSTI, \$4.00 CY, \$0.75 MN

ON JULY 1, 1963, THE BABCOCK AND WILCOX COMPANY, AS PART OF THE JOINT U.S.-EURATOM RESEARCH AND DEVELOPMENT PROGRAM, BEGAN AN EXPERIMENTAL AND ANALYTICAL PROGRAM TO DETERMINE HOW IRREGULAR HEAT FLOW THROUGH REACTOR CHANNELS AFFECTS THE OPERATING CONDITIONS THAT CAUSE BURNOUT (CRITICAL HEAT FLUX). EXPERIMENTAL WORK ON TUBULAR SPECIMENS WITH FOUR AXIAL POWER SHAPES WAS COMPLETED IN DECEMBER 1964. ANNULAR SPECIMENS WITH FIVE POWER SHAPES ARE NOW BEING TESTED, AND AN EFFORT TO CORRELATE THE EXPERIMENTAL DATA WITH EMPIRICAL AND ANALYTICAL MODELS IS BEING MADE. THE COMPLETION DATE OF THE PROGRAM, WITH ONE EXTENSION, IS JUNE 30, 1966. THE DATA AND RESULTS FROM THE TUBULAR TEST SECTIONS ARE PRESENTED HERE. THE FOLLOWING CRITICAL HEAT FLUX CONDITIONS WERE RUN IN ALL COMBINATIONS - AXIAL FLUX SHAPE (UNIFORM, PEAK NEAR INLET, PEAK NEAR MIDPOINT, PEAK NEAR OUTLET), PRESSURE (2000, 1500, 1000 PSIA), MASS VELOCITY (0.5, 1.5, 2.5 LB PER HR PER SQ FT TIMES 1 MILLION), INLET SUBCOOLING (20, 50, 100, 150 F). THE ANALYSIS PRESENTS OBSERVATIONS REGARDING CRITICAL HEAT FLUX LOCATION AND MAGNITUDE, ALONG WITH EQUATIONS THAT EVALUATE THE EFFECT OF OPERATING CONDITIONS ON CRITICAL HEAT-FLUX LOCATION AND MAGNITUDE.

*BURNOUT HEAT FLUX + *FLUX DISTRIBUTION + *HEAT TRANSFER, BOILING + *POWER DISTRIBUTION + FLOW, TUBE + HEAT TRANSFER + HEAT TRANSFER EXPERIMENT

5-10849 TOWELL RH
EFFECT OF SPACING ON HEAT TRANSFER BURNOUT IN ROD BUNDLES
SAVANNAH RIVER LABORATORY
CP-1013 +. 21 PAGES, NOVEMBER 1965, CFSTI \$1.00 CY, \$0.50

THE BURNOUT HEAT FLUX FOR BOILING LIGHT-WATER IN A MOCKUP OF THE CENTRAL COOLING CHANNEL OF A MULTI-ROD FUEL BUNDLE DID NOT CHANGE APPRECIABLY WHEN THE SPACE BETWEEN THE RODS WAS DECREASED TO AS LITTLE AS 0.019 IN. BURNOUT HEAT FLUXES MEASURED WITH FORCED BOILING FLOW WERE TWICE THE VALUES REPORTED FOR SOME MULTI-ROD TEST SECTIONS WITH COMPARABLE ROD SPACING (0.015 TO 0.050 IN.), AND ABOUT 50 PERCENT HIGHER THAN VALUES REPORTED FOR LARGER ROD SPACINGS (LONGER THAN 0.070 IN.). THE HIGHER HEAT FLUXES ARE ATTRIBUTED TO THE RELATIVELY UNIFORM COOLING THAT WAS OBTAINED IN THE MOCKUP BY USE OF A SINGLE COOLANT CHANNEL OF A SYMMETRICAL SHAPE. SUCH HIGH HEAT FLUXES PROBABLY CANNOT BE DUPLICATED IN ROD BUNDLES THAT HAVE NONUNIFORM COOLANT CHANNELS.

*BURNOUT HEAT FLUX + *HEAT TRANSFER, BOILING + FUEL ELEMENT + HEAT TRANSFER + HEAT TRANSFER EXPERIMENT

CATEGORY 5
ACCIDENT ANALYSIS

5-10850 BIANCONE F + CAMPANILE A + GALIMI G + GOFFI M
FORCED CONVECTION BURNOUT AND HYDRODYNAMIC INSTABILITY EXPERIMENTS FOR WATER AT HIGH PRESSURE. PART I.
FIAT S.P.A., SEZIONE ENERGIA NUCLEARE - TROINO
EUR-2490 +. 104 PAGES, AUGUST 1965, DEP. MN.

THE OBJECT OF THIS REPORT IS TO PRESENT THE DATA, COLLECTED DURING THE FIRST PHASE OF A COMPREHENSIVE EXPERIMENTAL INVESTIGATION OF BURNOUT BEING CONDUCTED IN THE HEAT TRANSFER LABORATORY OF THE SORIN NUCLEAR RESEARCH CENTER IN SALUGGIA. THE FIRST PHASE, DESCRIBED HERE, DEALT WITH BURNOUT EXPERIMENTS FOR WATER FLOWING UPWARD INSIDE SINGLE, ROUND, VERTICAL CHANNELS WITH BOTH UNIFORM AND NONUNIFORM AXIAL HEAT-FLUX DISTRIBUTION. AN ATTEMPT TO CORRELATE THE DATA OR TO COMPARE THEM WITH EXISTING CORRELATIONS WILL BE PRESENTED IN THE NEXT TOPICAL REPORT. TO THIS PURPOSE A COMPUTER PROGRAM HAS BEEN WRITTEN.

*HEAT TRANSFER, BOILING + BURNOUT HEAT FLUX + FLOW, TUBE + HEAT TRANSFER + HEAT TRANSFER EXPERIMENT

5-10867 MILLER CE + BROWNING WE
THE ADEQUACY OF SCALE-UP IN EXPERIMENTS ON FISSION PRODUCT BEHAVIOR IN REACTOR ACCIDENTS. PART I. AN ANALYSIS OF SCALE-UP IN THE U. S. NUCLEAR SAFETY PROGRAM
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TENNESSEE
ORNL-3901 +. 48 PAGES, 2 TABLES, 17 FIGURES, 17 REFERENCES, JULY 1966, CFSTI, \$3.00 CY, \$0.50 MN

FOUR AREAS DISCUSSED - (1) RELEASE OF FISSION PRODUCTS FROM FUEL, (2) THEIR TRANSPORT TO CONTAINMENT VESSEL, (3) THEIR BEHAVIOR IN A CONTAINMENT SYSTEM, AND (4) THEIR BEHAVIOR IN GAS-CLEANING SYSTEMS. IN GENERAL, LARGE-SCALE EXPERIMENTS SUCH AS LOFT WERE THE UPPER BOUND OF THE STUDY. CONCLUSION - ITEMS (3) AND (4) ARE WELL SCALED OVER RANGE, BUT INTERMEDIATE-SCALE EXPERIMENTS (JUST BELOW LOFT) ARE NEEDED FOR ITEMS (1) AND (2). CONTAINS GOOD GENERAL INTRODUCTION TO PROBLEM, PLUS COMPARISON OF LOFT WITH POWER REACTORS AND BENCH-SCALE EXPERIMENTS.

*CONTAINMENT FILTERING SYSTEM + *CONTAINMENT RESEARCH AND DEVELOPMENT + *DEPOSITION +
*FISSION PRODUCT RELEASE, GENERAL + *FISSION PRODUCT TRANSPORT + FUEL MELTDOWN +
LOFT (LOSS OF FLUID TEST) + REACTOR, PRESSURIZED WATER

5-10880 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2.
CONSOLIDATED EDISON COMPANY OF NEW YORK
3 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 10 -- ADEQUATE CONDENSATE IS STORED TO RELEASE DECAY HEAT FOR 24 HR BY SECONDARY STEAM DUMP. RESIDUAL HEAT EXCHANGERS AND CONTAINMENT AIR COOLERS ALSO SUPPLIED.

*DECAY HEAT + *DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS +
INDIAN POINT II + REACTOR, PRESSURIZED WATER

5-10881 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2.
CONSOLIDATED EDISON COMPANY OF NEW YORK
2 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 11 -- REACTOR VESSEL DESIGN TRANSITION TEMPERATURE SHIFT OF 275 F WAS SELECTED, BASED ON INTEGRATED FAST NEUTRON FLUX OF 3.7×10^{19} TH. CONTAINMENT LINE WILL BE MINIMUM OF 50 F, WELL ABOVE HDT PLUS 30.

*BRITTLE FRACTURE + *DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS +
CONTAINMENT, PRESSURE VESSEL + INDIAN POINT II + REACTOR, PRESSURIZED WATER

5-10898 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2.
CONSOLIDATED EDISON COMPANY OF NEW YORK
25 PAGES, 1 FIGURE, 27 REFERENCES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT
NUCLEAR GENERATING UNIT NO. 2, MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 3 IS REALLY 12 QUESTIONS ABOUT PRESSURE-VESSEL DESIGN, NDT STRESS ANALYSIS ASSUMPTIONS, ACCEPTABLE FLAW SIZES, LEAKS, SURVEILLANCE, ETC. A FRACTURE-ANALYSIS DIAGRAM FOR VARIOUS FLAW SIZES IS INCLUDED. DIFFERENCES IN NDT THROUGH THICK PLATES ARE TAKEN INTO ACCOUNT BY CHOOSING A REFERENCE POINT 1/4 THROUGH THE PLATE. ENHANCED METALLURGICAL PROPERTIES AT SURFACE COUNTERACT DECREASED NDT THERE.

*BRITTLE FRACTURE + *CONTAINMENT, PRESSURE VESSEL + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS +
INDIAN POINT II + NDT DATA (NIL DUCTILITY TRANSITION) + REACTOR, PRESSURIZED WATER + STRESS ANALYSIS

5-10899 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2.
CONSOLIDATED EDISON COMPANY OF NEW YORK
37 PAGES, 21 FIGURES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS, INDIAN POINT NUCLEAR GENERATING
UNIT NO. 2, MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 4 IS REALLY FIVE QUESTIONS RELATING TO CALCULATION OF DOUBLE-ENDED PIPE RUPTURE CONTAINMENT-PRESSURE TRANSIENT AND EFFECT OF VARIOUS ENGINEERED SAFEGUARDS - (A) RELATES TO METAL-WATER, HYDROGEN REACTION, AND OTHER ENERGY SOURCES, (B) SHOWS THE ENERGY DISSIPATION FOR THE FIRST 30 MIN. POST INCIDENT, (C) SHOWS PERCENTAGE OF CORE ZIRCONIUM ABOVE CERTAIN TEMPERATURES VS TIME, (D) (E) (F) PROVIDES GRAPHS OF PRESSURE TRANSIENTS WITH VARIOUS

CATEGORY 5
ACCIDENT ANALYSIS

5-10899 *CONTINUED*

ENGINEERED SAFEGUARDS NOT WORKING, AND WITH VARIOUS STEP INCREASES OF ENERGY.

*ENGINEERED SAFEGUARD + *LOSS OF COOLANT + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + PRESSURE, INTERNAL + REACTOR, PRESSURIZED WATER

5-10927 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2 CONSOLIDATED EDISON COMPANY OF NEW YORK
3 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2, MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 191 - DESIGN CRITERIA AND JUSTIFICATION, HOW FULFILLED, AND TEST METHODS -- WHILE FAILURE OF CORE SUPPORT IS CONSIDERED INCREDIBLE, CORE DOWNWARD DROP WOULD BE LIMITED TO LESS THAN 2 IN. (LESS THAN 0.3 PERCENT REACTIVITY) BY THE IN-CORE INSTRUMENTATION STRUCTURE AND ENERGY ABSORBERS. THE ENERGY ABSORBERS WOULD REST ON THE INSIDE OF THE BOTTOM HEAD OF THE VESSEL AND WOULD SUPPORT THE CORE THROUGH THE IN-CORE INSTRUMENTATION STRUCTURES.

*CORE COMPONENTS, MISCELLANEOUS + *DESIGN CRITERIA + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + *SUPPORT STRUCTURE + FAILURE, COMPONENT + INDIAN POINT II + INSTRUMENTATION, IN CORE + REACTOR, PRESSURIZED WATER

5-10988 FUEL ELEMENT RUPTURE TEST FACILITY INCIDENT AT THE PLUTONIUM RECYCLE TEST REACTOR U. S. ATOMIC ENERGY COMMISSION, DIVISION OF OPERATIONAL SAFETY
ROE-66-1 +. 3 PAGES, AUGUST 5, 1966, OPERATING EXPERIENCES, REACTOR SAFETY BULLETIN, DPI

ON SEPTEMBER 29, 1965, A UO2-PUO2 FUEL ELEMENT WITH AN INTENTIONAL DEFECT, IRRADIATED IN A TEST LOOP, CAUSED THE FAILURE OF A PRESSURE TUBE. THE RESULTANT PRESSURE DECREASE CAUSED 700 G OF MOLTEN FUEL TO BE EJECTED FROM THE FUEL ROD THROUGH THE FAILED TUBE. ALTHOUGH THE MOLTEN FUEL WAS STOPPED BY THE SURROUNDING SHROUD TUBE, SOME FUEL AND FISSION PRODUCT WAS SPREAD BY THE DRY GAS AND THE CONTAINMENT VENTILATION SYSTEM. THE HYPOTHEZIZED COURSE OF THE INCIDENT WAS AS FOLLOWS - WATER OXIDIZED THE FUEL TO UO2.1, THERMAL CONDUCTIVITY WAS LOWERED, INCREASING THE VOLUME OF MOLTEN FUEL AND THE INTERNAL PRESSURE, WHICH SPLIT THE CLADDING. THE SWOLLEN FUEL INTERFERED WITH THE COOLING OF THE PRESSURE TUBE, WHICH THEN FAILED UNDER PRESSURE.

*CENTERLINE MELTING + *FAILURE, CLADDING + *INCIDENT, ACTUAL, GENERAL + *OXIDATION + FAILURE, PIPE + IN PILE LOOP + PRTR (PLUTONIUM RECYCLE TEST REACTOR) + REACTOR, AEC OWNED + REACTOR, HEAVY WATER + REACTOR, PRESSURE TUBE + URANIUM DIOXIDE

5-11039 TEMPORARY AUTHORIZATION TO OPERATE INDIAN POINT WITH PUMP FLOW TECHNICAL SPECIFICATIONS REQUIREMENT DELETED

U. S. ATOMIC ENERGY COMMISSION

1 PAGE, JULY 27, 1966, DOCKET 50-8, ATOMIC ENERGY CLEARING HOUSE, 12(32), PAGE 11 (AUGUST 8, 1966)

TEMPORARY FULL-POWER AUTHORIZATION WITH A LOWER-THAN-TECHNICAL-SPECIFICATION VALUE ON PRIMARY COOLANT FLOW PER PUMP GRANTED TO DETERMINE ACCURATELY FULL-FLOW VALUE.

*OPERATING LIMITS/TECHNICAL SPECIFICATIONS + FLOW, HIGH SPEED + INDIAN POINT I + PUMP + REACTOR, PRESSURIZED WATER

5-11040 FERMI POWER COEFFICIENT ANALYSIS
POWER REACTOR DEVELOPMENT COMPANY

2 PAGES, JULY 22, 1966, ATOMIC ENERGY CLEARING HOUSE, 12(32), PAGES 12-13 (AUGUST 8, 1966)

REVIEW OF DATA SHOWS THAT POWER COEFFICIENT IS LINEAR WITH POWER, AND TRANSFER-FUNCTION MEASUREMENTS SHOW REACTOR STRONGLY STABLE. PRINCIPLE CHANGES WERE - MORE-NEGATIVE CORE SODIUM EXPANSION EFFECT AND LESS-NEGATIVE CORE RADIAL EXPANSION EFFECT. NO CAUSE FOR CONCERN EXISTS, AS PREVIOUS SAFETY ANALYSIS USED POWER COEFFICIENTS AS LOW AS MINUS 0.15 CENT PER MEGAWATT, AND PRESENT COEFFICIENT IS MINUS 0.18.

*COMPARISON, THEORY AND EXPERIENCE + *POWER COEFFICIENT + FERMI + REACTOR, FAST BREEDER + REACTOR, LIQUID METAL COOLED

5-11046 ANDERSON AN

CORE B LOWER FLOWS REQUIRE TECHNICAL SPECIFICATION CHANGE AT INDIAN POINT UNIT 1 CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

2 PAGES, JULY 14, 1966, DOCKET 50-3, ATOMIC ENERGY CLEARING HOUSE, 12(31), PAGES 14-15, (AUGUST 1, 1966)

PRELIMINARY HEAT BALANCES INDICATE THE PRIMARY-COOLANT FLOW IS ABOUT 2.5 PERCENT BELOW DESIGN VALUE, ALTHOUGH THERE DOES NOT APPEAR TO BE HIGHER PRESSURE DROP ACROSS THE CORE. SINCE SPECIFICATIONS REQUIRE 18,500 GPM FLOW PER PUMP, REACTOR WILL BE LIMITED TO 7 (OF 8) PUMPS RUNNING TO PRODUCE REQUIRED FLOW PER PUMP WITH LOWER CORE DELTA-P. THIS IS DONE FOR LITERAL COMPLIANCE WITH SPECIFICATIONS, ALTHOUGH THERE IS NO REASON TO BE SURE THAT THEY WOULD NOT BE IN COMPLIANCE WITH ALL PUMPS RUNNING.

*OPERATING LIMITS/TECHNICAL SPECIFICATIONS + FLOW, HIGH SPEED + INDIAN POINT I + PUMP + REACTOR, PRESSURIZED WATER

CATEGORY 5
ACCIDENT ANALYSIS

5-11051 ANDERSON AN
EVALUATION OF STEAM GENERATOR TUBING FAILURES, INDIAN POINT UNIT 1
CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
2 PAGES, DOCKET 50-3, JUNE 20, 1966, ATOMIC ENERGY CLEARING HOUSE, 12(28), PAGES 16-17, (JULY 11, 1966)

EIGHT TUBE LEAKS HAVE OCCURRED SO FAR IN BOILERS 11 AND 14, WITH NO LEAKS IN 12 OR 13. FIVE LEAKS WERE LOCATED IN THE U-BENDS (INSPECTION SHOWED SAGGED TUBE SUPPORTS IN BOILER 14 AT THE U-BEND), AND ALL LEAKS OCCURRED DURING A PLANT HEATUP. THE LARGEST LEAK (EQUIVALENT TO A 3/4-IN. HOLE) CAUSED PRESSURIZER LEVEL TO DROP 105 IN. IN 6 MIN WITH NORMAL MAKEUP. THE INVESTIGATION CONTINUES.

*FAILURE, PIPE + *HEAT EXCHANGER + INDIAN POINT I + REACTOR, PRESSURIZED WATER + SUPPORT STRUCTURE + THERMAL MECHANICAL EFFECT

5-11058 NAHAVANDI AN + VON HOLLEN RF
PRESSURE EFFECTS ON SPACE-DEPENDENT DYNAMICS IN BOILING SYSTEMS
WESTINGHOUSE ELECTRIC CORPORATION, PITTSBURGH, PA., ATOMIC POWER DIVISION
CONF-650,413 +. 18 PAGES, 5 FIGURES, 5 REFERENCES, APRIL 1965, PAGES 566-583 OF NEUTRON DYNAMICS AND CONTROL, PROCEEDINGS OF THE SYMPOSIUM ON NUCLEAR ENGINEERING, UNIVERSITY OF ARIZONA, TUCSON, APRIL 5-7, 1965, CFSTI \$4.50 CY, \$2.50 MN

EARLIER WORK WAS DONE ON CONSTANT-PRESSURE REACTOR. THIS ARTICLE REPORTS WORK DONE WHEN IT WAS REALIZED THAT LOSS OF LOAD WOULD CAUSE TURBINE-SPEED REGULATOR TO OVERCOME THE CONSTANT-DEMAND SIGNAL. EARLIER WORK AND THIS WORK WERE CHECKED AGAINST LOAD RAMP AT FULL POWER. MODEL WAS ALSO APPLIED TO DYNAMIC ANALYSIS OF A 400-MW (TH) VERTICAL STEAM GENERATOR.

*HEAT TRANSFER, BOILING + HEAT EXCHANGER + LOSS OF LOAD + REACTOR, BOILING WATER

5-11083 DICKERMAN CE + ROBINSON LE
TREAT EXPERIMENTS TO PROVIDE DATA FOR FAST REACTOR SAFETY KINETICS CALCULATIONS
ARGONNE NATIONAL LABORATORY
CONF-650 413 +. 14 PAGES, 10 FIGURES, 18 REFERENCES, PP. 371-385 OF NEUTRON DYNAMICS AND CONTROL, APRIL 7, 1966, CFSTI \$4.50 CY, \$2.50 MN

TREAT EXPERIMENT ON EBR-II-TYPE UO₂ FUEL ENABLED THE INCLUSION OF VARIATIONS IN POWER AND COOLANT FLOW IN HYPOTHETICAL ACCIDENT MODELS. SUCH VARIATIONS MAY REDUCE REACTIVITY INSERTION RATES TENFOLD FROM SINGLE-PIN-FAILURE DATA. URANIUM SULPHIDE WAS MECHANICALLY SUPERIOR TO UO₂. SIGNIFICANTLY DIFFERENT FAILURE MODES WITH DIFFERENT FAILURE THRESHOLDS WERE FOUND FOR UO₂ IN FAST-REACTOR-FUEL SIZE.

*FUEL ELEMENT + *REACTOR TRANSIENT + EBR I AND II (EXPERIMENTAL BREEDER REACTORS) + REACTOR, GRAPHITE MODERATED + REACTOR, TEST + TREAT (TRANSIENT TEST REACTOR FACILITY) + URANIUM DIOXIDE + URANIUM SULFIDE

5-11170 CHERNOZUBOV VB + BOLOTOV AA + GOLUB SI + CHADOV VN + ZAOSTROVSKII FP + CHEMEZOV VA + MINUKHIN LA + MREZHIN LS
INTENSIFICATION OF HEAT EXCHANGE IN EVAPORATORS
AEC-TR-6737 + CONF-651005-12 +. 23 PAGES, TRANSLATED FROM SWD/62 PRESENTED AT THE FIRST INTERNATIONAL SYMPOSIUM ON WATER DESALINATION, OCTOBER 3-9, 1965, WASHINGTON, D.C., JCL \$2.60 FS, \$0.89 MF

THE DESALTING OF WATER IN MODERN INDUSTRIAL PLANTS REQUIRES EXTENSIVE USE OF METAL FOR HEAT EXCHANGER SURFACES. CONSEQUENTLY, AN INTENSIFICATION OF HEAT EXCHANGE WOULD LEAD TO A CONSIDERABLE REDUCTION IN THE COST OF FRESH WATER PRODUCTION. THE STUDIES OF HEAT-EXCHANGE INTENSIFICATION WERE CARRIED OUT ALONG THE FOLLOWING APPROACHES - (1) REMOVING THE HARMFUL INFLUENCE OF NONCONDENSABLE GAS MIXTURES IN THE HEATING STEAM ON THE HEAT-TRANSFER COEFFICIENT DURING CONDENSATION, (2) ENSURING DROPLET VAPOR CONDENSATION ON THE HEATING SURFACES, (3) DEVELOPING SUFFICIENTLY ECONOMICAL METHODS FOR INCREASING THE COEFFICIENT OF HEAT GENERATION BY THE LIQUID IN HEAT-EXCHANGERS.

*HEAT EXCHANGER + *HEAT TRANSFER AUGMENTATION + *HEAT TRANSFER, BOILING + HEAT TRANSFER + HEAT TRANSFER EXPERIMENT + SURFACE, GENERAL

5-11173 BENNETT AW + HEWITT GF + KEARSEY HA + KEEYS RK + PULLING DJ
STUDIES OF BURNOUT IN BOILING HEAT TRANSFER TO WATER IN ROUND TUBES WITH NONUNIFORM HEATING
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, HARWELL, BERKSHIRE
AERE-R-5076 +. 64 PAGES, 17 FIGURES, 3 TABLES, 18 REFERENCES, MAY 1966, UKAEA

AS AN EXTENSION OF THE EARLIER WORK AT HARWELL ON THE MECHANISM OF BURNOUT, STUDIES WERE MADE OF THE EFFECT OF A COLD-PATCH OR UNHEATED LENGTH PLACED IN VARIOUS POSITIONS ALONG A TUBE IN WHICH BURNOUT HEAT FLUX IS DETERMINED. EXPERIMENTS AT LOW AND HIGH PRESSURES CAN BE INTERPRETED TO GIVE INFORMATION ABOUT THE BEHAVIOR OF THE LIQUID PHASE IN THE CHANNEL. THIS INTERPRETATION HAS BEEN AIDED BY MAKING DIRECT MEASUREMENTS OF LIQUID-FILM FLOWRATE FOR THE LOW-PRESSURE CASE. IT WAS FOUND THAT, WITH THE COLD PATCH IN CERTAIN POSITIONS, THE POWER REQUIRED FOR BURNOUT COULD ACTUALLY BE HIGHER THAN THAT FOR A UNIFORM TUBE OF THE SAME TOTAL LENGTH. THE INTERPRETATION OF THE COLD-PATCH DATA SUGGESTED THAT OTHER ARRANGEMENTS OF HEAT-FLUX DISTRIBUTION COULD GIVE SIMILARLY HIGHER POWERS. EXPERIMENTS ARE DESCRIBED ON BURNOUT IN TUBES WITH A PEAK IN HEAT FLUX AT THE ENTRANCE AND, AS EXPECTED, THESE RESULTS SHOW AN IMPROVEMENT IN BURNOUT POWER OVER WIDE RANGES OF CONDITIONS. IN SOME TESTS, BURNOUT DID NOT OCCUR AT THE END OF THE HEATED TEST SECTION, AND THESE RESULTS COULD BE INTERPRETED TO GIVE THE RATE OF DEPOSITION OF ENTRAINED DROPLETS WHICH IN TURN LED TO A CALCULATION OF MASS-TRANSFER COEFFICIENT FOR DROPLET-TO-WALL TRANSFER.

CATEGORY 5
ACCIDENT ANALYSIS

5-11173 *CONTINUED*
*BURNOUT HEAT FLUX + *FLOW, TUBE + *HEAT TRANSFER, BOILING + *WATER, GENERAL +
DNB (DEPARTURE FROM NUCLEATE BOILING) + HEAT TRANSFER

5-11225 DENT JC
TRANSIENT HEAT TRANSFER PROBLEMS
3 PAGES, CHEMICAL AND PROCESS ENGINEERING 47(3), PAGES 134-136, MARCH 1966

THE SCHMIDT-BINDER METHOD IS APPLIED TO THE SOLUTION OF PROBLEMS INVOLVING TRANSIENT CONDUCTION IN SLABS, WITH HEAT TRANSFER AT THE BOUNDARIES BY RADIATION AND COMBINED RADIATION AND FREE CONVECTION. THE RESULTS OBTAINED BY THIS METHOD ARE COMPARED WITH ANALYTICAL AND NETWORK ANALOGUE SOLUTIONS. THE METHOD IS USEFUL FOR QUICK SOLUTIONS TO SIMPLE PROBLEMS.

*HEAT CONDUCTION + *TEMPERATURE TRANSIENT + HEAT TRANSFER + HEAT TRANSFER ANALYSIS + TEMPERATURE GRADIENT

5-11227 ARAGONES M + GUERRERO H
THE EFFECT OF DENSITY AND GRAIN SIZE ON THE THERMAL CONDUCTIVITY OF UO₂ DURING IRRADIATION
ATOMIC ENERGY OF CANADA LIMITED, CHALK RIVER, ONTARIO
AECL-2564 +. 44 PAGES, 14 FIGURES, 10 TABLES, 19 REFERENCES, APRIL, 1966, AECL \$1.50

EIGHT HYDRAULIC-RABBIT SPECIMENS WERE IRRADIATED IN THE NRX FOR 3 MIN. FROM THE EXTENT OF MELTING IN THE UO₂ FUEL, VALUES OF THE CONDUCTIVITY INTEGRAL $K-D-\theta$ WERE CALCULATED. THE DIFFERENCES DUE TO VARIATIONS IN DENSITY FROM 10.5 TO 10.8/CC.WERE GIVEN BY AN EXPRESSION THAT RELATED INTEGRAL AS A FUNCTION OF PORE VOLUME TO THAT FOR FULLY DENSE UO₂. INCREASING THE GRAIN SIZE FROM 10 TO 100 MICRO-METERS DID NOT APPRECIABLY ALTER THE VALUE OF THE INTEGRAL IN THE UO₂ THAT HAD A DENSITY OF 10.8.

*HEAT CONDUCTION + *THERMAL PROPERTY + *URANIUM DIOXIDE + HEAT TRANSFER + POROUS MEDIA

5-11321 EDWARDS AL
TRUMP, A COMPUTER PROGRAM FOR TRANSIENT AND STEADY STATE TEMPERATURE DISTRIBUTIONS IN MULTIDIMENSIONAL SYSTEMS
LAWRENCE RADIATION LAB, UNIVERSITY OF CALIFORNIA
UCRL-14754 +. 149 PAGES, 16 FIGURES, FEBRUARY 24, 1966, CFSTI \$5.00 CY, \$1.00 MN

THE TRUMP COMPUTER PROGRAM WAS DEVELOPED TO SOLVE PROBLEMS INVOLVING TRANSIENT AND STEADY-STATE TEMPERATURE DISTRIBUTIONS IN MULTIDIMENSIONAL SYSTEMS WITH ARBITRARY CONFIGURATIONS, INITIAL CONDITIONS, BOUNDARY CONDITIONS, AND PHYSICAL PROPERTIES. THE MATHEMATICAL METHOD USES A UNIQUE COMBINATION OF FORWARD AND BACKWARD DIFFERENCE EQUATIONS TO ACHIEVE FAST, EFFICIENT, AND ACCURATE SOLUTIONS OF BOTH TRANSIENT AND STEADY-STATE TEMPERATURE DISTRIBUTIONS. THE PROGRAM IS WRITTEN IN SEPARATE VERSIONS FOR THE IBM-7094, CDC-3600, AND CDC-6600 TO MAKE FULL USE OF THE AVAILABLE MEMORY CAPACITY AND SPECIAL CHARACTERISTICS OF EACH COMPUTER. PROBLEMS MAY INCLUDE HEAT TRANSFER BY CONDUCTION, FREE AND FORCED CONVECTION, SURFACE RADIATION, AND MASS FLOW. HEAT MAY BE PRODUCED OR ABSORBED BY INTERNAL HEAT SOURCES AND SINKS, PHASE CHANGES, AND CHEMICAL REACTION. THE PROPERTIES CONTROLLING THESE EFFECTS MAY BE TABULATED AS FUNCTIONS OF TIME OR TEMPERATURE.

*HEAT CONDUCTION + *HEAT TRANSFER ANALYSIS + *TEMPERATURE TRANSIENT + COMPUTER, DIGITAL + HEAT TRANSFER + HEAT TRANSFER, CONVECTION + THERMAL PROPERTY

5-11322 SANDERS JP
TEMPERATURE DISTRIBUTION UNDER DIMPLES PROPOSED AS SPACERS IN THE BONUS SUPERHEATER ASSEMBLIES
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE
ORNL-TM-1453 +. 17 PAGES, 2 FIGURES, 6 TABLES, 3 REFERENCES, APRIL 22, 1966, CFSTI \$1.00 CY, \$0.50 MN

IT HAS BEEN PROPOSED THAT DIMPLES IN THE COOLANT TUBE BE USED AS AN ALTERNATIVE TO THE PRESENT SPACER RING TO CENTER THE CLAD FUEL ROD IN THE COOLANT STREAM IN THE BONUS SUPERHEATER ASSEMBLIES. THE TEMPERATURE DISTRIBUTION UNDER SUCH A DIMPLE WAS INVESTIGATED USING THE HEATING CODE WRITTEN BY ASTRA, INC., OF RALEIGH, NORTH CAROLINA. CALCULATIONS WERE MADE IN TWO DIMENSIONS (R, θ) USING CYLINDRICAL GEOMETRY AND A 78.5 DEGREE SEGMENT. IT WAS FOUND THAT LATERAL CONDUCTION COULD NOT DISSIPATE HEAT FROM BENEATH THE DIMPLE SUFFICIENTLY WELL TO MAINTAIN TEMPERATURES IN THE CLADDING LESS THAN 1250 F. THE ONLY METHOD OF MAINTAINING SUFFICIENTLY LOW TEMPERATURES IN THE CLADDING WAS TO ENSURE GOOD THERMAL CONTACT BETWEEN THE CLADDING AND THE DIMPLE. SUFFICIENT CONTACT MIGHT BE OBTAINED BY PLACING THREE DIMPLES AROUND THE SAME PERIMETER AND CONSTRUCTING THEM TO OBTAIN AN INTERFERENCE FIT AT THE THREE POINTS OF CONTACT. THE DIMPLES MIGHT BE SLIGHTLY FLATTENED TO THE CURVATURE OF THE FUEL ROD AT THE POINT OF CONTACT, AND BOTH METAL SURFACES SHOULD BE CLEAN AND FREE OF OXIDE FILM.

*BONUS (BOILING NUCLEAR SUPERHEAT PROJECT) + *FUEL ELEMENT + *HEAT EXCHANGER + HEAT TRANSFER + HEAT TRANSFER ANALYSIS + REACTOR, BOILING WATER + REACTOR, SUPERHEAT

5-11323 SANDERS JP
TEMPERATURES IN THE CLADDING UNDER THE SPACERS OF THE BONUS SUPERHEATER ASSEMBLIES
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE
ORNL-TM-1452 +. 16 PAGES, 4 FIGURES, 3 TABLES, 4 REFERENCES, APRIL 22, 1966, CFSTI \$1.00 CY, \$0.50 MN

THE TEMPERATURE DISTRIBUTION UNDER THE SPACERS IN THE BONUS SUPERHEATER ASSEMBLIES WAS CALCULATED WITH THE HEATING PROGRAM ASSEMBLED BY ASTRA, INC., RALEIGH, NORTH CAROLINA. A TWO-DIMENSIONAL MODEL IN CYLINDRICAL COORDINATES (R, θ) WAS USED FOR A 60 DEGREE SYMMETRICAL SEGMENT. THE RESULTS INDICATE THAT IF A BRAZE WIDTH AT THE POINT OF CONTACT OF

CATEGORY 5
ACCIDENT ANALYSIS

5-11323 *CONTINUED*

AT LEAST 40 MILS CAN BE OBTAINED, THE MAXIMUM TEMPERATURE IN THE CLADDING WILL BE LESS THAN 1200 F. THE PRESENCE OF A CRACKED BRAZE FILLET DOES NOT APPEAR TO HAVE A MAJOR ADVERSE EFFECT SO LONG AS A SUFFICIENT WIDTH OF SOUND BRAZE IS OBTAINED. IT IS RECOMMENDED THAT ADEQUATE INSPECTION PROCEDURES BE ADAPTED TO ENSURE THIS MINIMUM CONTINUOUS BRAZE WIDTH OF 40 MILS AT THE CLADDING-TO-SPACER JUNCTION. ANOTHER DESIGN THAT CONSISTS OF THREE TRIANGULAR RIBS BRAZED LONGITUDINALLY TO THE CLADDING IS PROPOSED. HEAT DISSIPATION WOULD BE INCREASED BY THE PRESENCE OF THESE RIBS.

*BONUS (BOILING NUCLEAR SUPERHEAT PROJECT) + FUEL ELEMENT + HEAT EXCHANGER + HEAT TRANSFER + HEAT TRANSFER ANALYSIS + REACTOR, BOILING WATER + REACTOR, SUPERHEAT

5-11324 SANDERS JP

EFFECT OF TWO-PASS FLOW IN THE BONUS SUPERHEATER ASSEMBLIES
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE

ORNL-TM-1449 +. 7 PAGES, 2 TABLES, 3 REFERENCES, APRIL 22, 1966, CFSTI \$1.00 CY, \$0.50 MN

A BRIEF STUDY WAS MADE OF THE EFFECT OF REDESIGNING THE BONUS SUPERHEATER ASSEMBLIES FOR TWO-PASS FLOW RATHER THAN FOUR-PASS. BASED ON THE DESIGN CRITERIA AND ASSUMED UNIFORM DISTRIBUTION OF FLOW, IT WAS ESTIMATED THAT THE HEAT-TRANSFER COEFFICIENT IN THE SUPERHEATER WOULD BE REDUCED FROM 598 TO 343 BTU PER HR PER SQ. FT PER DEGREE F. THIS REDUCTION WOULD RESULT IN CLADDING TEMPERATURES APPROACHING 1500 F AT THE POINT OF MAXIMUM HEAT FLUX. THESE TEMPERATURES ARE ABOVE THE ALLOWABLE LIMIT FOR THE INCONEL CLADDING.

*BONUS (BOILING NUCLEAR SUPERHEAT PROJECT) + *HEAT TRANSFER ANALYSIS + FUEL ELEMENT + HEAT EXCHANGER + HEAT TRANSFER + REACTOR, BOILING WATER + REACTOR, SUPERHEAT

5-11325 REILLY HJ + BAUMEISTER KJ + ALTOMARE S

HEAT-TRANSFER ANALYSIS OF THE PLUM BROOK REACTOR
NASA, LEWIS RESEARCH CENTER, CLEVELAND

NASA-TN-D-3552 +. 31 PAGES, 12 FIGURES, 1 TABLE, 10 REFERENCES, AUGUST 1966, CFSTI \$2.00 CY

A HEAT-TRANSFER ANALYSIS OF THE PLUM BROOK REACTOR (PBR) CORE WAS PERFORMED TO DETERMINE FUEL-PLATE SURFACE TEMPERATURES, HEAT FLUXES, AND THE DEPARTURE-FROM-NUCLEATE-BOILING (DNB) RATIO DURING FULL POWER OPERATION. THE HOT-SPOT--HOT-CHANNEL METHOD WAS EMPLOYED, THE HEAT-FLUX DISTRIBUTIONS IN THE COOLANT CHANNELS WERE BASED ON THE MEASURED LOW-POWER NEUTRON-FLUX DISTRIBUTIONS IN THE COLD CLEAN CORE AND IN CORES CONTAINING PARTIALLY DEPLETED ELEMENTS. THE RESULTS INDICATE THAT THE ANALYTICAL METHODS DESCRIBED GIVE MORE REALISTIC ESTIMATES OF THE HEAT-TRANSFER MARGIN DURING OPERATION AT 60 MW(TH) THAN WOULD BE OBTAINED WITH CONVENTIONAL METHODS. THE OBSERVED PERFORMANCE OF THE REACTOR INDICATES THAT THE METHODS USED ARE SUFFICIENTLY CONSERVATIVE TO ENSURE ITS SAFETY.

*DNB (DEPARTURE FROM NUCLEATE BOILING) + *FUEL ELEMENT + *HOT SPOT + *PLUM BROOK + FUEL ELEMENT + HEAT TRANSFER + HEAT TRANSFER ANALYSIS + REACTOR, TEST

5-11326 COLLINS WT + SELBY TW

A GRAVIMETRIC GAS FLOW STANDARD - PART II. PERFORMANCE AND EVALUATION
UNION CARBIDE CORPORATION, OAK RIDGE, OAK RIDGE GASEOUS DIFFUSION PLANT

K-1632 + CONF-660902-1 +. 85 PAGES, 16 FIGURES, 15 TABLES, APRIL 15, 1966, CFSTI \$3.00 CY, \$0.75 MN

DESIGN AND CONSTRUCTION FEATURES OF THE GRAVIMETRIC GAS FLOW STANDARD WERE REPORTED IN K-1632, PART I OF THIS SERIES. THIS REPORT, PART II, DESCRIBES THE PERFORMANCE AND EVALUATION OF THE FLOW STANDARD. PRECISION ESTIMATES BASED ON THE STANDARD DEVIATION OF LINEAR FITS TO FLOW VERSUS PRESSURE RELATIONSHIPS FOR CRITICALLY OPERATED FLOW ELEMENTS WERE PLUS-OR-MINUS 0.035 PERCENT OVER THE RANGE OF 0.05 TO 1725 OF DRY AIR PER MINUTE. THE ACCURACY WAS ESTIMATED FROM A RIGOROUS ANALYSIS OF ALL KNOWN SOURCES OF UNCERTAINTY. THE PRINCIPAL SOURCES OF UNCERTAINTY ARE DISCUSSED AND METHODS PROPOSED FOR REDUCING THEIR EFFECT. IT WAS CONCLUDED THAT THE GRAVIMETRIC METHOD HAS A POTENTIAL IMPRECISION SIGNIFICANTLY LESS THAN PLUS OR MINUS 0.10 PERCENT STANDARD DEVIATION, AND THAT THE CONCEPT COULD BE EXTENDED FOR CALIBRATING GAS FLOW RATES OF SEVERAL THOUSAND STANDARD CUBIC FEET PER MINUTE.

*INSTRUMENTATION, FLOW + *INSTRUMENTATION, GENERAL + FLOW THEORY AND EXPERIMENTS + HYDRODYNAMIC ANALYSIS + INSTRUMENTATION CALIBRATION

5-11327 LONGWELL PA

MECHANICS OF FLUID FLOW
CALIFORNIA INST. OF TECH., PASADENA

433 PAGES, FIGURES, TABLES, 1966, MCGRAW-HILL, INC., \$14.75 CY

THIS BOOK IS INTENDED AS A TEXT IN THE AREAS OF FLUID MECHANICS BELIEVED TO BE MOST USEFUL TO CHEMICAL ENGINEERS. IT IS AIMED AT GIVING STUDENTS SUFFICIENT BACKGROUND AND EXPERIENCE SO THAT THEY NOT ONLY CAN READ THE CURRENT LITERATURE WITH UNDERSTANDING BUT ALSO CAN ATTACK NEW PROBLEMS WITH SOME COMPETENCE. THE TEXT REPRESENTS THE EXTENSION OF NOTES USED IN TEACHING A COURSE OF THE SAME TITLE FOR EIGHT YEARS TO FIRST-YEAR GRADUATE STUDENTS IN CHEMICAL ENGINEERING AT THE CALIFORNIA INSTITUTE OF TECHNOLOGY. THE PRIMARY EMPHASIS IS ON MOMENTUM TRANSPORT, HOWEVER, SOME ENERGY TRANSPORT IS INCLUDED TO ILLUSTRATE HOW FLUID MECHANICS ENTERS INTO THE SOLUTION OF SUCH PROBLEMS.

FLOW THEORY AND EXPERIMENTS + HEAT TRANSFER + HYDRAULIC ANALYSIS + HYDRODYNAMIC ANALYSIS + MASS TRANSFER

CATEGORY 5
ACCIDENT ANALYSIS

5-11452 JONES LT + REBMAN HP
BLOWOUT, HEAT TRANSFER, PRESSURE DROP, AND MAXIMUM FLOW TESTS CONDUCTED ON A PROTOTYPE MARK III FUEL BUNDLE
GENERAL ELECTRIC CO., SAN JOSE
GEAP-4898 +. 90 PAGES, REFERENCES, JUNE 25, 1965, CFSTI \$3.00 CY, \$0.75 MN

AN EVESR MK III MODIFIED FUEL BUNDLE WAS FULLY INSTRUMENTED AND OPERATED INTERMITTENTLY FOR THREE MONTHS AT THE MOSS LANDING POWER PLANT. THE TEST BUNDLE WAS OPERATED AT 1000 PSI WITH STEAM FLOWS FROM 660 TO OVER 18,100 LB/HR, AND STEAM INLET TEMPERATURES UP TO 760 F. DATA WERE RECORDED FOR BLOWOUT, FLOW DISTRIBUTION, HEAT TRANSFER, PRESSURE DROP, AND MAXIMUM FLOW.

*FUEL ELEMENT + *LOSS OF COOLANT + *PRESSURE DROP + HEAT TRANSFER + HEAT TRANSFER EXPERIMENT + INSTRUMENTATION, TEMPERATURE + STEAM + WATER, GENERAL

5-11453 FISHER CR
ALKALI METALS EVALUATION PROGRAM
AEROJET-GENERAL NUCLEONICS, SAN RAMON
ACN-8162 +. 73 PAGES, REFERENCES, JANUARY 1966, CFSTI \$3.00 CY, \$0.75 MN

INVESTIGATIONS WERE MADE OF THE HEAT-TRANSFER CHARACTERISTICS OF RUBIDIUM AND CESIUM UNDER CONDITIONS OF FORCED-CONVECTION CONDENSATION IN A ROUND TUBE IN BOTH VERTICAL AND HORIZONTAL ORIENTATIONS. AN AISI TYPE 316 STAINLESS STEEL LOOP, WITH A NICKEL TEST SECTION WAS USED. DATA WERE OBTAINED AT TEMPERATURES UP TO 1360 F. OPERATING PARAMETERS WERE VARIED TO OBTAIN INFORMATION USEFUL FOR THE DESIGN OF CONDENSERS FOR SPACE POWER SYSTEMS.

*CESIUM + *CONDENSATION + *METAL, LIQUID + *RUBIDIUM + FLOW, TUBE + HEAT TRANSFER + HEAT TRANSFER EXPERIMENT

5-11457 WATERS ED
HEAT TRANSFER EXPERIMENTS FOR THE ADVANCED TEST REACTOR
BATTELLE-NORTHWEST, RICHLAND
BNWL-216 +. 106 PAGES, 28 FIGURES, TABLES, MAY 1966, CFSTI \$4.00 CY, \$0.75 MN

HEAT TRANSFER EXPERIMENTS WERE CONDUCTED WITH ELECTRICALLY HEATED TEST SECTIONS (FULL-SCALE MODELS) OF A TYPICAL COOLANT CHANNEL OF THE ADVANCED TEST REACTOR (ATR). A STEADY-STATE HEAT CONDUCTION ANALYSIS OF AN ATR FUEL CHANNEL WAS USED TO DETERMINE THE PROPER SIZE AND SHAPE OF THE RESISTANCE HEATER BARS TO PRODUCE HEAT FLUX DISTRIBUTION TYPICAL OF THE REACTOR FUEL ELEMENTS. A CHOPPED COSINE AXIAL HEAT FLUX PATTERN WAS USED IN BOTH SECTIONS, AND, IN ONE SECTION, A LATERAL FLUX PEAKING FACTOR OF 1.36 PEAK/AVERAGE WAS ALSO USED. A HYDRAULIC ANALYSIS WAS MADE FOR THE ATR CORE WITH MANY PARALLEL FLOW CHANNELS. THE ANALYSIS SHOWED THAT IF THE HYDRAULIC DEMAND (PRESSURE DROP VS FLOW) CURVES FOR ANY COOLANT CHANNEL EXHIBITED MINIMA (NEAR BOILING) WHICH WERE GREATER THAN THE CONSTANT CORE PRESSURE DROP, THEN FLOW INSTABILITY WOULD OCCUR IN THAT CHANNEL AND LEAD TO BOILING BURN-OUT CONDITIONS. EXPERIMENTS WERE THEN PERFORMED TO VERIFY THIS ANALYSIS. THE RESULTS SHOW THAT HYDRAULIC INSTABILITY, NOT BOILING BURNOUT, WILL BE THE LIMITING FACTOR FOR THE ATR. WITH ENFORCED STABLE FLOW, BOILING BURNOUT CONDITIONS WERE NOT ENCOUNTERED IN ANY OF THE EXPERIMENTS, EVEN THOUGH BULK BOILING WAS ALLOWED AND PEAK HEAT FLUXES UP TO 4.0 MILLION BTU/HR-SQ. FT. WERE REACHED.

*ATR (ADVANCED TEST REACTOR - NRTS) + *FLOW STABILITY + BURNOUT HEAT FLUX + FUEL ELEMENT + HEAT TRANSFER ANALYSIS + HEAT TRANSFER EXPERIMENT + REACTOR, TFSI + WATER, GENERAL

5-11460 SCHAUER DA + GIEDT WH
CONTACT CONDUCTANCE MEASUREMENTS DURING TRANSIENT HEATING
LAWRENCE RADIATION LABORATORY, UNIVERSITY OF CALIFORNIA
UCRL-14227 (REV. 1) +. 11 PAGES, OCTOBER 20, 1965, CFSTI \$1.00 CY, \$0.50 MN

AN EXPERIMENTAL METHOD IS DESCRIBED FOR DETERMINING THE INTERFACE CONDUCTANCE BETWEEN TWO PLATES DURING TRANSIENT HEAT TRANSFER. THE TECHNIQUE IS BASED ON HEATING ONE PLATE IN ABOUT 100 MICROSECONDS WITH A CAPACITOR-BANK DISCHARGE AND THEN RECORDING THE CONTACTING-SURFACE TEMPERATURES OF THE TWO SLABS AS THEY COME TO EQUILIBRIUM. RESULTS ARE PRESENTED FOR COMBINATIONS OF (1) ALUMINUM AND STAINLESS STEEL WITH CONTACT-SURFACE FINISH OF 5.5 MICROINCHES, AA (ARITHMETIC AVERAGE) OF 12-30, 15-38, AND 50-35, AND (2) STAINLESS STEEL AND CERAMIC WITH CONTACT-SURFACE FINISHED OF 31-38 AA AND 64-38 AA. THE PRESSURE WAS VARIED FROM 100 TO 2000 PSI. FOR METALLIC CONTACTS, THE CONDUCTANCE INCREASED ABOUT 200 PERCENT WITH TIME. THE REVERSE OCCURRED WITH THE METAL-CERAMIC CONTACTS.

*HEAT CONDUCTION + *INSTRUMENTATION, TEMPERATURE + HEAT TRANSFER + HEAT TRANSFER EXPERIMENT + TEMPERATURE TRANSIENT

5-11462 HAUSKNECHT OF
COMPUTER CALCULATION OF FUEL CLADDING TEMPERATURES, HEAT FLUXES AND POWER DISTRIBUTION IN THE PNPF CORE
ATOMICS INTERNATIONAL, CANOGA PARK
NAA-SR-MEMO-9492 +. 69 PAGES, APRIL 4, 1964, CFSTI \$3.00 CY

A COMPUTER PROGRAM WAS WRITTEN TO MONITOR FUEL-CLADDING TEMPERATURES, HEAT FLUXES, AND OVERALL POWER DISTRIBUTION IN THE PNPF CORE ON A ROUTINE BASIS. COMPUTATION OF THE QUANTITIES OF INTEREST IS BASED ON AN EXTENSION OF EARLIER THEORETICAL ANALYSES OF THE FISSION-POWER DISTRIBUTION AND HEAT CONDUCTION IN THE CORE. AXIAL FISSION-POWER DISTRIBUTIONS WERE FITTED WITH TRANSCENDENTAL FUNCTIONS, USING THE METHOD OF LEAST SQUARES, SO THAT THEY CAN BE EXPRESSED IN ANALYTICAL FORM, THEREBY PERMITTING THE MAXIMUM VALUES OF RELATED QUANTITIES TO BE DETERMINED BY A COMPUTER.

*CLAD + *FUEL ELEMENT + *INSTRUMENTATION, TEMPERATURE + HEAT CONDUCTION + HEAT TRANSFER

CATEGORY 5
ACCIDENT ANALYSIS

5-11463 TWO-PHASE FLOW AND HEAT TRANSFER IN MULTIROD GEOMETRIES. QUARTERLY PROGRESS REPORT NO. 3
GENERAL ELECTRIC CO., SAN JOSE
GEAP-4933 +. 26 PAGES, AUGUST 1965, CFSTI \$2.00 CY, \$0.50 MN

PRESSURE DROP AND AVERAGE TEST-SECTION VOID DATA FOR TWO-PHASE UPFLOW OF AIR AND WATER AT 100 PSIA IN BOTH A ROUND TUBE AND CONCENTRIC ANNULUS ARE IN GOOD AGREEMENT WITH THE LOCKHART-MARTINELLI CORRELATION. MEASUREMENTS MADE WITH THE ISOKINETIC SAMPLING PROBE FOR SINGLE-PHASE AIR AND SINGLE-PHASE WATER ARE WITHIN ABOUT 5 PERCENT OF A THEORETICAL CURVE BASED UPON PREDICTION OF INLET PRESSURE DROP FOR LAMINAR FLOW IN THE SAMPLING PROBE. FOR TWO-PHASE FLOW MEASUREMENTS, A CONTINUOUS PURGE WILL BE USED IN THE STATIC PRESSURE LINES OF THE SAMPLING PROBE SETUP. A DETAILED PROFILE INVESTIGATION OF LOW-QUALITY (6.7 PERCENT), TWO-PHASE FLOW IN A ROUND TUBE, BY MEANS OF THE SAMPLING PROBE SHOWS THAT THE MAXIMUM IMPACT PRESSURE DOES NOT OCCUR ON THE TUBE CENTERLINE IN SPITE OF THE EXPECTED SMOOTH DISTRIBUTIONS OF LOCAL QUALITY AND VOID FRACTION ACROSS THE TUBE.

*FLOW, TUBE + *FLOW, TWO PHASE + AIR + FLOW THEORY AND EXPERIMENTS + HEAT TRANSFER + WATER, GENERAL

5-11464 LEVY S
FORCED CONVECTION SUB-COOLED BOILING. PREDICTION OF VAPOR VOLUMETRIC FRACTION
GENERAL ELECTRIC CO., SAN JOSE
GEAP-5157 +. 33 PAGES, REFERENCES, APRIL 1966, CFSTI \$2.00 CY, \$0.50 MN

A MODEL IS DEVELOPED TO PREDICT THE VAPOR VOLUMETRIC FRACTION DURING FORCED CONVECTION SUBCOOLED BOILING. THE PROPOSED METHOD OF CALCULATION CONSISTS OF THREE STEPS - (1) THE POINT OF BUBBLE DEPARTURE FROM THE HEATED SURFACE (I.E., THE LOCATION OF VAPOR VOLUMETRIC FRACTIONS SIGNIFICANTLY HIGHER THAN ZERO) IS DETERMINED FROM A BUBBLE FORCE BALANCE AND THE SINGLE-PHASE LIQUID TURBULENT TEMPERATURE DISTRIBUTION AWAY FROM THE HEATED WALL. (2) A RELATION IS POSTULATED BETWEEN THE TRUE LOCAL VAPOR WEIGHT FRACTION AND THE CORRESPONDING THERMAL EQUILIBRIUM VALUE. (3) THE VAPOR VOLUMETRIC FRACTION IS OBTAINED FROM THE TRUE LOCAL VAPOR WEIGHT FRACTION AND AN ACCEPTED RELATIONSHIP BETWEEN VAPOR WEIGHT AND VOLUMETRIC FRACTIONS. THE METHOD WAS APPLIED TO A VARIETY OF AVAILABLE TEST DATA, AND THE AGREEMENT WAS SATISFACTORY FOR A MULTITUDE OF FLOW, HEAT FLUX, AND FLUID PROPERTY CONDITIONS.

*CONVECTIVE BOILING + *FLOW, TWO PHASE + *HEAT TRANSFER, BOILING + FLOW, TUBE + HEAT TRANSFER + HYDRODYNAMIC ANALYSIS

5-11465 DAVIES AL
SPEED OF SOUND IN MIXTURES OF WATER AND STEAM
UNITED KINGDOM ATOMIC ENERGY ASSOCIATION, WINFRITH
AEEW-M-452 +. 22 PAGES, 5 FIGURES, REFERENCES, OCTOBER 1965, DEP. MN

THE SPEED OF SOUND IN A HOMOGENEOUS MIXTURE OF WATER AND STEAM WAS CALCULATED FOR TWO DIFFERENT SETS OF ASSUMPTIONS. IN THE FIRST CASE IT IS ASSUMED THAT THERE IS NO MASS TRANSFER BETWEEN THE PHASES AND THEREFORE THE WATER AND STEAM ARE INDEPENDENTLY ISENTROPIC. IN THE SECOND CASE IT IS ASSUMED THAT THE WATER AND STEAM ARE IN CONTINUOUS THERMAL EQUILIBRIUM ON THE SATURATION LINE, WITH MASS TRANSFER BETWEEN THE PHASES. IT IS SUGGESTED THAT, IN GENERAL, COMPRESSION WAVES PROPAGATE ACCORDING TO THE FIRST SET OF ASSUMPTIONS, WHEREAS RAREFACTION WAVES PROPAGATE ACCORDING TO THE SECOND SET. THE EFFECT OF VARIOUS FLOW REGIMES AND SLIP ON THE APPLICATION OF THE RESULTS TO TWO-PHASE FLOW IS DISCUSSED, AND SOME OTHER WORK ON THE SPEED OF SOUND IS BRIEFLY DESCRIBED. RECOMMENDATIONS ARE MADE ABOUT THE APPLICATION OF THE RESULTS TO THE PROPAGATION OF PRESSURE WAVES AND THE DETERMINATION OF CRITICAL FLOW IN WATER-REACTOR SYSTEMS.

*FLOW, TUBE + *FLOW, TWO PHASE + *HYDRODYNAMIC ANALYSIS + FLOW THEORY AND EXPERIMENTS + WATER, GENERAL

5-11468 KIRBY GJ
BURNOUT IN CLIMBING-FILM TWO-PHASE FLOW. A REVIEW OF THEORIES OF THE MECHANISM
UNITED KINGDOM ATOMIC ENERGY ASSOCIATION, WINFRITH
AEEW-R-470 +. 63 PAGES, 9 FIGURES, REFERENCES, MARCH 1966, BIS \$1.80 CY

BURNOUT DATA FOR ANNULAR FLOW WERE EXAMINED, AND IT WAS FOUND THAT FOR QUALITIES ABOVE (SAY) 10 PERCENT THE BURNOUT HEAT FLUX IS A FUNCTION ONLY OF PRESSURE, TUBE DIAMETER (TO THE HALF POWER) TIMES MASS FLOW RATE, AND QUALITY TO WITHIN THE ERRORS IN THE EXPERIMENTAL DATA. VARIOUS BURNOUT MODELS WERE EXAMINED AND NONE COULD PREDICT THE TRENDS GIVEN BY THE ABOVE FUNCTION. THE LITERATURE ON DROPLET DEPOSITION, ENTRAINMENT, AND ONSET OF ANNULAR FLOW WAS STUDIED TO SEE IF ANY NEW LIGHT COULD BE THROWN ON THE PROBLEM OF BURNOUT. ACTUAL VALUES FOR THE DEPOSITION RATE OF DROPLETS IN A BOILING CHANNEL WERE DERIVED, AND IT IS HOPED THAT THESE WILL PROVIDE A BASIS FOR FURTHER STUDIES OF POSSIBLE BURNOUT MODELS.

*BURNOUT HEAT FLUX + *DNB (DEPARTURE FROM NUCLEATE BOILING) + *HEAT TRANSFER CORRELATION + *HEAT TRANSFER, BOILING + HEAT TRANSFER

5-11510 WILKIE D + WHITE L
CALCULATION OF FLOW RESISTANCE OF PASSAGES BOUNDED BY A COMBINATION OF ROUGH AND SMOOTH SURFACE
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, WINDSCALE
TRG-1113 (W) +. 20 PAGES, 11 FIGURES, 11 REFERENCES, OCTOBER 22, 1965, UKAEA

A SET OF EQUATIONS IS DERIVED WHICH FORMS THE BASIS OF A METHOD OF APPLYING TRANSFORMED ROUGHENED-SURFACE FRICTION-FACTOR DATA TO THE CALCULATION OF MIXED-SURFACE PRESSURE DROP. DETAILED EXAMPLES OF THE METHOD APPLIED TO ANNULAR AND CLUSTER CONFIGURATIONS ARE PRESENTED, AND THE RESULTS ARE COMPARED WITH EXPERIMENTAL VALUES.

CATEGORY 5
ACCIDENT ANALYSIS

5-11510 *CONTINUED*
*FLOW, AXIAL + *FUEL ELEMENT + *PRESSURE DROP + FLOW THEORY AND EXPERIMENTS + FLOW, TUBE +
FLOW, TURBULENT + HYDRODYNAMIC ANALYSIS

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-08441 FOX TA + MUELLER RA + FORD CH + ALGER DL
CRITICAL MASS STUDIES WITH NASA ZERO POWER REACTOR II. I - CLEAN HOMOGENEOUS CONFIGURATIONS
LEWIS RESEARCH CENTER, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, CLEVELAND, OHIO
NASA-TN-D-3097 +. 19 PAGES, 6 FIGURES, 2 TABLES, 6 REFERENCES- NOVEMBER 1965, CFSTI \$1.00 CY, \$0.50 MN

THE NASA ZERO POWER REACTOR II (ZPR-II) HAS BEEN USED TO DETERMINE EXPERIMENTALLY THE CRITICAL MASSES FOR MORE THAN A TENFOLD RANGE OF HIGHLY ENRICHED (93.2 PERCENT U-235) AQUEOUS URANYL FLUORIDE FUEL CONCENTRATIONS IN CLEAN CYLINDRICAL GEOMETRIES. IN ADDITION TO THE CRITICAL MASSES, DATA ARE PRESENTED ON THE TEMPERATURE COEFFICIENT OF REACTIVITY WORTH AT CRITICALITY FOR A SIMILAR RANGE OF CONCENTRATIONS. A BRIEF DESCRIPTION OF THE ZPR-II AND THE EXPERIMENTAL PROCEDURES USED ARE ALSO INCLUDED.

CRITICALITY EXPERIMENT + CRITICALITY SAFETY + REACTIVITY COEFFICIENT + TEMPERATURE COEFFICIENT + URANIUM

6-08896 MARGOLIS SG + CURLEE NJ
CONTROL-INDUCED XENON OSCILLATIONS
WESTINGHOUSE ELECTRIC CORPORATION, BETTIS ATOMIC POWER LABORATORY
WAPD-T-1732 +. 27 PAGES, 7 SLIDES, 2 FIGURES, 2 REFERENCES, JULY, 1964, AMERICAN NUCLEAR SOCIETY WINTER MEETING, SAN FRANCISCO, CALIFORNIA, DECEMBER, 1964, SOURCE

SMALL-PERTURBATION THEORY IS SAID TO BE SATISFACTORY. THE COUPLING REQUIRED FOR STABILITY WITH AVERAGE-TEMPERATURE-CONTROL INCREASES AS FLUX IN THE CONTROLLED REGION DECREASES. CONTROL BY ROD RATE PROPORTIONAL TO ERROR IN A LOCAL FLUX HAS ACCEPTABLE TRANSIENT RESPONSE.

*XENON + REACTOR STABILITY

6-G9377 JONES AB
REACTIVITY STABILITY OF A BOILING REACTOR. PART 2
KNOLLS ATOMIC POWER LABORATORY, GENERAL ELECTRIC CO.
KAPL-3093 +. 40 PAGES, 1 FIGURE, MARCH 1, 1965, CFSTI, \$2.00 CY

EXTENSION OF KAPL-3072. LINEARIZED, DENSITY-DEPENDENT REACTIVITY STABILITY OF A ONE-FLUX-MODE BOILING REACTOR. TRANSIENT FLOW REDISTRIBUTION IS PERMITTED AT THE CHANNEL INLETS, IN ACCORDANCE WITH MOMENTUM EQUATION CONSIDERATIONS IN EACH CHANNEL, WITH THE IMPOSED CONSTRAINT THAT TOTAL REACTOR INLET FLOW IS CONSTANT. DIGITAL COMPUTER PROGRAM (FABLE) IS DESCRIBED.

*REACTOR STABILITY + COMPUTER PROGRAM + COMPUTER, DIGITAL + REACTOR, BOILING WATER

6-09404 TORLIN BZ
CALCULATION OF MODES OF LOW-LEVEL OSCILLATION IN NUCLEAR REACTORS
ATOMNAYA ENERGIYA 18(5)- 463 (MAY 1965)

A METHOD IS PRESENTED FOR APPROXIMATE CALCULATION OF SMALL-AMPLITUDE OSCILLATIONS. THE EQUATION GIVES THE FREQUENCIES OF THE POSSIBLE OSCILLATORY STATES, TOGETHER WITH THE AMPLITUDES IN THE REACTIVITY AND POWER, AS WELL AS THE PHASE DIFFERENCES BETWEEN THESE OSCILLATIONS.

REACTOR DYNAMICS + REACTOR STABILITY + TRANSFER FUNCTION

6-09694 LAURY JH
SUMMARY OF WATER MODERATED EXPERIMENTS WITH 1.8 WT PERCENT PU-AL FUEL IN THE PRCF
BATTELLE-NORTHWEST, RICHLAND
BNWL-149 +. 13 PAGES, 1 FIGURE, 4 TABLES, 2 REFERENCES, JULY 1965, PP. 5-17 OF THE PHYSICS RESEARCH QUARTERLY REPORT APRIL, MAY, JUNE, 1965, CFSTI, \$3.00 CY, \$0.75 MN

THIS IS A SUMMARY OF WATER-MODERATED EXPERIMENTS WITH 1.8 PERCENT BY WEIGHT PLUTONIUM-ALUMINUM IN THE PRCF. WORTH MEASUREMENTS OF CONTROL ELEMENTS, REACTIVITY COEFFICIENTS FOR VARIOUS REACTOR MATERIALS, AND REACTOR STUDIES ARE SUMMARIZED.

*PRTR (PLUTONIUM RECYCLE TEST REACTOR) + CONTROL ROD WORTH + FUEL ELEMENT + REACTIVITY COEFFICIENT + REACTOR KINETICS + TEMPERATURE COEFFICIENT

6-09695 LIIKALA RC + JENQUIN UP + REARDON WA
PUO2 - UO2 EXPERIMENT IN THE EBWR
BATTELLE-NORTHWEST, RICHLAND
BNWL-149 +. 2 PAGES, 2 REFERENCES, PP. 18-19 OF THE PHYSICS RESEARCH QUARTERLY REPORT APRIL, MAY, JUNE, 1965, CFSTI, \$3.00 CY, \$0.75 MN

A PLUTONIUM EXPERIMENT TO BE PERFORMED IN THE EXPERIMENTAL BOILING WATER REACTOR (EBWR) AT ARGONNE NATIONAL LABORATORY TO DEMONSTRATE THE UTILIZATION OF PLUTONIUM IN A LIGHT-WATER MODERATED POWER REACTOR. REACTIVITY WORTH OF FUEL RODS, SAFETY RODS, VOIDS, AND BORIC ACID IN THE MODERATOR, NEGATIVE REACTIVITY EFFECTS DUE TO VOIDS, XENON CONCENTRATIONS, INCREASED MODERATOR TEMPERATURE, AND MODERATOR VOID CHANGES ARE MEASURED. THE SUBJECT IS DISCUSSED IN MORE DETAIL IN BNWL-126.

*EBWR (EXPERIMENTAL BOILING WATER REACTOR) + CHEMICAL SHIM + CONTROL ROD WORTH + MODERATOR COEFFICIENT + PLUTONIUM + PLUTONIUM OXIDE + REACTIVITY COEFFICIENT + URANIUM DIOXIDE + VOID COEFFICIENT + XENON

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-09696 HOCH RJ + HUMES RM + BROWN WW
SPHERICAL AND SLAB GEOMETRY SOLUTIONS TO A TWO-REGION BOUNDARY VALUE PROBLEM GIVING TEMPERATURE INCREASE DURING AN EXPONENTIAL POWER RISE
BATTTELLE-NORTHWEST, RICHLAND
BNWL-149 +. 5 PAGES, 1 REFERENCE, JULY 1965, PP. 36-40 OF THE PHYSICS RESEARCH QUARTERLY REPORT APRIL, MAY, JUNE, 1965, CFSTI, \$3.00 CY, \$0.75 MN

BOUNDARY VALUE PROBLEM IN HEAT CONDUCTIONS WAS DISCUSSED. HEAT IS GENERATED IN SPHERICAL PELLETS OF RADIUS (A) WHICH ARE EMBEDDED IN GRAPHITE. WITH EACH PELLETT ASSOCIATE A CONCENTRIC SPHERE OF GRAPHITE OF RADIUS (B). AN EXPONENTIAL POWER EXCURSION WITH INVERSE PERIOD (W) OCCURS, AND THE TEMPERATURE RISE $\theta(r,t)$ IS TO BE FOUND.

*THERMAL ANALYSIS + SLAB + SPHERE + THEORETICAL INVESTIGATION

6-09697 HUMES RM
NEUTRON PULSING POSSIBILITIES IN HTLTR
BATTTELLE-NORTHWEST, RICHLAND
BNWL-149 +. 4 PAGES, 1 TABLE, 1 REFERENCE, JULY 1965, PP. 41-44 OF THE PHYSICS RESEARCH QUARTERLY REPORT APRIL, MAY, JUNE, 1965, CFSTI, \$3.00 CY, \$0.75 MN.

MEASUREMENT OF SUBCRITICALITY IN HTLTR (HIGH TEMPERATURE LATTICE TEST REACTOR) BY MEANS OF PULSED NEUTRON SOURCE.

*PULSED NEUTRON TECHNIQUE + GRAPHITE + MEASUREMENT, GENERAL + MEASUREMENT, SUBCRITICALITY

6-09724 SPERT IV -- SUBASSEMBLY TEST PROGRAM
PHILLIPS PETROLEUM COMPANY, IDAHO
IDO-17123 +. PAGES 1-17 OF QUARTERLY TECHNICAL REPORT - SPERT PROJECT, APRIL, MAY, JUNE 1965, CFSTI, \$3.00 CY, \$0.75 MN

REGARDING CDC - DESCRIPTION AND SPECIFICATIONS OF CAPSULE. TESTS WITH CHEMICAL EXPLOSIVES. MODIFICATIONS OF EXPERIMENT TUBE. ANALYTICAL INVESTIGATION OF FUEL-ROD FAILURE. SCALED-DOWN FUEL RODS.

*CORE, CAPSULE DRIVER (CDC) + BURST PRESSURE + FAILURE, FUEL ELEMENT + REACTOR, TEST + SPERT 4 (SPECIAL POWER EXCURSION REACTOR TEST)

6-09725 QUARTERLY TECHNICAL REPORT - SPERT PROJECT, JULY, AUGUST, SEPTEMBER, 1965
PHILLIPS PETROLEUM COMPANY, IDAHO
IDO-17146 +. 29 PAGES, 9 FIGURES, 5 TABLES, 21 REFERENCES, CFSTI, \$2.00 CY, \$0.50 MN

REGARDING CDC (CAPSULE DRIVER CORE) - LOW-POWER EXPERIMENTS IN SPERT IV. DESCRIPTION OF CORE LOADING AND EXPERIMENT TUBE. SHUTDOWN MARGIN. CONTROL-ROD WORTH. FUEL-ROD WORTH. STRENGTH OF STEELS FOR EXPERIMENT TUBE. PRESSURE TRANSDUCER. INFLUENCE OF ENRICHMENT OF TEST SAMPLES ON FAILURE MECHANISM. SCALED-DOWN FUEL RODS. COMPUTATION OF DOPPLER FEEDBACK, INCLUDING SPACE-DEPENDENT REACTOR DYNAMICS CALCULATIONS. COMPUTATION OF ENERGY DEPOSITED AT THE END OF EXCURSION WITHOUT COMPUTING CORE FLUXES.

ANALYTICAL MODEL + COMPUTER, DIGITAL + CONTROL ROD + CRITICALITY EXPERIMENT + DESTRUCTIVE TRANSIENT + DOPPLER EFFECT + FAILURE, FUEL ELEMENT + MEASUREMENT, GENERAL + MEASUREMENT, STRAIN GAGE + PRESSURE, INTERNAL + REACTIVITY EFFECT + SHUTDOWN MARGIN + SPACE DEPENDENT DYNAMICS + STRESS ANALYSIS

6-09737 RANDES J
FEEDBACK DUE TO ELASTIC WAVES AND DOPPLER COEFFICIENT DURING THE EXCURSIONS OF A PULSED FAST REACTOR
EURATOM, ISPRA, ITALY
16 PAGES, 10 REFERENCES, JOURNAL OF NUCLEAR ENERGY PARTS A/B REACTOR SCIENCE AND TECHNOLOGY 20(1)- 1-16 (JUNE 30, 1965)

FOR A PULSED REACTOR WITH POSITIVE DOPPLER EFFECT AND NEGATIVE FUEL-EXPANSION REACTIVITY COEFFICIENT, SELF-LIMITING OF EXCURSION OCCURS ONLY IF THE DOPPLER COEFFICIENT IS LESS THAN A CERTAIN LIMIT.

*DOPPLER EFFECT + *REACTOR, PULSED + EXPANSION REACTIVITY EFFECT + REACTOR, FAST BURST

6-C9740 HOUNGHTALING JE + NORBERG JA + HAIRE JC
ADDENDUM TO THE SPERT III HAZARDS SUMMARY REPORT -- LOW-ENRICHMENT OXIDE CORE
PHILLIPS PETROLEUM COMPANY, IDAHO
IDO-17003 (REV. 2) +. 92 PAGES, 22 TABLES, 21 FIGURES, 34 REFERENCES, OCTOBER 1965, CFSTI, \$3.00 CY, \$0.75 MN

PERTINENT MECHANICAL CHARACTERISTICS OF THE C-CORE ARE EXPLAINED, AS WELL AS CHANGES MADE TO THE SPERT III CONTROL SYSTEM. INCLUDED ARE THE NUCLEAR CHARACTERISTICS OF THE CORE AS DETERMINED BY CALCULATION AND EXTRAPOLATION OF PREVIOUS EXPERIMENTAL RESULTS. ALSO, THE PREDICTED KINETIC BEHAVIOR FOR THE PLANNED TESTS AND CERTAIN ACCIDENT CONDITIONS ARE DISCUSSED. SEVERAL ACCIDENT SITUATIONS ARE CONSIDERED AND ANALYZED TO OBTAIN NUMERICAL ESTIMATES OF RADIOLOGICAL HAZARDS.

*SPERT 3 (SPECIAL POWER EXCURSION REACTOR TEST) + ACCIDENT ANALYSIS + CONTROL SYSTEM + DOSE + HAZARDS ANALYSIS + REACTOR KINETICS + REACTOR, PRESSURIZED WATER + REACTOR, TEST + SAFEGUARDS REPORT, GENERAL

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-09783 A STUDY OF A GAS-COOLED FAST BREEDER REACTOR. INITIAL STUDY, CORE DESIGN ANALYSIS AND SYSTEM DEVELOPMENT PROGRAM. FINAL SUMMARY REPORT
GENERAL ATOMIC DIVISION, GENERAL DYNAMICS CORP.
GA-5537 +. 255 PAGES, FIGURES, TABLES, REFERENCES, AUGUST 15, 1964, CFSTI

REPORT RELATES TO DESIGN BASED ON MINIMAL EXTENSION OF PRESENT TECHNOLOGY, USING ESTABLISHED REACTOR MATERIALS, OPERATED WELL WITHIN THEIR CAPABILITIES. CONCLUSIONS ARE THAT GAS COOLING OFFERS ADVANTAGES BEYOND PROVISION OF AN ALTERNATIVE TECHNOLOGY, AS IT AVOIDS SOME PRACTICAL PROBLEMS ASSOCIATED WITH SODIUM. AVOIDANCE OF THE SAFETY - AND STABILITY - DICTATED DESIGN COMPROMISES IMPOSED BY NUCLEAR-COOLANT INTERACTION ALLOWS THE REALIZATION OF A COMBINATION OF HIGH INTERNAL CONVERSION RATIO AND FUEL RATING WITH VERY LOW BURNUP REACTIVITY CHANGE AND LOW COOLANT-VOID EFFECTS. THE REDUCED MODERATION INFLUENCE OF THE COOLANT RESULTS IN A TOLERABLE REDUCTION OF DOPPLER COEFFICIENT IN VIEW OF THE REDUCED COOLANT-VOID COEFFICIENT AND LOW EXCESS REACTIVITY REQUIREMENTS. COOLANT-LOSS RATES SUFFICIENT TO HALVE PRESSURE IN 20 SEC CAN BE DEALT WITH BY THE NORMAL GAS CIRCULATORS. FOR THE MORE-DETAILED STUDIES, INCLUDING ILLUSTRATION OF CONSTRUCTIONAL FEATURES AND KINETIC-BEHAVIOR EVALUATION, A 500 MW(E) REFERENCE DESIGN BASED ON A 5000-LITER CORE WAS SELECTED.

*DESIGN STUDY + *REACTOR, BREEDER + *REACTOR, GAS COOLED + DOPPLER EFFECT + FLOODING COEFFICIENT + LOSS OF COOLANT + REACTOR STABILITY + VOID COEFFICIENT

6-09987 CARLSMITH RS + DELENE JG
RESPONSE OF A HELIUM-COOLED FAST REACTOR TO CHANGES IN COOLANT FLOW AND REACTIVITY
OAK RIDGE NATIONAL LABORATORY
ORNL-P-1698 + CONF-651009-4 +. 24 PAGES, PRESENTED AT CONFERENCE ON SAFETY, FUELS AND CORE DESIGN IN LARGE FAST POWER REACTORS, ARGONNE NATIONAL LABORATORY, OCTOBER 11-14, 1965, CFSTI, \$1.00 CY, \$0.50 MN

ORNL DESIGN OF A HELIUM-COOLED FAST REACTOR STUDIED WITH RESPECT TO STEP AND RAMP REACTIVITY INSERTIONS AND LOSS OF COOLANT PRESSURE AND FLOW.

*REACTOR, FAST + ACCIDENT, REACTIVITY + HELIUM + LOSS OF FLOW + LOSS OF PRESSURE + REACTOR, GAS COOLED

6-C9988 MOSKALEV OB + CHUYANOV VA
CERTAIN NONLINEAR PROBLEMS IN NUCLEAR REACTOR THEORY
3 PAGES, 1 FIGURE, 3 REFERENCES, ATOMNAYA ENERGIYA, 18(3), PAGES 254-255 (MARCH, 1965)

THIS ARTICLE IS CONCERNED WITH THE EXISTENCE OF A UNIQUE, POSITIVE, NONTRIVIAL SOLUTION OF PEIERLS NONLINEAR INTEGRAL EQUATION. THE EQUATION IS SOLVED BY USING THE METHOD OF SUCCESSIVE APPROXIMATIONS UNDER NATURAL PHYSICAL ASSUMPTIONS. THE SOLUTION IS UNIQUE IF ADDITIONAL LIMITATIONS ARE IMPOSED.

DYNAMICS, NONLINEAR

6-09989 CHELINTSEV NG
PRESENTATION OF THE REACTOR DYNAMICS EQUATIONS IN TERMS OF THE RECIPROCAL PERIOD
4 PAGES, 3 REFERENCES, ATOMNAYA ENERGIYA, 18(3), PAGES 292-294 (MARCH, 1965)

REDERIVES IN-HOUR EQUATION, TRANSFER FUNCTION, ETC.

EQUATION, IN HOUR + REACTOR DYNAMICS + TRANSFER FUNCTION

6-C9990 SHOTKIN LM
CENTERS AND LIMIT CYCLES IN REACTOR KINETICS
BROOKHAVEN NATIONAL LABORATORY
BNL-9010 + CONF-650413-14 +. 33 PAGES, MARCH, 1965, SYMPOSIUM ON NEUTRON DYNAMICS AND CONTROL, TUCSON, ARIZ., CFSTI, \$2.00 CY

PRACTICAL METHOD FOR COMPUTING THE AMPLITUDE AND FREQUENCY OF CENTERS AND LIMIT CYCLES, BASED ON METHOD OF KRYLOV AND BOGOLIUBOV. ANALYTIC RESULTS FOR THE TWO-TEMPERATURE PROBLEM WITH NO PROMPT POWER COEFFICIENT, AND THE XENON PROBLEM WITH NO TEMPERATURE FEEDBACK

*DYNAMICS, NONLINEAR

6-10039 SECTION II - PHYSICS
11 PAGES, 1 FIGURE, 1 TABLE, 56 REFERENCES, FALL 1965, POWER REACTOR TECHNOLOGY 8(4), PAGES 210-220, SECTION II

THE SUBSECTION ON CRITICAL AND EXPONENTIAL EXPERIMENTS WITH PLUTONIUM REVIEWS WORK ON POWER AND TEMPERATURE COEFFICIENTS. INCLUDES U.S. AND FRENCH WORK WITH U-PU MIXTURES AND WITH PU THAT CONTAINS PU-240 AND -241.

*CRITICALITY EXPERIMENT + *CRITICALITY SAFETY + *PLUTONIUM + FRANCE + POWER COEFFICIENT + TEMPERATURE COEFFICIENT

6-10040 WASHBURN B + HUDSON CE
PIN TECHNIQUE FOR DISPLACEMENT MEASUREMENTS IN KIWI TNT
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS
LA-3388-MS +. 21 PAGES, 14 FIGURES, JUNE 1965, CFSTI, \$1.00 CY, \$0.05 MN

ACCESSION NUMBER 6-09783 TO 6-10040

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-10040 *CONTINUED*

A PIN TECHNIQUE THAT WAS USED TO MEASURE RELATIVELY SMALL, EARLY, OUTWARD DISPLACEMENTS OF THE TNT REACTOR CORE AND REFLECTOR CYLINDER COMPONENTS DURING THE KIWI TRANSIENT NUCLEAR TEST IS DESCRIBED. CONSIDERATIONS NECESSARY TO ADAPT THIS METHOD TO THE ENVIRONMENT OF THE REACTOR TRANSIENT AND THE RESULTS ARE PRESENTED. AN EXPERIMENT TO DETERMINE THE TIMES OF CLOSING OF SELECTED PROPELLANT PASSAGES BY USING COAXIAL WIRES IS ALSO GIVEN.

*KIWI TNT (TRANSIENT NUCLEAR TEST) + INSTRUMENTATION, GENERAL

6-10346 SANDQUIST GM

XKINEQ -- A TWO-GROUP, TWO-DIMENSIONAL MULTIREGION COMPUTER CODE FOR EXAMINING FLUX STABILITY IN NUCLEAR REACTORS IN THE PRESENCE OF XENON-135
PHILLIPS PETROLEUM CO., IDAHO
ID0-17127 +. 94 PAGES, 5 FIGURES, JANUARY 1966, CFSTI \$3.00 CY, \$0.75 MN

XKINEQ IS A FORTRAN CODED DIGITAL COMPUTER PROGRAM FOR EXAMINING THE STABILITY OF THE NEUTRON FLUX DISTRIBUTION IN TIME IN A REACTOR CORE UNDER THE INFLUENCE OF XENON-135. THE PROGRAM SIMULATES KINETIC EQUATIONS WHICH EMPLOY TWO-ENERGY-GROUP DIFFUSION THEORY TO DESCRIBE THE NEUTRON FLUX AND DESCRIBES THE TWO-DIMENSIONAL RADIAL-AXIAL TIME BEHAVIOR IN MULTIREGION REACTOR CORES WITH CYLINDRICAL GEOMETRY AND ANY TWO-DIMENSIONAL TIME BEHAVIOR IN MULTIREGION CORES WITH RECTANGULAR GEOMETRY.

*COMPUTER PROGRAM + *COMPUTER, DIGITAL + *XENON OSCILLATION

6-10430 ARGONNE NATIONAL LABORATORY PUBLICATIONS, JULY 1, 1964 - JUNE 30, 1965

ARGONNE NATIONAL LABORATORY, ARGONNE, ILLINOIS
ANL-7087 +. 328 PAGES, AUGUST 1965 CFSTI, \$7.00 CY, \$1.50 MN

THIS PUBLICATION LIST IS A BIBLIOGRAPHY OF SCIENTIFIC AND TECHNICAL ACCOUNTS ORIGINATED AT ARGONNE AND PUBLISHED DURING FISCAL YEAR 1965. IT INCLUDES ITEMS PUBLISHED AS JOURNAL ARTICLES, TECHNICAL REPORTS, BOOKS, ETC., ALL OF WHICH HAVE BEEN MADE AVAILABLE TO THE PUBLIC. THE LIST IS DIVIDED INTO THREE PARTS - THE FIRST A LIST DIVISION, THE SECOND AN ALPHABETICAL AUTHOR INDEX, AND THE THIRD PART A KWIC SUBJECT INDEX. INCLUDED ARE SECTIONS ON RADIOLOGICAL PHYSICS, REACTOR PHYSICS, REACTOR ENGINEERING, INDUSTRIAL HYGIENE AND SAFETY, FIRE PROTECTION, AND CHEMICAL ENGINEERING.

*BIBLIOGRAPHY + *BURNOUT HEAT FLUX + *CHEMICAL REACTION + *DOSE MEASUREMENT, EXTERNAL + *HEAT TRANSFER + *REACTOR DYNAMICS + *REACTOR STABILITY + ACCIDENT ANALYSIS + FARET (FAST ARGONNE REACTOR EXPERIMENT TEST) + METAL WATER REACTION + NOISE + REACTIVITY COEFFICIENT + REACTOR KINETICS + REACTOR TRANSIENT + REACTOR, BREEDER + REACTOR, FAST + REACTOR, LIQUID METAL COOLED + SPACE DEPENDENT DYNAMICS + VOID COEFFICIENT

6-10509 ANALOG MODELS FOR HNPFC CONTROL AND PROTECTION STUDIES

ATOMICS INTERNATIONAL, CANOGA PARK
NAA-SR-8579 +. 69 PAGES, 16 FIGURES, 7 TABLES, 10 REFERENCES, JUNE 1964, CFSTI, \$1.50 CY

PROBLEM - DEVELOP A MODEL FOR THE DYNAMIC BEHAVIOR OF THE HNPFC. APPROACH - AN ANALOG COMPUTER MODEL WAS DEVELOPED FOR USE IN STUDIES OF THE CONTROL AND SAFETY SYSTEMS. THE MODEL INCLUDES - NEUTRON KINETICS, AFTERHEAT, CORE HEAT-TRANSFER FOR AVERAGE CHANNEL AND HOT CHANNEL, PRIMARY-COOLANT HYDRAULICS FOR FORCED AND CONVECTION FLOWS, ROD DRIVES, CONTROL SYSTEM, AND PROTECTIVE SYSTEM. THE SIMULATIONS OF THE VARIOUS SECTIONS ARE DESCRIBED IN DETAIL.

*ANALYTICAL MODEL + *COMPUTER PROGRAM + *COMPUTER, ANALOG + *REACTOR DYNAMICS + CONTROL SYSTEM + HALLAM + MATHEMATICAL STUDY + REACTOR SAFETY SYSTEM + REACTOR, LIQUID METAL COOLED

6-10532 JUDD AM

LOSS-OF-COOLANT ACCIDENTS IN A LARGE SODIUM-COOLED FAST REACTOR
U.K. ATOMIC ENERGY AUTHORITY, WINFRITH
ANL-7120 +. 15 PAGES, 11 FIGURES, 2 TABLES, 8 REFERENCES, PP. 67-81 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI \$9.25 CY

BASICALLY, THE APPROACH USED HERE IS TO CONSIDER A SERIES OF FAULT CONDITIONS WHICH MIGHT ARISE IN A TYPICAL OXIDE-FUELLED, SODIUM-COOLED FAST REACTOR. THE ACCIDENTS RESULTING FROM THESE FAULTS ARE THEN ANALYSED STEP-BY-STEP, USUALLY UNDER SOME PESSIMISTIC ASSUMPTIONS, SUCH AS THE FAILURE OF ONE OR MORE REACTOR TRIP CIRCUITS. THERE ARE, HOWEVER, SOME MECHANISMS WHICH ARE IMPORTANT FOR SEVERAL OF THE ACCIDENTS AND REQUIRE DETAILED CONSIDERATION, SUCH AS COOLANT AND FUEL REACTIVITY WORTH, THE BEHAVIOUR OF THE COOLANT AS IT BOILS, AND PARTICULARLY THE EFFECTS OF NUCLEATE BOILING, THE RELEASE OF FISSION-PRODUCT GAS FROM A BURST FUEL CAN. AS A RESULT OF THESE ANALYSES, CERTAIN PROBLEMS STAND OUT AS BEING PARTICULARLY IMPORTANT FOR THE SAFETY OF THE REACTOR, INCLUDING THE POSSIBILITY OF A SINGLE SUBASSEMBLY ACCIDENT SPREADING TO THE WHOLE CORE AND THE TIME FOR AVAILABLE FOR A TRIP MECHANISM TO OPERATE.

*ACCIDENT, MAXIMUM CREDIBLE (MCA) + *LOSS OF COOLANT + *REACTOR, FAST + FUEL ELEMENT + HEAT TRANSFER + METAL, LIQUID + RADIUM + REACTOR KINETICS + TEMPERATURE TRANSIENT + URANIUM DIOXIDE

6-10536 OKRENT D

SUMMARY OF INTERCOMPARISON CALCULATIONS PERFORMED IN CONJUNCTION WITH CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS
ARGONNE NATIONAL LABORATORY, ARGONNE
ANL-7120 +. 21 PAGES, 5 FIGURES, 5 TABLES, REFERENCES, PP. 3-23 OF PROCEEDINGS OF THE CONFERENCE ON

CATEGORY 6.
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-10536 *CONTINUED*

SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

AMONG THE ITEMS SUBJECT TO THE INTERCOMPARISON, THE DOPPLER COEFFICIENT, THE SODIUM COEFFICIENT, AND ITS COMPONENTS ARE OF DIRECT SAFETY INTEREST.

*DOPPLER COEFFICIENT + *SODIUM COEFFICIENT + COMPUTER, DIGITAL + REACTOP, FAST

6-10537 GREEBLER P + COWAN CL + FIES CL + GYOREY GL + SUEOKA JR
CALCULATED PHYSICS PARAMETERS AND THEIR UNCERTAINTIES IN A 1000-MW(E) FAST CERAMIC REACTOR
GENERAL ELECTRIC COMPANY, SAN JOSE

ANL-7120 +. 9 PAGES, 3 FIGURES, 5 TABLES, 25 REFERENCES, PP. 24-32 OF PROCEEDINGS OF THE CONFERENCE ON
SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

AMONG THE PHYSICS PARAMETERS CALCULATED, THE DOPPLER EFFECT AND THE SODIUM COEFFICIENT ARE OF
DIRECT SAFETY INTEREST. PHYSICS PERFORMANCE OF LARGE FAST REACTORS CANNOT NOW BE RELIABLY
PREDICTED. FAVORABLE OR UNFAVORABLE COMBINATIONS OF THE UNCERTAINTIES STRONGLY INFLUENCE THE
CORE DESIGN AND MAKE LARGE DIFFERENCES IN THE SAFETY AND ECONOMICS PARAMETERS.

*DOPPLER COEFFICIENT + *SODIUM COEFFICIENT + COMPUTER, DIGITAL + REACTOR, FAST

6-10538 SHERER DB

AN ANALYSIS OF FAST REACTOR TRANSIENT RESPONSE AND SAFETY IN SELECTED ACCIDENTS

GENERAL ELECTRIC COMPANY, SAN JOSE

ANL-7120 +. 8 PAGES, 5 FIGURES, 2 TABLES, 13 REFERENCES, PP. 46-53 OF PROCEEDINGS OF THE CONFERENCE ON
SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

ACCIDENTS ANALYZED WERE NONTERMINATING RAMP REACTIVITY INSERTIONS AT \$0.20/SEC AND \$2/SEC, AND
LOSS OF PUMPING POWER WITH RESULTANT FLOW COASTDOWN. THE TIME AVAILABLE BEFORE A GIVEN TYPE
OF DAMAGE OR FAILURE OCCURRED WAS CONSIDERED TO BE A MEASURE OF THE INHERENT SAFETY OF THE
REACTOR. CONSIDERATION WAS GIVEN TO A PROMPT COEFFICIENT (NORMALLY NEGATIVE) DUE TO CHANGES
IN FUEL TEMPERATURE, A DELAYED NEGATIVE COEFFICIENT DUE TO EXPANSION OF THE REACTOR
STRUCTURE, AND A DELAYED COEFFICIENT DUE TO COOLANT-DENSITY CHANGE, WHICH MAY BE EITHER
NEGATIVE OR POSITIVE.

COMPUTER, DIGITAL + DOPPLER COEFFICIENT + EXPANSION REACTIVITY EFFECT + REACTOR TRANSIENT + REACTOR, FAST +
SODIUM COEFFICIENT

6-10539 NOVAK PE + LAURITZEN TA + PROTSIK R + DAVIES JH + ZEBROSKI EI
PLUTONIUM AND FISSION PRODUCT REDISTRIBUTION IN MIXED OXIDE FUELS

GENERAL ELECTRIC COMPANY, SAN JOSE

ANL-7120 +. 8 PAGES, 7 FIGURES, 1 TABLE, PP. 392-399 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS,
AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

PREVIOUS OBSERVATIONS AND RECENT MEASUREMENTS OF PLUTONIUM AND FISSION-PRODUCT CONCENTRATION
GRADIENTS IN MIXED OXIDE FUEL, CONSEQUENCES OF PLUTONIUM RE-DISTRIBUTION IN THE CALCULATED
DOPPLER, CONCLUSIONS.

DOPPLER EFFECT + FAILURE, FUEL ELEMENT + FUEL SEGREGATION + PLUTONIUM OXIDE + URANIUM OXIDE

6-10540 HUMMEL HH + HWANG RN + PHILLIPS K

RECENT INVESTIGATIONS OF FAST REACTOR REACTIVITY COEFFICIENTS

ARGONNE NATIONAL LABORATORY, ARGONNE

ANL-7120 +. 8 PAGES, 6 FIGURES, 5 TABLES, 23 REFERENCES, PP. 413-420 OF PROCEEDINGS OF THE CONFERENCE ON
SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

CRITICAL REVIEW OF EQUIVALENCE BETWEEN HOMOGENEOUS AND HETEROGENEOUS RESONANCE INTEGRALS IN
CYLINDRICAL GEOMETRY, EFFECT OF PARAMETER VARIATIONS AND OF PU-241 ON SODIUM - VOID EFFECT
NONLINEARITY IN SPECTRAL COMPONENT AS A FUNCTION OF SODIUM CONTENT.

*DOPPLER EFFECT + *SODIUM COEFFICIENT + REACTOR, FAST + VOID COEFFICIENT

6-10541 TRAVELLI A

A COMMENT ON THE COMPARISON OF SOME SODIUM VOID COEFFICIENTS WITH EXPERIMENTAL DATA

ARGONNE NATIONAL LABORATORY, ARGONNE

ANL-7120 +. 11 PAGES, 1 TABLE, 4 REFERENCES, PP. 421-422 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY,
FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

COMPARISON OF CENTRAL SODIUM WORTH, AS MEASURED ON ASSEMBLY 45A OF ZPR-3, AND IS CALCULATED BY
USING VARIOUS SETS OF CROSS SECTIONS. SAME FOR 50 PERCENT SODIUM REMOVAL THROUGHOUT THE CORE.

*REACTOR, FAST + *SODIUM COEFFICIENT + ZPR III (ANL ZERO POWER REACTOR)

6-10542 KUSTERS H + METZENROTH M

THE INFLUENCE OF SOME IMPORTANT GROUP CONSTANTS ON INTEGRAL FAST REACTOR QUANTITIES

KERNFORSCHUNGSZENTRUM, KARLSRUHE, GERMANY

ANL-7120 +. 11 PAGES, 9 FIGURES, 7 TABLES, 8 REFERENCES, PP. 423-433 OF PROCEEDINGS OF THE CONFERENCE ON
SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-10542 *CONTINUED*

EFFECT OF SPECTRAL FINE STRUCTURE ON RESONANCE SELF-SHIELDING. INFLUENCE OF THE MICROSCOPIC WEIGHTING SPECTRUM ON DOPPLER COEFFICIENT AND SODIUM-DENSITY COEFFICIENT. EFFECT OF UNCERTAINTY IN MICROSCOPIC DATA.

*SODIUM COEFFICIENT + DOPPLER COEFFICIENT + REACTOR, FAST

6-10543 CODD J + DURSTON C + WRIGHT WV
SOME CALCULATIONS OF FAST REACTOR DOPPLER AND SODIUM LOSS COEFFICIENTS WITH PARTICULAR REFERENCE TO THE EFFECTS OF CORE LATTICE STRUCTURE AND RADIAL FUEL TEMPERATURE DISTRIBUTION
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, WINFRITH
ANL-7120 +. 6 PAGES, 3 TABLES, 8 REFERENCES, PP. 434-439 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI \$9.25 CY

THE REACTIVITY OF A TYPICAL DILUTE FAST POWER REACTOR CORE, AND THE DOPPLER AND SODIUM LOSS COEFFICIENTS, ARE FOUND TO BE ONLY SLIGHTLY INFLUENCED BY HETEROGENEITY EFFECTS IN THE RESONANCE ENERGY REGION BELOW 15 KEV. THE USE OF DIFFERENT DATA FOR THE 2.85-KEV SODIUM RESONANCE ALSO GIVES RISE TO ONLY SMALL CHANGES IN THE RESULTS. THE U238 RESONANCE CAPTURE IN A FUEL ROD HAVING A PARTICULAR RADIAL TEMPERATURE DISTRIBUTION AGREES CLOSELY WITH THE RESULTS FOR THE UNIFORM MEAN TEMPERATURE OVER THE ENERGY RANGE FROM 0.8 TO 2.1 KEV WHICH WAS INVESTIGATED.

*DOPPLER COEFFICIENT + *REACTOR, FAST + *SODIUM COEFFICIENT

6-10544 FROELICH R + OTT K + SHAVIV G + YIFTAH S
RESULTS OF DOPPLER COEFFICIENT CALCULATIONS FOR FAST REACTORS AND COMPARISON OF DIFFERENT METHODS
KERNFORSCHUNGSZENTRUM, KARLSRUHE, GERMANY + ISRAEL INSTITUTE OF TECHNOLOGY
ANL-7120 +. 9 PAGES, 5 FIGURES, 10 TABLES, 20 REFERENCES, PP. 440-448 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

RESULTS OF DOPPLER-COEFFICIENT CALCULATIONS OF THREE DIFFERENT ORIGINS ARE COMPARED AND ANALYSED. THE AIM IS TO FIND THE SPECIAL ASSUMPTIONS RESPONSIBLE FOR OBVIOUS DISCREPANCIES. THIS PAPER GIVES PRELIMINARY RESULTS.

*DOPPLER COEFFICIENT + REACTOR, FAST

6-10545 HWANG RN
EFFECT OF THE FLUCTUATIONS IN COLLISION DENSITY ON FAST-REACTOR DOPPLER EFFECT CALCULATIONS
ARGONNE NATIONAL LABORATORY, ARGONNE
ANL-7120 +. 13 PAGES, 7 FIGURES, 8 TABLES, PP. 449-461 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

PHYSICAL AND MATHEMATICAL ASPECTS OF SLOWING-DOWN PROBLEM, PLACZEK OSCILLATION DUE TO ISOLATED RESONANCES, EFFECT OF INCOMPLETE RECOVERY BETWEEN RESONANCES FOR A SINGLE RESONANCE SUBSTANCE IN THE MIXTURE, FIRST-ORDER APPROXIMATION AND GROUP REACTION RATES FOR OVERLAPPING RESONANCE IN THE DOPPLER REGION.

*DOPPLER EFFECT + *REACTOR, FAST

6-10546 OLHOEFT JE + KRUG HE
COMPARISON OF MONTE CARLO AND RESONANCE INTEGRAL METHODS IN THE DETERMINATION OF DOPPLER EFFECTS IN FAST REACTORS
WESTINGHOUSE ELECTRIC CORPORATION, PITTSBURGH + ARGONNE NATIONAL LABORATORY
ANL-7120 +. 16 PAGES, 6 FIGURES, 8 TABLES, 25 REFERENCES, PP. 462-477 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

THIS PAPER DESCRIBES A COMPARISON OF THE CALCULATIONS BY THE MONTE CARLO METHOD AND RESONANCE-INTEGRAL TECHNIQUES, OF DOPPLER EFFECT IN FAST REACTORS. THESE COMPARISONS WERE BASED ON A COMMON SET OF GROUND RULES, SELECTED TO MINIMIZE THE EFFECT OF UNCERTAINTIES IN NONFUEL CROSS SECTIONS. IN THIS WAY, DISCREPANCIES IN RESULTS CAN BE ATTRIBUTED TO THE DIFFERENCES IN THE TREATMENTS OF THE DOPPLER-BROADENED CROSS SECTIONS AND THE SLOWING-DOWN MODELS.

*DOPPLER EFFECT + *REACTOR, FAST

6-10550 STACHURA SJ + SILBERBERG M
THE APPLICATION OF EXPERIMENTAL DATA FROM TREAT MELTDOWN STUDIES TO REACTOR ACCIDENT ANALYSIS
ATOMICS INTERNATIONAL, CANOGA PARK
ANL-7120 +. 10 PAGES, 7 FIGURES, 2 TABLES, 3 REFERENCES, PP. 514-523 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

RESULTS OF RECENT TREAT MELTDOWN STUDIES OF CERAMIC FUEL IN SODIUM ARE PRESENTED, AND THE SIGNIFICANCE OF THESE RESULTS WITH RESPECT TO LARGE CORE MELTDOWN IS INDICATED. THE COURSE OF FUEL MOTION IN A LARGE CORE WAS ESTIMATED FOR A SIMPLIFIED CASE, AND THE ASSOCIATED REACTIVITY EFFECTS WERE DETERMINED. THESE REACTIVITY EFFECTS WERE THEN INCORPORATED INTO THE AIREX REACTOR KINETICS CODE TO ESTIMATE CORE BEHAVIOR AFTER GROSS FUEL MELTING IN CENTRAL REGIONS OF THE CORE. A DISCUSSION OF THOSE FACTORS WHICH CAN INFLUENCE MELTDOWN BEHAVIOR WAS PRESENTED.

*ACCIDENT, GENERAL + *CORE MELTDOWN + *FUEL MELTDOWN + *REACTOR, FAST +

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-10550 *CONTINUED*

*TREAT (TRANSIENT TEST REACTOR FACILITY) + FUEL ELEMENT + HEAT TRANSFER

6-10567 POWER REACTOR DEVELOPMENT COMPANY REQUESTS TECH. SPEC. CHANGE FOR POWER COEFFICIENT
POWER REACTOR DEVELOPMENT COMPANY
1 PAGE, JUNE 24, 1966, DOCKET 50-16, ATOMIC ENERGY CLEARING HOUSE, 12(27), PAGE 21 (JULY 4, 1966)

PRESENT POWER-COEFFICIENT MEASUREMENTS HAVE A PLUS OR MINUS UNCERTAINTY OF 25 PERCENT BECAUSE OF INACCURACIES IN HEAT BALANCE AT LOW POWER. THE LOWER LIMIT IS MINUS 0.15 CENT/MW, LESS THAN THE SAFEGUARDS-REPORT VALVE OF 0.2. THE SAFETY ANALYSIS WAS REDONE IN SUPPORT OF REQUESTING A CHANGE TO THE LOWER COEFFICIENT.

*OPERATING LIMITS/TECHNICAL SPECIFICATIONS + *POWER COEFFICIENT + FERMI + REACTOR, BREEDER + TEST, PHYSICS

6-10578 DIETZ KA
QUARTERLY TECHNICAL REPORT - STEP PROJECT, APRIL 1965-JUNE 1965
PHILLIPS PETROLEUM COMPANY, IDAHO FALLS, IDAHO
ID0-17145 +. 104 PAGES, 69 FIGURES, 14 TABLES, 30 REFERENCES, MAY 1966, CFSTI, \$4.00 CY, \$0.75 MN

QUARTERLY PROGRESS REPORT ON SNAPTRAN-1 TEST PROGRAM, LOFT CORE DESIGN, LOFT FACILITY AND EXPERIMENTAL DESIGN, LOFT ANALYSIS, LOFT RADIOLOGICAL STUDIES, AND INSTRUMENTATION STUDIES.

*LOFT (LOSS OF FLUID TEST) + *SNAPTRAN (SNAP TRANSIENT REACTOR TEST SERIES) +
*STEP (SAFETY TEST ENGINEERING PROGRAM) + ANALYTICAL MODEL + CONTAINMENT DESIGN +
CONTAINMENT FILTERING SYSTEM + CONTAINMENT INSTRUMENTATION + FISSION PRODUCT TRANSPORT +
INSTRUMENTATION, GENERAL + IODINE + REACTOR KINETICS + REACTOR, PRESSURIZED WATER + SAMPLING

6-10609 CARPENTER SG + OTTER JM + PASCHALL RK + ROYDEN HN
TUNGSTEN RESONANCE INTEGRALS AND DOPPLER COEFFICIENTS. SECOND QUARTERLY REPORT, OCTOBER - DECEMBER 1965
ATOMIC INTERNATIONAL, CANOGA PARK, CALIFORNIA
NASA-CR-54888 + AI-66-16 +. 29 PAGES, TABLES, REFERENCES, FEBRUARY 11, 1966, CFSTI, \$2.00 CY, \$0.50 MN

CALCULATIONS ON DOPPLER COEFFICIENT AND FUEL EXPANSION REACTIVITY EFFECT. MEASUREMENTS IN SODIUM GRAPHITE REACTOR CRITICAL ASSEMBLY OF NATURAL-TUNGSTEN SLUGS AT VARIOUS TEMPERATURES, AND PRELIMINARY DOPPLER MEASUREMENTS.

*DOPPLER EFFECT + *TUNGSTEN + REACTOR, GRAPHITE MODERATED + REACTOR, LIQUID METAL COOLED +
SRE (SODIUM REACTOR EXPERIMENT)

6-10610 LIIMATAINEN RC + TESTA FJ
THERMAL REACTOR SAFETY STUDIES ON UO2 CORE FUEL PIN CLUSTERS
ARGONNE NATIONAL LABORATORY, ARGONNE, ILLINOIS
P-306 +. 23 PAGES, 10 FIGURES, JUNE 10, 1966, PRESENTED AT ANS ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966, SOURCE

EXPERIMENTS WERE CONDUCTED IN TREAT TO INVESTIGATE THE SAFETY PROBLEMS ASSOCIATED WITH THE BEHAVIOR OF UO2-CORE, METAL-CLAD FUEL SPECIMENS UNDER CONDITIONS SIMULATING A POWER EXCURSION. SPECIFICALLY, THE PURPOSE OF THESE RECENT SCALE-UP TRANSIENT TESTS WAS TO OBTAIN INFORMATION ON THE CHEMICAL AND PHYSICAL CHANGES THAT TAKE PLACE UPON MELTDOWN OF A SUBASSEMBLY OR A PORTION OF A NUCLEAR REACTOR CORE. PARTICULAR EMPHASIS WAS PLACED ON DETERMINING THE EXTENT OF METAL-WATER REACTION, THE PEAK PRESSURE PRODUCED, AND THE FINAL PARTICLE-SIZE DISTRIBUTION OF FRAGMENTED FUEL CLUSTER. THESE PARAMETERS WERE THEN CORRELATED WITH THE ENERGY OF THE REACTOR PULSE.

*TREAT (TRANSIENT TEST REACTOR FACILITY) + *URANIUM OXIDE + FAILURE, FUEL ELEMENT + METAL WATER REACTION +
REACTOR, GRAPHITE MODERATED + REACTOR, TEST + TEST, DESTRUCTIVE

6-10611 HELLSTRAND E + ANDERSSON TL + BRUNFELTER B + KOCKUM J + LONDEN SO + TIREN LI
EXPERIMENTAL STUDIES ON ASSEMBLIES 1 AND 2 OF THE FAST REACTOR FRO
AKTIEBOLAGET ATOMENERGI, STOCKHOLM, SWEDEN
AE-207 +. 56 PAGES, FIGURES, TABLES, DECEMBER 1965, DEP/MN

CONTROL ROD CALIBRATIONS HAVE BEEN MADE BY USING THE POSITIVE PERIOD, THE INVERSE MULTIPLICATION, THE ROD DROP, AND THE PULSED SOURCE TECHNIQUES AND SHOW SATISFACTORY AGREEMENT BETWEEN THE VARIOUS METHODS. THE REACTIVITY WORTHS OF SAMPLES OF DIFFERENT MATERIALS AND DIFFERENT SIZES WERE MEASURED AT THE CORE CENTRE. COMPARISONS WITH PERTURBATION CALCULATIONS SHOW THAT THE REGULAR AND ADJOINT FLUXES ARE WELL-PREDICTED IN THE CENTRAL REGION OF THE CORE. THE VARIATION IN THE PROMPT NEUTRON LIFE-TIME WITH REACTIVITY HAS BEEN STUDIED BY MEANS OF THE PULSED SOURCE AND THE ROSSI-ALPHA TECHNIQUES.

*CONTROL ROD CALIBRATION + *REACTOR, FAST + DANGER COEFFICIENT + PROMPT NEUTRON LIFETIME + ROSSI ALPHA +
SWEDEN

6-10612 CROCKER JG
SPERT III - EXTERNAL PRESSURE TESTS WITH SPERT III OXIDE-CORE FUEL RODS
PHILLIPS PETROLEUM COMPANY, IDAHO FALLS, IDAHO
ID0-17179 +. PAGES 1-2 OF QUARTERLY TECHNICAL REPORT - SPERT PROJECT, OCTOBER, NOVEMBER, DECEMBER 1965,
55 PAGES, 35 FIGURES, 2 TABLES, 28 REFERENCES, JUNE 1966, CFSTI, \$3.00 CY, \$0.75 MN

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-10612 *CONTINUED*

FOR EXPERIMENTS TO INVESTIGATE THE KINETIC BEHAVIOR OF LOW-ENRICHMENT UO₂ CORES IN SPERT III, IT WAS DETERMINED THAT THE FUEL RODS SHOULD BE LIMITED TO 1750 PSIG AND 500 AND 550 F FOR STEADY-STATE AND TRANSIENT OPERATION RESPECTIVELY.

*SPERT 3 (SPECIAL POWER EXCURSION REACTOR TEST) + *URANIUM OXIDE + REACTOR TRANSIENT + REACTOR, PRESSURIZED WATER + REACTOR, TEST

6-10613 CROCKER JG

SPERT IV - CAPSULE DRIVER CORE SUBASSEMBLY TEST PROGRAM

PHILLIPS PETROLEUM COMPANY, IDAHO FALLS, IDAHO

IDO-17179 +. PAGES 3-15 OF QUARTERLY TECHNICAL REPORT - SPERT PROJECT, OCTOBER, NOVEMBER, DECEMBER 1965, 55 PAGES, 35 FIGURES, 2 TABLES, 28 REFERENCES, JUNE 1966, CFSTI, \$3.00 CY, \$0.75 MN

FOR THE CAPSULE DRIVER CORE IN THE SPERT IV FACILITY INTERCALIBRATION OF TRANSIENT AND OPERATIONAL POWER CHAMBER, FIGURES OF MERIT OF 3 AND 4 PERCENT ENRICHED URANIUM OXIDE, VOID WORTHS AND FLUX GRADIENT WERE DETERMINED. THE LATTER IS OF IMPORTANCE FOR TRANSIENT BOWING. FIDUCIAL TRANSIENTS TEST WITH PERIODS DOWN TO 17.5 MSEC ARE REPORTED. AN OUT-OF-PILE EXPLOSIVE TESTING PROGRAM YIELDED CORRELATION OF PERMANENT DEFORMATION OF CAPSULE WITH MATERIAL YIELD STRESS, INSIDE RADIUS AND WALL THICKNESS. A TRANSDUCER FOR WATER-HAMMER VELOCITIES WAS DEVELOPED.

*SPERT 4 (SPECIAL POWER EXCURSION REACTOR TEST) + FUEL ELEMENT BOWING + REACTOR TRANSIENT + REACTOR, TEST + TEST, DESTRUCTIVE

6-10614 CROCKER JG

POWER BURST FACILITY FUEL TESTING PROGRAM

PHILLIPS PETROLEUM COMPANY, IDAHO FALLS, IDAHO

IDO-17179 +. PAGES 16-30 OF QUARTERLY TECHNICAL REPORT - SPERT PROJECT, OCTOBER, NOVEMBER, DECEMBER 1965, 55 PAGES, 35 FIGURES, 2 TABLES, 28 REFERENCES, JUNE 1966, CFSTI, \$3.00 CY, \$0.75 MN

PBF FUEL-ROD TESTS IN TREAT WERE CARRIED TO 239 CAL/G UO₂. A GAP OF 19 MILS BETWEEN THE INSULATOR AND THE FUEL PELLETS, AND AN INTERFERENCE FIT BETWEEN CLAD AND INSULATORS WAS DECIDED ON.

*PBF (POWER BURST FACILITY) + FUEL ELEMENT + REACTOR, GRAPHITE MODERATED + REACTOR, TEST + TREAT (TRANSIENT TEST REACTOR FACILITY)

6-10615 CROCKER JG

TWO-DIMENSIONAL HEAT TRANSFER CALCULATIONS

PHILLIPS PETROLEUM COMPANY, IDAHO FALLS, IDAHO

IDO-17179 +. PAGES 31-55 OF QUARTERLY TECHNICAL REPORT - SPERT PROJECT, OCTOBER, NOVEMBER, DECEMBER 1965, 55 PAGES, 35 FIGURES, 2 TABLES, 28 REFERENCES, JUNE 1966, CFSTI, \$3.00 CY, \$0.75 MN

TOODEE, A REACTOR KINETICS CODE WITH THERMAL REACTIVITY FEEDBACK INCORPORATING TWO-DIMENSIONAL ANALYSIS WAS DEVELOPED AND CHECKED OUT. AN IMPROVED MODEL FOR CALCULATING REACTIVITY FEEDBACK DURING SHORT-PERIOD EXCURSIONS IN LOW-ENRICHMENT URANIUM OXIDE CORES WAS FORMULATED. LIST OF RECENT SPERT PUBLICATIONS.

*COMPUTER, DIGITAL + DOPPLER EFFECT + REACTOR TRANSIENT + THERMAL ANALYSIS + URANIUM OXIDE

6-10617 DURAND-SMET R

THE PROBLEM OF DETERMINATION OF NEUTRON FLUX OF SODIUM-COOLED FAST BREEDER REACTORS WITH THE SNEAK-2 CODE

GESELLSCHAFT FÜR KERNFORSCHUNG M.B.H., KARLSRUHE, KERNFORSCHUNGSZENTRUM

KFK-382 +. 51 PAGES, FIGURES, TABLES, 12 REFERENCES, NOVEMBER 1965, DEP. MN

SNEAK-2 ASSEMBLY. CALCULATION OF CRITICALITY FACTORS AND NEUTRON LIFETIME. FUEL-EXPANSION COEFFICIENT, DOPPLER COEFFICIENT. LOCAL DANGER COEFFICIENT OF SODIUM, CENTRAL SODIUM-VOID COEFFICIENT, HOMOGENEOUS SODIUM VOIDING COEFFICIENT.

*REACTOR, FAST + CRITICALITY EXPERIMENT + DANGER COEFFICIENT + DOPPLER COEFFICIENT + GERMANY + PROMPT NEUTRON LIFETIME + SODIUM COEFFICIENT + VOID COEFFICIENT

6-10619 BRUNA JG + BRUNET JP + CAIZERGUES R + CLOUET D ORVAL C + KREMSE J + TELLIER H + VERRIERE P

ALECTO - RESULTS OBTAINED WITH HOMOGENEOUS CRITICAL EXPERIMENTS ON PLUTONIUM 239, URANIUM 235 AND URANIUM 233

COMMISSARIAT A L'ENERGIE ATOMIQUE, FRANCE, CENTRE D'ETUDES NUCLEAIRES, SACLAY

CEA-R-2814 +. 130 PAGES, 37 FIGURES, 24 TABLES, OCTOBER 1965, DEP. MN

IN THIS REPORT ARE GIVEN THE RESULTS OF THE HOMOGENEOUS CRITICALITY EXPERIMENTS ALECTO, MADE ON PLUTONIUM-239, URANIUM-235 AND URANIUM-233. AFTER A BRIEF DESCRIPTION OF THE EQUIPMENT, THE CRITICAL MASSES FOR CYLINDERS OF DIAMETERS VARYING FROM 25 TO 42 CM ARE GIVEN AND COMPARED WITH OTHER VALUES (FOREIGN RESULTS, CRITICALITY GUIDE). EXPERIMENTS RELATING TO CROSS SECTIONS AND CONSTANTS TO BE USED ON THESE MATERIALS ARE PRESENTED. LASTLY, KINETIC EXPERIMENTS ALLOW ONE TO COMPARE PULSED-NEUTRON METHODS WITH FLUCTUATION METHODS.

*CRITICALITY EXPERIMENT + CRITICALITY SAFETY + NOISE ANALYSIS + PLUTONIUM + PULSED NEUTRON TECHNIQUE + URANIUM

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-10620 LEAMER RD + HANLEN DF + HAMILTON GN + TAYLOR EG
CRITICAL EXPERIMENTS PERFORMED WITH CLUSTERED AND UNIFORM ARRAYS OF RODDED ABSORBERS
WESTINGHOUSE ELECTRIC CORPORATION, PITTSBURGH
WCAP-3269-39 +. 103 PAGES, 67 FIGURES, 15 TABLES, 2 REFERENCES, NOVEMBER 1965, CFSTI, \$4.00 CY, \$0.75 MN

CRITICALITY EXPERIMENTS ON REACTIVITY WORTHS OF CLUSTERS AND UNIFORM ARRAYS OF AG-IN-CD
ABSORBER RODS WERE MEASURED IN WATER-MODERATED URANIUM OXIDE CORES OF LOW ENRICHMENT.
EXPERIMENTAL FACTORS INCLUDED ENRICHMENT, LATTICE PITCH, DIAMETER OF POISON AND FUEL RODS,
AND ABSORBER-ROD-CLADDING THICKNESS. FUEL INCLUDED STAINLESS-STEEL-CLAD FUEL RODS OF 2.7,
3.7, AND 5.7 PERCENT ENRICHMENTS, AND ZIRCALOY-4-CLAD RODS OF 2.72 PERCENT ENRICHMENT.

*CONTROL ROD WORTH + *CRITICALITY EXPERIMENT + REACTOR, WATER + URANIUM OXIDE

6-10641 WAGNER RJ
IREKIN--PROGRAM FOR THE NUMERICAL SOLUTION OF THE REACTOR KINETICS EQUATIONS
PHILLIPS PETROLEUM COMPANY, IDAHO
IDO-17114 +. 86 PAGES, 2 REFERENCES, JANUARY 1966, CFSTI, \$3.00 CY, \$0.75 MN

IREKIN PROGRAM IS TO OBTAIN A NUMERICAL SOLUTION OF THE ORDINARY, ONE-GROUP,
SPACE-INDEPENDENT, DIFFERENTIAL EQUATIONS THAT DESCRIBE THE POWER BEHAVIOR OF A NUCLEAR
REACTOR IN RESPONSE TO AN ARBITRARY FUNCTION OF REACTIVITY.

*DYNAMICS, NONLINEAR + *REACTOR TRANSIENT + COMPUTER, DIGITAL

6-10642 HIROTA J
REACTOR PHYSICS ACTIVITIES IN JAPAN
JAPAN ATOMIC ENERGY RESEARCH INSTITUTE
EACRP-L-57 +. 7 PAGES, 25 REFERENCES, SEPTEMBER 20, 1965

SAFETY-RELATED TOPICS INCLUDE THEORY OF STATISTICAL FLUCTUATIONS OF NEUTRON AND PRECURSOR
DISTRIBUTIONS IN POSITION AND VELOCITY SPACE, CRITICAL EXPERIMENTS (SOME INCLUDING REACTIVITY
COEFFICIENTS AND FUEL-WORTH MEASUREMENTS) ON LIGHT-WATER LATTICES, REFLECTED URANYL SULFATE
SOLUTION IN HEAVY WATER, GRAPHITE SYSTEMS, AND ASSEMBLIES RELATED TO LARGE FAST CORES OF
CERAMIC FUEL, PULSED-NEUTRON EXPERIMENTS ON REFLECTED HIGHLY SUBCRITICAL SYSTEMS, LIGHT-WATER
MODERATED AND REFLECTED NATURAL URANIUM SUBCRITICAL ASSEMBLY, AND NANOSECOND DIFFUSION IN
FAST ASSEMBLIES. LITERATURE REFERENCES, BUT NO DATA.

*JAPAN + CRITICALITY SAFETY + NOISE ANALYSIS + PULSED NEUTRON TECHNIQUE

6-10643 INZAGHI A + MISENTA R
AIREK-PUL. A VERSION OF THE KINETIC CODE AIREK-MOD FOR PERIODICALLY PULSED FAST REACTORS
EUROPEAN ATOMIC ENERGY COMMUNITY (EURATOM), ISPRA, ITALY.
EUR-2552.E +. 75 PAGES, NOVEMBER 1965, SOURCE

FOR KINETIC CALCULATIONS OF A PERIODICALLY PULSED FAST REACTOR, THE CODE AIREK-MOD WAS
SUPPLEMENTED. THE NEW CODE, AIREK-PUL, INTEGRATES THE KINETIC EQUATIONS FOR A PERIODICALLY
PULSED REACTOR FOR TWO SPACE POINTS AND FEW NEUTRON GROUPS AND FOR ONE GROUP WITH AN EXTERNAL
NEUTRON SOURCE. THE KINETIC EQUATIONS SOLVED BY THE CODE AIREK-PUL ARE DESCRIBED, AND THE
LISTINGS OF THE THREE VERSIONS OF THE CODE ARE GIVEN.

*REACTOR, FAST + *REACTOR, PULSED + COMPUTER, DIGITAL

6-10647 PERSSON R + WIKDAHL CE
REACTOR PHYSICS MEASUREMENTS IN RO WITH 27-ROD CLUSTERS OF NATURAL UO₂, 1.35 CM IN DIAMETER
AKTIEBOLAGET ATOMENERGI, STOCKHOLM, SWEDEN
RFX-316 +. 28 PAGES, 10 FIGURES, REFERENCES, SEPTEMBER 30, 1964, DEP/MN

CLUSTERS WITH THREE DIFFERENT PIN PITCHES WERE INVESTIGATED REGARDING THE MATERIAL BUCKLING
VERSUS LATTICE PITCH AND THE CHANGES OF BUCKLING AND DIFFUSION COEFFICIENTS CAUSED BY THE
INTRODUCTION OF AIR AS COOLANT. THE BUCKLING CHANGE WITH VOID IS IN APPROXIMATE AGREEMENT
WITH THAT PREDICTED BY A MODIFIED VERSION OF BURNUP-5 CALCULATIONS. ACTIVATION STUDIES WERE
MADE IN ONE LATTICE CONFIGURATION ON VOIDED AND D₂O-FILLED CLUSTERS. THE FINE STRUCTURE WAS
MEASURED BY MEANS OF COPPER FOILS AND WIRES.

SWEDEN + URANIUM, NATURAL + VOID COEFFICIENT

6-10649 LELLOUCHE GS + LEVINE MM + CHERNICK J
SOME SAFETY CONSIDERATIONS BASED ON DESIGN EXPERIENCES IN THE BNL SETTLED BED FAST REACTOR CONCEPT
BROOKHAVEN NATIONAL LABORATORY
BNL-9475 + CONF-651009-1 +. 8 PAGES, AUGUST, 1965, CONFERENCE ON SAFETY, FUELS AND CORE DESIGN IN LARGE
FAST POWER REACTORS, ARGONNE, ILL., CFSTI, \$1.00 CY, \$0.50 MN

THE SODIUM REGIONS ABOVE AND BELOW THE BNL SETTLED-BED FAST REACTOR EXHIBIT A STRONG, THOUGH
DELAYED, NEGATIVE VOID COEFFICIENT. TYPICAL TRANSIENTS ARE DISCUSSED.

*REACTOR, FAST + BNL (BROOKHAVEN NATIONAL LABORATORY) + REACTOR TRANSIENT + SODIUM COEFFICIENT +
VOID COEFFICIENT

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-10654 GREEBLER P + HUTCHINS BA + KELLEY MD
FLUZ - A COMPUTER CODE FOR ANALYZING THE REACTOR RESPONSE TO SMALL REACTIVITY OSCILLATIONS
GENERAL ELECTRIC COMPANY, SAN JOSE, CALIFORNIA
GEAP-4580 +. 51 PAGES, MARCH 22, 1965, CFSTI, \$3.00 CY

FLUZ COMPUTES TO THE FIRST ORDER TO AMPLITUDES AND PHASE ANGLES OF THE OSCILLATING POWER AND
FEEDBACK REACTIVITY OF A FAST REACTOR, WHICH IS OSCILLATING ABOUT CRITICALITY DUE TO AN
IMPRESSED SINUSOIDAL REACTIVITY OF GIVEN AMPLITUDE AND FREQUENCY. BY VARYING THIS AMPLITUDE
AND FREQUENCY AS WELL AS THE STEADY-STATE POWER, FLUZ CAN BE USED TO SIMULATE THE POWER
RESPONSE OF THE REACTOR BEING STUDIED TO THE MAGNITUDES OF VARIOUS COEFFICIENTS OF
REACTIVITY. A COMPARISON OF THE FLUZ RESULTS WITH EXPERIMENTAL RESULTS FROM OSCILLATION
TESTS ON THE ACTUAL REACTOR CAN BE USED TO REVEAL THE MAGNITUDES OF THE VARIOUS REACTIVITY
COEFFICIENTS.

COMPUTER, DIGITAL + FLUCTUATION + TRANSFER FUNCTION

6-10658 MERRILL M
BLOOST-5. A COMBINED REACTOR KINETICS-HEAT TRANSFER CODE FOR THE IBM-7044. PRELIMINARY DESCRIPTION
GENERAL ATOMIC
GAMD-6644(ADD.) +. 5 PAGES, NOVEMBER 9, 1965, CFSTI, \$1.00 CY, \$0.50 MN

A MODIFICATION HAS BEEN MADE IN BLOOST-5 TO PERMIT USING THE HEAT-TRANSFER SUBROUTINES TO
DESCRIBE THE ENTIRE CORE INSTEAD OF A SINGLE AVERAGE FUEL ELEMENT.

*COMPUTER, DIGITAL + REACTOR KINETICS + THERMAL ANALYSIS

6-10667 PETERSON RE + GOLDSMITH S
FAST REACTOR SAFETY CONSIDERATIONS RELATED TO FUEL MACROSTRUCTURE
BATTELLE-NORTHWEST
BNWL-SA-346 + CONF-651009-3 +. 19 PAGES, OCTOBER 6, 1965, CONFERENCE ON SAFETY, FUELS AND CORE DESIGN IN
LARGE FAST POWER REACTORS, ARGONNE, ILL., CFSTI, \$1.00 CY, \$0.50 MN

INFLUENCE OF FUEL SEGREGATION AND OF DELAY OF FUEL EXPANSION ON PROMPT EXCURSIONS IN FAST
REACTORS.

*FUEL SEGREGATION + *PROMPT CRITICALITY + *REACTOR, FAST + FUEL EXPANSION COEFFICIENT

6-10685 SMETS HB
REACTOR SAFETY RESEARCH. WATER REACTOR BEHAVIOR DURING RAPID POWER VARIATIONS SUBJECT OF INTERNATIONAL
MEETING
EUROPEAN NUCLEAR ENERGY AGENCY
2 PAGES, NUCLEAR NEWS 9(7)- 32-33 (JULY 1966)

FRENCH WORK ON ALUMINUM AND METALLIC URANIUM PLATES, PLANS FOR OXIDE TESTS IN FLUX TRAPS.
BRITISH WORK ON FUNDAMENTAL PRINCIPLES, SPECIFICALLY, W. B. HALL, OF MANCHESTER, WORKS ON
TRANSIENTS, PRESSURES, AND MECHANISM OF TRANSIENT BOILING. GRENoble WORK ON OUT-OF-PILE
LOOPS, TRW WORK. SAMUELS (UK) MOCKUP OF SL-1. PASCOUET (FRANCE) SIMULATION OF REACTOR
EXCURSIONS BY PROGRAMMED CHANGES. CABRI REACTOR (SIMILAR TO SPERT). H. BLANC (FRANCE)
CALCULATED REACTOR-ACCIDENT MODEL. BIRKHOFFER AND KARWAT (GERMANY), SPACE-TIME CALCULATIONS
ON POWER EXCURSIONS IN OXIDE-WATER REACTORS.

*FRANCE + *GERMANY + *REACTOR TRANSIENT + *UNITED KINGDOM + EXCURSION, LARGE + EXPLOSIVE, CONVENTIONAL +
HEAT TRANSFER, BOILING + PRESSURE, INTERNAL + REACTOR, POOL TYPE + REACTOR, WATER +
SPACE DEPENDENT DYNAMICS + THERMAL ANALYSIS

6-10686 FIRSTENBERG A + NEAL LG
KINETIC STUDIES OF HETEROGENEOUS WATER REACTORS, QUARTERLY PROGRESS REPORT FOR MARCH 31, 1966
TRW SYSTEMS, REDONDO BEACH, CALIFORNIA
STL-372-38 +. 48 PAGES, 24 FIGURES, 2 TABLES, 9 REFERENCES, APRIL 15, 1966

SIMULTANEOUS MEASUREMENT OF POWER, INLET FLOW RATE, INLET SUBCOOLING EXIT VOID FRACTION AND
EXIT MOMENTUM FLUX IN THE GEOMETRY OF A SIMULATED SPERT 1A MODERATOR-COOLANT CHANNEL AT
ATMOSPHERIC PRESSURE. MEASUREMENT OF BOTH MASS FLUX AND MOMENTUM FLUX ALLOWS US TO DEFINE
AND EVALUATE A SINGLE PARAMETER CHOSEN TO CHARACTERIZE THE DISTRIBUTIONAL EFFECTS. 1. SOME
FRACTION OF LIQUID IS ENTRAINED IN THE VAPOR PHASE TRAVELING AT THE VAPOR VELOCITY. 2. A
LIQUID FILM OF UNIFORM THICKNESS EXISTS AT THE CHANNEL WALL AND THE LIQUID VELOCITY VARIES
LINEARLY WHILE THE VAPOR VELOCITY IN THE CORE OF THE CHANNEL IS UNIFORM.

*FLOW, TWO PHASE + *HYDRAULIC ANALYSIS + HEAT TRANSFER, BOILING + THERMAL ANALYSIS

6-10688 OCCHIPINTI BB
XENON AND SAMARIUM TABLES
SAVANNAH RIVER LABORATORY, AIKEN, SOUTH CAROLINA
DP-958 +. DOCUMENT REVIEWED IN NUCLEAR NEWS 9(8)- 29 (AUGUST 1966). 223 DOCUMENT PAGES, CFSTI, \$6.00
CY, \$1.25 MF

XENON AND SAMARIUM TABLES FOR CALCULATING THE REACTIVITY TRANSIENTS THAT RESULT FROM XE-135 OR
SM-149 POISONING IN ANY THERMAL REACTOR USING U-235 AS PRINCIPAL FUEL, AND TABLES FOR THE
CHANGE IN REACTIVITY HELD IN XE AFTER STEP REDUCTIONS IN POWER. TABLES COVER A RANGE OF
POWER FROM 0 TO 500 MW/KG.

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-10688 *CONTINUED*
*REACTOR TRANSIENT + *XENON

6-10689 TORLIN BZ
CALCULATION OF WEAK SELF-OSCILLATION REGIMES IN NUCLEAR REACTORS
9 PAGES, 3 FIGURES, 2 REFERENCES, JOURNAL OF NUCLEAR ENERGY 20(6)- 485-493 (JUNE 1966)

A PROCEDURE IS GIVEN FOR MAKING AN APPROXIMATE CALCULATION OF THE PARAMETERS ASSOCIATED WITH SELF-OSCILLATION REGIMES OF NUCLEAR REACTORS WHEN THE AMPLITUDE OF THE POWER OSCILLATIONS IS SMALL. AN EQUATION IS OBTAINED WHICH, WITHIN THE FRAMEWORK OF THE APPROXIMATIONS MADE, PERMITS ONE TO DETERMINE THE FREQUENCIES OF THE POSSIBLE SELF-OSCILLATION STATES OF THE REACTOR, THE AMPLITUDE OF THE REACTIVITY AND POWER OSCILLATIONS, AND THE PHASE DIFFERENCE BETWEEN THESE OSCILLATIONS.

*REACTOR DYNAMICS + TRANSFER FUNCTION

6-10690 KRASNOYAROV NV + NIKOLSKII RV + EFIMOV IA
POWER EFFECTS IN THE BR-5 REACTOR
6 PAGES, 4 FIGURES, 1 TABLE, 9 REFERENCES, JOURNAL OF NUCLEAR ENERGY 20(6)- 503-508 (JUNE 1966)

THE RESULTS OF AN EXPERIMENTAL STUDY OF THE POWER COEFFICIENT OF REACTIVITY IN THE BR-5 REACTOR AT DIFFERENT COOLANT FLOW RATES ARE DISCUSSED. A METHOD IS DESCRIBED FOR DETERMINING THE COMPONENT OF THE POWER EFFECT ASSOCIATED WITH THE HEATING OF THE FUEL-ELEMENT CORES.

POWER COEFFICIENT + UNION OF SOVIET SOCIALIST REPUBLICS

6-10691 CHELINTSEV NG
REPRESENTATION OF REACTOR DYNAMICS EQUATIONS IN TERMS OF A RECIPROCAL PERIOD
3 PAGES, 3 REFERENCES, JOURNAL OF NUCLEAR ENERGY 20(5)- 433-435 (MAY 1966)

GENERALIZED TREATMENT OF REACTOR DYNAMICS EQUATION, WHICH YIELDS THE IN-HOUR EQUATION AS A SPECIAL CASE, AND YIELDS SOLUTION FOR ARBITRARY TIME-DEPENDENCE OF THE REACTIVITY TRANSFER FUNCTION.

*REACTOR DYNAMICS + EQUATION, IN HOUR + TRANSFER FUNCTION

6-10692 WALLACE SK + TEARE KR + GREEN JB
METHODS FOR THE COMPARISON OF PULSED-NEUTRON SHUTDOWN MEASUREMENTS WITH THEORY
ROLLS-ROYCE + ASSOCIATES LIMITED, DERBY, ENGLAND
6 PAGES, 1 FIGURE, 1 TABLE, 12 REFERENCES- NUCLEAR SCIENCE AND ENGINEERING 25(4), 407-412 (1966)

DISCUSSION OF VALIDITY OF THE PULSED-NEUTRON EXPERIMENTS FOR CHECKING CORE-SHUTDOWN CALCULATIONS. ANALYSIS OF EXPERIMENTAL METHODS IS BASED ON ENERGY-DEPENDENT DIFFUSION THEORY, SINCE THIS, IN ITS FEW-GROUP FORM, IS THE USUAL CORE-DESIGN MODEL. COMPARISON OF EXPERIMENTAL AND THEORETICAL VALUES OF THE FUNDAMENTAL-MODE PROMPT-DECAY CONSTANT IS A VALID CHECK, BUT GARELIS AND RUSSELL METHOD BASED ON CERTAIN ASSUMPTIONS. EXPERIMENTER SHOULD CHECK EXTENT TO WHICH THESE ASSUMPTIONS ARE VIOLATED.

PULSED NEUTRON TECHNIQUE + SHUTDOWN MARGIN

6-10693 ZIYA AKCASU A + NOBLE LD
LAGRANGE STABILITY IN REACTORS WITH A LINEAR FEEDBACK
BROOKHAVEN NATIONAL LABORATORY, UPTON, NEW YORK + UNIVERSITY OF MICHIGAN, ANN ARBOR, MICHIGAN
3 PAGES, 4 REFERENCES, NUCLEAR SCIENCE AND ENGINEERING 25 (4)- 427-429 (1966)

TWO CRITERIA FOR THE LAGRANGE STABILITY IN REACTORS WITH AN ARBITRARY LINEAR FEEDBACK HAVE BEEN DERIVED.

REACTOR STABILITY

6-10694 KAPLAN S + YASINSKY JB
NATURAL MODES OF THE XENON PROBLEM WITH FLOW FEEDBACK--AN EXAMPLE
BETTIS ATOMIC POWER LABORATORY + WESTINGHOUSE ELECTRIC CORPORATION, WEST MIFFLIN, PENNSYLVANIA
9 PAGES, 8 FIGURES, 1 TABLE, 9 REFERENCES, NUCLEAR SCIENCE AND ENGINEERING 25 (4)- 430-438 (1966)

THE PHYSICAL QUESTION OF THE SPATIAL STABILITY OF A REACTOR WITH RESPECT TO XENON OSCILLATIONS CORRESPONDS TO A MATHEMATICAL QUESTION REGARDING THE LOCATION IN THE COMPLEX PLANE OF THE ROOTS OF A CERTAIN EIGENVALUE PROBLEM. THE INTRODUCTION OF FEEDBACK CONTROLLERS CORRESPONDS TO THE IMPOSITION OF CONSTRAINTS ON THE EIGENVALUE PROBLEM. THE EFFECT OF CERTAIN SUCH CONSTRAINTS ON THE LOCATIONS OF THE EIGENVALUES IS EXAMINED IN THIS PAPER FOR THE IDEALIZED CASE OF A ONE-GROUP UNIFORM-RING REACTOR. IT IS FOUND THAT THE EIGENVALUES OBEY A RULE RELATED TO RAYLEIGH'S SEPARATION THEOREM FOR VIBRATING MECHANICAL SYSTEMS. A NUMERICAL EXAMPLE IS GIVEN IN WHICH THE SOLUTIONS OF THE CONSTRAINED EIGENPROBLEM ARE DISPLAYED, INTERPRETED PHYSICALLY, AND COMPARED WITH THOSE OF THE UNCONSTRAINED PROBLEM.

REACTOR STABILITY + XENON OSCILLATION

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-10695 LONG JK + MCVEAM RL + REYNOLDS AB + STEWART SL + WEITZBERG A + LERIDON A
CRITICAL MASS OF SEFOR MOCKUP IN ZPR-III
ARGONNE NATIONAL LABORATORY, IDAHO FALLS, IDAHO + GENERAL ELECTRIC COMPANY, SAN JOSE, CALIFORNIA + CENTRE
D ETUDES NUCLEAIRES DE CADARACHE, FRANCE
2 PAGES, 1 FIGURE, 1 TABLE, 12 REFERENCES, NUCLEAR SCIENCE AND ENGINEERING 25 (4)- 442-443 (1966)

CRITICALITY OF THE MOCKUP OF THE SOUTHWEST EXPERIMENTAL FAST OXIDE REACTOR (SEFOR) IN THE
ZPR-III FACILITY WAS ACHIEVED NOVEMBER 17, 1965. THE NEUTRON SPECTRUM AND
URANIUM-TO-PLUTONIUM RATIO OF THIS ALL-PLUTONIUM CRITICAL IS CHARACTERISTIC OF LARGE, FAST,
CERAMIC POWER REACTORS. THE CRITICAL LOADING WAS THE FIRST IN A SERIES OF EXPERIMENTS.

*SEFOR (SOUTHWEST EXP. FAST OXIDE REACTOR) + CRITICAL ASSEMBLY FACILITY + CRITICALITY EXPERIMENT +
REACTOR, BREEDER + REACTOR, FAST + ZPR III (ANL ZERO POWER REACTOR)

6-10696 MIHALCZO JT
URANIUM (93.2 PERCENT) METAL CYLINDERS WITH THIN STAINLESS-STEEL REFLECTORS
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TENNESSEE
2 PAGES, 1 TABLE, 2 FIGURES, 9 REFERENCES, NUCLEAR SCIENCE AND ENGINEERING 25 (4)- 444-445 (1966)

THE POSSIBLE USE OF STAINLESS-STEEL REFLECTORS TO FLATTEN THE FISSION-DENSITY DISTRIBUTION IN
SUPERPROMPT-CRITICAL FAST-BURST REACTORS MOTIVATED A SERIES OF EXPERIMENTS IN WHICH THE
PROMPT-NEUTRON DECAY CONSTANT AT DELAYED CRITICAL WERE MEASURED BY THE ROSSI-ALPHA TECHNIQUE.
FOR REACTORS OF THIS TYPE, THE RESULTS INDICATE QUALITATIVELY THE EFFECT OF THE REFLECTOR ON
THE BURST SHAPE AND VERIFY THE S-SUB-N METHOD OF CALCULATION USING PUBLISHED VALUES OF THE
CROSS SECTIONS FOR STAINLESS STEEL.

*REACTOR, FAST BURST + *REFLECTOR + *STEEL, STAINLESS + ROSSI ALPHA

6-10697 SMETS HB
ON THE EFFECT OF DELAYED NEUTRONS IN REACTOR DYNAMICS
EUROPEAN NUCLEAR ENERGY AGENCY, OECD, PARIS, FRANCE
6 PAGES, 8 FIGURES, 15 REFERENCES, NUCLEAR SCIENCE AND ENGINEERING 25(3)- 236-241 (JULY 1966)

A STUDY OF LINEARIZED REACTOR DYNAMICS EQUATIONS SHOWS THAT DELAYED NEUTRONS DO NOT ALWAYS
IMPROVE THE STABILITY OF NUCLEAR REACTORS AT POWER LEVEL AND THAT A REACTOR MAY BE UNSTABLE
ALTHOUGH IT IS STABLE WHEN DELAYED NEUTRONS ARE NEGLECTED. THE CRITICAL POWER FOR
INSTABILITY AND THE DAMPING OF NATURAL OSCILLATIONS ARE LARGER WHEN DELAYED NEUTRONS ARE
TAKEN INTO ACCOUNT IN THE CASE OF LOW-PASS PHASE-LAGGING-REACTIVITY FEEDBACKS, BUT THIS
PROPERTY IS NOT TRUE FOR ALL TYPES OF FEEDBACKS.

*DELAYED NEUTRON + *REACTOR DYNAMICS + REACTOR STABILITY

6-10698 KEANE A
AN ESTIMATE OF THE DECREASE IN THE EFFECTIVE RESONANCE INTEGRAL DUE TO RESONANCE OVERLAP
HOUSTON UNIVERSITY, HOUSTON, TEXAS
3 PAGES, 1 TABLE, 9 REFERENCES, NUCLEAR SCIENCE AND ENGINEERING 25(3)- 296-298 (JULY 1966)

A SIMPLE MODEL IS INVESTIGATED ANALYTICALLY WHICH SHOWS THE RANGE OF VALIDITY OF AND THE
CORRECTION NECESSARY TO ROWLANDS FORMULA AND PROVIDES AN ALTERNATIVE EXPRESSION FOR THOSE
CONCENTRATIONS WHERE HIS FORMULA HAS ITS GREATEST ERROR.

*DOPPLER EFFECT

6-10709 EICKELPASCH N
NUCLEAR SAFETY IN THE DESIGN OF POWER REACTORS
NUCLEAR ENERGY AND RADIATION PROTECTION GROUP, GERMANY, TECHNISCHER UBERWACHUNGSVEREIN BAYERN
ORNL-TX-430 +. 14 PAGES, 2 TABLES, 2 FIGURES, TRANSLATED FROM ATOMKERNENERGIE 10 (5-6)- 187-190 (1965)

THE MOST IMPORTANT SAFETY FEATURES OF POWER REACTORS ARE LISTED, AND THEIR MECHANISM OF ACTION
IS EXPLAINED. THE IMPORTANCE OF THE REACTIVITY COEFFICIENTS IS ILLUSTRATED IN PARTICULAR
WITH THE EXAMPLE OF SPECIAL REACTOR ACCIDENTS. A CONCEPT OF THE ORDER OF MAGNITUDE OF THE
SAFETY FACTORS CITED IS TO BE ESTABLISHED.

FAILURE, FUEL ELEMENT + FUEL MELTDOWN + GERMANY + REACTIVITY COEFFICIENT + REACTIVITY, EXCESS +
REACTOR, BOILING WATER + REACTOR, PRESSURIZED WATER + SAFETY PRINCIPLES AND PHILOSOPHY

6-10714 DIETZ KA + MELLOW EW + PACE NE
QUARTERLY TECHNICAL REPORT - STEP PROJECT - JULY 1964-SEPTEMBER 1964 - OCTOBER 1964-DECEMBER 1964
PHILLIPS PETROLEUM COMPANY, IDAHO FALLS, IDAHO
IDO-17077 +. 219 PAGES, 154 FIGURES, 29 TABLES, 37 REFERENCES, MARCH 1966, CFSTI, \$6.00 CY, \$1.25 MN

BRIEF DISCUSSION OF ANALYSIS OF SNAPTRAN 2/10A-3 FUEL WATER-IMMERSION TEST. SNAPTRAN 2/10A-1
NON-DAMAGE, STEP-REACTIVITY-INSERTION, TRANSIENT TESTS. EXPERIMENTAL MEASUREMENTS AND
INSTRUMENTATION. TESTS INITIATED FROM AMBIENT TEMPERATURES OF LESS THAN 100 F. DIGITAL
COMPUTER CALCULATIONS OF THE POWER AND ENERGY RESPONSE OF THE SNAPTRAN 2/10A-1 REACTOR DURING
AN IMPULSE REACTIVITY INSERTION. PROPOSED SNAPTRAN 2/10A-2 DESTRUCTIVE TEST.

*SNAPTRAN (SNAP TRANSIENT REACTOR TEST SERIES) + COMPUTER, DIGITAL + REACTOR TRANSIENT + TEST, DESTRUCTIVE

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-10715 FAST REACTOR SAFETY STUDIES
ARGONNE NATIONAL LABORATORY, ARGONNE, ILLINOIS
ANL-7175 +. 10 PAGES, 5 FIGURES, PP. 175-184 OF ARGONNE NATIONAL LABORATORY CHEMICAL ENGINEERING DIVISION
RESEARCH HIGHLIGHTS, MAY 1965 - APRIL 1966, CFSTI, \$6.00 CY, \$1.25 MF.

HOT MATERIAL DROPPED INTO LIQUID SODIUM AND CONSEQUENCES EXAMINED AND DISCUSSED. SWINGING-ARM
TECHNIQUE OF STUDYING TRANSIENT HEAT TRANSFER FROM SMALL PARTICLES. (THE PRECEDING ITEMS
HAVE BEEN PREVIOUSLY REPORTED IN MONTHLY REPORTS). PLANS FOR STUDY OF FUEL SEGREGATION IN
MIXED URANIUM-PLUTONIUM COMPOUNDS FOR DETERMINATIONS OF HIGH-TEMPERATURE PHYSICAL PROPERTIES
OF FAST-REACTOR MATERIAL. STUDIES OF SODIUM-AIR REACTION (ALSO PREVIOUSLY REPORTED IN
MONTHLY REPORTS).

*REACTOR, FAST + *THERMAL ANALYSIS + FIRE + FUEL MELTDOWN + FUEL SEGREGATION + HIGH TEMPERATURE +
PROPERTY, PHYSICAL + SODIUM

6-10716 MAGNUSON DW
STATIC AND DYNAMIC TRANSPORT CALCULATIONS FOR PULSED-NEUTRON EXPERIMENTS WITH SPHERES OF URANYL NITRATE
SOLUTION
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TENNESSEE
ORNL-TM-1213 +. 15 PAGES, 1 FIGURE, 3 TABLES, APRIL 26, 1966, CFSTI, \$1.00 CY, \$0.50 MN

IN STATIC REACTOR CALCULATIONS, THE NEUTRON BALANCE IS MAINTAINED BY ADDING NEUTRONS AT
FISSION ENERGIES. IN DYNAMIC REACTOR CALCULATIONS, THE BALANCE MAY BE MAINTAINED BY ADDING
NEUTRONS WHICH HAVE A SPECTRUM PROPORTIONAL TO THE FLUXES AND INVERSELY PROPORTIONAL TO THE
NEUTRON VELOCITY. SINCE THE NEUTRONS ADDED IN THE TWO METHODS HAVE UNEQUAL IMPORTANCES, THE
REACTIVITIES ARE UNEQUAL. CALCULATIONS FOR APPLICATION TO PULSED-NEUTRON EXPERIMENTS ON
SPHERES OF URANYL NITRATE SOLUTION.

*PULSED NEUTRON TECHNIQUE

6-10717 FOULKE LR + GYFTOPOULOS EP
THE USE OF OSCILLATION TESTS TO INVESTIGATE FLUX TILTING
MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASSACHUSETTS
4 PAGES, 1 FIGURE, 6 REFERENCES, 1966 ANNUAL MEETING AMERICAN NUCLEAR SOCIETY, DENVER, COLORADO, JUNE
20-23, 1966, TRANSACTIONS OF AMERICAN NUCLEAR SOCIETY 9(1)- 271

SMALL-AMPLITUDE OSCILLATION TESTS CAN BE USED TO MEASURE CERTAIN MODAL EIGENVALUES, WHICH MAY
BE USED TO INFER THE SUSCEPTIBILITY OF A POWER REACTOR TO FLUX TILTING. THE PROCEDURE HAS
BEEN APPLIED BOTH TO COMPUTER EXPERIMENTS AND TO EXPERIMENTAL DATA FROM THE NORA REACTOR,
WITH SATISFACTORY RESULTS. IT IS SUGGESTED THAT THE OSCILLATION TECHNIQUE BE USED TO MONITOR
CHANGING SPACE-TIME CHARACTERISTICS OF A REACTOR CORE DURING ITS LIFETIME.

*FLUX TILT + *OSCILLATOR, REACTIVITY + NORWAY + SPACE DEPENDENT DYNAMICS

6-10718 BROWN CL
CRITICALITY SAFETY OF PUO2-SS DRIVER FUEL IN THE FFTF
BATTELLE-NORTHWEST, PACIFIC NORTHWEST LABORATORY, RICHLAND, WASHINGTON
BNWL-222 +. PAGES 10-11 OF PHYSICS RESEARCH QUARTERLY REPORT - OCTOBER, NOVEMBER, DECEMBER 1965. JANUARY
14, 1966, CFSTI, \$2.00 CY, \$0.50 MN

UPDATES, IN THE LIGHT OF SLIGHT DESIGN CHANGES, THE REACTIVITY SAFETY CALCULATIONS OF THE
PLUTONIUM OXIDE-STAINLESS STEEL DRIVER IN THE FFTF.

*FAST NEUTRON + *HANFORD SITE + REACTIVITY, EXCESS + REACTOR, TEST

6-10719 GARLID KL + BIERMAN SR
APPLICATIONS OF PULSED NEUTRON MEASUREMENTS IN VERY LARGE SYSTEMS
BATTELLE-NORTHWEST, PACIFIC NORTHWEST LABORATORY, RICHLAND, WASHINGTON
BNWL-222 +. PAGES 12-23 OF PHYSICS RESEARCH QUARTERLY REPORT - OCTOBER, NOVEMBER, DECEMBER 1965. JANUARY
14, 1966, CFSTI, \$2.00 CY, \$0.50 MN

THE PURPOSE OF THIS WORK IS TO SEE IF USEFUL INFORMATION CAN BE OBTAINED FROM PULSED-NEUTRON
EXPERIMENTS IN VERY LARGE MEDIA AND TO AT LEAST EXPLORE AND EXAMINE THE BEHAVIOR OF TRANSIENT
NEUTRON POPULATIONS IN SUCH MEDIA. THEORETICAL APPROACHES AND EXPERIMENTAL MEASUREMENTS ARE
DESCRIBED.

*PULSED NEUTRON TECHNIQUE + *REACTOR, LARGE + CONTAINMENT, FUEL REPROCESSING + FUEL STORAGE +
SPACE DEPENDENT DYNAMICS + WASTE STORAGE

6-10800 CHEZEM CG
ON POWER TRANSIENTS IN PROPULSION REACTORS INDUCED BY WATER INJECTION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO
LA-3428-MS +. 54 PAGES, 10 FIGURES, 2 TABLES, 11 REFERENCES, DECEMBER 1965, CFSTI, \$3.00 CY, \$0.50 MN

MAGNITUDE OF THE NUCLEAR TRANSIENT RESULTING FROM THE INFLOW OF WATER INTO THE CORE OF A
NERVA-TYPE REACTOR. CORE ASSUMED TO BE AN ARRAY OF SMALL CIRCULAR HOLES PENETRATING A THICK
SOLID. INITIALLY WATER ENTERS THE ARRAY, AND THE WATER-AIR INTERFACE IS ADVANCED THROUGH THE
CHANNELS IN SMALL STEPS, DURING WHICH STEADY-STATE CONDITIONS OF FLOW, HEAT CONDUCTION, AND
NUCLEAR-RADIATION HEATING ARE ASSUMED TO EXIST. REACTIVITY IS ADDED AS AN EMPIRICAL FUNCTION
OF WATER PENETRATION. CORE POWER TIME PROFILE IS TRACED.

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-10800 *CONTINUED*
*FLOODING COEFFICIENT + *REACTOR TRANSIENT + *SPACECRAFT + POWER DISTRIBUTION

6-10801 SINGH RS + HUMMEL HH
PARAMETRIC STUDIES OF THE REACTIVITY COEFFICIENTS FOR LARGE U-233-TH-FUELED FAST REACTORS
ARGONNE NATIONAL LABORATORY, ARGONNE, ILLINOIS
ANL-6930 +. 28 PAGES, 11 FIGURES, 12 TABLES, 22 REFERENCES, JANUARY 1966, CFSTI, \$2.00 CY, \$0.50 MN

COMPOSITION AND TEMPERATURE-DEPENDENT CROSS SECTIONS FOR THORIUM EVALUATED BY LATEST RESONANCE PARAMETERS. SODIUM-VOID COEFFICIENT STUDIED OVER A RANGE OF COMPOSITIONS AND SIZES OF CORE FOR METAL AND OXIDE FUELS. EFFECT OF U-234 AND FISSION PRODUCTS. DOPPLER EFFECT CALCULATED FOR METAL- AND OXIDE-FUELED SYSTEMS. EVEN WITH PRESENT CROSS-SECTION UNCERTAINTIES, THE REACTIVITY CHANGES DUE TO SODIUM LOSS AND THE DOPPLER EFFECT ARE ENCOURAGING FOR FAST BREEDER REACTORS WITH VERY LARGE SINGLE CORES IF U-233 AND THORIUM ARE THE FUEL.

*DOPPLER COEFFICIENT + *REACTOR, FAST + *SODIUM COEFFICIENT + REACTOR, LARGE + THORIUM

6-10802 THIE JA
NOISE ANALYSIS IN REACTOR SAFETY
8 PAGES, 3 TABLES, 4 FIGURES, 58 REFERENCES, NUCLEAR SAFETY, 7(3), PAGES 271-278 (SPRING, 1966), GPO, \$0.55

THE APPLICATIONS OF TECHNIQUES IN THE FIELD OF REACTOR NOISE (OR RANDOM POWER FLUCTUATIONS) TO REACTOR SAFETY ARE REVIEWED. TABULATIONS ARE GIVEN OF NEARLY ALL THE APPLICATIONS TO DATE, BOTH IN ZERO-POWER REACTORS AND IN POWER REACTORS. THESE CONTRIBUTE TO SAFETY BY DETERMINING THE REACTIVITY SHUTDOWN MARGIN, MONITORING FOR POSSIBLE INSTABILITIES, AND ASSISTING IN UNDERSTANDING THE DYNAMIC PROCESSES IN THE REACTOR. EXAMPLES OF RECENT WORK ARE GIVEN ALONG WITH AN EXTENSIVE BIBLIOGRAPHY. THE SIGNIFICANCE OF VARIOUS EXPERIMENTAL APPLICATIONS IS POINTED OUT, WITH COMMENTS REGARDING THEIR FUTURE PROMISE.

NOISE ANALYSIS + REACTOR STABILITY + SHUTDOWN MARGIN + SPACE DEPENDENT DYNAMICS

6-10803 BENNETT RA + SCHMID LC
APPROACH TO CRITICAL AND CALIBRATION EXPERIMENTS IN THE PLUTONIUM RECYCLE CRITICAL FACILITY
HANFORD ATOMIC PRODUCTS OPERATION
HW-80206 +. 54 PAGES, 23 FIGURES, REFERENCES, JULY, 1964, CFSTI, \$3.00

INITIAL APPROACH TO CRITICAL EXPERIMENT AND POWER LEVEL, CONTROL ROD, AND MODERATOR-LEVEL CALIBRATION EXPERIMENTS IN THE PRCF MODERATED WITH D₂O. IN A FEW CASES, THE EXPERIMENTAL RESULTS ARE COMPARED WITH ANALYTICAL RESULTS, USING THREE-GROUP DIFFUSION THEORY. REACTOR CRITICAL AT A MODERATOR LEVEL OF 105 IN., WITH 25 URANIUM DIOXIDE FUEL CLUSTERS SURROUNDED BY 30 PU-AL FUEL CLUSTERS AT AN 8-IN. LATTICE SPACING. CONTROL RODS WORTH APPROXIMATELY 2 MK. MODERATOR-LEVEL COEFFICIENT OF REACTIVITY IS 0.16 MK/IN. AT 105 IN.

*CONTROL ROD WORTH + *MODERATOR COEFFICIENT + HEAVY WATER + PLUTONIUM

6-10804 IOTINEN VO + SCHMID LC
THE D₂O MODERATOR LEVEL COEFFICIENTS OF THE PRCF
HANFORD ATOMIC PRODUCTS OPERATION
HW-81397 +. 18 PAGES, AUGUST 27, 1964, CFSTI, \$1.00

MODERATOR-LEVEL COEFFICIENTS FOR THE PLUTONIUM RECYCLE CRITICAL FACILITY (PRCF) WITH D₂O MODERATOR DETERMINED FOR LEVELS BETWEEN 69 IN. AND 105 IN. EFFECT OF UNMODERATED FUEL ON THE EXTRAPOLATION DISTANCE WAS ALSO INVESTIGATED.

*MODERATOR COEFFICIENT + FUEL ELEMENT + HEAVY WATER + MEASUREMENT, REACTIVITY + PLUTONIUM

6-10805 BIERMAN SR
PULSED NEUTRON SOURCE MEASUREMENTS OF THE Z-9 CRIB
HANFORD ATOMIC PRODUCTS OPERATION
HW-80913 +. 9 PAGES, MARCH 16, 1964, CFSTI, \$1.00 CY

THE PULSED-NEUTRON TECHNIQUE IS THOUGHT OF AS A DEVICE TO MEASURE THE SUBCRITICALITY OF COMPONENTS OF PLANTS WHICH HANDLE FISSIONABLE MATERIAL. THE ACTUAL EXPERIMENTS IN THE HANFORD CRITICAL MASS LABORATORY WERE DONE IN CONJUNCTION WITH MEASUREMENTS OF CRITICAL MASS, CONTROL AND SAFETY ROD WORTH, AND NEUTRON LIFETIMES. INCLUDES ANALYSIS OF THE EXPERIMENTS.

*FUEL HANDLING + *PULSED NEUTRON TECHNIQUE + *SHUTDOWN MARGIN + CONTROL ROD WORTH + CRITICALITY SAFETY + PROMPT NEUTRON LIFETIME + RADIOCHEMICAL PROCESSING

6-10852 BOHLANDER H + KLODT K + RUSSE S
STABILITY INVESTIGATIONS FOR BOILING WATER REACTORS. QUARTERLY REPORT NO. 4, JANUARY 1-MARCH 31, 1965
KERNENERGIEANLAGEN, ALLGEMEINE ELEKTRICITÄTS-GESELLSCHAFT, FRANKFURT, WEST GERMANY
EURAC-1353 + EUR-2328 +. 60 PAGES, CFSTI, \$3.00 CY, \$0.75 MN

MAINLY A PROGRESS REPORT ON A DEVICE IN WHICH FUEL CHANNELS ARE SIMULATED AND THE STEAM VOID FRACTION MEASURED BY GAMMA RAYS. ALSO ANALYTICAL WORK ON A TRANSFER FUNCTION INVOLVING THE VOID FRACTION.

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-10852 *CONTINUED*
*HYDRAULIC ANALYSIS + *REACTOR, BOILING WATER + *THERMAL ANALYSIS + TRANSFER FUNCTION + VOID COEFFICIENT

6-10853 IFTODE I + MIKHEILE A + PURIKA I + POSHU K + STOYAN D
METHOD FOR THE INVESTIGATION OF BOILING BY AN ANALYSIS OF FLUCTUATIONS INDUCED IN A REACTOR
INSTITUTUL DE FISIKA ATOMICA, ACADEMIA R.P.R., BUCHAREST
ANL-TRANS-302 + NP-13442 +. 9 PAGES, APRIL, 1963, CFSTI, \$1.00 CY, \$0.50 MN

MEASUREMENT IN THE VVR-S REACTOR OF STEAM-BUBBLE FORMATION IN AN ELECTRICALLY HEATED ALUMINUM TUBE. FREQUENCY SPECTRUM SHOWS RESONANCES BETWEEN 0.2 CPS AND 0.25 AND AT 1.5 CPS.

HEAT TRANSFER, BOILING + REACTOR, BOILING WATER + THERMAL ANALYSIS + TRANSFER FUNCTION

6-10854 HANSON JE + FIELD JH + RABIN SA
EXPERIMENTAL STUDIES OF TRANSIENT EFFECTS IN FAST REACTOR FUELS. SERIES II. MIXED OXIDE (PUO₂-UO₂) IRRADIATIONS
GENERAL ELECTRIC COMPANY, SAN JOSE, CALIFORNIA
GEAP-4804 +. 96 PAGES, REFERENCES, MAY, 1965, CFSTI, \$3.00 CY, \$0.75 MN

THE RESULTS OF AN EXPERIMENTAL PROGRAM TO EVALUATE THE PERFORMANCE OF NON-PREIRRADIATED FAST-CERAMIC-REACTOR FUEL UNDER CONDITIONS SIMULATING ACCIDENTAL POWER EXCURSIONS ARE PRESENTED. RESULTS FROM THREE EXPERIMENTS IN THE TREAT FACILITY USING 0.250-INCH-O.D., TYPE 347 STAINLESS STEEL CLAD, 20 WEIGHT PERCENT PUO₂ - 80 WEIGHT PERCENT UO₂ FUEL SPECIMENS ARE INTERPRETED WITH REGARD TO FUEL-CLADDING TEMPERATURES, FUEL VAPOR PRESSURE, THERMAL EXPANSION OF THE FUEL, AND CLADDING INTEGRITY. INCIDENT FAILURE LIMITS FOR AXIALLY UNRESTRAINED FUEL ARE IDENTIFIED AS FUNCTIONS OF THE MAXIMUM FUEL AND CLADDING TEMPERATURES ATTAINED DURING THE TRANSIENT.

FAILURE, FUEL ELEMENT + PLUTONIUM + STEEL, STAINLESS + TREAT (TRANSIENT TEST REACTOR FACILITY)

6-10855 HAEGGBLOM H
THEORETICAL WORK FOR FAST ZERO-POWER REACTOR FRO
AKTIEBOLAGET ATOMENERGI, STOCKHOLM, SWEDEN
AE-194 +. 45 PAGES, TABLES, FIGURES, REFERENCES, AUGUST, 1965, DEP/MN

FOR THE FRO REACTOR, CALCULATIONS OF CONTROL ROD WORTH, PROMPT NEUTRON LIFETIME, EFFECTIVE DELAYED NEUTRON FRACTION AND OTHER ITEMS. USE OF CARLSON CODES IN SPHERICAL AND CYLINDRICAL GEOMETRY, AND OF PERTURBATION THEORY AND VARIATIONAL CALCULUS.

*REACTOR, FAST + *SWEDEN + CONTROL ROD WORTH + DELAYED NEUTRON + PROMPT NEUTRON LIFETIME

6-10856 EUROLA T
NOISE EXPERIMENTS WITH THE HBWR SECOND FUEL CHARGE
INSTITUTT FOR ATOMENERGI, HALDEN, NORWAY
HPR-53 +. 82 PAGES, FIGURES, TABLES, REFERENCES, DECEMBER, 1964, DEP/MN

THE REPORT SUMMARIZES THE HBWR EXPERIENCE IN THE STUDY OF BOILING-WATER-REACTOR DYNAMICS BY THE NOISE TECHNIQUE. THIS EXPERIENCE IS BASED ON MEASUREMENTS OF FLUCTUATIONS OF A NUMBER OF LOCAL IN-CORE AND INTEGRAL PARAMETERS AT VARIOUS OPERATIONAL CONDITIONS AND ON STUDIES OF A SIMPLIFIED ANALOGUE SIMULATION OF THE HBWR PLANT.

*NOISE ANALYSIS + HBWR (HALDEN BOILING WATER REACTOR) + TRANSFER FUNCTION

6-10865 ASAKA T + MISENTA R
KINETIC THEORY AND CALCULATIONS IN A FEW-ENERGY-GROUP TWO-SPACE-POINT MODEL FOR A FAST REACTOR PERIODICALLY PULSED BY REACTIVITY VARIATIONS
EUROPEAN ATOMIC ENERGY COMMUNITY, ISPRA, ITALY
EUR-2273.E +. 37 PAGES, REFERENCES, 1965, DEPMN

FOR A FAST REACTOR PERIODICALLY PULSED BY REACTIVITY VARIATIONS, THERE EXISTS A CONDITION FOR THE STATIONARILY PULSED OPERATION. THIS REPORT CONSISTS OF A PERIODICALLY PULSED FAST REACTOR WHICH CONSISTS OF A CORE WITH HIGHLY ENRICHED URANIUM. THE CORE IS SURROUNDED BY A REFLECTOR CONTAINING SCATTERERS IN ORDER TO GET A HIGH THERMAL NEUTRON FLUX DURING THE POWER PULSE. THE MULTIGROUP TREATMENT HAS BEEN EXTENDED BY DIVIDING THE CORE-REFLECTOR GEOMETRY INTO TWO REGIONS, THE CORE AND THE SCATTERER REGION. THE COUPLING BETWEEN THE CORE AND SCATTERER REGION DOES NOT APPEAR EXPLICITLY. THE NUMERICAL RESULTS ARE EASILY OBTAINED, BY ASSUMING THAT THE COUPLING BETWEEN THE CORE AND SCATTERER REGION DURING THE PULSE IS THE SAME AS IN THE STATIC CASE.

*ITALY + *REACTOR, PULSED + MODERATOR + REACTOR, FAST

6-10874 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2.
CONSOLIDATED EDISON COMPANY OF NEW YORK
2 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 4 -- LOSS OF LOAD AND LOSS OF FLOW ARE PROTECTED AGAINST BY ROD INSERTION, STEAM DUMP, AND BY ROTATIONAL INERTIA OF CONTROLLED LEAKAGE PUMPS.

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-10874 *CONTINUED*
*DESIGN CRITERIA + *LOSS OF FLOW + *LOSS OF LOAD + *REGULATION, AEC +
*SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + REACTOR, PRESSURIZED WATER

6-10875 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2. CONSOLIDATED EDISON COMPANY OF NEW YORK
5 PAGES, 1 FIGURE, 1 TABLE OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2, MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 5 -- SPATIAL-POWER-DISTRIBUTION INSTABILITIES (DUE TO XENON OSCILLATION OR MODERATOR TEMPERATURE VARIATIONS) WILL BE EXAMINED IN DETAIL. PRELIMINARY STUDIES INDICATE THAT THESE CAN BE CONTROLLED IF NECESSARY. MOST OF THE EXPERIMENTAL DATA IS ON STAINLESS-STEEL CORES, SO DAMPING DUE TO POWER COEFFICIENT CANNOT BE ACCURATELY CHECKED IN ZIRCALOY-CLAD CORE.

*DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + *XENON OSCILLATION + INDIAN POINT II + MODERATOR COEFFICIENT + POWER DISTRIBUTION + REACTOR, PRESSURIZED WATER

6-10930 HARRIS DR + PRESCOP V
STABILITY AND STATIONARITY OF A REACTOR AS A STOCHASTIC PROCESS WITH FEEDBACK
WESTINGHOUSE ELECTRIC CORPORATION, BETTIS ATOMIC POWER LABORATORY
2 PAGES, 1 FIGURE, 5 REFERENCES, ANS TRANSACTIONS 9(1), PAGES 118-119 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

STABILITY IN THE DETERMINISTIC SENSE IS ANALOGOUS TO A CONDITION WHERE EACH STATE WILL CERTAINLY RECUR. THE MEAN RECURRENCE TIME IS FINITE, AND A UNIQUE STATIONARY PROBABILITY DISTRIBUTION EXISTS. INSTABILITY CORRESPONDS TO A CONDITION WHERE NO STATIONARY DISTRIBUTION EXISTS. THE PROBABILITY OF RECURRENCE IS INFINITE.

*REACTOR STABILITY

6-10931 CLARKE WG + HARRIS DR + NATELSON M + WALTER JF
VARIANCES AND COVARIANCES OF NEUTRON AND PRECURSOR POPULATIONS IN TIME-VARYING REACTORS
WESTINGHOUSE ELECTRIC CORPORATION, BETTIS ATOMIC POWER LABORATORY
2 PAGES, 1 FIGURE, 2 REFERENCES, ANS TRANSACTIONS 9(1), PAGES 119-120, (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

WHILE FIRST AND SECOND MOMENTS OF REACTOR POPULATIONS HAVE BEEN DETERMINED FOR THE STATIONARY PROCESS (SUBCRITICAL CONSTANT REACTOR WITH SOURCE), STUDIES OF FIRST AND SECOND MOMENTS OF POPULATIONS IN TIME-VARYING REACTORS HAVE NOT APPEARED PREVIOUSLY AND ARE PRESENTED HERE. FEEDBACK IS IGNORED, SO THESE STUDIES APPLY TO STARTUP AND SUB-POWER-RANGE TRANSIENTS.

REACTOR DYNAMICS

6-10933 KESSLER WE + BROCKETT GF + BINGHAM GE
ZIRCONIUM-HYDRIDE FUEL BEHAVIOR IN THE SNAPTRAN TRANSIENT TESTS
PHILLIPS PETROLEUM COMPANY, IDAHO FALLS, IDAHO
1 PAGE, ANS TRANSACTIONS, 9(1), PAGE 155 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

FOR SNAP 10A/2-TYPE REACTORS, REACTIVITY EXCURSIONS BELOW 1.7 DOLLARS ARE NONDESTRUCTIVELY SELF-LIMITED BY THE INHERENT TEMPERATURE-DEPENDENT NEGATIVE-REACTIVITY FEEDBACK MECHANISMS OF 12 CENTS/MW-SEC. FOR EXCURSIONS RESULTING FROM ESSENTIALLY ANY AMOUNT OF REACTIVITY ABOVE 1.7 DOLLARS, THE INHERENT DISASSEMBLY CHARACTERISTICS OF THIS TYPE FUEL LIMITS THE ENERGY RELEASE TO WELL BELOW 100 MW-SEC. IN THE WATER IMMERSION TEST, RAPID COOLING OF THE FUEL LIMITED THE RELEASE OF NOBLE GASES AND THEIR DAUGHTERS TO THE ENVIRONMENT FROM THE FUEL TO LESS THAN 5 PERCENT OF THAT AVAILABLE IN THE FUEL. THE IODINE RELEASE WAS LIMITED TO LESS THAN 13 PERCENT OF THE AVAILABLE. IN THE AIR-ENVIRONMENT TEST, FUEL DISINTEGRATION WAS ACCOMPANIED BY HYDROGEN-OXYGEN COMBUSTION. ABOUT 100 PERCENT OF THE NOBLE GASES AND 50 PERCENT OF THE AVAILABLE IODINE WERE RELEASED.

*FISSION GAS RELEASE + *SNAPTRAN (SNAP TRANSIENT REACTOR TEST SERIES) + DESTRUCTIVE TRANSIENT + FISSION PRODUCT RETENTION + FISSION PRODUCT, IODINE + HYDROGEN + REACTOR TRANSIENT

6-10934 MOSS LI + JACKSON JF + RHOADES WA + GREEN WB + JOHNSON RP + DYE FC
PRELIMINARY ANALYSES OF SNAPTRAN-2 DATA
ATOMICS INTERNATIONAL
3 PAGES, 2 FIGURES, 9 REFERENCES, ANS TRANSACTIONS, 9(1), PAGES 155-157, (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

PEAK POWER, 78,000 MW. ENERGY RELEASE, 39 MW-SEC. TEMPERATURE COEFFICIENT DURING NONDESTRUCTIVE PART, 0.25 CENT PER DEGREE F. INITIAL REACTIVITY, 5 DOLLARS. INITIAL ASYMPTOTIC PERIOD, 200 MICROSECONDS. FUEL DISINTEGRATION BEGAN BEFORE POWER PEAK. PROGRESS OF IN-CORE FUEL DISINTEGRATION MEASURED BY STREAK-CAMERA PHOTOGRAPHS OF LIGHTS SHINING THROUGH COOLANT CHANNELS.

*DESTRUCTIVE TRANSIENT + *SNAPTRAN (SNAP TRANSIENT REACTOR TEST SERIES) + FAILURE, FUEL ELEMENT + HYDROGEN

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-10935 MCVEAN RL + GOIN RW + WEITZBERG A + LERIDON A
CRITICAL ASSEMBLY MOCKUP OF THE SEFOR REACTOR IN ZPR-3
ARGONNE NATIONAL LABORATORY, IDAHO + GENERAL ELECTRIC COMPANY, VALLECITOS ATOMIC POWER LABORATORY + CENTRE
NUCLEAIRE DE CADARACHE, FRANCE
1 PAGE, 1 TABLE, 5 REFERENCES, ANS TRANSACTIONS, 9(1), PAGE 226 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY
ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

AVERAGE CONTROL-ROD WORTH IS 117 CENTS. ONE HUNDRED, THIRTY-NINE CENTS REACTIVITY REDUCTION
DUE TO HALF-INCH ELONGATION OF FUEL RODS. MEASUREMENTS OF CENTRAL REACTIVITY WORTHS, DOPPLER
EFFECT, AND ROSSI ALPHA.

*SEFOR (SOUTHWEST EXP. FAST OXIDE REACTOR) + *ZPR III (ANL ZERO POWER REACTOR) + CONTROL ROD WORTH +
CRITICAL ASSEMBLY FACILITY + DOPPLER EFFECT + FUEL EXPANSION COEFFICIENT + REACTIVITY EFFECT +
REACTOR, BREEDER + REACTOR, FAST + ROSSI ALPHA

6-10936 DAVEY WG + AMUNDSON PI
ACTIVATION MEASUREMENTS OF THE DOPPLER EFFECT IN URANIUM-238 IN ZPR-3 ASSEMBLY 47 (SEFOR)
ARGONNE NATIONAL LABORATORY, IDAHO
2 PAGES, 3 REFERENCES, ANS TRANSACTIONS, 9(1), PAGES 226-227 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL
MEETING, DENVER, COLORADO, JUNE 20-23, 1966

DOPPLER MEASUREMENTS USING THE U-239 ACTIVATION IN HIGHLY DEPLETED URANIUM FOIL, COMPARING
FOIL HEATED BY AN ELECTRIC FURNACE WITH A COLD FOIL OUTSIDE THE FURNACE. LOCAL ENVIRONMENT
INFLUENCES RESULTS BY A FACTOR OF 2.

*DOPPLER EFFECT + *SEFOR (SOUTHWEST EXP. FAST OXIDE REACTOR) + *ZPR III (ANL ZERO POWER REACTOR) +
CRITICAL ASSEMBLY FACILITY + REACTOR, BREEDER + REACTOR, FAST

6-10937 REYNOLDS AB + STEWART SL
ANALYSIS OF SEFOR MOCKUP IN ZPR-III
GENERAL ELECTRIC COMPANY, SAN JOSE
2 PAGES, 13 REFERENCES, ANS TRANSACTIONS, 9(1), PAGES 227-228 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY
ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

COMPUTED REACTIVITY REDUCTION DUE TO HALF-INCH ELONGATION OF FUEL - 130 CENTS COMPARED WITH A
MEASURED VALUE OF 140. COMPUTED AVERAGE CONTROL-ROD WORTH - 127 CENTS, COMPARED WITH 131
CENTS, MEASURED.

*SEFOR (SOUTHWEST EXP. FAST OXIDE REACTOR) + *ZPR III (ANL ZERO POWER REACTOR) + COMPUTER, DIGITAL +
CONTROL ROD WORTH + CRITICAL ASSEMBLY FACILITY + FUEL EXPANSION COEFFICIENT + REACTOR, BREEDER +
REACTOR, FAST

6-10938 DOERNER RC + KNAPP WG
STUDIES IN FAST CORES WITH LIGHT METAL AND OXIDE REFLECTORS
ARGONNE NATIONAL LABORATORY
1 PAGE, ANS TRANSACTIONS, 9(1), PAGE 228, (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER,
COLORADO, JUNE 20-23, 1966

A SERIES OF FAST CRITICAL ASSEMBLIES WERE STUDIED IN THE ZPR-9 FACILITY TO EVALUATE THE
IMPORTANT DIFFERENCES BETWEEN METAL- AND OXIDE-FUELED CORES AND BETWEEN AL, AL OXIDE, AND BEO
REFLECTORS. MEASUREMENTS MADE IN EACH OF THE ASSEMBLIES INCLUDE A DETERMINATION OF THE
CRITICAL MASS AND VOLUME, CENTRAL WORTHS OF U-235, U-238, B-10, C, AND HYDROGEN, ROSSI-ALPHA
AND SPATIAL-DEPENDENT REACTIVITY WORTHS OF RE, GD, W, AND EU.

CRITICAL ASSEMBLY FACILITY + REACTIVITY EFFECT + REACTOR, FAST + ROSSI ALPHA + URANIUM + URANIUM OXIDE +
ZPR IX (ANL ZERO POWER REACTOR)

6-10939 HENRY AF
DEFINITION AND GENERAL CONSIDERATIONS CONCERNING LARGE CHANGES IN REACTIVITY
WESTINGHOUSE ELECTRIC CORPORATION, BETTIS ATOMIC POWER LABORATORY
2 PAGES, 1 TABLE, 10 REFERENCES, ANS TRANSACTIONS, 9(1), PAGES 235-236 (JUNE, 1966), AMERICAN NUCLEAR
SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

GIVES TABLE AND DISCUSSION OF THE DIFFERENT DEFINITIONS OF REACTIVITY.

*REACTOR DYNAMICS + *SHUTDOWN MARGIN + PERTURBATION METHOD + PULSED NEUTRON TECHNIQUE

6-10940 GOZANI T
SUBCRITICAL REACTIVITY DETERMINATIONS-COMPARISON OF EXPERIMENTAL METHODS
RENSSELAER POLYTECHNIC INSTITUTE
2 PAGES, 22 REFERENCES, ANS TRANSACTIONS, 9(1), PAGES 236-237 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY
ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

BASIC SUBCRITICAL METHODS FOR REACTIVITY MEASUREMENTS UTILIZING THE SOURCE-JERK, THE ROD-DROP,
THE PULSED SOURCE, AND THE BORON HOMOGENEOUS POISONING METHODS ARE DISCUSSED AND COMPARED.

*SHUTDOWN MARGIN + PULSED NEUTRON TECHNIQUE

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-10941 BECKER M
PRINCIPLES OF, AND PROBLEMS WITH, PULSED-NEUTRON REACTIVITY MEASUREMENTS
GENERAL ELECTRIC COMPANY, KNOLLS ATOMIC POWER LABORATORY
2 PAGES, 5 REFERENCES, ANS TRANSACTIONS, 9(1), PAGES 237-238 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

SEVERAL METHODS HAVE BEEN ADVANCED BY WHICH PULSED-NEUTRON TECHNIQUES CAN BE USED TO MEASURE THE REACTIVITY OF A SUBCRITICAL ASSEMBLY. IN THIS PAPER, WE DESCRIBE THE PRINCIPAL METHODS AND DISCUSS FACTORS THAT CAN INHIBIT THE APPLICATION OF SOME OF THESE PROCEDURES.

*SHUTDOWN MARGIN + PULSED NEUTRON TECHNIQUE

6-10942 HANSEN GE
SPECIAL PROBLEMS ASSOCIATED WITH THE DETERMINATION OF LARGE NEGATIVE REACTIVITY CHANGES IN FAST SYSTEMS
LOS ALAMOS SCIENTIFIC LABORATORY
1 PAGE, ANS TRANSACTIONS, 9(1), PAGE 238 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

FIRST-ORDER PERTURBATION THEORY YIELDS A HOST OF LINEARLY RELATED REACTIVITY SCALES EQUALLY SUITABLE FOR EXPRESSING SMALL REACTIVITY CHANGES IN NEAR-CRITICAL SYSTEMS. FOR SUFFICIENTLY LARGE CHANGES IN MATERIAL COMPOSITION OR DISPOSITION, SUCH REACTIVITY SCALES AS REPRODUCTION NUMBER, FISSION-CHAIN LIFETIME, FRACTIONAL CRITICAL MASS, ETC., ARE NO LONGER SIMPLY RELATED. THIS PAPER REVIEWS SOME OF THE EXPERIMENTAL AND COMPUTATIONAL DIFFICULTIES IN THE CORRELATION OF VARIOUS REACTIVITY CHARACTERIZATIONS OF HIGHLY SUBCRITICAL FAST NEUTRON SYSTEMS.

*REACTOR, FAST + *SHUTDOWN MARGIN + PERTURBATION METHOD

6-10943 ALBRECHT RW
APPLICATION OF CORRELATION TECHNIQUES TO DETERMINATION OF SUBCRITICAL REACTIVITY
UNIVERSITY OF WASHINGTON
1 PAGE, ANS TRANSACTIONS, 9(1), PAGE 238 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

IN THIS DISCUSSION WE REVIEW THE BASIC PRINCIPLES OF THE VARIOUS STOCHASTIC METHODS THAT HAVE COME TO LIGHT, AND ATTEMPT TO ILLUMINATE, IN A QUALITATIVE WAY, THE ADVANTAGES AND LIMITATIONS OF EACH AS A FUNCTION OF SYSTEM PARAMETERS AND THE USE TO BE MADE OF THE INFORMATION. SOME OF THE METHODS HAVE BEEN MORE FULLY DEVELOPED THAN OTHERS, OWING PRIMARILY TO THEIR CLOSE RELATIONSHIP TO THE CAPABILITIES OF EXISTING ELECTRONIC EQUIPMENT AND THE PARTICULAR NEEDS OF THE EXPERIMENTS PERFORMED. THUS, IT IS NOT ENTIRELY POSSIBLE TO GIVE AN UNBIASED ESTIMATE OF THE POTENTIAL OF ALL THE AVAILABLE TECHNIQUES.

*SHUTDOWN MARGIN + NOISE ANALYSIS + PULSED NEUTRON TECHNIQUE

6-10944 SHOMO RB + HAMILTON GN + LEAVER RD
ANALOG COMPUTER TECHNIQUES IN CRITICAL EXPERIMENTS
WESTINGHOUSE ELECTRIC CORPORATION, ATOMIC POWER DIVISION
1 PAGE, 1 FIGURE, 2 REFERENCES, ANS TRANSACTIONS, 9(1), PAGE 261 (JUNE 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

EXPERIMENTS AT THE WESTINGHOUSE REACTOR EVALUATION CENTER (WREC) WERE PERFORMED ALMOST EXCLUSIVELY USING ON-LINE ANALOG COMPUTERS FOR THE MEASUREMENT OF BOTH POSITIVE AND NEGATIVE VALUES OF REACTIVITY. THIS METHOD OF REACTIVITY MEASUREMENT WAS USED IN BOTH HEAVY-WATER- AND LIGHT-WATER-MODERATED SYSTEMS AND WITH CORES CONTAINING BOTH HIGHLY ENRICHED AND LOW-ENRICHED URANIUM FUEL, AND RECENTLY WITH SYSTEMS CONTAINING URANIUM DIOXIDE AND PLUTONIUM/URANIUM DIOXIDE FUEL. A UNIQUE CIRCUIT WAS DESIGNED AND BUILT AT THE WREC TO IMPROVE THE ACCURACY, GAIN AND READ-OUT TIME ON THE RECORDER.

6-10945 COHN CE
FURTHER USE OF AN ON-LINE COMPUTER IN REACTOR PHYSICS EXPERIMENTS
ARGONNE NATIONAL LABORATORY
1 PAGE, 3 REFERENCES, ANS TRANSACTIONS, 9(1), PAGE 262 (JUNE 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

DIGITAL COMPUTER FOR ON-LINE DATA REDUCTION IN CRITICAL-ASSEMBLY EXPERIMENTS USED FOR REACTOR NOISE MEASUREMENTS, USING THE CROSS-CORRELATION TECHNIQUE TO REDUCE REQUIREMENTS FOR DETECTOR EFFICIENCY. A STUDY LOOKING TOWARD THE AUTOMATIC CONTROL OF CRITICAL EXPERIMENTS WAS STARTED WITH EXPERIMENTS ON THE STARTUP OF THE ZPR-9 FAST CRITICAL. UNDER COMPUTER CONTROL, THE LAST CONTROL DRAWER IS INSERTED TO TAKE THE REACTOR THROUGH CRITICAL TO A DEMAND PERIOD AND UP TO A DEMAND POWER.

*ZPR IX (ANL ZERO POWER REACTOR) + COMPUTER, DIGITAL + CRITICAL ASSEMBLY FACILITY + CRITICALITY EXPERIMENT + NOISE ANALYSIS + REACTOR, FAST + SHUTDOWN MARGIN

6-10946 STANLEY L + HOLLAND LK + HOLLADAY RL
DEVELOPMENT OF A CONTROL-ROD WORTH MINIMIZER
GENERAL ELECTRIC COMPANY, SAN JOSE, CALIFORNIA + CONTROL DATA CORPORATION
1 PAGE, ANS TRANSACTIONS 9(1), PAGE 265 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

THE ROD-WORTH MINIMIZER (RWM) WAS DEVELOPED FOR INCORPORATION INTO THE NUCLEAR POWER PLANT TO

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-10946 *CONTINUED*

SIGNIFICANTLY REDUCE THE PROBABILITY OF REACTOR-VESSEL DAMAGE DUE TO SUDDEN UNEXPECTED WITHDRAWAL OF ANY CONTROL ROD FROM THE CORE. THE RWM ENSURES THAT ALL CONTROL RODS IN THE CORE DO NOT EXCEED A PREDETERMINED ROD-WORTH LIMIT BY APPROPRIATE RESTRICTIONS ON CONTROL-ROD-DRIVE MOVEMENTS.

*CONTROL ROD WORTH + ENGINEERED SAFEGUARD + REACTOR, BOILING WATER

6-10947 CANOSA J

THE EFFECT OF DELAYED NEUTRONS ON REACTOR EXCURSIONS WITH RAMP REACTIVITY INSERTION
GENERAL ELECTRIC COMPANY, VALLECITOS ATOMIC LABORATORY
2 PAGES, 1 TABLE, 5 REFERENCES, ANS TRANSACTIONS, 9(1), PAGES 268-269 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

THE PROBLEM OF REACTOR EXCURSIONS WITH RAMP REACTIVITY INSERTION HAS BEEN SOLVED BEFORE IN THE PROMPT APPROXIMATION. THE SAME PROBLEM, BUT TAKING DELAYED NEUTRONS INTO ACCOUNT, HAS NOW BEEN SOLVED ANALYTICALLY, USING THE CONSTANT DELAYED-NEUTRON SOURCE APPROXIMATION. IT WAS FELT THAT THIS ASSUMPTION WAS ADEQUATE TO DESCRIBE ACCURATELY THE FIRST POWER BURST. THIS IS SHOWN TO BE THE CASE BY THE GOOD AGREEMENT BETWEEN THE ANALYTICAL RESULTS AND THE EXACT ONES OBTAINED WITH THE TER CODE.

*DELAYED NEUTRON + *EXCURSION, LARGE + REACTOR DYNAMICS

6-10948 KAZI AH

ON THE EFFECT OF RAMP REACTIVITY INSERTIONS IN THE FUCHS-NORDHEIM REACTOR EXCURSION MODEL
UNITED NUCLEAR CORPORATION
2 PAGES, 1 TABLE, 9 REFERENCES, ANS TRANSACTIONS, 9(1), PAGES 269-270 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

BY A COMPUTER PROGRAM, RPI, SIMILAR TO THE AIREK III PROGRAM, EXCURSIONS CAUSED BY RAMP REACTIVITY ADDITIONS ARE INVESTIGATED UNDER ASSUMPTIONS SIMILAR TO THOSE OF THE FUCHS-NORDHEIM MODEL.

EXCURSION, LARGE + FUCHS MODEL + REACTOR DYNAMICS

6-10949 HOUGHTALING JE

AN IMPROVED MODEL FOR ANALYSIS OF FAST TRANSIENT REACTIVITY EFFECTS IN LOW-ENRICHED OXIDE-FUELED REACTORS
PHILLIPS PETROLEUM COMPANY, IDAHO FALLS, IDAHO
1 PAGE, 8 REFERENCES, ANS TRANSACTIONS, 9(1), PAGE 270 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

SPANOS ORIGINAL DOPPLER REACTIVITY MODEL TO DESCRIBE FAST EXCURSION BEHAVIOR OF LOW-ENRICHMENT URANIUM OXIDE FUELED THERMAL REACTORS IS MODIFIED SO THAT THE NORMALIZATION OF THE COMPENSATED REACTIVITY BECOMES CONSISTENT WITH THE NORMALIZATION USUALLY DEFINED FOR THE PROMPT NEUTRON GENERATION TIME AND DELAYED NEUTRON FRACTION. THE MODIFIED MODEL WAS APPLIED TO FOUR EXCURSIONS IN THE SPERT I OXIDE CORE, USING CURRENT CALCULATIONAL TECHNIQUES AND GAVE GOOD AGREEMENT WITH EXPERIMENT, WHEREAS SIMILAR APPLICATION OF THE ORIGINAL MODEL YIELDED POWER AND ENERGY ONLY HALF THAT OF THE EXPERIMENTAL DATA.

*DOPPLER EFFECT + *SPERT 1 (SPECIAL POWER EXCURSION REACTOR TEST) + COMPUTER, DIGITAL + REACTOR, TEST + URANIUM OXIDE

6-10950 SANATHANAN CK + CARTER JC + BRYANT LT + AMIOT LW

THE APPLICATION OF A HYBRID COMPUTER TO THE ANALYSIS OF TRANSIENT PHENOMENA IN A FAST REACTOR CORE
ARGONNE NATIONAL LABORATORY, ILLINOIS
1 PAGE, 6 REFERENCES, ANS TRANSACTIONS, 9(1), PAGE 272 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

AN ITERATION PROCEDURE BASED ON THE PRINCIPAL OF CONTRACTION MAPPING AND THE USE OF AN ANALOG-DIGITAL HYBRID PROVIDE A COMPUTATIONAL METHOD FOR ANALYZING THE TRANSIENT BEHAVIOR OF A FAST REACTOR CORE. THE ANALOG COMPONENT OF THE HYBRID SYSTEM IS USED FOR THE INTEGRATION OF THE EQUATIONS IN TIME, AND THE DIGITAL COMPONENT IS USED FOR MEMORY REQUIREMENTS, LOGIC, AND ARITHMETIC OPERATIONS.

*REACTOR TRANSIENT + *REACTOR, FAST + COMPUTER, ANALOG + COMPUTER, DIGITAL

6-10951 JACOBOWITZ HJ + AKCASU AZ + SHOTKIN LM

STABILITY CONSIDERATIONS WITH CONVECTION TIME DELAYS
NEW YORK UNIVERSITY + UNIVERSITY OF MICHIGAN + BROOKHAVEN NATIONAL LABORATORY
2 PAGES, 1 FIGURE, 4 REFERENCES, ANS TRANSACTIONS, 9(1), PAGES 272-273 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

THE INFLUENCE OF THE TIME DELAY ON THE STABILITY IS INVESTIGATED BY THE PRINCIPLE OF PONTRYAGIN FOR THE LINEAR APPROXIMATION, AND BY THE CRITERIA OF WELTON AND AKCASU FOR THE NONLINEAR EQUATIONS. A STABILITY-REGION MAP IS GIVEN.

*REACTOR DYNAMICS + *REACTOR STABILITY

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-10952 ZIVI SM + JONES AB
AN ANALYSIS OF THE EBWR INSTABILITY BY THE FABLE PROGRAM
TRW SYSTEMS + GENERAL ELECTRIC COMPANY, SAN JOSE, CALIFORNIA
2 PAGES, 1 FIGURE, 5 REFERENCES, ANS TRANSACTIONS, 9(1), PAGES 273-274 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

THE CAUSES OF THE INSTABILITY OBSERVED IN THE EXPERIMENTAL BOILING WATER REACTOR ARE INVESTIGATED HERE BY COMPUTATIONS WITH THE FABLE COMPUTER PROGRAM OF JONES. THE PREDOMINANT MECHANISM OF THE INSTABILITY IS A HYDRODYNAMIC INTERACTION BETWEEN DISSIMILAR REGIONS OF THE CORE. SUCH INTERACTIONS CAN OCCUR IN REACTORS WHEN VARIOUS FUEL ASSEMBLIES HAVE DISPARATE STEAM VOID AND FLOW RESPONSES WITH RESPECT TO A POWER DISTURBANCE.

*COMPUTER, DIGITAL + *EBWR (EXPERIMENTAL BOILING WATER REACTOR) + *REACTOR STABILITY + HYDRAULIC ANALYSIS + REACTOR, BOILING WATER + THERMAL ANALYSIS

6-10953 GOZANI T
THE DIRECT MEASURABILITY OF REACTIVITY (IN DOLLARS) AND ITS EXPERIMENTAL BOUNDS (THE BRACKETING-PROCEDURE) RENSSSLAER POLYTECHNIC INSTITUTE
2 PAGES, 10 REFERENCES, ANS TRANSACTIONS, 9(1), PAGES 274-275 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

IT IS SHOWN THAT THE GENERAL EVALUATION PROCEDURE FOR THE MODIFIED PULSED-SOURCE TECHNIQUE HAS A BASIC MERIT - IT LEADS TO BRACKETING THE VALUE OF REACTIVITY (IN DOLLARS) AND ROSSI ALPHA, WHICH ARE PERTINENT TO THE PERSISTING MODE, NAMELY, THE ABSOLUTELY TRUE VALUES IN BETWEEN TWO PURELY EXPERIMENTAL BOUNDS. THESE BOUNDS ARE DUE TO THE SYSTEMATIC ERRORS CAUSED BY HIGHER HARMONICS. THE HARMONICS HAVE OPPOSITE EFFECTS ON THE TWO MODIFIED PULSED-SOURCE TECHNIQUES.

*REACTOR DYNAMICS + PULSED NEUTRON TECHNIQUE + REACTIVITY, EXCESS

6-10954 WYKE TF + WILLOUGHBY W
CVTR MODERATOR TEMPERATURE COEFFICIENT AS A FUNCTION OF CORE DEPLETION
WESTINGHOUSE ELECTRIC CORPORATION, ATOMIC POWER DIVISION + CAROLINAS-VIRGINIA NUCLEAR POWER ASSOCIATION
1 PAGE, 2 FIGURES, 3 REFERENCES, ANS TRANSACTIONS, 9(1), PAGE 276 (JUNE 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

THE TREND IN THE MEASURED MODERATOR TEMPERATURE COEFFICIENT OVER THE CORE LIFETIME SHOWS A REDUCTION BY A FACTOR OF 2. ANALYSIS BASED ON THE 4-FACTOR FORMULA SHOWS THAT A SUBSTANTIAL CONTRIBUTION TO THE CHANGE WOULD BE EXPECTED FROM THE PRODUCT OF η AND f . IN ADDITION, CONTROL-ROD REMOVAL AS A FUNCTION OF LIFE WOULD BE EXPECTED TO CONTRIBUTE A POSITIVE EFFECT.

*CVTR (CAROLINAS VIRGINIA TUBE REACTOR) + *FUEL BURNUP + *MODERATOR COEFFICIENT + REACTOR, HEAVY WATER + REACTOR, PRESSURE TUBE + TEMPERATURE COEFFICIENT

6-10955 WILLOUGHBY W + NATH R.J + WYKE TF
COMPARISON OF ANALYTICAL AND EXPERIMENTAL LIFETIME AND CONTROL ROD WORTHS FOR CVTR
CAROLINAS-VIRGINIA NUCLEAR POWER ASSOCIATION + WESTINGHOUSE ELECTRIC CORPORATION, ATOMIC POWER DIVISION
2 PAGES, 1 FIGURE, 1 TABLE, 5 REFERENCES, ANS TRANSACTIONS, 9(1), PAGES 276-277, (JUNE 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

THE RESULTS OF ANALYTICAL AND EXPERIMENTAL DETERMINATIONS OF ROD GROUP WORTHS ARE GIVEN.

*CONTROL ROD WORTH + *CVTR (CAROLINAS VIRGINIA TUBE REACTOR) + COMPUTER, DIGITAL + FUEL BURNUP + REACTOR, HEAVY WATER + REACTOR, PRESSURE TUBE

6-10956 SHEFF JR
SHORT-TERM DYNAMIC EFFECTS UPON THE UTILIZATION OF PLUTONIUM AS A REACTOR FUEL
BATTELLE-NORTHWEST, RICHLAND, WASHINGTON
2 PAGES, 1 TABLE, ANS TRANSACTIONS, 9(1), PAGES 283-284 (JUNE 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

INCLUSION IN THE FUEL-CYCLE-ANALYSIS SYSTEM OF A CODE PACKAGE FOR COMPUTING AT VARIOUS TIMES THROUGHOUT THE BURNUP SUCH KINETIC PARAMETERS AS THE TEMPERATURE COEFFICIENT. DELAYED-NEUTRON FRACTION FOR U-235 AND PLUTONIUM CORES IS NOT VERY DIFFERENT BECAUSE OF PLUTONIUM BUILDUP IN U-235 CORES AND BECAUSE OF PU-241 BUILDUP IN PLUTONIUM CORES.

*DELAYED NEUTRON + *TEMPERATURE COEFFICIENT + FUEL BURNUP + PLUTONIUM + URANIUM

6-10957 HARRISON LJ + IVINS RO
A PHOTOGRAPHIC STUDY OF THE TRANSIENT MELTDOWN BEHAVIOR OF ALUMINUM/URANIUM FUEL PLATES IN WATER
ARGONNE NATIONAL LABORATORY, IDAHO AND ILLINOIS
1 PAGE, 5 REFERENCES, ANS TRANSACTIONS, 9(1), PAGE 305 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

HIGH-SPEED COLOR MOVIES OF SPERT ID AND HFIR FUEL SAMPLES IN RELATIVELY MODERATE TREAT TRANSIENTS SHOWED THE FUEL TO MELT, INCANDESCENCE, AND REACT WITH WATER. AT HIGH-ENERGY INPUTS, IGNITION AND BURNING FOR 3.6 SEC. THRESHOLD FOR BURNING AND FRAGMENTATION, 1400 TO 1500 C. TEMPERATURE ABOVE 2000 C REACHED IN SAMPLES THAT IGNITED.

ALUMINUM + CLAD + FUEL MELTDOWN + HFIR (HIGH FLUX ISOTOPE REACTOR) + METAL WATER REACTION + REACTOR, GRAPHITE MODERATED + REACTOR, RESEARCH + REACTOR, TEST +

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-10957 *CONTINUED*
SPERT 1 (SPECIAL POWER EXCURSION REACTOR TEST) + TREAT (TRANSIENT TEST REACTOR FACILITY) + URANIUM + URANIUM OXIDE

6-10958 WRIGHT RW + HUMBERSTONE GH
DISPERSAL AND PRESSURE GENERATION BY WATER IMPACT UPON MOLTEN ALUMINUM
TRW SYSTEMS, REDONDO BEACH, CALIFORNIA
2 PAGES, 1 FIGURE, 4 REFERENCES, ANS TRANSACTIONS, 9(1), PAGES 305-306 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

A MOVING WATER COLUMN IMPACTED UPON A POOL OF MOLTEN ALUMINUM IN VACUUM. THIS EXPERIMENT DEMONSTRATED THAT WATER IMPACT UPON MOLTEN ALUMINUM PRODUCES HIGH DISPERSAL AND GENERATION RATES OF HIGH PRESSURE STEAM (OR HYDROGEN) OF THE RIGHT MAGNITUDE TO ACCOUNT FOR THE DELAYED DESTRUCTIVE PRESSURIZATION OF THE PARTIALLY VOIDED SPERT 1D CORE.

*DESTRUCTIVE TRANSIENT + *SPERT 1 (SPECIAL POWER EXCURSION REACTOR TEST) + ALUMINUM + DISPERSION + METAL WATER REACTION + PRESSURE, INTERNAL + THERMAL ANALYSIS

6-10959 CARMICHAEL BM
FAST TRANSIENTS IN LIQUID PLUTONIUM
LOS ALAMOS SCIENTIFIC LABORATORY
2 PAGES, 1 TABLE, 4 REFERENCES, ANS TRANSACTIONS, 9(1), PAGES 308-309 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

FAST TRANSIENTS IN CLEAN FUEL WERE STUDIED BY USING A CODE, TRN, WHICH IS BEING DEVELOPED SPECIFICALLY FOR APPLICATIONS TO LIQUID-PLUTONIUM CAPSULES. THE CODE CALCULATES DISTRIBUTED VALUES FOR THE POWER, TEMPERATURE, PRESSURE, AND MOTION OF THE FUEL IN CAPSULES FOR GIVEN REACTIVITY INPUT FUNCTIONS. THE HYDRODYNAMIC-DIFFERENCE EQUATIONS ARE MODELED AFTER THOSE GIVEN BY CHEZEM AND STRATTON.

COMPUTER, DIGITAL + EXCURSION, LARGE + LAMPRE I (LASL MOLTEN PU REACTOR EXPERIMENT) + MPBE (MOLTEN PLUTONIUM BURNUP EXPERIMENT) + REACTOR, BREEDER + REACTOR, FAST + REACTOR, LIQUID METAL COOLED

6-10960 LAWRENCE BR
DETERMINATION OF THE POWER VS REACTIVITY FREQUENCY RESPONSE FUNCTION OF A POWER REACTOR, WITH APPLICATION TO THE HIGH FLUX ISOTOPE REACTOR
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TENNESSEE
ORNL-TM-1471 +. 21 PAGES, 2 TABLES, 2 FIGURES, 5 REFERENCES- JULY 5, 1966, CFSTI, \$2.00 CY, \$0.50 MN

A NUMERICAL TECHNIQUE IS PRESENTED FOR CALCULATING THE POWER VS REACTIVITY-FREQUENCY-RESPONSE FUNCTION OF A POWER REACTOR. THE APPROACH AVOIDS THE EVALUATION OF TRANSFER FUNCTIONS IN AN ALGEBRAIC FORM. THE SPACE-INDEPENDENT REACTOR-KINETICS MODEL IS USED IN CONJUNCTION WITH A GENERAL SET OF FIRST-ORDER EQUATIONS TO REPRESENT THE THERMAL PERFORMANCE OF THE REACTOR. RESULTS OBTAINED BY APPLYING THE TECHNIQUE TO THE OAK RIDGE HIGH FLUX ISOTOPE REACTOR INDICATE THAT THE REACTOR OPERATING AT FULL POWER OF 100 MW WITH THE FLUX CONTROLLER OFF HAS A FREQUENCY RESPONSE WHICH PEAKS BROADLY AT 10 CPS WITH A PARTIAL-DERIVATIVE-OF-P OVER P-SUPERSCRIP-T-ZERO VS PARTIAL-DERIVATIVE-OF-K OVER K-SUPERSCRIP-T-ZERO GAIN OF 140.

*HFIR (HIGH FLUX ISOTOPE REACTOR) + REACTOR DYNAMICS + REACTOR, RESEARCH + REACTOR, TEST + TRANSFER FUNCTION

6-10970 GODTS JE
ANALOG ANALYSIS OF TRANSIENT NEUTRON FLUX BY DISCONTINUOUS SYNTHESIS
CARNEGIE INSTITUTE OF TECHNOLOGY, PITTSBURGH, PENNSYLVANIA
WCAP-2828 +. 127 PAGES, JUNE 1965, CFSTI

ANALOG SIMULATION OF THE REACTOR-KINETICS EQUATIONS, INCLUDING SOME CRUDE THERMOHYDRAULIC FEEDBACKS.

*COMPUTER, ANALOG + *REACTOR DYNAMICS + HYDRAULIC ANALYSIS + THERMAL ANALYSIS

6-10975 PETTUS WG + BALDWIN MN
DOPPLER COEFFICIENT MEASUREMENTS ON TH AND THO2 RODS WITH NONUNIFORM TEMPERATURE DISTRIBUTIONS
THE BABCOCK AND WILCOX COMPANY, LYNCHBURG, VIRGINIA
12 PAGES, 15 FIGURES, 7 TABLES, NUCLEAR SCIENCE AND ENGINEERING, 26(1), PAGES 34-46 (SEPTEMBER, 1966)

MEASUREMENTS OF THE DOPPLER EFFECT ON THORIUM AND THORIUM DIOXIDE RODS OF APPROXIMATELY 3/4-IN. DIAM. HAVING A NONUNIFORM TEMPERATURE DISTRIBUTION. ACTIVATION TECHNIQUE USED. DOPPLER COEFFICIENT AS A FUNCTION OF THE AVERAGE SAMPLE TEMPERATURE IS ESSENTIALLY THE SAME FOR BOTH AXIAL AND PERIPHERAL HEATING OVER THE TEMPERATURE RANGE INVESTIGATED. THE MEASURED VALUES OF THE COEFFICIENTS ARE GIVEN.

*DOPPLER COEFFICIENT + *TEMPERATURE GRADIENT + *THORIUM

6-10976 AKCASU AZ + OSBORN RK
APPLICATION OF LANGEVINS TECHNIQUE TO SPACE- AND ENERGY-DEPENDENT NOISE ANALYSIS
BROOKHAVEN NATIONAL LABORATORY + UNIVERSITY OF MICHIGAN

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REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-10976 *CONTINUED*
13 PAGES, NUCLEAR SCIENCE AND ENGINEERING, 26(1), PAGES 13-25 (SEPTEMBER 1966)

THE SPACE- AND ENERGY-DEPENDENT THEORY OF REACTOR-NOISE ANALYSIS WAS DEVELOPED BY USING THE TECHNIQUE OF LANGEVIN, STARTING FROM THE TRANSPORT EQUATIONS. THE THEORY INCLUDES DELAYED NEUTRONS. THE CORRELATION FUNCTION AND THE POWER SPECTRAL DENSITY FOR THE DETECTION RATE, AS WELL AS FOR THE NEUTRON DENSITY, WERE OBTAINED. THE APPLICATION OF THE GENERAL THEORY TO SIMPLE REACTOR MODELS IS DISCUSSED AND ILLUSTRATED BY CONSIDERING THE ONE-SPEED TRANSPORT AND ONE-SPEED DIFFUSION APPROXIMATIONS. THE CONNECTION BETWEEN THE TECHNIQUE OF LANGEVIN AND THE DOUBLET THEORY BASED ON THE LIOUVILLE EQUATION WAS ESTABLISHED. IT WAS FOUND THAT BOTH FORMULATIONS YIELD IDENTICAL RESULTS AND THAT THE POSTULATES OF LANGEVIN ARE JUSTIFIED FOR THE STUDY OF NEUTRON DISTRIBUTIONS.

*NOISE ANALYSIS + *SPACE DEPENDENT DYNAMICS

6-10977 KAZI AH + TOMONTO JR + CHERRY BH
QUANTITATIVE EVALUATION OF THE NORDHEIM-FUCHS REACTOR EXCURSION MODEL WITH NONLINEAR REACTIVITY FEEDBACK
UNITED NUCLEAR CORPORATION
3 PAGES, 2 FIGURES, NUCLEAR SCIENCE AND ENGINEERING, 26(1), PAGES 131-133 (SEPTEMBER, 1966)

A COMPUTER PROGRAM SHOWS FOR A THERMAL, LOW-ENRICHMENT URANIUM-OXIDE-FUELED PULSED REACTOR WITH TEMPERATURE-DEPENDENT HEAT CAPACITY OR PROMPT TEMPERATURE COEFFICIENT THAT THE POWER TRACE OF AN EXCURSION PROCEEDS ESSENTIALLY ACCORDING TO THE PREDICTION OF WOLFE OR OF SCALLETAR. THE RESULTS USING THE SIMPLE NORDHEIM-FUCHS MODEL WITH CONSTANT AVERAGE PROPERTIES ARE IN REASONABLE AGREEMENT WITH THE DATA USING QUADRATIC VARIATION OF THE REACTIVITY COEFFICIENTS AND HEAT CAPACITY WITH TEMPERATURE. USING CONSTANT COEFFICIENTS EVALUATED AT THE INITIAL FUEL TEMPERATURE IS NONCONSERVATIVE IN PREDICTING PEAK POWER, TOTAL ENERGY RELEASE, AND MAXIMUM CORE TEMPERATURE FOR A SAFETY ANALYSIS. FOR EXAMPLE, TOTAL ENERGY RELEASE IS UNDERPREDICTED BY ABOUT 25 PERCENT.

EXCURSION, LARGE + FUCHS MODEL

6-10978 REACTOR PHYSICS EFFORTS REQUIRED IN SUPPORT OF THE FAST BREEDER DEVELOPMENT PROGRAM
DIVISION OF REACTOR DEVELOPMENT AND TECHNOLOGY, U.S. ATOMIC ENERGY COMMISSION, WASHINGTON, D. C.
WASH-1066 +. 41 PAGES, 3 TABLES, JANUARY 1966, CFSTI, \$3.00 CY, \$0.50 MN

SCATTERED THROUGHOUT THE REPORT ARE REFERENCES TO SODIUM COEFFICIENT, DOPPLER COEFFICIENT, CONTROL SYSTEM, AND DYNAMICS OF LARGE SYSTEMS.

*CONTROL SYSTEM + *SODIUM COEFFICIENT + CRITICAL ASSEMBLY FACILITY +
EBR I AND II (EXPERIMENTAL BREEDER REACTORS) + FERMI + REACTOR DYNAMICS + REACTOR, BREEDER +
REACTOR, FAST + REACTOR, FAST + REACTOR, LARGE + REACTOR, LIQUID METAL COOLED +
SEFOR (SOUTHWEST EXP. FAST OXIDE REACTOR) + SPACE DEPENDENT DYNAMICS +
ZPPR (ANL ZERO POWER PLUTONIUM REACTOR) + ZPR III (ANL ZERO POWER REACTOR) +
ZPR IX (ANL ZERO POWER REACTOR) + ZPR VI (ANL ZERO POWER REACTOR)

6-10979 CARTER DH + GIBSON M + KING DC + MARSHALL J + PUCKETT BJ + RICHARDS AE + WASS T + WILSON DJ
BUCKLING AND REACTION RATE MEASUREMENTS IN GRAPHITE MODERATED LATTICES FUELLED WITH PLUTONIUM-URANIUM
OXIDE CLUSTERS AT TEMPERATURES UP TO 400 DEGREES C.
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, WINFRITH
AEEW-R-438 +. 147 PAGES, 30 FIGURES, 18 TABLES, 14 REFERENCES, JULY 1965, BIS, \$4.00 CY

THE REPORT DESCRIBES A SERIES OF EXPERIMENTS CARRIED OUT IN SCORPIO I AND II ON SUBCRITICAL GRAPHITE-MODERATED LATTICES FUELED WITH 21-ROD CLUSTERS OF PUO₂/UO₂. THREE FUEL BATCHES WITH NOMINAL PLUTONIUM-TO-URANIUM RATIOS OF 0.25, 0.8, AND 1.2 PERCENT WERE INVESTIGATED AT TEMPERATURES BETWEEN 20 AND 400 C. FROM THE RESULTS, THE TEMPERATURE COEFFICIENT MAY BE ESTIMATED.

*GRAPHITE + *TEMPERATURE COEFFICIENT + *URANIUM OXIDE + MODERATOR + PLUTONIUM OXIDE + UNITED KINGDOM

6-11006 JAKEMAN D
PHYSICS OF NUCLEAR REACTORS. CHAPTER 9 - REACTIVITY CHANGES AND CONTROL
356 PAGES, THE ENGLISH UNIVERSITIES PRESS LTD (1966)

CHAPTER 9 CONTAINS A FEW TOPICS OF SAFETY INTEREST. THESE INCLUDE REACTIVITY EFFECTS OF TEMPERATURE IN THERMAL REACTORS, REACTIVITY EFFECTS IN FAST REACTORS DUE TO FUEL EXPANSION, SODIUM VOIDS AND DOPPLER EFFECT, CONTROL METHODS, THEORY OF CONTROL RODS, AND REACTOR KINETICS.

CONTROL ROD + CONTROL, GENERAL + DOPPLER EFFECT + FUEL EXPANSION COEFFICIENT + REACTOR DYNAMICS +
REACTOR, FAST + REACTOR, THERMAL + SODIUM COEFFICIENT + TEMPERATURE COEFFICIENT

6-11022 FROELICH R
THEORY OF DOPPLER COEFFICIENTS OF FAST REACTORS WITH CONSIDERATION OF MUTUAL SHIELDING RESONANCES
KERNFORSCHUNGS - ZENTRUM, KARLSRUHE
KRK-367 + ANL-TRANS-320 +. 81 PAGES, 7 FIGURES, NOVEMBER, 1965, DEP. MN

CHAPTER 7 IS THE IMPORTANT SECTION. DESCRIPTION OF CALCULATIONS, FROM NUCLEAR PHYSICS DATA, OF AVERAGE OF IMPORTANCE FOR THE DOPPLER EFFECT.

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-11022 *CONTINUED*
DOPPLER EFFECT

6-11059 MILEY GH + KURSTEDT HA + BECK GP
FEEDBACK EFFECTS DURING SHORT-INTERVAL SERIES PULSING
UNIVERSITY OF ILLINOIS
CONF-650,413 +. 17 PAGES, 7 FIGURES, 2 TABLES, 14 REFERENCES, APRIL 1965, PAGES 420-436 OF NEUTRON DYNAMICS AND CONTROL, PROCEEDINGS OF THE SYMPOSIUM ON NUCLEAR ENGINEERING AT THE UNIVERSITY OF ARIZONA, TUCSON, APRIL 5-7, 1965, CFSTI \$4.50 CY, \$2.50 MN

THE EFFECTS OF INITIAL PULSE AMPLITUDE, TIME BETWEEN PULSES, AND TIME AFTER PEAK FOR ROD DROP WERE INVESTIGATED FOR 0.5 TO 3 PULSES PER MINUTE. A CALCULATIONAL MODEL FOR TIME-DEPENDENT TEMPERATURE WAS FOUND. CALCULATIONS SHOW THAT THE WATER-TEMPERATURE COEFFICIENT IS POSITIVE.

*TEMPERATURE COEFFICIENT + REACTOR TRANSIENT + REACTOR, PULSED + REACTOR, RESEARCH + TRIGA (TRAINING REACTOR, ISOTOPES, G.A.)

6-11060 HORNYIK K + WYMAN ME
STUDY OF THE DYNAMICS OF A TRIGA TYPE REACTOR
UNIVERSITY OF ILLINOIS
CONF-650 413 +. 15 PAGES, 14 FIGURES, 10 REFERENCES, PP. 457-572 OF NEUTRON DYNAMICS AND CONTROL, APRIL 7, 1966, CFSTI \$4.50 CY, \$2.50 MN

COOLANT FLOW AND TEMPERATURE ANALYSES MADE FROM STEADY-STATE POWER UP TO 1 MW AND PULSES UP TO 2 DOLLARS. A SIMPLE HEAT-TRANSFER MODEL WAS DEVELOPED THAT WAS IN GOOD AGREEMENT AFTER LESS THAN 1-DOLLAR PULSES. HEAT DENSITY AND TEMPERATURE IS CONCENTRATED IN OUTER LAYERS OF FUEL ELEMENT DURING A PULSE AND AFFECTS BOTH REACTIVITY AND HEAT TRANSFER.

*ANALYTICAL MODEL + HEAT TRANSFER ANALYSIS + REACTOR TRANSIENT + REACTOR, PULSED + REACTOR, RESEARCH + TRIGA (TRAINING REACTOR, ISOTOPES, G.A.)

6-11081 COFFER CO + DEE JB + SHOPTHUGH JR + WEST GB
CHARACTERISTICS OF LARGE REACTIVITY INSERTIONS IN A HIGH-PERFORMANCE TRIGA URANIUM-ZIRCONIUM HYDRIDE CORE
GENERAL ATOMIC DIVISION OF GENERAL DYNAMICS
CONF-650 413 +. 21 PAGES, 16 FIGURES, 2 TABLES, 5 REFERENCES, PP. 398-419 OF NEUTRON DYNAMICS AND CONTROL, APRIL 7, 1966, CFSTI \$4.50 CY, \$2.50 MN

MORE THAN 400 PULSES BETWEEN 4.0 AND 4.6 DOLLARS INDICATE THAT THE STAINLESS-STEEL-CLAD (304 SS) FUEL CAN WITHSTAND SUCH SERVICE. PEAK POWER, TEMPERATURE, ETC., IN A BURST COMPARE FAVORABLY WITH FUCHS-NORDHEIM-SCALLETAR MODEL USING VARIABLE HEAT CAPACITY. AT THE HIGHEST POWER (6480 MW, 44.5 MW-SEC FILM BOILING OCCURED, AS INDICATED BY SMALL PATCHES OF BLUE, OXIDIZED CLAD. EXPERIMENTS SHOWED THAT 3-4 DOLLAR PULSING RAISED FUEL TEMPERATURE 100 C WHEN REACTOR OPERATED AT 800 KW. BECAUSE GAS PRESSURES ARE LOWER THAN PREDICTED AND VARY LINEARLY WITH DOLLARS, AUTHORS BELIEVE THAT INTERNAL PRESSURE IS DUE TO AIR HEATING RATHER THAN HYDROGEN DISSOCIATION.

*FUCHS MODEL + *FUEL ELEMENT + *REACTOR TRANSIENT + COMPARISON, THEORY AND EXPERIENCE + PRESSURE, INTERNAL + REACTOR, PULSED + REACTOR, RESEARCH + TRIGA (TRAINING REACTOR, ISOTOPES, G.A.)

6-11084 RAJAGOPAN V + SWEN GE
MEASUREMENT OF LOCAL KINETIC PARAMETERS IN THE SAXTON REACTOR
WESTINGHOUSE ELECTRIC CORPORATION, PITTSBURGH
CONF-650 413 +. 10 PAGES, 6 FIGURES, 2 TABLES, 3 REFERENCES, PP. 299-311 OF NEUTRON DYNAMICS AND CONTROL, APRIL 7, 1966, CFSTI \$4.50 CY, \$2.50 MN

A ROTATING REACTIVITY OSCILLATOR AND MINIATURE IN-CORE ION CHAMBERS YIELDED POWER AND CROSS-POWER SPECTRAL ANALYSES. THE DETECTOR LOCATION WAS VARIED AXIALLY. MEASUREMENTS SHOWED THAT THE LOCAL PROMPT POWER COEFFICIENT DECREASES TOWARD THE CORE CENTER (OR AS HEAT FLUX INCREASES) AND COMPARES WELL WITH CALCULATIONS.

*OSCILLATOR, REACTIVITY + *POWER COEFFICIENT + REACTOR, PRESSURIZED WATER + SAXTON + TRANSFER FUNCTION

6-11085 PLUTA PR
COUPLED-CORE KINETIC BEHAVIOR
GENERAL ELECTRIC COMPANY, ATOMIC POWER EQUIPMENT DEPT., SAN JOSE
CONF-650 413 +. 21 PAGES, 17 FIGURES, 1 TABLE, 16 REFERENCES, PP. 544-565 OF NEUTRON DYNAMICS AND CONTROL, APRIL 7, 1966, CFSTI \$4.50 CY, \$2.50 MN

POWER TRANSIENTS AND TRANSFER FUNCTIONS WITHOUT FEEDBACK ARE SHOWN. THE MODEL PROPOSED BY AVERY WAS USED. WITH CENTRAL SUPERHEAT ZONES, TWO CORES WERE USED, ONE HAVING A FAST SPECTRUM, AND ONE THERMAL.

*COUPLED CORES + REACTOR TRANSIENT + REACTOR, SUPERHEAT + TRANSFER FUNCTION

6-11088 REACTOR DEVELOPMENT PROGRAM PROGRESS REPORT, JULY 1966
ARGONNE NATIONAL LABORATORY
ANL-7245 +. 74 PAGES, 17 FIGURES, 17 TABLES, REFERENCES, AUGUST 26, 1966, CFSTI, \$3.00 CY

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-11088 *CONTINUED*

ARGONNE NATIONAL LABORATORY PROGRESS REPORT, JULY 1966. THIS REPORT IS ONE OF A SERIES OF SUCH REPORTS ON THE SUBJECTS ENUMERATED BELOW. TOPICS COVERED IN THIS REPORT ARE - IRRADIATION OF FUEL PINS, TREAT MELTDOWN TEST, INTEGRAL SODIUM LOOP, FAST-REACTOR SAFETY CONTAINMENT, EQUATION OF STATE OF REFRACTORIES SUCH AS UO₂, METAL-WATER REACTIONS, AND PLUTONIUM VOLATILITY SAFETY.

CONTAINMENT DESIGN + EQUATION OF STATE + FUEL MELTDOWN + METAL WATER REACTION + PLUTONIUM + REACTOR DYNAMICS + REACTOR, FAST + SODIUM + TREAT (TRANSIENT TEST REACTOR FACILITY) + URANIUM DIOXIDE

6-11090 CAMERON IR + DRAGESSET A + FREEMANTLE RG
STUDIES WITH PLUTONIUM-FUELLED CORES IN THE ZERO-ENERGY, HIGH-TEMPERATURE NUCLEAR REACTOR ZENITH UNITED KINGDOM ATOMIC ENERGY AUTHORITY, WINFRITH + OECD HIGH TEMPERATURE REACTOR PROJECT (DRAGON), WINFRITH + IBM(U.K.) LTD., LONDON
26 PAGES, 11 FIGURES, 6 TABLES, 38 REFERENCES, JOURNAL OF NUCLEAR ENERGY PARTS A/B, 20(4), PAGES 285-311 (1966)

A SERIES OF EXPERIMENTS CARRIED OUT THE AIM OF TESTING CURRENT THEORETICAL METHODS FOR CALCULATING EXCESS REACTIVITY, TEMPERATURE COEFFICIENTS, DIFFERENTIAL SPECTRUM, AND REACTION-RATE DISTRIBUTIONS. TWO CORES OF WIDELY DIFFERENT FISSILE/MODERATOR ATOM RATIOS WERE LOADED TO OBTAIN SIGNIFICANTLY VARIED SPECTRUM CONDITIONS. THE GENERAL AGREEMENT IS COMPARABLE WITH THAT FOUND FOR THE U-235 CORES PREVIOUSLY INVESTIGATED.

*COMPARISON, THEORY AND EXPERIENCE + *CRITICALITY EXPERIMENT + *PLUTONIUM + REACTIVITY, EXCESS + REACTOR, GAS COOLED + REACTOR, GRAPHITE MODERATED + TEMPERATURE COEFFICIENT + UNITED KINGDOM

6-11107 BIRKHOFER A + KARWAT H
ANALYSIS IN LARGE WATER MODERATED LOW ENRICHED UO₂ REACTORS
TECHNISCHEN HOCHSCHULE, MÜNCHEN
MRR-21 +. 20 PAGES, 8 FIGURES, 2 TABLES, APRIL 1966, SOURCE

ANALYSIS OF THE SPACE-TIME BEHAVIOUR OF REACTOR POWER IN TWO DIMENSIONS. DIFFUSION COEFFICIENT, ABSORPTION CROSS SECTION, FISSION CROSS SECTION, AND RESONANCE ESCAPE PROBABILITY CAN BE SPACE AND TEMPERATURE DEPENDENT. ONE NEUTRON GROUP. SIX DELAYED-NEUTRON GROUPS. NUMERICAL EXAMPLE. PEAK-TO-AVERAGE VALUE HIGHER THAN BY OTHER METHODS. COMPUTATION OF PRESSURE RISE BY THREE ZONES - FUEL-FAILURE ZONE, ACCELERATION ZONE, AND STEAM ZONE. RESULTS OF COMPUTATION.

*SPACE DEPENDENT DYNAMICS + DELAYED NEUTRON + HYDRAULIC ANALYSIS + THERMAL ANALYSIS

6-11153 WEAVER LM
SRE REACTIVITY -- CALCULATION TECHNIQUE
ATOMICS INTERNATIONAL, CANOGA PARK
NAA-SR-MEMO-7936 +. 56 PAGES, APRIL 10, 1964, CFSTI \$3.00 CY

PROBLEM - DEVELOP A CALCULATIONAL TECHNIQUE TO PROVIDE SURVEILLANCE OF THE SRE NUCLEAR PERFORMANCE. RESULTS - A FORTRAN COMPUTER PROGRAM WAS DEVELOPED TO COMPARE THE EXCESS REACTIVITY CALCULATED FROM REACTOR POWER AND TEMPERATURES WITH THE MEASURED REACTIVITY OBTAINED FROM THE POSITIONS OF THE SHIM RODS. VARIATIONS AND CHANGES IN REACTIVITY DIFFERENCES ARE INVESTIGATED ON THE BASIS OF CHANGES IN OPERATING PARAMETERS. THIS REACTIVITY-NORMALCY PROGRAM WAS SUCCESSFULLY USED FOR SRE CORE-II NUCLEAR ANALYSIS.

*COMPUTER, DIGITAL + *SRE (SODIUM REACTOR EXPERIMENT) + REACTIVITY, EXCESS + REACTOR, GRAPHITE MODERATED + REACTOR, LIQUID METAL COOLED + TEMPERATURE COEFFICIENT

6-11154 BLAINE RA
REACTOR KINETICS AND REACTOR SAFETY STUDIES
ATOMICS INTERNATIONAL, CANOGA PARK
NAA-SR-MEMO-9837 +. 32 PAGES, REFERENCES, APRIL 24, 1964, CFSTI \$2.00 CY

THE GOALS AND ACCOMPLISHMENTS IN REACTOR KINETICS AND REACTOR SAFETY STUDIES OF THE ATOMICS INTERNATIONAL REACTOR SAFETY PROGRAM ARE REVIEWED. PRESENT DIRECTIONS AND FUTURE REQUIREMENTS ARE PRESENTED. SUBJECTS RELEVANT TO NUCLEAR SAFETY INCLUDE - ATRK EQUATIONS, NOISE ANALYSIS, POISON MIXTURES TO ENHANCE REACTOR SAFETY, BUBBLE GROWTH, MULTICHANNEL FLOW STABILITY, REACTOR SITING, SPACE-DEPENDENT KINETICS, AND MULTIREGION-MULTIGROUP KINETICS.

*REACTOR DYNAMICS + *SITING, REACTOR + HYDRAULIC ANALYSIS + KEWB (KINETIC EXPERIMENT ON WATER ROILERS) + NOISE ANALYSIS + POISON, SOLUBLE + REACTOR, HOMOGENEOUS + REACTOR, RESEARCH + SPACE DEPENDENT DYNAMICS + THERMAL ANALYSIS + VOID COEFFICIENT

6-11155 GRAHAM WW + COHN CE + HARMER DS + CLEMENT JD + JOHNSON RJ + MACDONALD RN + PATRICK RE + RYNNON DS JM
KINETICS PARAMETERS OF A HIGHLY ENRICHED HEAVY-WATER REACTOR, FINAL REPORT, FEBRUARY 26, 1965 - FEBRUARY 25, 1966
GEORGIA INST. OF TECH., ATLANTA
TID-23037 +. 74 PAGES, REFERENCES, APRIL 1966, CFSTI \$3.00 CY, \$0.75 MN

IN A HIGHLY ENRICHED HEAVY-WATER RESEARCH REACTOR SUCH AS THE GEORGIA TECH RESEARCH REACTOR (GTRR), WHICH HAS OPERATED AT LOW POWER, USE OF TWELVE DELAYED-NEUTRON AND PHOTONEUTRON GROUPS DESCRIBE THE KINETICS BEHAVIOR. A METHOD OF ACCOUNTING FOR THE EFFECT OF THE PREVIOUS

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-11155 *CONTINUED*

POWER HISTORY OF THE REACTOR WAS DEVELOPED AND USED IN THE EVALUATION OF THE KINETICS PARAMETERS. A VALUE OF 9.8 RECIPROCAL SEC FOR THE RATIO OF THE EFFECTIVE DELAYED-NEUTRON FRACTION TO THE PROMPT-NEUTRON LIFETIME WAS MEASURED. SPACE DEPENDENCE OF THE OSCILLATOR-DETECTOR REACTOR TRANSFER FUNCTION WAS DEMONSTRATED BY PILE-OSCILLATOR MEASUREMENTS. EFFECTIVE DELAYED-NEUTRON FRACTION OF THE GTRR IS BEING MEASURED.

*HEAVY WATER + *REACTOR, RESEARCH + DELAYED NEUTRON + NOISE ANALYSIS + REACTOR KINETICS + SPACE DEPENDENT DYNAMICS

6-11156 SZWARCBAUM G + YIFTAH S
CALCULATION OF THE DOPPLER EFFECT IN FAST REACTORS
ISRAEL ATOMIC ENERGY COMMISSIONS, YAVNE
IA-1039 +. 85 PAGES, REFERENCES, MAY 1965, DEP. MN

METHODS AND PARAMETERS USED IN THE CALCULATION OF THE DOPPLER EFFECT IN TYPICAL 800- TO 2500-LITER FAST REACTORS ARE DESCRIBED. THE INFLUENCE OF THE CHEMICAL COMPOSITION OF THE FUEL AND THE ISOTOPIC COMPOSITION OF THE PLUTONIUM ON THE TOTAL DOPPLER EFFECT IS EXAMINED.

*DOPPLER COEFFICIENT + *REACTOR, FAST + PLUTONIUM + URANIUM + URANIUM CARBIDE + URANIUM OXIDE

6-11161 TUTTLE RJ
A SUMMARY OF THE CALCULATED CHARACTERISTICS OF THE EPITHERMAL CRITICAL ASSEMBLIES 1 THROUGH 13
ATOMICS INTERNATIONAL, CANOGA PARK
NAA-SR-MEMO-11799 +. 92 PAGES, JANUARY 12, 1966, CFSTI \$3.00 CY, \$0.75 MN

PROBLEM - SUMMARIZE THE RESULTS OF CALCULATIONS PERFORMED FOR THE CRITICAL ASSEMBLIES AT THE EPITHERMAL CRITICAL EXPERIMENT LABORATORY TO FACILITATE ANALYSIS OF THE EXPERIMENTAL RESULTS AND AID FUTURE EXPERIMENTAL PLANNING. RESULTS - CRITICALITY CALCULATIONS AND PERTURBATION THEORY CALCULATIONS OF THE PROMPT-NEUTRON LIFETIME, EFFECTIVE DELAYED-NEUTRON FRACTION AND AVERAGE FISSION IMPORTANCE ARE TABULATED FOR THE ECEL CORES 1-13. THE FLUX AND ADJOINT SPECTRA ARE TABULATED AND PRESENTED IN GRAPHICAL FORM. MATERIAL SPECIFICATIONS AND THE CROSS-SECTION LIBRARY USED IN THE CALCULATIONS ARE ALSO RECORDED. A BIBLIOGRAPHY OF THE EXPERIMENTAL PROGRAM IS PROVIDED.

*CRITICALITY EXPERIMENT + DELAYED NEUTRON + PROMPT NEUTRON LIFETIME + ROSSI ALPHA

6-11174 SANDERS JP
APPROPRIATE VALUES FOR THE THERMAL CONDUCTIVITY OF UO₂ FOR USE IN THE DESIGN OF THE BONUS SUPERHEATERS
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TENNESSEE
ORNL-TM-1450 +. 11 PAGES, 1 FIGURE, 6 REFERENCES, APRIL 22, 1966, CFSTI \$1.00 CY, \$0.50 MN

A LITERATURE SURVEY WAS MADE, AND A THERMAL CONDUCTIVITY OF 1.0 - 1.2 BTU/HR-FT-DEG F WAS CHOSEN. VARIOUS REPORTS INCLUDED GAS-GAP EFFECT. THERMAL CYCLING AND IRRADIATION HISTORY AFFECT CHOICE ALSO.

BONUS (BOILING NUCLEAR SUPERHEAT PROJECT) + HEAT CONDUCTION + REACTOR, BOILING WATER + REACTOR, SUPERHEAT + URANIUM DIOXIDE

6-11176 ALCORN FM + MICKLE RA + WOODHALL CB
ADVANCED TEST REACTOR TEMPERATURE AND VOID COEFFICIENTS OF REACTIVITY
BABCOCK AND WILCOX COMPANY, LYNCHBURG, VIRGINIA
IDO-24455 +. 28 PAGES, MARCH 1964, CFSTI, \$2.60 FS, \$1.40 MF

SPATIALLY DEPENDENT TEMPERATURE AND VOID COEFFICIENTS OF REACTIVITY WERE CALCULATED FOR THE REFERENCE CORE OF THE ADVANCED TEST REACTOR. THE FUEL-TEMPERATURE COEFFICIENT IS NEGATIVE. ALL OTHER REGIONS HAVE POSITIVE TEMPERATURE COEFFICIENTS. THE COLD-TO-HOT OPERATING TEMPERATURE DEFICIT OF REACTIVITY IS PLUS 0.0060. THE BEGINNING-OF-LIFE, HOT-OPERATING, FUEL VOID COEFFICIENT IS NEGATIVE 0.209 WHILE ALL OTHER REGIONS ARE POSITIVE. END-OF-LIFE COEFFICIENTS ARE SIMILAR TO BEGINNING-OF-LIFE COEFFICIENTS. FUEL-TEMPERATURE COEFFICIENT HAS BECOME LESS NEGATIVE. END-OF-LIFE VOID REACTIVITY ADDITIONS HAVE ALL INCREASED.

*ATR (ADVANCED TEST REACTOR - NRTS) + *TEMPERATURE COEFFICIENT + *VOID COEFFICIENT + REACTOR, TEST

6-11177 BOUZYK J + KUBOWAKI J + LATEK S + SUWALSKI W
WATER REACTIVITY EFFECTS IN THE ANNA CRITICAL ASSEMBLY
INSTITUTE OF NUCLEAR RESEARCH, WARSAW
INR-600/IX-A/PR +. 22 PAGES, FEBRUARY, 1965, DEP., IN POLISH, ENGLISH ABSTRACT

THE RESULTS OF REACTIVITY MEASUREMENTS ON LOSS OF WATER FROM THE FUEL AND GRAPHITE (EXPERIMENTAL) CHANNELS OF THE ANNA CRITICAL ASSEMBLY ARE PRESENTED. THE SHADOWING EFFECT, AS WELL AS THE OPPOSED EFFECT OF THE WATER REMOVAL FROM THE CORE AND THE SIDE REFLECTOR, RESPECTIVELY, HAS BEEN OBSERVED. THE RESULTS ARE VERY IMPORTANT FOR THE REACTOR OPERATION.

POLAND + VOID COEFFICIENT

6-11178 GOLDMAN DT
UTILIZING MUFT RESONANCE PARAMETERS TO INCLUDE DOPPLER BROADENING

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-11178 *CONTINUED*
KNOLLS ATOMIC POWER LABORATORY, SCHENECTADY, NEW YORK
KAPL-M-6158 +. 14 PAGES, JUNE 1, 1964, CFSTI \$1.00 CY

KEEPING WITHIN THE MUFT FRAMEWORK, A METHOD IS PROPOSED FOR INCLUDING THE EFFECT OF DOPPLER (TEMPERATURE) BROADENING OF RESONANCES ON THE CALCULATION OF RESONANCE INTEGRALS. THIS METHOD IS SEEN TO BE SIMPLE IN ITS APPLICATION. SOME ATTEMPT WAS MADE TO DETERMINE ITS RANGE OF VALIDITY, ESPECIALLY IN COMPARISON WITH THE TECHNIQUE PRESENTLY IN USE IN MUFT. FINALLY, AN ADDITIONAL PROPOSAL IS MADE TO REPLACE FOR ALL NUCLEI THE NR1A APPROXIMATION PRESENTLY IN USE IN MUFT WITH THE NR APPROXIMATION.

*COMPUTER, DIGITAL + *DOPPLER EFFECT

6-11179 GYFTOPOULOS EP
NONLINEAR REACTOR KINETICS
MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASSACHUSETTS
MMPP-FRPC-64-3 + CONF-640615-2 +. 47 PAGES, FROM FAST REACTOR PHYSICS CONFERENCE, ANN ARBOR, MICHIGAN, JUNE 8-12, 1964, CFSTI \$2.00 CY

LECTURE NOTES ON THE FOLLOWING SUBJECTS - BALANCE RELATIONS, REDUCTION TO POINT KINETICS EQUATIONS AND EFFECTS OF SHAPE CHANGES, EXAMPLE OF EFFECT OF SHAPE CHANGES, CONSISTENT TRANSFER FUNCTIONS, LIFETIME, APPLICABILITY OF KINETICS EQUATIONS TO STABILITY STUDIES, SOME STABILITY CRITERIA, CONTINUATION OF STABILITY ANALYSIS, EQUILIBRIUM STATES AT INFINITY, REVIEW, EXAMPLE, APPLICABILITY TO FAST REACTORS.

REACTOR DYNAMICS

6-11249 KEATEN RW + PHELPS RD + GUNBY AL
NUCLEAR PARAMETERS OF THE SRE CORE II
ATOMICS INTERNATIONAL, CANOGA PARK, CALIF.
NAA-SR-9430 +. 37 PAGES, 12 TABLES, 15 REFERENCES, AUGUST 1, 1964, CFSTI \$0.75

VARIOUS NUMBERS GIVEN AS WELL AS FORMULAS USED FOR CALCULATING THEM.

CROSS SECTION + REACTIVITY COEFFICIENT + REACTOR, GRAPHITE MODERATED + REACTOR, LIQUID METAL COOLED + SRE (SODIUM REACTOR EXPERIMENT)

6-11266 KEETON DC
PROPOSALS FOR EGCR REACTOR KINETICS EXPERIMENTS UTILIZING NOISE-ANALYSIS TECHNIQUES
TENNESSEE VALLEY AUTHORITY, OAK RIDGE
TID-22753 +. 19 PAGES, JUNE 11, 1965, CFSTI, \$1.00 CY, \$0.50 MN

THIS PAPER DESCRIBES THE KINETICS EXPERIMENTS TO BE PERFORMED ON THE EGCR DURING PHASE IV AND V TESTS WITH NOISE-ANALYSIS METHODS. THE TESTS WILL BE MADE WITH THE REACTOR AT VARIOUS POWER LEVELS UP TO FULL POWER. NOISE-ANALYSIS TECHNIQUES, STEP-TRANSIENT METHODS, AND POSSIBLY ROD-OSCILLATOR TECHNIQUES WILL BE USED DURING STARTUP. THIS REPORT DISCUSSES ONLY THE NOISE ANALYSIS.

*EGCR (EXPERIMENTAL GAS COOLED REACTOR) + *NOISE ANALYSIS + REACTOR, GAS COOLED + REACTOR, GRAPHITE MODERATED

6-11269 LITTLE WW + HARDIE RW
NEUTRONICS CHARACTERISTICS OF POSSIBLE DRIVER FUELS FOR THE FAST TEST REACTOR (FTR)
BATTELLE-NORTHWEST, RICHLAND
BNWL-281 +. 28 PAGES, FIGURES, TABLES, 8 REFERENCES, MAY, 1966, CFSTI

THIS REPORT DESCRIBES THE PRINCIPAL NEUTRONICS CHARACTERISTICS OF 14 POSSIBLE DRIVER FUELS FOR THE FAST TEST REACTOR (FTR). THE FUELS CONSIDERED ARE CERMETS OF STAINLESS STEEL AND PUO₂, (PU-U)O₂ AND (PU-U)C CERAMICS, AND PU-U-ZR METALS. FOR EACH FUEL, CORE VOLUMES OF 600 AND 800 LITERS ARE STUDIED. THE CERMET-FUELED REACTORS PRODUCE THE HIGHEST FLUX FOR A GIVEN POWER DENSITY. UNMODERATED 600- AND 800-LITER CERAMIC-FUELED REACTORS APPEAR TO HAVE ONLY A MARGINAL DOPPLER COEFFICIENT. THE DOPPLER COEFFICIENT, HOWEVER, CAN BE SIGNIFICANTLY INCREASED BY ADDING BEO TO THE CORE.

*DOPPLER EFFECT + *REACTOR, FAST + BERYLLIUM + REACTOR, TEST

6-11303 WINSON RW
A TECHNIQUE FOR SOLVING DYNAMICS PROBLEMS BY DIGITAL COMPUTATION
ATOMICS INTERNATIONAL, CANOGA PARK, CALIFORNIA
NAA-SR-MEMO-10692 +. 8 PAGES, NOVEMBER 2, 1964, CFSTI, \$1.00 CY

A SET OF FUNCTIONAL EQUATIONS IS DEVELOPED FOR GREATLY ENHANCING THE SOLUTION OF SYSTEM EQUATIONS UTILIZING DIGITAL COMPUTERS. THE SOLUTION OF THE DIFFERENTIAL EQUATIONS, REPRESENTING THE SYSTEM, IS NOT LIMITED BY ANY APPROXIMATE NUMERICAL INTEGRATION SCHEME, HOWEVER THE COMPUTATIONAL TIME INTERVAL IS LIMITED TO THE EXTENT THAT THE SYSTEM DRIVING FUNCTION CAN BE REPRESENTED BY A SERIES OF STEPS AND RAMPS. THE METHOD CAN BE PROGRAMMED WITH THE EASE OF SIMPLE EULER INTEGRATION, WITH THE ADDED ADVANTAGE OF REQUIRING LESS COMPUTATION TIME OF EITHER EULER OR RUNGE-KUTTA NUMERICAL INTEGRATION SCHEMES.

*COMPUTER, DIGITAL + *REACTOR DYNAMICS

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-11315 CROCKER JG
ANALYSIS - SPACE-TIME EFFECTS AND THE POINT KINETIC EQUATIONS
PHILLIPS PETROLEUM COMPANY, IDAHO FALLS, IDAHO
IDO-17123 +. 10 PAGES, PAGES 43-52 OF QUARTERLY TECHNICAL REPORT - SPERT PROJECT, APRIL, MAY, JUNE 1965,
JANUARY 1966, CFSTI, \$3.00 CY, \$0.75 MN

FOR CORES WHICH HAVE UNIFORM NEGATIVE INHERENT REACTIVITY FEEDBACK, POINT KINETICS WILL YIELD GOOD RESULTS IF THE HALF-WIDTH OF THE POWER BURST IS AT LEAST A FACTOR OF TWO GREATER THAN THE TIME REQUIRED TO PROPOGATE A PULSE ACROSS THE CORES. THE RANGE OF VALIDITY OF THE POINT-KINETIC EQUATIONS IS CONSIDERABLY GREATER THAN THAT INDICATED IN AN ANALYSIS PERFORMED BY YASINSKY AND HENRY.

SPACE DEPENDENT DYNAMICS

6-11316 CROCKER JG
POWER BURST FACILITY (PBF) - SHORT-PERIOD TRANSIENT IRRADIATION OF PROTOTYPE PBF FUEL PELLETS DURING KIWI DESTRUCTIVE TEST
PHILLIPS PETROLEUM COMPANY, IDAHO FALLS, IDAHO
IDO-17123 +. 25 PAGES, PAGES 18-42 OF QUARTERLY TECHNICAL REPORT - SPERT PROJECT, APRIL, MAY, JUNE 1965,
JANUARY 1966, CFSTI, \$3.00 CY, \$0.75 MN

REGARDING PBF, THE CAPSULE TESTS AT KIWI-TNT AND TREAT SHOW NO PERIOD-DEPENDENT THRESHOLD FOR FUEL CRACKING. ONE SAMPLE IN KIWI TEST REACHED GROSS FUEL MELTING, WITH VAPORIZATION AND CLAD DAMAGE.

*PBF (POWER BURST FACILITY) + FAILURE, CLADDING + FAILURE, FUEL ELEMENT +
KIWI TNT (TRANSIENT NUCLEAR TEST) + REACTOR, GRAPHITE MODERATED + REACTOR, TEST +
TREAT (TRANSIENT TEST REACTOR FACILITY)

6-11415 PFANN J
DYNAMICS OF ACCIDENTS IN NUCLEAR REACTORS
CZECHOSLOVAK ACADEMY OF SCIENCES, PRAGUE
UJV-1459-65 +. 36 PAGES, 1965, DEP. MN, ENGLISH ABSTRACT ONLY

THE METHOD OF NUMERICAL SOLUTION OF EQUATIONS FOR REACTOR TRANSIENTS AND THE ALGOL PROGRAM DYNAMIKA REAKTORU DESIGNED FOR THE SOLUTION OF TRANSIENT AND ACCIDENTAL PROCESSES IN HEAVY-WATER-MODERATED, GAS-COOLED REACTORS WITH FUEL RODS ARE DESCRIBED.

*COMPUTER, DIGITAL + *REACTOR DYNAMICS + ACCIDENT ANALYSIS + CZECHOSLOVAKIA + REACTOR TRANSIENT +
REACTOR, GAS COOLED + REACTOR, HEAVY WATER

6-11424 HORST KM
SOUTHWEST EXPERIMENTAL FAST OXIDE REACTOR DEVELOPMENT PROGRAM. THIRD QUARTERLY REPORT, OCTOBER 1964 -
JANUARY 1965
GENERAL ELECTRIC, SAN JOSE
GEAP-4799 +. 150 PAGES, FEBRUARY 1965, CFSTI \$4.00 CY, \$1.00 MN

THIS REPORT IS ONE OF A SERIES OF SUCH REPORTS ON THE FOLLOWING SUBJECTS - PLANNING,
EXPERIMENTAL PROGRAM IN ZPR-III, FUEL DEVELOPMENT, INSTRUMENTATION, CORE DYNAMICS, REACTIVITY
CONTROL, FUEL HANDLING, AND CORE DESIGN

*RESEARCH CONTRACT + *SEFOR (SOUTHWEST EXP. FAST OXIDE REACTOR) + *ZPR III (ANL ZERO POWER REACTOR) +
CRITICAL ASSEMBLY FACILITY + DOPPLER COEFFICIENT + FUEL ELEMENT + FUEL HANDLING + HEAT TRANSFER +
INSTRUMENTATION, GENERAL + INSTRUMENTATION, TEMPERATURE + REACTOR, BREEDER + REACTOR, FAST +
REACTOR, LIQUID METAL COOLED + TEST, PHYSICS

6-11432 ASH M
OPTIMAL SHUTDOWN CONTROL OF NUCLEAR REACTORS. MATHEMATICS IN SCIENCE AND ENGINEERING, VOLUME 26
E. H. PLESSET ASSOCIATES, INC., SANTA MONICA, CALIFORNIA
169 PAGES, FIGURES, TABLES, 32 REFERENCES, SEPTEMBER 1966, ACADEMIC PRESS, 1966, NEW YORK AND LONDON,
\$8.50 CY

THE PROBLEM OF CONTROLLING THE SHUTDOWN SEQUENCE OF A NUCLEAR REACTOR SO AS TO MINIMIZE THE XENON POISONING AT A LATER TIME IS SOLVED. THE GENERATION AND CHARACTERISTICS OF NUCLEAR POISONS ARE GIVEN, AS IS THE DERIVATION OF THE CONTROL THEORY. A COMPUTER CODE IS LISTED ALONG WITH COEFFICIENTS. THE PROBLEM OF XENON POISONING IS SOLVED FOR THE IRR-1 REACTOR (ISRAEL), AND THE AGREEMENT BETWEEN THEORETICAL AND EXPERIMENTAL RESULTS ARE GIVEN.

*XENON + CONTROL ROD WORTH + SHUTDOWN MARGIN + XENON OSCILLATION

6-11444 ENGEL JR + HAUBENREICH PN + BALL SJ
ANALYSIS OF FILLING ACCIDENTS IN MSRE
OAK RIDGE NATIONAL LABORATORY
ORNL-TM-497 +. 41 PAGES, 14 FIGURES, 1 TABLE, AUGUST 16, 1966, CFSTI \$2.00 CY, \$0.50 MN

POSTULATED ACCIDENTS WERE ANALYZED TO HELP DESIGN FILLING-RATE VALVES AND GAS-CONTROL VALVES TO LIMIT SUCH EXCURSION. SEQUENTIAL FAILURE WOULD BE NEEDED TO CAUSE THE ACCIDENT, ALSO SELECTIVE SALT FREEZING TO CONCENTRATE THE FUEL.

*ACCIDENT, REFUELING + MSRE (MOLTEN SALT REACTOR EXPERIMENT) + REACTOR, CIRCULATING FUEL +

CATEGORY 6
REACTOR TRANSIENTS, KINETICS, AND STABILITY

6-11444 *CONTINUED*
REACTOR, MOLTEN SALT

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-08682 CASTLEMAN AW + TANG IN
CHEMICAL CONSIDERATIONS IN FAST REACTOR SAFETY
BROOKHAVEN NATIONAL LABORATORY

BNL-9667 + CONF-651009-6 +. 24 PAGES, OCTOBER, 1965, PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, ARGONNE NATIONAL LABORATORY, OCTOBER 11-14, 1965, CFSTI, \$2.00 FS, \$0.50 MN

THIS PAPER SUMMARIZES THE RESULTS OF STUDIES ON THE CHEMICAL STATES OF IODINE RELEASED FROM U AND UC INTO HELIUM BETWEEN 1200 AND 2500 C. THE SECOND SECTION GIVES THE CHEMICAL STATES FORMED UPON RELEASE FROM THESE FUELS INTO AIR AND STEAM. INCLUDED ALSO ARE CALCULATIONS THAT PREDICT THE BEHAVIOR OF IODINE IN SODIUM, BASED ON THERMODYNAMIC CONSIDERATIONS.

*FISSION PRODUCT TRANSPORT + *FISSION PRODUCT, IODINE + *IODINE + *THERMODYNAMICS + HELIUM + SODIUM + STEAM + URANIUM + URANIUM CARBIDE

7-08895 OAK RIDGE NATIONAL LABORATORY STATUS AND PROGRESS REPORT
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE
ORNL-3814 +. 59 PAGES, MAY 1965

RELEASE OF FISSION PRODUCTS DURING MELTING OF FUELS UNDER TRANSIENT REACTOR CONDITIONS. REMOVAL OF FISSION PRODUCTS FROM GASES UNDER REACTOR ACCIDENT CONDITIONS. BEHAVIOR OF FISSION PRODUCTS ON IN-PILE DESTRUCTION OF REACTOR FUELS. CHARACTERIZATION OF GAS-BORNE FISSION PRODUCTS. PREPARATION OF HIGH-SPECIFIC-ACTIVITY METHYL IODIDE FOR USE IN TESTING CHARCOAL ABSORBER SYSTEMS. SIMULATION OF REACTOR-ACCIDENT AEROSOLS. NUCLEAR SAFETY INFORMATION CENTER. INDEXED BIBLIOGRAPHY OF CURRENT NUCLEAR SAFETY LITERATURE. NUCLEAR SAFETY PILOT PLANT.

*AEROSOL + *FISSION PRODUCT TRANSPORT + *FISSION PRODUCT, IODINE + *IN PILE LOOP + *ORGANIC IODIDE + FISSION PRODUCT, IODINE + FISSION PRODUCT, VOLATILE + IN PILE EXPERIMENT + IODINE

7-09273 LIU BY + WHITBY KT
THE ELECTRICAL CHARGING OF SMALL PARTICLES AT LOW PRESSURES
UNIVERSITY OF MINNESOTA, MINNEAPOLIS, MINNESOTA
72 PAGES, 21 FIGURES, 10 TABLES, OCTOBER 1965, SOURCE

THE ELECTRIC CHARGE IMPARTED TO AEROSOL PARTICLES RANGING IN SIZE FROM 0.08 TO APPROXIMATELY 3 MICRON HAS BEEN MEASURED EXPERIMENTALLY IN A COMBINED CHARGER AND MOBILITY ANALYZER OVER THE PRESSURE RANGE FROM 0.01 TO 0.001 ATM. SOLID SPHERICAL PARTICLES OF METHYLENE BLUE WERE USED IN THESE STUDIES, AND THEY WERE CHARGED UNDER ELECTRIC FIELD INTENSITIES OF 100 TO 240 V/CM BY POSITIVE IONS PRODUCED IN A CORONA DISCHARGE. THE PRODUCT OF ION CONCENTRATION AND CHARGING TIME USED IN THE EXPERIMENTS RANGED TO A MAXIMUM VALUE OF 3 MILLION (IONS/CC)(SEC). THE ELECTRIC MOBILITY OF THESE PARTICLES CHARGED UNDER THE VARIOUS CONDITIONS OF THE EXPERIMENTS WAS FOUND TO INCREASE RAPIDLY WITH DECREASING PRESSURES AND SOMEWHAT LESS RAPIDLY WITH DECREASING PARTICLE SIZE. THE MEASURED CHARGE ON PARTICLES HAS BEEN COMPARED WITH VALUES PREDICTED BY VARIOUS THEORIES, AND THE RESULTS INDICATE THAT BOTH THE DIFFUSION AND FIELD-CHARGING EQUATIONS UNDERESTIMATE THE PARTICLE CHARGE BY A FACTOR RANGING FROM APPROXIMATELY 2 TO 30. RESULTS OF NUMERICAL SOLUTION BY A COMPUTER PROGRAM OF THE CHARGING EQUATION BASED UPON THE ASSUMPTION THAT THE CONCENTRATION OF IONS IS UNIFORM AROUND THE PARTICLE AGREE WITH THE EXPERIMENTAL RESULTS FOR PRESSURES OF 1/100 AND 1/300 ATMOSPHERE, EXCEPT FOR THE HIGHEST ELECTRIC FIELD INTENSITY, TO WITHIN THE ACCURACY OF THE EXPERIMENT. FOR A PRESSURE OF 0.001 ATMOSPHERE, A SIMPLE INTERCEPTION THEORY GIVES RESULTS THAT AGREED THE BEST WITH THE EXPERIMENTAL DATA.

*AEROSOL + *ELECTROSTATIC CHARGE + *FILTER THEORY, INTERCEPTION + COMPUTER PROGRAM + DIFFUSION + PARTICLE SIZE + PARTICULATE

7-C9350 MELEHAN JB + GATES JE
IN-PILE FISSION-GAS RELEASE FROM URANIUM CARBIDE AND URANIUM NITRIDE
BATTELLE MEMORIAL INSTITUTE, COLUMBUS
BMI-1701 +. 54 PAGES, 30 FIGURES, 13 REFERENCES, NOVEMBER 1964, CFSTI, \$1.50 CY

IN-PILE FISSION-GAS RELEASE BEHAVIOR OF CAST UC0.9, UC1.01, UC1.04, AND UC1.4, SINTERED UC1.04 (93 PERCENT DENSE), AND UN1.01 (92 PERCENT DENSE) WAS STUDIED AT TEMPERATURES UP TO 1700 C. FISSION-GAS RELEASE FROM UN1.01 WAS TEMPERATURE INDEPENDENT UP TO ABOUT 800 C. ABOVE 800 C, RELEASE WAS TEMPERATURE-DEPENDENT AND COULD BE DESCRIBED IN TERMS OF DIFFUSION THEORY. BETWEEN 1000 AND 1600 C THE DIFFUSION COEFFICIENTS FOR XE-133, XE-135, AND KR-85M COULD BE EXPRESSED BY THE RELATION- $D \text{ EQUALS } D_{\text{SUB ZERO}} (\text{EXP}) E \text{ TO THE MINUS } Q/RT$, WHERE $D_{\text{SUB ZERO}}$ EQUALS 3 PLUS OR MINUS 2 X 10 TO THE MINUS 6 CM SQUARED PER SEC, AND Q EQUALS 60 PLUS OR MINUS 5 KCAL PER MOLE. LIMITED DATA SUGGEST THAT BETWEEN 1000 AND 1600 C THE FISSION-GAS DIFFUSION COEFFICIENTS IN SINTERED UC1.04 ARE COMPARABLE TO THOSE FOR SINTERED UN1.01. FISSION-GAS RELEASE FROM THE CAST CARBIDES WAS TEMPERATURE DEPENDENT BETWEEN 1000 AND 1600 C BUT NEVER EXCEEDED THE THEORETICAL RECOIL RELEASE. AT 1600 C THE RATE OF FISSION-GAS RELEASE IN UC1.01 AND UC1.4 WAS EQUAL BUT AT LOWER TEMPERATURES THE RELEASE RATE IN UC1.01 WAS HIGHER THAN IN UC1.4. THIS HIGHER RELEASE RATE MIGHT BE RELATED TO THE PRESENCE OF THE INTERCONNECTED UC2 SECOND PHASE IN THE UC1.01 ALLOY. DEFINITE VALUES FOR THE FISSION-GAS DIFFUSION COEFFICIENTS IN THE CAST CARBIDES COULD NOT BE DETERMINED BECAUSE OF THE LOW RATE OF GAS RELEASE.

*DIFFUSION + *DIFFUSION COEFFICIENT + *FISSION GAS RELEASE + *FISSION PRODUCT RELEASE, GENERAL + *IN PILE LOOP + FUEL BURNUP + FUEL INTEGRITY + KRYPTON + NITRIDE + URANIUM + URANIUM CARBIDE + XENON

7-C9352 BRADBURY BT + DEMANT JT + MARTIN PM

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-09352 *CONTINUED*
SOLID FISSION PRODUCTS IN IRRADIATED URANIUM DIOXIDE
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, HARWELL
AERE-R-5149 +. 27 PAGES, 11 FIGURES, 4 TABLES, 19 REFERENCES, JANUARY 1966, UKAEA

BOTH SOLID AND GASEOUS FISSION PRODUCTS ARE GENERATED DURING IRRADIATION OF UO₂, AND THE DIMENSIONAL STABILITY OF THE FUEL WILL BE CONTROLLED BY THE BEHAVIOUR OF THESE FISSION PRODUCTS. FRAGMENTS OF IRRADIATED UO₂ AND A COMPLETE SECTION FROM A FUEL PELLET OF 4.6 PERCENT BURN-UP AND ESTIMATED CENTRE TEMPERATURE OF APPROXIMATELY 1500 DEGREES C HAVE BEEN STUDIED USING A C.A.M.E.C.A. ELECTRON PROBE MICROANALYZER. A MICROSTRUCTURAL FEATURE WAS THE APPEARANCE ABOVE APPROXIMATELY 3 PERCENT BURN-UP OF WHITE INCLUSIONS AT GRAIN BOUNDARIES. THE SOLID PRODUCT ELEMENTS MOLYBDENUM, TECHNETIUM, RUTHENIUM AND RHODIUM WERE IN ALL THESE INCLUSIONS. BARIUM AND STRONTIUM, ASSOCIATED WITH ZIRCONIUM AND SMALL AMOUNTS OF CERIUM WERE ADDITIONALLY PRESENT IN MANY CASES. NEODYMIUM WAS PRESENT IN THE MATRIX UO₂. THE CHEMICAL STATE AND SEGREGATION OF THESE ELEMENTS IS DISCUSSED.

*ANALYTICAL TECHNIQUE, CALIBRATION + *FISSION PRODUCT TRANSPORT + *FISSION PRODUCT, NONVOLATILE + BARIUM + CERIUM + DIFFUSION + MOLYBDENUM + NEODYMIUM + RHODIUM + RUTHENIUM + STRONTIUM + TECHNETIUM + URANIUM OXIDE + ZIRCONIUM

7-09359 NELSON RC + COPLIN DH + LYONS MF + WEIDENBAUM B
FISSION GAS RELEASE FROM UO₂ FUEL RODS WITH GROSS CENTRAL MELTING. 1. PELLET FUEL
GENERAL ELECTRIC COMPANY, VALLECITOS ATOMIC LABORATORY
GEAP-4572 + EURAEC-1435 +. 58 PAGES, REFERENCES, JULY 24, 1964, CFSTI, \$3.00 CY, \$0.50 MN

THE EXTENSION OF FUEL-ROD OPERATING CONDITIONS ABOVE THE LIMIT OF CENTER MELTING AND PROCEEDING INTO GROSS AMOUNTS OF MOLTEN FUEL HAS BROUGHT WITH IT THE KNOWLEDGE OF FISSION-GAS RELEASE AT HIGH TEMPERATURE. THE FUEL WAS UO₂ PELLETS WHICH WERE 1.27 CM IN DIAMETER AND HAD A DENSITY OF 10.4 GM/CU.CM. THE FUEL-ROD AVERAGE OPERATING CONDITIONS RANGED FROM 69.6 TO 118.8 W/CM. THE CALCULATED VOLUME FRACTIONS OF MOLTEN UO₂ EXTENDED FROM 0.002 TO 0.375, AND THE CORRESPONDING FISSION GAS RELEASES RANGED FROM 10 TO 62 PERCENT. THE FISSION GAS RELEASE FROM THESE FUEL RODS WAS CORRELATED WITH THE GAS PRODUCED IN THE FUEL VOLUME WHICH EXHIBITS FISSION PRODUCT MOBILITY, AS OBSERVED BY AUTORADIOGRAPHY. THE RESULTS OF THIS ANALYSIS SHOW A RELEASE OF ALL THE FISSION GAS PRODUCED IN THAT VOLUME OF UO₂ ABOVE 1900 C, WHERE COLUMNAR GRAIN GROWTH AND MELTING OCCURRED. IN THE REGION OF EQUIAXED GRAIN GROWTH, BETWEEN 1650 AND 1900 C, ABOUT 20 PERCENT OF THE FISSION GAS PRODUCED IN THIS FUEL VOLUME WAS RELEASED. FOR UO₂ FUEL RODS OPERATING UNDER CONDITIONS OF CENTRAL MELTING, THE FRACTION OF FISSION GAS RELEASED FROM THE FUEL VOLUME BELOW 1650 C IS RELATIVELY SMALL AND MAY BE NEGLECTED.

*FISSION PRODUCT TRANSPORT + *FUEL ELEMENT + *FUEL MELTDOWN + *NOBLE GAS + *URANIUM OXIDE + ANALYTICAL MODEL + DIFFUSION + FISSION GAS RELEASE + FISSION PRODUCT RELEASE, GENERAL + FUEL BURNUP

7-C9360 PERRIGO LD
TRANSPORT AND BUILDUP OF RADIOACTIVE MATERIALS IN REACTOR SYSTEMS AS DETERMINED BY SHUTDOWN RADIATION MEASUREMENTS
BATTELLE-NORTHWEST
BNWL-SA-85 +. 14 PAGES, MARCH 5, 1965, CFSTI, \$1.00 CY, \$0.50 MN

A PROGRAM OF MEASURING SHUTDOWN RADIATION LEVELS ON THE PLUTONIUM RECYCLE TEST REACTOR BEGAN CONCURRENT WITH REACTOR STARTUP TO PROVIDE INFORMATION ON RADIOACTIVITY BUILDUP AND TRANSPORT REACTIONS. BUILDUP TRENDS WERE RELATED TO COOLANT PURITY, CORROSION, REACTOR POWER LEVEL, AND GENERAL REACTOR OPERATION, WITH THE OBJECTIVE OF FINDING METHODS FOR REDUCING RADIATION BUILDUP AND EXPOSURE AROUND REACTOR SYSTEMS. THIS PAPER PRESENTS THE SHUTDOWN-RADIATION-MEASUREMENT TECHNIQUE, COVERING ITS DEVELOPMENT AND SUBSEQUENT USE, WITH EXAMPLES OF SOME OF THE RESULTS.

*MONITOR, RADIATION, GENERAL + *RADIATION SAFETY AND CONTROL + *SURVEY, RADIATION, GENERAL + FISSION PRODUCT TRANSPORT + PERSONNEL EXPOSURE, RADIATION

7-09369 SMOLKINA TI + CHUBAKOV AA
INVESTIGATION OF ADSORPTION OF RADIOIODINE ON ACTIVATED CHARCOAL, AND STUDY OF FORMS OF GASEOUS IODINE IN AIR
3 PAGES, 3 FIGURES, 8 REFERENCES, ATOMNAYA ENERGIYA, 18(3), PAGES 298-299 (MARCH, 1965)

RADIOACTIVE IODINE IS CAPABLE OF EXISTING IN AIR IN TWO PHASES - AEROSOL AND VAPOR. USEFUL TOOLS FOR DETERMINING THE CONCENTRATION OF RADIOIODINE IN AIR AND FOR REMOVING IT FROM THE AIR ARE THEREFORE NOT ONLY AEROSOL PARTICULATE FILTERS BUT ALSO FILTERS OR SORBING AGENTS CAPABLE OF TRAPPING GASEOUS IODINE. THE AUTHORS MADE A STUDY OF THE ADSORPTION OF IODINE VAPOR EMERGING IN A STREAM OF AIR FROM A SPENT FUEL ELEMENT HEATED TO 900-1000 C ON ACTIVATED BAU GRADE CHARCOAL AT AN AIR FLOWSPEED OF 20 CM/SEC. THE FUEL ELEMENTS WERE MADE OF BERYLLIUM OXIDE AND ENRICHED URANIUM DIOXIDE, WITH NO FRAGMENT-PROOF CLADDING. THE RADIOIODINE CONCENTRATION WAS 10-TO-THE-MINUS-9 TO 10-TO-THE-MINUS-10 CURIE/LITER. THE IODINE VAPOR DISTRIBUTION CURVES OVER THE LENGTH OF THE BAU CHARCOAL BED ARE PLOTTED. THE RADIOIODINE CONCENTRATION IN AIR WAS FOUND TO BE REDUCED BY A FACTOR OF ABOUT 500 BY USING A BAU CHARCOAL BED 10 CM LONG. IN STUDYING THE FILTERS THAT ARE EFFICIENT TRAPPERS OF IODIDES, WE SUCCESSFULLY ESTABLISHED THAT IODINE COMPOUNDS ARE PRESENT IN THREE FORMS IN THE VAPOR PHASE - ELEMENTAL IODINE, IODIDES, IODATES, AND POSSIBLY EVEN A MIXTURE OF SEVERAL COMPOUNDS.

*ANALYTICAL TECHNIQUE, CALIBRATION + *FISSION PRODUCT, IODINE + ADSORPTION + CHARCOAL + FILTER + FILTER, TRAP + FISSION PRODUCT TRANSPORT + IODINE

7-09370 NUTTER JI + BURNET G
FIXED-BED DRYING OF AIR USING MOLECULAR SIEVES

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-C9370 *CONTINUED*

IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, AMES, IOWA

11 PAGES, 10 FIGURES, 2 TABLES, 7 REFERENCES, I AND EC PROCESS DESIGN AND DEVELOPMENT, 5(1), PAGES 1-10 (JANUARY, 1966)

THE RATE OF DRYING OF AIR IN A FIXED BED OF MOLECULAR SIEVES WAS INVESTIGATED. EXIT AIR MOISTURE CONTENT AS A FUNCTION OF TIME WAS MEASURED AT SEVERAL VALUES OF INLET CONCENTRATION, FLOW RATE, FIXED-BED HEIGHT, AND BED TEMPERATURE. OVERALL, SOLID PHASE, AND GAS PHASE MASS TRANSFER COEFFICIENTS AND PARTICLE AND PORE DIFFUSIVITIES WERE CALCULATED. THE PORE-DIFFUSION MODEL OF VERMEULEN AND ACRIVOS BEST REPRODUCED EXPERIMENTAL DATA AND IS RECOMMENDED AS A BASIS FOR DESIGN CALCULATIONS.

*MOLECULAR SIEVE + *POROUS MEDIA + AIR CLEANING + ANALYTICAL MODEL + DIFFUSION + STEAM + WATER, GENERAL

7-C9371 GIESEKE JA + MITCHELL RI

SIZE MEASUREMENT OF COLLECTED DROPS
BATTELLE MEMORIAL INSTITUTE, COLUMBUS, OHIO

4 PAGES, 2 TABLES, 2 FIGURES, 5 REFERENCES, JOURNAL OF CHEMICAL AND ENGINEERING DATA, 10(4), PAGES 350-353 (OCTOBER, 1965)

IN AN EXPERIMENTAL PROGRAM USING WATER, DIBUTYL PHTHALATE, AND NO. 2 HEATING OIL, THE MOST CONVENIENT METHOD FOR SIZING DROPS IN THE 5- TO 250-MICRON RANGE WAS TO MEASURE THE SIZE OF CRATERS FORMED BY THE DROPS ON A SLIDE COATED WITH MAGNESIUM OXIDE. SIX METHODS OF SIZING DROPS COLLECTED ON SLIDES OR IN CELLS WERE INVESTIGATED. THE CRATER COEFFICIENT FOR WATER OR DIBUTYL PHTHALATE DROPS ON THE COATED SLIDE WAS 0.82. THE OBSERVED FLATTENING COEFFICIENTS FOR DROPS ON CLEAN GLASS SLIDES WERE 0.05 FOR DIBUTYL PHTHALATE AND 0.42 FOR NO. 2 HEATING OIL.

*AEROSOL PROPERTIES + *ANALYTICAL TECHNIQUE, CALIBRATION + *PARTICLE SIZE + AEROSOL + MIST

7-C9373 SMITH RK + WILLS GB

APPLICATION OF PENETRATION THEORY TO GAS ABSORPTION ON A SIEVE TRAY
VIRGINIA POLYTECHNIC INSTITUTE

6 PAGES, 10 FIGURES, 10 REFERENCES, I AND EC PROCESS DESIGN AND DEVELOPMENT, 5(1), PAGES 39-44 (JANUARY, 1966)

A METHOD WAS DEVELOPED FOR EXTENDING TRANSIENT ABSORPTION MEASUREMENTS FROM SIMPLIFIED APPARATUS TO OPERATING, PILOT-SCALE ABSORPTION EQUIPMENT THROUGH MEASUREMENT OF THE EFFECTIVE TIMES OF PENETRATION AND OF THE INTERFACIAL AREAS AVAILABLE FOR MASS TRANSFER IN A 4-INCH-DIAMETER SIEVE-TRAY COLUMN. THE SYSTEM STUDIED WAS THAT OF THE ABSORPTION OF CARBON DIOXIDE INTO DILUTE AQUEOUS SOLUTIONS OF SODIUM HYDROXIDE. THE MEASURED VALUES OF THE TIMES OF PENETRATION WERE ABOUT TWICE AS LARGE AS PREVIOUS ESTIMATES. THE VALUES OF THE INTERFACIAL AREAS DETERMINED WERE CONSISTENT WITH PREVIOUS, INDEPENDENT ESTIMATES.

*CARBON DIOXIDE + *LIQUID SCRUBBER + CHEMICAL REACTION + DECONTAMINATION

7-C9374 BLUME H + STRICH ER + HATTWIG M + BISINGER HJ

ULTRAPURIFICATION OF GASES BY MEANS OF NEWLY DEVELOPED CATALYSTS
WALTER ULBRICHT PLANT, VEB LEUNA-WERKE

ORNL-TR-1081 +. 9 PAGES, 7 TABLES, 1 FIGURE, 14 REFERENCES, APRIL 1, 1966, TRANSLATED FROM CHEM. TECHN. 17, PAGES 463-466, (1965)

PROTECTIVE GASES, SUCH AS H₂, N₂, AND NOBLE GASES, ARE BEING EMPLOYED IN EVER-INCREASING QUANTITIES IN THE CHEMICAL INDUSTRY, LAMP FACTORIES, SEMI-CONDUCTOR PLANTS, AS WELL AS IN METALLURGY. THESE MUST BE FREE FROM IMPURITIES, PARTICULARLY OXYGEN. ALTHOUGH THE REMOVAL OF SMALL CONCENTRATIONS OF OXYGEN FROM H₂ OR H₂-CONTAINING GASES IS CARRIED OUT MOST ADVANTAGEOUSLY WITH NOBLE METAL CATALYSTS (E.G., LEUNA-CATALYST 7748, 0.5 PERCENT PD ON GAMMA-AL₂O₃) AT ROOM TEMPERATURE, OXYGEN REMOVAL FROM INERT GASES (N₂ AND NOBLE GASES) IS PERFORMED CHIEFLY BY OXIDATION OF THE METALLIC CONSTITUENTS OF PURIFYING AGENTS. IN THE PAST YEAR, THE CATALYST GROUP OF VEB LEUNA-WERKE DISCOVERED A NICKEL CATALYST, DESIGNATED 6525, WHOSE OXYGEN-ABSORPTION POWER AT ROOM TEMPERATURE IS SEVERAL TIMES GREATER THAN THE USUAL COPPER CATALYSTS. THE PREPARATION, REDUCTION, AND STABILIZATION OF NICKEL CATALYSTS ON AN AL₂O₃ BASE, USED FOR HYDROGENATION OF PHENOL, HAS BEEN REPORTED. ALTHOUGH THE NICKEL-CHROMIUM OXIDE COMBINATION SEEMS TO BE ESPECIALLY SUITABLE, M. GREYSON FAILED TO PLACE EMPHASIS ON IT IN THE JOURNAL, CATALYSIS. AN ACTIVE NICKEL-CHROMIUM OXIDE CATALYST WAS ALSO DEVELOPED IN THE LEUNA PLANT WHICH HAS BEEN DESIGNATED CATALYST 6540. THE PROPERTIES OF CATALYSTS 6525 AND 6540 HAVE BEEN INVESTIGATED IN THEIR ACTION ON THE ULTRAPURIFICATION OF GASES.

*CHEMICAL KINETICS + *CHEMICAL REACTION + *HYDROGEN + *NOBLE GAS + *OXYGEN + CHEMICAL EQUILIBRIUM + DECONTAMINATION + OXIDATION

7-C9678 PRADOS JW

A COMPUTER PROGRAM FOR PREDICTING COATED-PARTICLE BEHAVIOR
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE

ORNL-TM-1385 +. 38 PAGES, 1 FIGURE, MARCH 1966, CFSTI, \$2.00 CY, \$0.50 MN

THIS REPORT DESCRIBES A COMPUTER PROGRAM FOR USE IN CALCULATING CONDITIONS UNDER WHICH THE PYROLYTIC-CARBON COATINGS OF FUEL MICROSPHERES WOULD BE EXPECTED TO FAIL. WORKING EQUATIONS AND A LISTING OF THE FORTRAN-63 SOURCE PROGRAM ARE PRESENTED, TOGETHER WITH INSTRUCTIONS FOR FURNISHING INPUT DATA.

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-09678 *CONTINUED*
*ANALYTICAL MODEL + *COATED PARTICLE + *COMPUTER PROGRAM + FUEL INTEGRITY

7-09729 PARKER DR
EVALUATION OF MICROSCOPIC-SIZED GRAPHITE AEROSOL FROM A ROVER REACTOR DESTRUCTION TEST, JUNE 1965
SANDIA CORPORATION, ALBUQUERQUE, NEW MEXICO
SC-RR-65-557 +. 16 PAGES, 5 FIGURES, 4 TABLES, DECEMBER 1965, CFSTI, \$1.00 CY, \$0.50 MN

THE USE OF A ROVER/NERVA SPACE PROPULSION ENGINE FOR SPACE FLIGHT MUST BE PRECEDED BY AN ACCEPTABLE EVALUATION OF THE SAFETY CRITERIA. THESE SAFETY CRITERIA ARE DEPENDENT ON A KNOWLEDGE OF THE DEBRIS SIZE, VELOCITY, AND DISTRIBUTION WHEN THE REACTOR IS DISPOSED OF AFTER FLIGHT OPERATION. THIS REPORT DESCRIBES ONLY THE TECHNIQUES USED TO COLLECT, SIZE, AND ANALYZE THE AIRBORNE DEBRIS RESULTING FROM THE DESTRUCTION OF A FULL-SCALE ROVER/NERVA MOCKUP ENGINE. THE AEC/NASA SPACE NUCLEAR PROPULSION OFFICE REQUESTED THE PARTICIPATION OF ABERDEEN PROVING GROUND AND SANDIA CORPORATION IN A DESTRUCTION TEST OF A FULL-SCALE MOCKUP ROVER/NERVA PROPULSION ENGINE. THIS TEST WAS SCHEDULED AND COMPLETED AT THE ABERDEEN PROVING GROUND IN JUNE 1965. THE TEST WAS PERFORMED TO PROVIDE COMPLETE DEBRIS DATA AS WELL AS AIRBORNE DEBRIS DATA WHICH WILL ALLOW THE SAFETY ANALYSES TO BE COMPLETED ON THE SPACE ENGINE. THE ANALYSES OF THE MICROSCOPIC PARTICLES WITHIN THE AIRBORNE CLOUD SHOW THAT (1) 80 PERCENT ARE BETWEEN 0.5 AND 3.5 MICRONS IN DIAMETER, (2) THE URANIUM PARTICLES CONTAINED WITHIN THE CORE ARE NOT CARRIED IN THE AIRBORNE CLOUD, (3) THE AIR SAMPLING OF A MULTIJET DEBRIS CLOUD DOES NOT PRODUCE RELIABLE DATA AS TO THE CONCENTRATION OF PARTICLES IN THE CLOUD, AND (4) A MINIMAL ENVIRONMENTAL HEALTH HAZARD MAY BE EXPECTED FROM THE URANIUM IN THE CORE.

*ACCIDENT, EXPLOSION + *AEROSPACE SAFETY + *ANALYTICAL TECHNIQUE, AIR + *ROVER PROGRAM + *SAMPLING + AEROSOL + AEROSOL PRODUCTION + AEROSOL PROPERTIES + AIRBORNE RELEASE + GRAPHITE + MONITOR, RADIATION, AIR + PARTICLE SIZE

7-C9730 CARFI N
PREPARATION OF ZNS(AG) PHOSPHOR SCREENS FOR DETECTION OF ALPHA PARTICLES
CENTRO INFORMAZIONE STUDI ESPERIMENTALI, MILAN, ITALY
2 PAGES, 3 FIGURES, ENERGIA NUCLEARE 12(12)- 661-662 (DECEMBER 1965)

ZNS(AG) SUITABLY PREPARED IS AN EXCELLENT DETECTOR OF ALPHA PARTICLES, WITH AN EFFICIENCY ALMOST EQUAL TO 100 PERCENT AND A TOTAL DISCRIMINATION FOR BETA AND GAMMA RAYS. IN FACT, 10 MG/SQ.CM THICKNESSES OF ZNS(AG) APPROXIMATELY CORRESPOND TO THE RANGE OF ALPHA PARTICLES EMITTED FROM MOST RADIOISOTOPES. OWING TO THIS FACT, THEY PRACTICALLY LOSE ALL THEIR ENERGY IN PASSING THROUGH THE PHOSPHOR AND THUS SUFFICIENTLY HIGH PULSES CAN BE OBTAINED. ON THE CONTRARY, BETA AND GAMMA RAYS GENERALLY LOSE AN EXTREMELY SMALL AMOUNT OF THEIR ENERGY, AND, AS A CONSEQUENCE, THEIR PULSES CAN BE EASILY DISCRIMINATED. THE PROBLEM IS ESSENTIALLY THAT OF MAKING THE PHOSPHOR FIRMLY STICK TO THE SUPPORT.

*ANALYTICAL TECHNIQUE, CALIBRATION + ALPHA EMITTER + GROSS ALPHA + URANIUM

7-C9731 LAZZARINI E
ON THE DISTRIBUTION OF SOME FISSION PRODUCTS BETWEEN CORE AND RECOMBINER OF L54M REACTOR-PART 4-DECAY PROBABILITY OF KR-89 AND KR-90 IN RECOMBINER
CENTRO STUDI NUCLEARI DELLA CASACCIA, ROME, ITALY
3 PAGES, 2 TABLES, 1 FIGURE, ENERGIA NUCLEARE 12(12)- 625-627 (DECEMBER 1965)

THE PROBABILITIES THAT KR-89 AND KR-90 DECAY IN THE RECOMBINER OF L54M REACTOR WERE MEASURED BY DETERMINING THE AMOUNTS OF SR-89 AND SR-90 IN THE RECOMBINER WATER. THESE PROBABILITIES, TOGETHER WITH THOSE PREVIOUSLY OBTAINED FOR XE-137, XE-140 AND XE-141, ARE PLOTTED AGAINST THE HALF-LIVES OF THE NUCLIDES AND INTERPOLATED WITH CALCULATED FUNCTIONS. THE AGREEMENT BETWEEN EXPERIMENTAL AND THEORETICAL BEHAVIOURS IS DISCUSSED.

*FISSION PRODUCT TRANSPORT + *RECOMBINER + FISSION GAS RELEASE + KRYPTON + NOBLE GAS + STRONTIUM + WATER, GENERAL + XENON

7-09732 LAZZARINI E + SANGIUST V + TERRANI M + TERRANI S
ON THE DISTRIBUTION OF SOME FISSION PRODUCTS BETWEEN CORE AND RECOMBINER OF L54M REACTOR - PART 3 - DETERMINATION OF THE TURNOVER TIME OF RECOMBINER WATER AND BUILDUP OF CS-137 AND BA-140 AND CE-141 IN IT
CENTRO STUDI NUCLEARI DELLA CASACCIA, ROME, ITALY
5 PAGES, 2 FIGURES, 1 TABLE, ENERGIA NUCLEARE 12 (11)- 593-597 (NOVEMBER 1965)

THE BUILD-UP OF FISSION PRODUCTS IN THE RECOMBINER WATER OF L54M REACTOR WHEN IT IS OPERATING AT MAXIMUM POWER WAS STUDIED. THE TURNOVER TIME OF THE RECOMBINER WATER WAS MEASURED AND THE PROBABILITIES THAT XE-137, XE-140 AND XE-141 DECAY IN IT WERE ALSO DETERMINED. AN EXPRESSION FOR THESE PROBABILITIES WAS OBTAINED IN FUNCTION OF THE TRANSPORT TIME OF GASEOUS FISSION PRODUCTS FROM THE CORE TO THE RECOMBINER AND OF THEIR TRANSIT TIME THROUGH THE RECOMBINER WATER. THESE TIME INTERVALS WERE DEDUCED FROM THE PROBABILITIES, EXPERIMENTALLY DETERMINED, THAT XE-137, XE-140 AND XE-141 DECAY IN RECOMBINER WATER. VALUES OF 6.2 AND 1.9 SEC, RESPECTIVELY, WERE FOUND.

*FISSION PRODUCT TRANSPORT + *NOBLE GAS + *RECOMBINER + *XENON + BARIUM + CERIUM + CESIUM + FISSION GAS RELEASE + FISSION PRODUCT, VOLATILE + WATER, GENERAL

7-09735 PURCHAS DR
WHAT IS INDUSTRIAL FILTRATION

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-09735 *CONTINUED*
1 PAGE, CHEMICAL AND PROCESS ENGINEERING 46(111)- 607 (NOVEMBER 1965)

AN INESCAPABLE FEATURE OF THE MODERN EXPLOSIVE GROWTH OF TECHNOLOGY IS THE PROLIFERATION OF BOTH SPECIAL TECHNIQUES AND OF NAMES FOR THESE TECHNIQUES WHICH ARE RESTRICTED TO CERTAIN AREAS OF APPLICATION. ALTHOUGH GENUINE DIFFERENCES BETWEEN THE TECHNIQUES MAY BE SLIGHT, THIS CAN BE OBSCURED EITHER BY THE SIMPLE MATTER OF TERMINOLOGY OR BY THE COMPLEXITY OF HIGHLY SPECIALIZED FEATURES OF THE DIFFERENT TECHNOLOGICAL FIELDS IN WHICH THE TECHNIQUES ARE APPLIED. TO COUNTER THIS FRAGMENTATION OF TECHNICAL KNOWLEDGE, A POSITIVE EFFORT IS NEEDED TO DEMOLISH SOME OF THE ARTIFICIAL BOUNDARIES WHICH HAVE ARISEN. INDUSTRIAL FILTRATION IS THE MECHANICAL SEPARATION OF DISPERSED PARTICLES OF A SOLID OR A LIQUID FROM A FLUID.

*FILTER + *FILTRATION + AEROSOL + AIR CLEANING + FILTER, RED + FILTER, COMMERCIAL + FILTER, CYCLONE + FILTER, ELECTROSTATIC + PARTICULATE + SCRUBBER

7-C9736 RADIOACTIVE SAMPLE EXTRACTOR PORT
BELGIAN PAT. 652,061 +. AUGUST 20, 1964, PATENT (FOREIGN)

THE PRESENT INVENTION IS A COMMUNICATION PORT PROVIDING FOR THE EXTRACTION OF MATERIAL FROM CONTAMINATED, ENCLOSED ATMOSPHERES. THE DEVICE INCLUDES A SLEEVED PORT COMMUNICATING INTO SAID ENCLOSURE AND ADAPTED TO RECEIVE A REMOVABLE CONTAINER PROVIDED WITH A CLOSE-FITTING FLEXIBLE SHIELD RING WHICH ENGAGES THE INNER MOUTH END OF SAID SLEEVE. THE SHIELD POSITIONS AND SEALS THE CONTAINER IN THE SLEEVE DURING LOADING, REMAINS THEREIN AS THE CONTAINER IS WITHDRAWN, AND IS DISPLACED INTO THE ENCLOSURE BY THE SUBSEQUENT INSERTION OF ANOTHER CONTAINER BEARING A NEW, CLEAN SHIELD.

*FILTER + *SAMPLING + GLOVE BOX + RADIATION SAFETY AND CONTROL + RADIOCHEMICAL PROCESSING

7-C9854 SZAWLEWICZ SA
THE AEC REACTOR SAFETY PROGRAM
U. S. ATOMIC ENERGY COMMISSION
7 PAGES, PRESENTED AT THE ANS SYMPOSIUM ON LOCATING NUCLEAR POWER PLANTS IN CITIES, MARCH 22, 1966, NEW YORK CITY

STEERING COMMITTEE ON SAFETY RESEARCH. ACCIDENT-PREVENTING AND CONSEQUENCE-LIMITING SAFEGUARDS. ENGINEERED SAFEGUARDS. LOSS-OF-COOLANT ACCIDENT AND MECHANICAL LOAD IT CREATES, IN-CORE SPRAY AND EMERGENCY COOLING SYSTEM, METAL-WATER REACTION, FUEL MELTDOWN, FISSION-PRODUCT RELEASE, RELIABILITY OF PIPING. LIST OF PLANNED ORNL SUMMARY REPORT BUDGET. IN-PLANT TEST PROGRAM. NUCLEAR SAFETY PILOT PLANT, CONTAINMENT SYSTEMS EXPERIMENT, LOFT, POWER BURST FACILITY.

CSE (CONTAINMENT SYSTEMS EXPERIMENT) + EMERGENCY COOLING + ENGINEERED SAFEGUARD + FISSION PRODUCT RELEASE, GENERAL + FUEL MELTDOWN + LOFT (LOSS OF FLUID TEST) + METAL WATER REACTION + NSPP (NUCLEAR SAFETY PILOT PLANT) + PBF (POWER BURST FACILITY) + REACTOR, PRESSURIZED WATER

7-09913 FRIEND JP + THOMAS DMC
THE DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION OF THE PARTICULATE MATERIAL COLLECTED DURING THE DOUBLE TRACKS AND CLEAN SLATE 1 EVENTS OF OPERATION ROLLER COASTER
ISOTOPES, INC., WESTWOOD, N.J.
AWRE-O-20/65 +. 34 PAGES, 11 FIGURES, 7 TABLES, FEBRUARY 1965, BIS, \$1.00 CY

MEASUREMENTS WERE MADE OF THE PARTICLE-SIZE DISTRIBUTIONS OF THE AEROSOLS PRODUCED IN THE ROLLER COASTER EXPERIMENTS FOR TWO REASONS. FIRST, SO THAT THE RESPIRABLE FRACTIONS OF THE TOTAL AIR CONCENTRATIONS AT THE LOCATIONS OF THE ANIMALS AND AT OTHER POINTS ON THE ARRAY OF SAMPLERS MIGHT BE DETERMINED AND, SECOND, TO PROVIDE SOURCE DISTRIBUTIONS FOR USE WITH THE CLOUD MODEL TO ENABLE PREDICTIONS OF THE DEPOSITION, PARTICLE-SIZE DISTRIBUTIONS, AND AIR CONCENTRATIONS DOWNWIND TO BE MADE. THE OVERALL SIZE-PLUTONIUM DISTRIBUTIONS FOR DOUBLE TRACKS AND CLEAN SLATE 1 WERE DETERMINED AND FOUND TO BE THE SAME, WITHIN EXPERIMENTAL ERROR. THE DISTRIBUTIONS ARE NOT LOG-NORMAL, AND THE CONTRADICTORY ESTIMATES OF THE GEOMETRIC STANDARD DEVIATION IN TG57 FROM IMPACTORS AND THE DEPOSITION MODEL ARE EXPLAINED ON A RATIONAL BASIS.

*AEROSOL + *FILTER, CASCADE IMPACTOR + *PARTICLE SIZE + *PLUTONIUM + *PLUTONIUM OXIDE + AEROSOL PROPERTIES + FILTER, CASCADE + PARTICLE SIZE DISTRIBUTION + URANIUM OXIDE

7-10270 ARNETT LM + ROSS CP + RUSCHE BC + TAYLOR CD
FINAL SAFETY ANALYSIS OF THE MAXIMUM CREDIBLE ACCIDENT IN THE HEAVY WATER COMPONENTS TEST REACTOR
SAVANNAH RIVER LABORATORY, DUPONT
DP-1037 +. 30 PAGES, 4 FIGURES, 7 TABLES, REFERENCES, DECEMBER 1965, CFSTI \$2.00 CY, \$0.50 MN

THE MAXIMUM CREDIBLE ACCIDENT IN THE HWCTR IS ANALYZED FOR THE CONDITIONS THAT EXIST SINCE IODINE ABSORBERS WERE INSTALLED IN THE CONTAINMENT BUILDING. THE ABSORBERS REMOVE RADIOIODINE ISOTOPES TO THE EXTENT THAT THE THYROID AND WHOLE-BODY DOSES AT THE SAVANNAH RIVER PLANT BOUNDARY WOULD BE LESS BY FACTORS OF SIX AND TWENTY-FIVE, RESPECTIVELY, THAN THE ALLOWABLE LIMITS SET FORTH IN THE CODE OF FEDERAL REGULATIONS (10-CFR 100).

*ACCIDENT, MAXIMUM CREDIBLE (MCA) + *HWCTR (HEAVY WATER COMPONENT TEST REACTOR) + FILTER + IODINE + SAFEGUARDS REPORT, GENERAL

7-10297 SMIDT C + SOMMER W

ACCESSION NUMBER 7-09735 TO 7-10297

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-10297 *CONTINUED*
APPLICATION OF THE VENTED FUEL CONCEPT TO A SODIUM COOLED POWER BREEDER WITH 1000 MWE
KERNFORSCHUNGSZENTRUM, KARLSRUHE
KFK-399 +. 15 PAGES, 2 FIGURES, 4 TABLES, OCTOBER 1965

THE PRINCIPLE OF VENTING THE FISSION GAS OF A FAST, CERAMIC-FUELED REACTOR TO ITS COOLANT HAS A NUMBER OF ADVANTAGES - (1) NO STRESS OF THE FUEL CLADDING BY FISSION-GAS PRESSURE, (2) MORE COMPACT SUBASSEMBLY, SINCE NO FISSION-GAS PLUENIUM IS NECESSARY, (3) NO STORAGE OF HIGH-PRESSURE RADIOACTIVE GAS. THE VENTING OF FISSION GASES TO THE SODIUM COOLANT ALLOWS FOR SAVINGS IN THE ORDER OF 2 PERCENT OF THE TOTAL PLANT COST, IF COMPARED WITH THE REFERENCE REACTOR. IN COMPARISON WITH A MORE OPTIMIZED REACTOR, THE SAVINGS ARE MUCH SMALLER.

*REACTOR, BREEDER + *REACTOR, FAST + *REACTOR, LIQUID METAL COOLED + *SODIUM + CERAMICS + CLAD + CONTAINMENT, GENERAL + ECONOMIC STUDY + FISSION PRODUCT RETENTION + FUEL ELEMENT + REACTOR COOLANT + REACTOR OFFGAS + RELEASE RATE + SAFETY PRINCIPLES AND PHILOSOPHY

7-10299 MUHLBAIER DR
NONDESTRUCTIVE TEST OF CARBON BEDS FOR REACTOR CONTAINMENT APPLICATIONS
SAVANNAH RIVER LABORATORY, AIKEN
DP-950 +. 15 PAGES, 4 FIGURES, 1 TABLE, 4 REFERENCES, MARCH 1965, CFSTI, \$1.00 CY

A STANDARDIZED, NONDESTRUCTIVE, AND GENERALLY APPLICABLE TEST FOR CARBON BEDS IN REACTOR-CONTAINMENT FACILITIES IS BEING DEVELOPED BY THE SAVANNAH RIVER LABORATORY. CONTINUING TESTS SHOW THAT THE PERMISSIBLE RANGES OF AIR VELOCITY AND WATER CONTENT OF THE CARBON CAN BE EXTENDED TO ENCOMPASS THE DESIRED TEST CONDITIONS FOR INSTALLED BEDS OF NEW CARBON. THE MAJOR IMPROVEMENT REPORTED IS THAT OF SUBSTITUTING F-112 OR F-113 FOR F-12 - A MORE VOLATILE FREON USED IN AN EARLIER TESTING METHOD.

*FILTER + *TEST, NONDESTRUCTIVE + *TESTING + CHARCOAL + FILTER, BED + FILTER, TRAP + FISSION PRODUCT RETENTION + FISSION PRODUCT, IODINE + TEST, FILTER

7-10302 LOCKHART IR + PATTERSON RL + SAUNDERS AW
FILTER PACK TECHNIQUE FOR CLASSIFYING RADIOACTIVE AEOSOLS BY PARTICLE SIZE
U. S. NAVAL RESEARCH LAB, WASHINGTON
NRL-6305 +. 18 PAGES, 6 FIGURES, 7 TABLES, 9 REFERENCES, JULY 1965, CFSTI, \$1.00 CY

ABOUT 60 COLLECTIONS OF RADIOACTIVE PARTICLES DISPERSED IN THE ATMOSPHERE HAVE BEEN MADE DURING THE PAST TWO YEARS BY USE OF FILTER PACK UTILIZING FOUR SUPERIMPOSED FILTERS. THE DISTRIBUTION OF RADIOACTIVITY AMONG THE FILTERS WAS ANALYZED MATHEMATICALLY BY MEANS OF FOUR SIMULTANEOUS LINEAR ALGEBRAIC EQUATIONS WHICH RELATE THE PARTICLE SIZE (DIAMETER) OF THE RETAINED MATERIAL TO THE FILTER CHARACTERISTICS SO AS TO PERMIT THE ASSIGNMENT OF RADIOACTIVITY IN EACH COLLECTION TO FOUR MAJOR SIZE GROUPINGS - 1.1, 0.6, 0.3, AND 0.15 MICRON.

*AIRBORNE RELEASE + *ANALYTICAL TECHNIQUE, CALIBRATION + *FILTER PACK + *PARTICLE SIZE + GROSS BETA + PARTICLE SIZE DISTRIBUTION + RADIOCHEMICAL ANALYSIS

7-10350 HIPPI AL
A COMPARISON OF DIFFERENT METHODS OF PARTICLE SIZE ANALYSIS
LOS ALAMOS SCIENTIFIC LABORATORY
LA-3424-MS +. 29 PAGES, 7 FIGURES, 4 TABLES, REFERENCES, SEPTEMBER 1965, CFSTI \$2.00 CY, \$0.50 MN

PARTICLE-SIZE ANALYSES WERE PERFORMED ON SEVERAL TUNGSTEN POWDERS, USING FOUR METHODS FOR COMPARISON. TWO OF THE METHODS MEASURED ONLY SPECIFIC SURFACE AREA, AND THE OTHER TWO MEASURED PARTICLE-SIZE DISTRIBUTIONS. AN APPLICATION OF LOG-NORMAL TRANSFORMATIONS WAS MADE TO CALCULATE SPECIFIC SURFACE AREA FROM THE SIZE DISTRIBUTIONS AND TO COMPARE THE DISTRIBUTIONS OBTAINED BY DIFFERENT METHODS.

*ANALYTICAL TECHNIQUE, SOLID + *METAL + *PARTICLE SIZE + *PARTICLE SIZE DISTRIBUTION + *SURFACE TO VOLUME RATIO + *TUNGSTEN

7-10505 WOODS FJ + JOHNSON JE
THE IGNITION AND COMBUSTION PROPERTIES OF ACTIVATED CARBON CONTAINING ADSORBED HYDROCARBONS
NAVAL RESEARCH LABORATORY, WASHINGTON
AD-605,193 + NRL-6090 +N64-29955 +. 36 PAGES, FIGURES, TABLES, 20 REFERENCES, MARCH 1964, CFSTI, \$0.75 CY

ACTIVATED CARBON CONTAINED IN LARGE FILTER BEDS IS USED IN NUCLEAR SUBMARINES FOR REMOVAL OF ODORS AND TRACE CONTAMINANTS. BECAUSE ORGANIC VAPORS ARE CONCENTRATED IN THIS WAY IN THE CARBON, A STUDY WAS MADE TO GET INFORMATION FOR ASSESSING THE FIRE HAZARDS INVOLVED IN MAINTAINING THE CARBON FILTER IN THE VENTILATION SYSTEM OF THE SUBMARINES. IN THIS STUDY, SPONTANEOUS IGNITION OF SUBMARINE-EXPOSED CARBONS OCCURRED AT TEMPERATURES AS LOW AS 490 DEGREES F (255 DEGREES C) IN AIR AT ONE ATMOSPHERE. EXOTHERMIC OXIDATIVE REACTIONS OCCURRED IN A FLOW SYSTEM AT TEMPERATURES AS LOW AS 390 DEGREES F (200 DEGREES C). COMBUSTION OF CARBONS CONTAINING HYDROCARBON PRODUCED CONSIDERABLE QUANTITIES OF CARBON DIOXIDE AND CARBON MONOXIDE, AND SIGNIFICANT AMOUNTS OF THESE GASES WERE EVOLVED EVEN UNDER PRECOMBUSTION CONDITIONS. OF A NUMBER OF CARBONS WHICH HAD BEEN USED IN SUBMARINES, THE LOWEST FLASH POINT FOUND WAS 160 DEGREES F.

*CHARCOAL + *CHARCOAL ADSORBENT + *FILTER, BED + *FIRE + *IGNITION + AIR CLEANING + CARBON + OXIDATION + VENTILATION SYSTEM

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-10506 KIEFER RJ + WINKLER EO
GENERAL ATOMIC IN-PILE LOOP FISSION PRODUCT TRAPPING SYSTEM. REGENERATIVE H₂O-CO₂ TRAP AND LIQUID NITROGEN COOLED NO. 2 CHARCOAL TRAP ASSEMBLY. INFORMATION DATA PACKAGE AND DESIGN ANALYSIS
GENERAL ATOMIC DIVISION, SAN DIEGO, CALIFORNIA
GAMD-5434 +. 55 PAGES, 4 FIGURES, 5 TABLES, JULY 1964, CFSTI, \$3.00 CY, \$0.50 MN

THE FISSION PRODUCT TRAPPING SYSTEM (FPTS) INITIALLY INSTALLED IN THE GAIL, HAS BEEN IN CONTINUOUS SERVICE FOR APPROXIMATELY THREE YEARS SINCE THE LOOP WAS FIRST OPERATED WITH NUCLEAR FUEL. THROUGHOUT THIS TIME, THE SYSTEM HAS EFFECTIVELY PERFORMED ITS INTENDED FUNCTION OF REMOVING FISSION PRODUCTS AND IMPURITIES FROM THE PURGE GAS STREAM.

*CHARCOAL ADSORBER + *CRYOGENICS + *DESIGN CRITERIA + *FILTER, BED + *FISSION PRODUCT RETENTION +
*NITROGEN + CHARCOAL + FILTER, TRAP + FISSION PRODUCT, VOLATILE + IN PILE LOOP + OPERATING EXPERIENCE

7-10532 JUDD AM
LOSS-OF-COOLANT ACCIDENTS IN A LARGE SODIUM-COOLED FAST REACTOR
U.K. ATOMIC ENERGY AUTHORITY, WINFRITH.
ANL-7120 +. 15 PAGES, 11 FIGURES, 2 TABLES, 8 REFERENCES, PP. 67-81 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI \$9.25 CY

BASICALLY, THE APPROACH USED HERE IS TO CONSIDER A SERIES OF FAULT CONDITIONS WHICH MIGHT ARISE IN A TYPICAL OXIDE-FUELLED, SODIUM-COOLED FAST REACTOR. THE ACCIDENTS RESULTING FROM THESE FAULTS ARE THEN ANALYSED STEP-BY-STEP, USUALLY UNDER SOME PESSIMISTIC ASSUMPTIONS, SUCH AS THE FAILURE OF ONE OR MORE REACTOR TRIP CIRCUITS. THERE ARE, HOWEVER, SOME MECHANISMS WHICH ARE IMPORTANT FOR SEVERAL OF THE ACCIDENTS AND REQUIRE DETAILED CONSIDERATION, SUCH AS COOLANT AND FUEL REACTIVITY WORTH, THE BEHAVIOUR OF THE COOLANT AS IT BOILS, AND PARTICULARLY THE EFFECTS OF NUCLEATE BOILING, THE RELEASE OF FISSION-PRODUCT GAS FROM A PURST FUEL CAN. AS A RESULT OF THESE ANALYSES, CERTAIN PROBLEMS STAND OUT AS BEING PARTICULARLY IMPORTANT FOR THE SAFETY OF THE REACTOR, INCLUDING THE POSSIBILITY OF A SINGLE SUBASSEMBLY ACCIDENT SPREADING TO THE WHOLE CORE AND THE TIME FOR AVAILABLE FOR A TRIP MECHANISM TO OPERATE.

*ACCIDENT, MAXIMUM CREDIBLE (MCA) + *LOSS OF COOLANT + *REACTOR, FAST + FUEL ELEMENT + HEAT TRANSFER + METAL, LIQUID + RADIUM + REACTOR KINETICS + TEMPERATURE TRANSIENT + URANIUM DIOXIDE

7-10533 SMIDT D + SOMMER W
APPLICATION OF THE VENTED FUEL CONCEPT TO A SODIUM-COOLED POWER BREEDER WITH 1000 MWE
KERNFORSCHUNGSZENTRUM, KARLSRUHE, GERMANY
ANL-7120 +. 6 PAGES, 2 FIGURES, 4 TABLES, PP. 130-135 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

THE PRINCIPLE OF VENTING THE FISSION GAS OF A FAST CERAMIC REACTOR TO ITS COOLANT HAS BEEN WELLKNOWN FOR SOME YEARS. THERE IS AN IMPRESSIVE NUMBER OF ADVANTAGES - (1) NO STRESS OF THE FUEL CLADDING CAUSED BY FISSION GAS PRESSURE. (2) MORE COMPACT SUBASSEMBLY, SINCE NO FISSION GAS PLENUM IS NECESSARY. (3) NO STORAGE OF HIGH-PRESSURE RADIOACTIVE GAS. THIS PAPER ANSWERS THE FOLLOWING QUESTIONS- (1) WHAT ARE THE PRINCIPAL DESIGN SPECIFICATIONS FOR THE GAS-PURIFICATION PLANT WITH RESPECT TO OPERATION AND SAFETY OF THE REACTOR, (2) WHAT ARE THE NUMERICAL RESULTS FOR A REFERENCE REACTOR, (3) WHAT IS THE ECONOMICAL BALANCE OF THE CITED ADVANTAGES AND DISADVANTAGES OF THE VENTED-TO-COOLANT CONCEPT.

*ECONOMICS + *REACTOR, BREEDER + *REACTOR, LIQUID METAL COOLED + CLAD + FISSION GAS RELEASE + FISSION PRODUCT TRANSPORT + REACTOR, FAST + SODIUM + THERMAL ANALYSIS

7-10534 ZEBROSKI EL + LYON WL + BAILY WE
EFFECT OF STOICHIOMETRY ON THE PROPERTIES OF MIXED OXIDE U-PU FUEL
GENERAL ELECTRIC COMPANY, SAN JOSE
ANL-7120 +. 17 PAGES, 14 FIGURES, 4 TABLES, 31 REFERENCES, PP. 374-388 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

CONVENTIONAL OXIDE FUELS FOR PRESENT ECONOMIC POWER REACTORS TYPICALLY EMPLOY ESSENTIALLY STOICHIOMETRIC FUEL, UO₂+X, WHERE X IS POSITIVE AND LIES IN A RANGE UP TO 0.02. THIS HAS PROVED SATISFACTORY FOR RELATIVELY LOW-BURNUP APPLICATIONS (10,000 TO 25,000 MWD/T) IN WHICH STOICHIOMETRY CHANGES WITH BURNUP ARE SMALL. FAST-REACTOR FUELS OF THE TYPE (U, PU)₂O₃ ARE REQUIRED TO ATTAIN AVERAGE BURNUP OF 75,000 TO 100,000 MWD/T TO BE OF ECONOMIC INTEREST, AND LOCAL PEAK BURNUPS UP TO 130,000 MWD/T. THIS PAPER IS INTENDED TO COVER THE STATUS OF SOME FUEL PREPARATION AND PROPERTIES DATA, AS WELL AS OBSERVATIONS OF FUEL PERFORMANCE, WHICH LEAD TO A TENTATIVE PREFERENCE FOR A STOICHIOMETRY OF 1.97 TO 1.98 FOR MIXED U-PU OXIDE FUEL.

*FUEL BURNUP + *FUEL ELEMENT + *OXIDE + *PLUTONIUM + *REACTOR, FAST + *URANIUM + FUEL EXPANSION COEFFICIENT + FUEL HANDLING + FUEL INTEGRITY + IN PILE EXPERIMENT + RADIATION DAMAGE + RADIOCHEMICAL PROCESSING

7-10535 BAUER AA + BEISSWENGER H + GIACCHETTI G + PATRASSI E + SCHUMACHER G + THEISEN R
MICROANALYTICAL STUDIES OF MICRO- AND MACRO-SEGREGATION IN OXIDE FUELS
KERNFORSCHUNGSZENTRUM, KARLSRUHE, GERMANY
ANL-7120 +. 10 PAGES, 11 FIGURES, 7 REFERENCES, PP. 400-409 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

ELECTRON-MICROPROBE TECHNIQUES, IF ADEQUATELY ADAPTED FOR HIGH-SENSITIVITY ANALYSIS IN THE PRESENCE OF RADIOACTIVE MATERIAL, ARE UNIQUELY SUITED TO THE STUDY OF SHORT-RANGE SEGREGATION. QUANTITATIVE ELEMENTARY MICROANALYSIS IS EFFECTIVE FOR THE ELEMENTS BORON TO PLUTONIUM (ATOMIC NUMBER Z FROM 5 TO 94), AND HIGHLY LOCALIZED POINT ANALYSIS OF MICROVOLUMES RANGING FROM 1 CU. MICRON TO INTEGRATED SURFACE SCANNINGS OF (300) (300) (1) CU. MICRON WITH

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-10535 *CONTINUED*

A DETECTION LIMIT OF ABOUT 0.01 PERCENT. THIS STUDY WAS MADE TO INVESTIGATE THE SEGREGATION OF CeO_2 IN UO_2 ANNEALED IN A TEMPERATURE GRADIENT. THE CeO_2 WAS INTENDED TO SERVE AS A SUBSTITUTE FOR PuO_2 , AS WELL AS BEING A REPRESENTATIVE OF SOLID FISSION PRODUCTS. THE RESULTS ARE PRELIMINARY, BUT THEY DEMONSTRATE THE VALUE OF THE TECHNIQUE IN STUDYING SEGREGATION.

*ANALYTICAL TECHNIQUE, CALIBRATION + *FISSION PRODUCT, NONVOLATILE + *FUEL INTEGRITY + *FUEL SEGREGATION + CERIUM + DIFFUSION + FISSION PRODUCT TRANSPORT + OXIDE + PLUTONIUM + REACTOR, FAST + URANIUM

7-10550 STACHURA SJ + SILBERBERG M

THE APPLICATION OF EXPERIMENTAL DATA FROM TREAT MELTDOWN STUDIES TO REACTOR ACCIDENT ANALYSIS
ATOMICS INTERNATIONAL, CANOGA PARK

ANL-7120 +. 10 PAGES, 7 FIGURES, 2 TABLES, 3 REFERENCES, PP. 514-523 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

RESULTS OF RECENT TREAT MELTDOWN STUDIES OF CERAMIC FUEL IN SODIUM ARE PRESENTED, AND THE SIGNIFICANCE OF THESE RESULTS WITH RESPECT TO LARGE CORE MELTDOWN IS INDICATED. THE COURSE OF FUEL MOTION IN A LARGE CORE WAS ESTIMATED FOR A SIMPLIFIED CASE, AND THE ASSOCIATED REACTIVITY EFFECTS WERE DETERMINED. THESE REACTIVITY EFFECTS WERE THEN INCORPORATED INTO THE AIRES REACTOR KINETICS CODE TO ESTIMATE CORE BEHAVIOR AFTER GROSS FUEL MELTING IN CENTRAL REGIONS OF THE CORE. A DISCUSSION OF THOSE FACTORS WHICH CAN INFLUENCE MELTDOWN BEHAVIOR WAS PRESENTED.

*ACCIDENT, GENERAL + *CORE MELTDOWN + *FUEL MELTDOWN + *REACTOR, FAST +
*TREAT (TRANSIENT TEST REACTOR FACILITY) + FUEL ELEMENT + HEAT TRANSFER

7-10552 ONEILL GL + KNIGHT FW + LEITZ FJ + SHEPHERD DR

SAFETY AND ECONOMIC ASPECTS OF VENTED FUEL IN SODIUM-COOLED REACTORS
GENERAL ELECTRIC COMPANY, SAN JOSE

ANL-7120 +. 10 PAGES, 5 FIGURES, 3 TABLES, 3 REFERENCES, PP. 540-549 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

THE RELEASE OF CONSIDERABLE FRACTIONS OF GENERATED FISSION GAS FROM HIGH-BURNUP, HIGH-POWER-DENSITY FCR FUEL IS WELL-KNOWN. THUS, THE ACCOMMODATION OF THESE FISSION GASES IS A MAJOR DESIGN PROBLEM FOR THE FCR FUEL AND SYSTEM. VARIOUS WAYS FOR ACCOMMODATING FISSION GASES IN FUEL PINS ARE SHOWN. THE BROAD OBJECTIVE OF ALL THESE DESIGNS IS TO RELIEVE THE PRESSURE BUILDUP DUE TO FISSION GAS WITHOUT PERMITTING RELEASE OF DAUGHTER ACTIVITY OR ENTRY OF SODIUM INTO THE FUEL-BLANKET REGION. IF THE GAS IS RETAINED IN THE CORE REGION, PRESSURE BUILDUP INSIDE THE FUEL ELEMENT REQUIRES RESTRAINING CLADDING THICKNESSES, WHICH ARE GENERALLY PRECLUDED BY CONSIDERATIONS OF BOTH THERMAL STRESS AND CORE COMPOSITION. ALTERNATIVELY, VERY-LOW-DENSITY FUEL, WHICH ALLOWS SPACE FOR FISSION GAS, ALSO LEADS TO A POORER NEUTRON ECONOMY.

*ECONOMIC STUDY + *FISSION GAS RELEASE + *REACTOR, BREEDER + FUEL BURNUP + REACTOR, LIQUID METAL COOLED + SAFETY PRINCIPLES AND PHILOSOPHY + SODIUM

7-10557 CASTLEMAN AW + TANG IN
CHEMICAL CONSIDERATIONS IN FAST REACTOR SAFETY
BROOKHAVEN NATIONAL LABORATORY, UPTON

ANL-7120 +. 7 PAGES, 6 FIGURES, 2 TABLES, 11 REFERENCES, PP. 848-854 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

THE HAZARD ASSOCIATED WITH ANY REACTOR DEPENDS, TO A LARGE EXTENT, ON THE NATURE OF THE RADIOACTIVE NUCLIDES LIKELY TO BE RELEASED IN AN ACCIDENT. A THOROUGH KNOWLEDGE OF THE CHEMICAL STATES OF THE FISSION PRODUCTS AS A FUNCTION OF TEMPERATURE, CONCENTRATION, AND ENVIRONMENT CAN BE USED TO PREDICT BEHAVIOR UNDER A WIDE VARIETY OF CONDITIONS WHICH WOULD BE ALMOST IMPOSSIBLE TO INVESTIGATE IN LARGE-SCALE TESTS. THIS PAPER IS DIVIDED INTO TWO SECTIONS. THE FIRST SUMMARIZES THE RESULTS OF OUR STUDIES ON THE CHEMICAL STATES OF IODINE RELEASED FROM URANIUM AND UC INTO HELIUM BETWEEN 1200 AND 2500 C. THE SECOND SECTION GIVES THE CHEMICAL STATES OF IODINE FORMED UPON RELEASE FROM THESE FUELS INTO AIR AND STEAM. IN ADDITION, CALCULATIONS, BASED ON THERMODYNAMIC CONSIDERATIONS, ARE INCLUDED WHICH PREDICT THE BEHAVIOR OF IODINE IN SODIUM. IN AN INERT ATMOSPHERE, TWO IODIDES AND ATOMIC IODINE ARE RELEASED FROM METALLIC URANIUM AND UC FUELS. THE RELATIVE QUANTITIES OF EACH SPECIES ARE PRIMARILY A FUNCTION OF FUEL TEMPERATURE. THE TWO IODIDES ARE TENACIOUSLY HELD ON SURFACES AT TEMPERATURES OF ABOUT 275 AND 200 DEGREES C IN AN INERT ATMOSPHERE, BUT READILY EVOLVE ELEMENTAL IODINE INTO AN OXIDIZING ENVIRONMENT. WHERE IODINE IS RELEASED DURING A METAL-WATER REACTION, CONVERSION TO HI CAN BE VALIDLY ESTIMATED FROM THERMODYNAMIC CONSIDERATIONS. IN A SODIUM ENVIRONMENT, NEARLY ALL THE IODINE WILL BE CONVERTED TO NAI WHEN THE FISSION-PRODUCT CONCENTRATIONS ARE IN PARTS PER MILLION. EXPRESSIONS ARE GIVEN FOR CALCULATING THE VOLATILITY OF NAI IN SODIUM. SUBSEQUENT EXPOSURE TO AN OXIDIZING ENVIRONMENT SHOULD NOT RESULT IN SUBSTANTIAL NAI OXIDATION IN THE PRESENCE OF EXCESS Na_2O_2 .

*FISSION PRODUCT TRANSPORT + *FISSION PRODUCT, IODINE + *FISSION PRODUCT, VOLATILE + *FUEL MELTDOWN + *IODINE + *URANIUM + *URANIUM CARBIDE + ANALYTICAL MODEL + CHEMICAL KINETICS + CHEMICAL REACTION + DEPOSITION + FISSION PRODUCT RELEASE, GENERAL + THERMODYNAMICS

7-10558 KUNKEL W + BERGER S

FISSION PRODUCT RETENTION IN SODIUM AND APPLICATIONS TO VENTED FUEL ELEMENT DESIGN
ATOMICS INTERNATIONAL, CANOGA PARK

ANL-7120 +. 7 PAGES, 6 FIGURES, 7 TABLES, 6 REFERENCES, PP. 855-861 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-10558 *CONTINUED*

THE USE OF A VENTED FUEL ELEMENT REDUCES CLADDING STRAIN FROM RELEASED FISSION-GAS PRESSURE, THEREBY INCREASING THE POTENTIAL OF THE FUEL FOR EXTENDED BURNUP. ALTHOUGH THERE ARE SOME RADIOLOGICAL PROBLEMS IN MOST VENTED-FUEL-ELEMENT DESIGNS, THE SUCCESSFUL OPERATION OF THE DOWNEYAY FAST REACTOR INDICATED THAT THESE PROBLEMS CAN BE SOLVED. THIS PAPER INDICATES SOME OF THE SAFETY PROBLEMS ASSOCIATED WITH THE VENTED-FUEL-ELEMENT CONCEPT AND APPLIES THE RESULTS OF RECENT EXPERIMENTAL AND ANALYTICAL STUDIES TO THOSE PROBLEMS. THE DATA INDICATE THAT THERE WAS ONLY 0.036 TIMES AS MUCH I-131 AS KR-85. THEREFORE, THE IODINE MUST HAVE BEEN DEPLETED BY PASSAGE THROUGH THE SODIUM BOND, BY PLATING, OR BY SOME OTHER MECHANISM. THESE DATA, WHILE SPARSE, INDICATE AN APPARENT FIGURE FOR IODINE RELEASE FROM THE SODIUM OF 0.2 PERCENT. THESE RESULTS COMPARE WITH 0.02 PERCENT FOR LABORATORY CONDITIONS.

*FISSION PRODUCT RELEASE, GENERAL + *FISSION PRODUCT TRANSPORT + *FISSION PRODUCT, IODINE + *SODIUM + CERIUM + CESIUM + FUEL ELEMENT + KRYPTON + NOBLE GAS + REACTOR, LIQUID METAL COOLED + RUTHENIUM + STRONTIUM + XENON + ZIRCONIUM

7-10559 PORGES KG

FUEL-FAILURE DETECTION IN SODIUM-COOLED REACTORS

ARGONNE NATIONAL LABORATORY, ARGONNE

ANL-7120 +. 6 PAGES, 1 FIGURE, 9 REFERENCES, PP. 862-867 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

THE ADVENT OF SODIUM COOLING PUTS AN ENTIRELY DIFFERENT EMPHASIS ON THE RATIONALE OF CLADDING-FAILURE MONITORING. SODIUM DOES NOT ATTACK THE FUEL, NOR IS THE INCREASE OF THE COOLANT ACTIVITY WHICH WOULD RESULT FROM FISSION PRODUCT CONTAMINATION (OVER AND ABOVE THE NA-24 ACTIVITY, POSSIBLY UP TO 10 MCI/CM³, ALREADY PRESENT) CAUSE FOR CONCERN. THE EBR-II CLADDING-FAILURE MONITOR CONSISTS OF A FAST DELAYED-NEUTRON DETECTOR, FERDL (FUEL-ELEMENT-RUPTURE-DETECTION LOOP), AS WELL AS A WIRE PRECIPITATOR PRESENTLY MONITORING THE GAS BLANKET. THE FERDL IS INSTALLED ON A LOOP THAT SAMPLES THE COOLANT AT THE HEAT EXCHANGER, WITH A MAXIMUM LOOP FLOW OF 100 GPM OUT OF A TOTAL OF ABOUT 8000 GPM.

*FAILURE, FUEL ELEMENT + *INSTRUMENTATION, SURVEILLANCE + *LEAK DETECTION + *SODIUM + FISSION PRODUCT RELEASE, GENERAL + FUEL INTEGRITY + INSTRUMENTATION, NUCLEAR + MONITOR, RADIATION, GENERAL + REACTOR, LIQUID METAL COOLED

7-10575 HAUSNER H + NELSON RC

CORRELATION OF UO₂ MICROSTRUCTURES FROM IN-PILE AND OUT-OF-PILE EXPERIMENTS

GENERAL ELECTRIC COMPANY, SAN JOSE, CALIFORNIA, ATOMIC POWER EQUIPMENT DEPT.

GEAP-4535 +. 42 PAGES, 25 FIGURES, 5 TABLES, 18 REFERENCES, JUNE 4, 1964, CFSTI, \$2.00 CY

A COMPARISON WAS MADE BETWEEN MICROSTRUCTURES OBTAINED FROM OUT-OF-PILE EXPERIMENTS AND FROM IRRADIATED MATERIAL. THE MAIN DIFFERENCES ARE DISCUSSED. THE INFLUENCE OF TEMPERATURE AND DURATION OF THE HEAT TREATMENT ON THE MICROSTRUCTURAL CHANGES BELOW THE MELTING POINT WAS INVESTIGATED, AND TEMPERATURES FOR THE ONSET OF THESE CHANGES WERE CALCULATED. MICROSTRUCTURES OBTAINED AFTER MELTING ARE DISCUSSED, AND CHANGES OF THESE STRUCTURES BY A SUBSEQUENT HEAT TREATMENT BELOW THE MELTING POINT ARE SHOWN IN BOTH IN-PILE AND OUT-OF-PILE EXPERIMENTS.

*FUEL ELEMENT + *IN PILE EXPERIMENT + *IRRADIATION TESTING + *URANIUM + FUEL INTEGRITY + THERMAL PROPERTY

7-10577 HAZARDS CONTROL QUARTERLY REPORT NO. 23, OCTOBER-DECEMBER 1965 AND INDEX TO HAZARDS CONTROL QUARTERLY REPORTS NOS. 20 THROUGH 23.

LAWRENCE RADIATION LAB., UNIV. OF CALIFORNIA, LIVERMORE

UCRL-14680 +. 29 PAGES, 15 FIGURES, 7 TABLES, DECEMBER 1965, CFSTI, \$2.00 CY, \$0.50 MN

GAS CHROMATOGRAPHS EQUIPPED WITH ELECTRON-CAPTURE DETECTORS HAVE A DETECTION SENSITIVITY FOR PICOGRAM AMOUNTS OF METHYL IODIDE. AS A RESULT, IT IS POSSIBLE TO PERFORM THESE EFFICIENCY TESTS WITH STABLE METHYL IODIDE, USING CONCENTRATIONS TYPICAL OF THE RADIOACTIVE FORM. THIS REPORT IS AN OUTLINE OF A TECHNIQUE WE FOUND USEFUL.

*ANALYTICAL TECHNIQUE, CALIBRATION + *FISSION PRODUCT, IODINE + *ORGANIC IODIDE + ANALYTICAL TECHNIQUE, AIR + CHROMATOGRAPHY + FISSION PRODUCT TRANSPORT + IODINE + MOLECULAR SIEVE

7-10578 DIETZ KA

QUARTERLY TECHNICAL REPORT - STEP PROJECT, APRIL 1965-JUNE 1965

PHILLIPS PETROLEUM COMPANY, IDAHO FALLS, IDAHO

IDO-17145 +. 104 PAGES, 69 FIGURES, 14 TABLES, 30 REFERENCES, MAY 1966, CFSTI, \$4.00 CY, \$0.75 MN

QUARTERLY PROGRESS REPORT ON SNAPTRAN-1 TEST PROGRAM, LOFT CORE DESIGN, LOFT FACILITY AND EXPERIMENTAL DESIGN, LOFT ANALYSIS, LOFT RADIOLOGICAL STUDIES, AND INSTRUMENTATION STUDIES.

*LOFT (LOSS OF FLUID TEST) + *SNAPTRAN (SNAP TRANSIENT REACTOR TEST SERIES) + *STEP (SAFETY TEST ENGINEERING PROGRAM) + ANALYTICAL MODEL + CONTAINMENT DESIGN + CONTAINMENT FILTERING SYSTEM + CONTAINMENT INSTRUMENTATION + FISSION PRODUCT TRANSPORT + INSTRUMENTATION, GENERAL + IODINE + REACTOR KINETICS + REACTOR, PRESSURIZED WATER + SAMPLING

7-10586 NEILL FH + GRAY DL + KRESS TS

IODINE TRANSPORT AND DEPOSITION IN A HIGH TEMPERATURE HELIUM LOOP

OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TENNESSEE

ORNL-TM-1386 +. 43 PAGES, 13 FIGURES, 7 TABLES, JUNE 1966, CFSTI, \$2.00 CY, \$0.50 MN

ACCESSION NUMBER 7-10558 TO 7-10586

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-10586 *CONTINUED*

THE MASS TRANSPORT OF TRACE AMOUNTS OF IODINE IN A TURBULENTLY FLOWING HELIUM STREAM AND ITS DEPOSITION ONTO VARIOUS SURFACE MATERIALS WERE INVESTIGATED. TESTS WERE CARRIED OUT WITH DEPOSITION SURFACES OF COPPER, SILVER, MILD STEEL, AND STAINLESS STEEL IN THE TEMPERATURE RANGE OF 400 TO 500 F. RESULTS INDICATE THAT IODINE SATURATES SURFACES AT DIFFERENT IODINE CONCENTRATIONS, AND THAT IT DESORBS SPONTANEOUSLY AT RATES THAT DIFFER FOR THE VARIOUS SURFACE MATERIALS. FLOW PERTURBATIONS AFFECTED BY A SUDDEN ENLARGEMENT OF THE FLOW DUCT RESULTED IN AN INCREASE IN THE PEAK MASS-TRANSFER COEFFICIENTS, SIMILAR TO REPORTED CHANGES IN HEAT-TRANSFER COEFFICIENTS FOR SIMILAR CHANGES IN GEOMETRY. ALSO, STUDIES OF DEPOSITION ON THIN WIRE ARRANGED IN ARRAYS PERPENDICULAR TO THE COOLANT STREAM INDICATE THAT DEPOSITION PREDICTED BY THE HEAT-MASS TRANSFER ANALOGY WILL CORRELATE REASONABLY WITH EXPERIMENTAL RESULTS.

*FISSION PRODUCT TRANSPORT + *FISSION PRODUCT, IODINE + *IODINE + *OUT OF PILE LOOPS AND EXPERIMENTS + ADSORPTION + ADSORPTION SURFACE + ANALYTICAL MODEL + CHEMISORPTION + COPPER + DEPOSITION + DESORPTION + MASS TRANSFER + SILVER + STEEL + STEEL, STAINLESS + SURFACE CONTAMINATION

7-10587 HIDEY GM + LILLY DK
SOLUTIONS TO THE EQUATIONS FOR THE KINETICS OF COAGULATION
NATIONAL CENTER FOR ATMOSPHERIC RESEARCH, BOULDER, COLORADO
8 PAGES, 2 FIGURES, 2 TABLES, 10 REFERENCES, JOURNAL OF COLLOID SCIENCE 20(8)- 867-874 (1965)

THE THEORY FOR THE KINETICS OF COAGULATION OF PARTICLES IN BROWNIAN MOTION IS REVIEWED BRIEFLY. THE RELATIONSHIP BETWEEN THE CLASSICAL SOLUTION OF SMOLUCHOWSKI AND THE SIMILARITY SOLUTION TO THE KINETIC EQUATION IS DISCUSSED. WHEN THE CLASSICAL RESULT IS PLACED IN THE FORM OF THE SIMILARITY SOLUTION, A SIMPLE EXPONENTIAL EXPRESSION RESULTS. IN SPITE OF THE THEORETICAL LIMITATIONS, THIS EXPRESSION FOR SMOLUCHOWSKI'S RELATION CAN BE USED TO PREDICT SATISFACTORILY A SUBSTANTIAL RANGE OF THE SIZE DISTRIBUTION WHICH HAS A SIMILAR OR A SELF-PRESERVING FORM.

*AEROSOL PROPERTIES + *AGGLOMERATE + *DIFFUSION + AEROSOL + ANALYTICAL MODEL + PARTICLE SIZE + PARTICLE SIZE DISTRIBUTION

7-10588 HIDEY GM + BROCK JR
SOME REMARKS ABOUT THE COAGULATION OF AEROSOL PARTICLES BY BROWNIAN MOTION
NATIONAL CENTER FOR ATMOSPHERIC RESEARCH, BOULDER, COLORADO + DEPARTMENT OF CHEMICAL ENGINEERING,
UNIVERSITY OF TEXAS, AUSTIN, TEXAS
15 PAGES, 1 FIGURE, 1 TABLE, 21 REFERENCES, JOURNAL OF COLLOID SCIENCE 20(6)- 477-491 (AUGUST 1965)

THE DEVELOPMENT OF THE THEORY FOR COLLISION AND COAGULATION OF AEROSOLS IN BROWNIAN MOTION IS REVIEWED. THEORETICAL CONCLUSIONS RESULTING FROM THE APPLICATION OF CONTINUUM THEORY ARE COMPARED WITH CALCULATIONS BASED ON THE KINETIC THEORY OF GASES. THESE TWO APPROACHES LEAD TO DIFFERENT RESULTS WHICH ARE APPLICABLE ONLY TO CHARGED, DILUTE AEROSOL CLOUDS, IN A LIMITED RANGE OF THE RATIO OF THE MEAN FREE PATH OF THE SUSPENDING MEDIUM λ TO THE PARTICLE RADIUS R . THE PRESENT THEORIES SUGGEST THAT (A) THE RATE OF COAGULATION OF AEROSOLS REACHES A MAXIMUM BETWEEN THE RATIO λ/R EQUALS 5 AND 10, (B) CHARGING OF PARTICLES SHOULD HAVE AN INCREASING EFFECT ON COAGULATION RATES AS THE RATIO OF THE AVERAGE CHARGE PER PARTICLE TO THE PARTICLE RADIUS INCREASES. THERE IS A SUBSTANTIAL REGION OF AEROSOL BEHAVIOR FOR WHICH THE PRESENT THEORY AND EXPERIMENTAL WORK ARE INCOMPLETE, PARTICULARLY IN ACCOUNTING FOR THE EFFECTS OF CHARGED PARTICLES. IT IS LIKELY THAT A COMPLETION OF THE THEORY FOR COAGULATION OF AEROSOLS MUST AWAIT NEW DEVELOPMENTS IN THE PHYSICS OF IONIZED DENSE GASES.

*AEROSOL PROPERTIES + *AGGLOMERATE + *DIFFUSION + AEROSOL + ANALYTICAL MODEL + PARTICLE SIZE + PARTICLE SIZE DISTRIBUTION

7-10589 SWIFT DL + FRIEDLANDER SK
THE COAGULATION OF HYDROSOLS BY BROWNIAN MOTION AND LAMINAR SHEAR FLOW
THE JOHNS HOPKINS UNIVERSITY, MARYLAND
27 PAGES, 13 FIGURES, 2 TABLES, 35 REFERENCES, JOURNAL OF COLLOID SCIENCE 19- 621-647 (1964)

THE COAGULATION OF HYDROSOLS WAS INVESTIGATED THEORETICALLY AND EXPERIMENTALLY. A REDUCED FORM OF THE PARTICLE-SIZE-DISTRIBUTION FUNCTION, DESIGNATED SELF-PRESERVING, WAS FOUND TO SATISFY SMOLUCHOWSKI'S EQUATIONS OF COAGULATION BY BROWNIAN MOTION AND SHEAR FLOW. BROWNIAN-MOTION COAGULATION EXPERIMENTS WITH TWO HETEROGENEOUS HYDROSOLS SHOWED THAT THE DISTRIBUTIONS WERE SELF-PRESERVING. THE RATE OF COAGULATION FOR HETEROGENEOUS SYSTEMS WAS FOUND TO BE SECOND-ORDER IN TOTAL PARTICLE CONCENTRATION, CONSISTENT WITH THE SELF-PRESERVING FORM OF THE DISTRIBUTION FUNCTION. COAGULATION EXPERIMENTS WERE CARRIED OUT IN A SIMPLE LAMINAR-SHEAR FIELD USING A HOMOGENEOUS LOW POLYSTYRENE LATEX DISPERSION. SMOLUCHOWSKI'S SHEAR-FLOW THEORY WAS CONFIRMED FOR SHEAR RATES RANGING FROM 1 TO 80 SEC MINUS 1. THE SHEAR COAGULATION OF A HETEROGENEOUS EMULSION WAS STUDIED AT SEVERAL SHEAR RATES, AND THE SIZE DISTRIBUTIONS WERE SELF-PRESERVING.

*AEROSOL PROPERTIES + *AGGLOMERATE + *DIFFUSION + AEROSOL + ANALYTICAL MODEL + PARTICLE SIZE + PARTICLE SIZE DISTRIBUTION + WATER, GENERAL

7-10854 HANSON JE + FIELD JH + RABIN SA
EXPERIMENTAL STUDIES OF TRANSIENT EFFECTS IN FAST REACTOR FUELS. SERIES II. MIXED OXIDE (PUO₂-UC₂) IRRADIATIONS
GENERAL ELECTRIC COMPANY, SAN JOSE, CALIFORNIA
GEAP-4804 +. 96 PAGES, REFERENCES, MAY, 1965, CFSTI, \$3.00 CY, \$0.75 MN

THE RESULTS OF AN EXPERIMENTAL PROGRAM TO EVALUATE THE PERFORMANCE OF NON-PREIRRADIATED

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-10854 *CONTINUED*

FAST-CERAMIC-REACTOR FUEL UNDER CONDITIONS SIMULATING ACCIDENTAL POWER EXCURSIONS ARE PRESENTED. RESULTS FROM THREE EXPERIMENTS IN THE TREAT FACILITY USING 0.250-INCH-O.D., TYPE 347 STAINLESS STEEL CLAD, 20 WEIGHT PERCENT PUO₂ - 80 WEIGHT PERCENT UO₂ FUEL SPECIMENS ARE INTERPRETED WITH REGARD TO FUEL-CLADDING TEMPERATURES, FUEL VAPOR PRESSURE, THERMAL EXPANSION OF THE FUEL, AND CLADDING INTEGRITY. INCIDENT FAILURE LIMITS FOR AXIALLY UNRESTRAINED FUEL ARE IDENTIFIED AS FUNCTIONS OF THE MAXIMUM FUEL AND CLADDING TEMPERATURES ATTAINED DURING THE TRANSIENT.

FAILURE, FUEL ELEMENT + PLUTONIUM + STEEL, STAINLESS + TREAT (TRANSIENT TEST REACTOR FACILITY)

7-10867 MILLER CE + BROWNING WE

THE ADEQUACY OF SCALE-UP IN EXPERIMENTS ON FISSION PRODUCT BEHAVIOR IN REACTOR ACCIDENTS. PART I. AN ANALYSIS OF SCALE-UP IN THE U. S. NUCLEAR SAFETY PROGRAM
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TENNESSEE
ORNL-3901 +. 48 PAGES, 2 TABLES, 17 FIGURES, 17 REFERENCES, JULY 1966, CFSTI, \$3.00 CY, \$0.50 MN

FOUR AREAS DISCUSSED - (1) RELEASE OF FISSION PRODUCTS FROM FUEL, (2) THEIR TRANSPORT TO CONTAINMENT VESSEL, (3) THEIR BEHAVIOR IN A CONTAINMENT SYSTEM, AND (4) THEIR BEHAVIOR IN GAS-CLEANING SYSTEMS. IN GENERAL, LARGE-SCALE EXPERIMENTS SUCH AS LOFT WERE THE UPPER ROUND OF THE STUDY. CONCLUSION - ITEMS (3) AND (4) ARE WELL SCALED OVER RANGE, BUT INTERMEDIATE-SCALE EXPERIMENTS (JUST BELOW LOFT) ARE NEEDED FOR ITEMS (1) AND (2). CONTAINS GOOD GENERAL INTRODUCTION TO PROBLEM, PLUS COMPARISON OF LOFT WITH POWER REACTORS AND BENCH-SCALE EXPERIMENTS.

*CONTAINMENT FILTERING SYSTEM + *CONTAINMENT RESEARCH AND DEVELOPMENT + *DEPOSITION +
*FISSION PRODUCT RELEASE, GENERAL + *FISSION PRODUCT TRANSPORT + FUEL MELTDOWN +
LOFT (LOSS OF FLUID TEST) + REACTOR, PRESSURIZED WATER

7-10876 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2.
CONSOLIDATED EDISON COMPANY OF NEW YORK
1 PAGE OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 6 -- EQUILIBRIUM CORE (3.92 PERCENT ENRICHMENT) WILL YIELD (AV- 27,000)
(MAX- 45000) MWD/METRIC TON OF U BURNUP. CLADDING, 0.0243 ZIRCALOY. CLADDING INTEGRITY
ENSURED BY KEEPING INTERNAL GAS PRESSURE LESS THAN REACTOR PRESSURE, DNB RATIO GREATER THAN
1.3, NO FUEL CENTERLINE MELTING, AND CLADDING STRESS BELOW YIELD POINT.

*DESIGN CRITERIA + *FAILURE, CLADDING + *FUEL BURNUP + *REGULATION, AEC +
*SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + REACTOR, PRESSURIZED WATER + STRESS

7-10933 KESSLER WE + BROCKETT GF + BINGHAM GE
ZIRCONIUM-HYDRIDE FUEL BEHAVIOR IN THE SNAPTRAN TRANSIENT TESTS
PHILLIPS PETROLEUM COMPANY, IDAHO FALLS, IDAHO
1 PAGE, ANS TRANSACTIONS, 9(1), PAGE 155 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER,
COLORADO, JUNE 20-23, 1966

FOR SNAP 10A/2-TYPE REACTORS, REACTIVITY EXCURSIONS BELOW 1.7 DOLLARS ARE NONDESTRUCTIVELY SELF-LIMITED BY THE INHERENT TEMPERATURE-DEPENDENT NEGATIVE-REACTIVITY FEEDBACK MECHANISMS OF 12 CENTS/MW-SEC. FOR EXCURSIONS RESULTING FROM ESSENTIALLY ANY AMOUNT OF REACTIVITY ABOVE 1.7 DOLLARS, THE INHERENT DISASSEMBLY CHARACTERISTICS OF THIS TYPE FUEL LIMITS THE ENERGY RELEASE TO WELL BELOW 100 MW-SEC. IN THE WATER IMMERSION TEST, RAPID COOLING OF THE FUEL LIMITED THE RELEASE OF NOBLE GASES AND THEIR DAUGHTERS TO THE ENVIRONMENT FROM THE FUEL TO LESS THAN 5 PERCENT OF THAT AVAILABLE IN THE FUEL. THE IODINE RELEASE WAS LIMITED TO LESS THAN 13 PERCENT OF THE AVAILABLE. IN THE AIR-ENVIRONMENT TEST, FUEL DISINTEGRATION WAS ACCOMPANIED BY HYDROGEN-OXYGEN COMBUSTION. ABOUT 100 PERCENT OF THE NOBLE GASES AND 50 PERCENT OF THE AVAILABLE IODINE WERE RELEASED.

*FISSION GAS RELEASE + *SNAPTRAN (SNAP TRANSIENT REACTOR TEST SERIES) + DESTRUCTIVE TRANSIENT +
FISSION PRODUCT RETENTION + FISSION PRODUCT, IODINE + HYDROGEN + REACTOR TRANSIENT

7-11270 ETTINGER HJ + MOSS WD + BUSEY H
CHARACTERISTICS OF THE AEROSOL PRODUCED FROM BURNING SODIUM AND PLUTONIUM
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS
LA-3491 +. 51 PAGES, 28 FIGURES, 7 TABLES, 12 REFERENCES, FEBRUARY, 1966, CFSTI \$3.00 CY, \$0.50 MN

SIZE CHARACTERISTICS OF THE AEROSOL PRODUCED DURING SODIUM AND PLUTONIUM FIRES WERE DETERMINED FOR DIFFERENT ATMOSPHERES RANGING FROM AIR TO 100 PERCENT NITROGEN. GRAM QUANTITIES OF SODIUM, PLUTONIUM-COBALT-CERIUM ALLOY, AND ALPHA- AND DELTA-PHASE PLUTONIUM WERE BURNED SEPARATELY. THE AEROSOL PRODUCED BY BURNING GRAM QUANTITIES OF SODIUM WAS COMPARED WITH THAT PRODUCED BY A FIRE INVOLVING 600 POUNDS OF SODIUM. DATA WERE OBTAINED REGARDING THE FRACTION OF PLUTONIUM ALLOY AIRBORNE DURING A PLUTONIUM FIRE. FIRES SIMULATING A REACTOR ACCIDENT INVOLVING BOTH FUEL AND COOLANT DEFINED THE RELATIVE AIRBORNE CONCENTRATIONS OF PLUTONIUM AND SODIUM. SODIUM AEROSOLS PRODUCED FROM SMALL- AND LARGE-SCALE FIRES HAVE COMPARABLE SIZE CHARACTERISTICS. AEROSOL PARAMETERS CAN BE DETERMINED FOR ANY SPECIAL CONDITIONS WITHOUT BUILDING A LARGE SYSTEM FOR SUCH TESTS. OXYGEN CONCENTRATION OF THE BURNING ATMOSPHERE DOES NOT AFFECT THE PARTICLE SIZE OF THE AEROSOL PRODUCED FROM BURNING PLUTONIUM METAL OR ALLOY. FIRES INVOLVING PLUTONIUM ALLOY AND SODIUM PRODUCE AIRBORNE PARTICLES THAT HAVE A PLUTONIUM-SODIUM RATIO RANGING FROM 0.34 TO LESS THAN 0.008 PERCENT. THE HIGH INITIAL RATIO IS RAPIDLY REDUCED AS THE MOLTEN SODIUM BLANKETS THE RELEASE OF PLUTONIUM.

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-11270 *CONTINUED*

*PARTICLE SIZE + *PLUTONIUM + *SODIUM + AEROSOL PRODUCTION + AEROSOL PROPERTIES + AEROSOL, RADIOACTIVE + AIR CLEANING + AIRBORNE RELEASE + ALLOY + FIRE + INCINERATION + OXIDATION

7-11271 KESSIE RW + RAMASWAMI D
REMOVAL OF PLUTONIUM HEXAFLUORIDE FROM CELL EXHAUST AIR BY HYDROLYSIS AND FILTRATION
ARGONNE NATIONAL LABORATORY, ARGONNE
ANL-7066 +. 71 PAGES, 22 FIGURES, 15 TABLES, 42 REFERENCES, DECEMBER 1965, CFSTI \$3.00 CY, \$0.75 MN

THE FLUORIDE VOLATILITY PROCESS FOR RECOVERING FISSIONABLE PLUTONIUM FROM SPENT REACTOR FUEL AS THE VOLATILE PLUTONIUM HEXAFLUORIDE (PUF₆) REQUIRES A DEMONSTRATED ABILITY TO CONTAIN THE HIGHLY TOXIC PLUTONIUM. AT HIGH CONCENTRATIONS OF PUF₆ AND MOISTURE, THE REACTION PROCEEDS RAPIDLY IN THE GAS PHASE TO PRODUCE A FINELY DISPERSED PRODUCT PUO₂F₂. MOST OF THE PARTICLES ARE SMALLER THAN 0.1 MICRON. WITH AIR CONTAINING EXCESS MOISTURE, THE FRACTION OF RELEASED PLUTONIUM PENETRATING TWO HIGH-EFFICIENCY FILTERS IN SERIES AMOUNTED TO BETWEEN 10 TO THE MINUS 9 AND 10 TO THE MINUS 6 AT A VELOCITY OF 1.0 CM/SEC. FILTER EFFICIENCY IS INCREASED BY THE AGGLOMERATION OF PARTICLES BEFORE FILTRATION AND BY LOADING EFFECTS OF THE COLLECTED PARTICLES ON THE FILTERS. WHEN AN EXCESS OF MOISTURE IS AVAILABLE, AGGLOMERATION EFFECTS TEND TO LIMIT THE MAXIMUM DISCHARGE RATE OF PLUTONIUM, AND LOADING EFFECTS TEND TO LIMIT THE MAXIMUM TOTAL QUANTITY OF PLUTONIUM THAT CAN BE DISCHARGED FROM A SINGLE FILTER. DESIGN CRITERIA OF PRACTICAL AIR-CLEANING SYSTEMS ARE PRESENTED.

*FILTER EFFICIENCY + *FILTER SYSTEM + *PLUTONIUM + AIR CLEANING + AIRBORNE RELEASE + DESIGN CRITERIA + FILTER OPERATION + FILTER SPRAY + FLUORINE + SCRUBBER + STACK + WATER VAPOR

7-11272 JOHNSON RE
FRACTURE MECHANICS- A BASIS FOR BRITTLE FRACTURE PREVENTION
WESTINGHOUSE ELECTRIC CORP., BETTIS ATOMIC POWER LAB
WAPD-TM-505 +. 82 PAGES, 32 FIGURES, 2 TABLES, 81 REFERENCES, NOVEMBER 1965, CFSTI \$3.00 CY

THE DEVELOPMENT OF FRACTURE MECHANICS IS PRESENTED HISTORICALLY AND MATHEMATICALLY. THE CENTRAL PROBLEMS AND LIMITATIONS OF EXPERIMENTAL FRACTURE MECHANICS ARE DETAILED, ALONG WITH THE ASSUMPTIONS AND APPROXIMATIONS USED. THE MEANING, MEASUREMENT, AND UTILITY OF PLANE STRAIN FRACTURE TOUGHNESS (CRITICAL STRAIN ENERGY RELEASE RATE OR CRITICAL STRESS INTENSITY FACTOR) ARE DISCUSSED. THE ROLE OF DEFECTS IN COMPONENTS IS DISCUSSED, SPECIFICALLY WITH RESPECT TO THE RELATIONSHIPS BETWEEN STRESS FIELDS, DEFECT GEOMETRY, AND MATERIAL CONDITION. BASIC ASPECTS OF ULTRASONIC TESTING ARE DISCUSSED WITH RESPECT TO QUANTITATIVE MEASUREMENT OF DEFECT GEOMETRIES IN STRUCTURES. SELECTED EXPERIMENTS DEALING WITH APPLICATION OF FRACTURE MECHANICS TO PREDICT ACTUAL COMPONENT FAILURES ARE REVIEWED. IT IS SHOWN THAT THE RELATIONSHIPS BETWEEN STRESS STATE, DEFECT GEOMETRY, ELASTIC CONSTANTS, AND FRACTURE TOUGHNESS EMPLOYED IN APPLIED FRACTURE MECHANICS CAN BE UTILIZED TO PREDICT BRITTLE FAILURE CONDITIONS IN A MORE QUANTITATIVE MANNER THAN TRANSITION TEMPERATURE CONCEPTS. BASED ON A DETAILED REVIEW OF THE METHODS AND PHYSICAL SIGNIFICANCE OF THE ENGINEERING METHOD OF FRACTURE MECHANICS, THE FOLLOWING CONCLUSIONS WERE REACHED - (1) THE METHODS OF FRACTURE MECHANICS CAN PROVIDE MORE ACCURATE PREDICTIONS OF BRITTLE FRACTURE CONDITIONS THAN TT CONCEPTS. (2) THE FRACTURE MECHANICS PARAMETER, PLANE STRAIN FRACTURE TOUGHNESS, APPEARS TO PROVIDE A MEASURE OF THE FRACTURE RESISTANCE OF METALS. (3) PLANE STRAIN FRACTURE TOUGHNESS CAN BE MEASURED USING LABORATORY FRACTURE TESTS AND APPLIED TO COMPONENTS. (4) GEOMETRY FACTORS ENTER FRACTURE MECHANICS EQUATIONS THROUGH ELASTIC NOTCH STRESS ANALYSES. (5) THE FRACTURE MECHANICS APPROACH TO OPERATIONAL LIMITATIONS IS COMPATIBLE WITH OTHER DESIGN CRITERIA AND WITH OBSERVED FRACTURE BEHAVIOR. (6) A POSSIBLE METHOD BY WHICH OPERATIONAL STRESS LIMITS CAN BE CALCULATED AND USED TO PROTECT COMPONENTS FROM BRITTLE FRACTURE WAS PRESENTED.

*BRITTLE FRACTURE + *COMPARISON, THEORY AND EXPERIENCE + *IMPACT PROPERTY + *TEST, PRESSURE VESSEL + CONTAINMENT, PRESSURE VESSEL + NDT DATA (NTL DUCTILITY TRANSITION) + STRESS + STRESS ANALYSIS + STRESS RUPTURE + SUPPORT STRUCTURE + TENSILE PROPERTY

7-11273 KYLE ML + ARNTZEN JD + COLEMAN LF
DESIGN AND OPERATION OF A PILOT-PLANT GETTERING SYSTEM OF TITANIUM-METAL SPONGE FOR REMOVAL OF NITROGEN FROM ARGON
ARGONNE NATIONAL LABORATORY, ARGONNE, ILLINOIS
ANL-7128 +. 42 PAGES, 15 FIGURES, 3 TABLES, 24 REFERENCES, JANUARY 1966, CFSTI \$2.00 CY, \$0.50 MN

A PILOT-PLANT DESIGNED TO DEMONSTRATE THE REMOVAL OF LOW CONCENTRATIONS (LESS THAN 1%) OF NITROGEN FROM LARGE, RELATIVELY PURE VOLUMES OF INERT GASES WAS BUILT AND OPERATED. IT UTILIZED TITANIUM-METAL SPONGE AT 900 C AS THE GETTER FOR THE NITROGEN. GAS PREHEATERS AND REGENERATIVE HEAT EXCHANGERS WERE USED TO OBTAIN BETTER UTILIZATION OF THE TITANIUM AND TO PROVIDE HEAT ECONOMY. DURING THE 1800 HR OF OPERATION, ALL EQUIPMENT ITEMS EXCEPT THE BLOWER PERFORMED WELL. THE UNIT SUCCESSFULLY DEMONSTRATED THE USEFULNESS AND RELATIVE ECONOMY OF TITANIUM-METAL SPONGE AS A GETTER FOR NITROGEN IMPURITY IN ARGON. THE PERFORMANCE OF THE EQUIPMENT IS ASSESSED, AND RECOMMENDATIONS FOR DESIGN OF LARGE PURIFICATION SYSTEMS ARE PRESENTED.

*ARGON + *DESIGN CRITERIA + *NITROGEN + *TITANIUM + NITRIDE + NOBLE GAS

7-11274 MARTIN WR + WEIR JR
IRRADIATION EMBRITTLEMENT OF LOW- AND HIGH-CARBON STAINLESS STEELS AT 700, 800, AND 900 DEGREES C.
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE
ORNL-TM-1516 + CONF-660 613-1 +. 27 PAGES, 19 FIGURES, 3 TABLES, JUNE, 1966, CFSTI \$2.00 CY, \$0.50 MN

IN GENERAL, THE DUCTILITY OF THE IRRADIATED ALLOY DECREASES WITH INCREASING IRRADIATION

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-11274 *CONTINUED*

TEMPERATURE WHEN THESE DUCTILITIES ARE DETERMINED AT TENSILE TEST TEMPERATURES WITHIN THE 650 TO 842 C TEMPERATURE RANGE. A MARKED DIFFERENCE IN THE DUCTILITY OF LOW- AND HIGH-CARBON IRRADIATED STAINLESS STEELS WAS OBSERVED AND APPEARS TO BE RELATED TO THE QUANTITY OF GRAIN-BOUNDARY CARBIDES. THESE DATA ARE INTERPRETED AS INDICATING THAT GRAIN-BOUNDARY CARBIDES FORMED IN IRRADIATED MATERIAL IN THIS TEMPERATURE RANGE ARE CAPABLE OF INCREASING THE STRESS AT WHICH WEDGE-TYPE GRAIN-BOUNDARY CRACKS ARE NUCLEATED AND ALSO REDUCING THE RATE OF CRACK PROPAGATION. THUS, IT APPEARS THAT AGGLOMERATED CARBIDES IN THE GRAIN BOUNDARY ARE CAPABLE OF REDUCING THE MAGNITUDE OF IRRADIATION EMBRITTLEMENT.

*EMBRITTLEMENT + *RADIATION EFFECT + *STEEL, STAINLESS + ALLOY + BRITTLE FRACTURE + CARBIDE + CLAD + RADIATION DAMAGE

7-11275 PARTRIDGE BA + ROWE PN

ANALYSIS OF GAS FLOW IN A BUBBLING FLUIDISED BED WHEN CLOUD FORMATION OCCURS
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, HARWELL
AERE-R-5037 +. 35 PAGES, 4 FIGURES, 15 REFERENCES, APRIL 1966, UKAEA

THIS REPORT PRESENTS AN ANALYSIS OF THE SITUATION IN WHICH GAS-CLOUD FORMATION OCCURS IN A FREELY BUBBLING GAS-FLUIDIZED BED. IN GENERAL, CLOUD FORMATION OCCURS IN THE GAS-FLUIDIZATION OF PARTICLES OF 350 MICRONS DIAMETER OR LESS. EXPRESSIONS DESCRIBING THE DISTRIBUTION OF THE FLUIDIZING GAS BETWEEN THE CLOUD AND INTERSTITIAL FLOWS ARE DERIVED. THE ANALYSIS JUSTIFIES THE COMMON ASSUMPTION THAT THE EXCESS GAS ABOVE THAT REQUIRED TO FLUIDIZE THE PARTICLES GOES THROUGH THE BED IN THE FORM OF BUBBLES, AND SHOWS IT TO BE CONSISTENT WITH PRESENT KNOWLEDGE ABOUT THE NATURE OF GAS CLOUDS.

*ANALYTICAL MODEL + *FLOW THEORY AND EXPERIMENTS + *FLUIDIZED BED + FLOW DISTRIBUTION + MATHEMATICAL STUDY + POROUS MEDIA

7-11365 QUAD CITIES STATION, UNIT 1 - PLANT DESIGN ANALYSIS, VOLUME 1

COMMONWEALTH EDISON COMPANY, CHICAGO
18 PAGES, PAGES XIV-3-3 TO 6 AND 3-15 TO 30 OF QUAD CITIES STATION, PLANT DESIGN ANALYSIS, VOLUME I DOCKET NO. 50-254, MAY 31, 1966 PDR

DRESDEN 1: EXPERIENCE WITH FUEL FAILURES QUOTED TO BE LESS THAN 1 MILLICURE/SEC, (KR-85 TO REPRESENT 54 CURIES - LESS THAN 1 PERCENT) IN THE GAS PLENUM. HALOGENS IN STEAM ARE ABOUT 10 TO THE MINUS 5 THAT IN WATER. A FURTHER FACTOR OF 10 TO THE MINUS 2 OCCURS IN THE CONDENSER. THUS A REACTOR EXCURSION RUPTURING 330 FUEL RODS WOULD RELEASE ONLY 10 TO THE MINUS 4 CURIES/SEC OF HALOGENS UP THE STACK THROUGH AIR EJECTER. STEAM-LINE BREAK ESTIMATED ON DRESDEN-1 COOLANT ACTIVITY AND WATER CARRYOVER- HOT CLOUD BREAKS BUILDING WALLS AND RISES TO 164-4100 FT (DEPENDING ON WIND), WITH DOSES IN MILLIREM RANGE. LOSS OF COOLANT WITH 100 PERCENT MELTDOWN GIVES LESS THAN 0.5 REM OFF-SITE BECAUSE OF THE HALOGEN RETENTION IN WATER, CHARCOAL ABSORPTION, AND STACK RELEASE. EVERSR CHARCOAL FILTER HAS BEEN RETAINING ORGANIC HALOGENS WITH A FILTER EFFICIENCY OF 99.8-99.9 PERCENT AT RELATIVE HUMIDITY OF 10 TO 15 PERCENT.

*AIRBORNE RELEASE + *DOSE + *SAFEGUARDS REPORT, PRELIMINARY + ACCIDENT, CONTROL ROD DROP-OUT + FAILURE, FUEL ELEMENT + LOSS OF COOLANT + OPERATING EXPERIENCE + QUAD CITIES 1 + REACTOR, BOILING WATER + STEAM LINE RUPTURE

7-11678 WATSON GM + PEREZ RB + FONTANA MH

EFFECTS OF CONTAINMENT SYSTEM SIZE ON FISSION PRODUCT BEHAVIOR
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE
CONF-660904 +. 2 PAGES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

SIMPLE MATHEMATICAL MODELS TO AID IN THE DETERMINATION OF EFFECT OF CONTAINMENT SIZE ON PLATE-OUT BEHAVIOR OF IODINE HAVE BEEN POSTULATED. TWO GENERAL CLASSES OF SYSTEMS HAVE BEEN CONSIDERED, DEPENDING ON THE ABSENCE OR ON THE PRESENCE OF STEAM. IN THE ABSENCE OF STEAM THE PRINCIPAL ASSUMPTIONS MADE WERE - (1) HOMOGENEOUS MIXING, (2) BOUNDARY GAS LAYER ENVELOPING ALL SURFACES, (3) DIFFUSION THROUGH BOUNDARY LAYER TO BE THE RATE LIMITING PROCESS, (4) MOLECULAR IODINE PRESENT, METHYL IODIDE ABSENT. MATHEMATICAL RELATIONS IN TERMS OF MASS TRANSFER COEFFICIENTS AND SURFACE-TO-VOLUME RATIOS OF CONTAINERS AND SURFACE CHARACTERIZATION PARAMETERS WERE DEVELOPED FOR CASES WITH AND WITHOUT DESORPTION FROM PARTIALLY COVERED SURFACES. IN THE PRESENCE OF CONDENSING STEAM, THERE IS BULK FLOW OF STEAM TOWARD THE WALLS. IN SUCH CASES, IT WAS ASSUMED THAT DIFFUSIVE AND BULK FLOW COMPONENTS MAY BE APPROXIMATED BY THE BULK-FLOW COMPONENT ALONE, NEGLECTING THE DIFFUSIVE COMPONENT. FURTHERMORE, IT HAS BEEN ASSUMED THAT THE SOLUBILITY OF IODINE IN STEAM-CONDENSATE IS HIGH ENOUGH TO PERMIT THE IODINE AND THE STEAM TO CONDENSE TOGETHER WITH THE SAME COMPOSITION AS THE GAS PHASE. AS A RESULT OF THESE ASSUMPTIONS, MATHEMATICAL RELATIONS WERE DERIVED FOR THE CONCENTRATION OF IODINE AS A FUNCTION OF TIME IN TERMS OF THE SURFACE-TO-VOLUME RATIOS, CONDENSING STEAM FLUXES, AND STEAM CONCENTRATIONS.

*ANALYTICAL MODEL + *CONTAINMENT FILTERING SYSTEM + *DEPOSITION + *FISSION PRODUCT, IODINE + AIR CLEANING + CONTAINMENT, GENERAL + IODINE + MASS TRANSFER + ORGANIC IODIDE + STEAM + SURFACE TO VOLUME RATIO + WATER VAPOR

7-11679 MORRISON DL + GIESEKE JA + RITZMAN RL

ANALYTICAL DESCRIPTION OF THE DISTRIBUTION OF FISSION PRODUCTS DURING NUCLEAR REACTOR ACCIDENTS FOR WATER AND GAS COOLED REACTORS
BATTTELLE MEMORIAL INSTITUTE, COLUMBUS
CONF-660904 +. 25 PAGES, 7 FIGURES, 2 TABLES, 28 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-11679 *CONTINUED*
CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

A MATHEMATICAL MODEL WAS DEVELOPED TO DESCRIBE FISSION-PRODUCT RELEASE DURING WATER-REACTOR ACCIDENTS. THE INPUT PARAMETERS FOR THE EQUATIONS FOR THE RELEASE FROM THE FUEL WERE BASED UPON EXPERIMENTAL DATA, AND THE TEMPERATURE INPUT TO THE MODEL WAS SUPPLIED FROM AN INDEPENDENT HEAT-TRANSFER ANALYSIS. THE TRANSPORT AND DEPOSITION OF THE FISSION PRODUCTS IN THE CORE AND PRIMARY VESSEL WERE CALCULATED TO PROVIDE THE SOURCE TERM FOR THE TRANSPORT AND DEPOSITION ANALYSIS WITHIN THE CONTAINMENT VESSEL. TWO SIMPLE MODELS, TRANSPORT WITHIN A WELL-MIXED GAS OR DIFFUSION IN A STAGNANT GAS, WERE CONSIDERED FOR THIS REGION. AN ANALYTICAL DESCRIPTION OF THE TIME-SPACE DISTRIBUTION OF FISSION PRODUCTS IN AN ACCIDENT CAN BE OBTAINED BY THE PROPER COMBINATION OF THESE MATHEMATICAL MODELS.

*ACCIDENT MODEL + *ANALYTICAL MODEL + *FISSION PRODUCT RELEASE, GENERAL + *FISSION PRODUCT TRANSPORT + AEROSOL + AEROSOL PROPERTIES + AIR CLEANING + DEPOSITION + DIFFUSION + FISSION PRODUCT, VOLATILE + THERMAL ANALYSIS

7-11680 LAUBEN GN + LAPSON CL
CHARACTERIZATION OF SOURCE TERMS FOR AEROSOL TRANSPORT DURING SODIUM FIRES
ATOMIC INTERNATIONAL, CANOGA PARK
CONF-660904 +. 21 PAGES, 11 FIGURES, 1 TABLE, 7 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

THE PRODUCTION OF RADIOACTIVE AEROSOLS AS A RESULT OF AN ACCIDENTAL SPILL OF SODIUM COOLANT FROM A NUCLEAR REACTOR WAS STUDIED. POSSIBLE AEROSOLS FROM MOLTEN SODIUM POOLS INCLUDED THOSE OF CONDENSED SODIUM VAPOR, PARTICULATE SODIUM OXIDE, AND FISSION PRODUCTS COMBINED WITH OR SEPARATE FROM THE SODIUM. THE VAPORIZATION AND COMBUSTION OF SODIUM ARE DISCUSSED, AND RESULTS OF A TEST PROGRAM DESIGNED TO MEASURE BURNING RATE AND PARTICULATE RELEASE RATE ARE PRESENTED. THE BUOYANT FORCES IN THE GAS PROVIDE A MECHANISM FOR TRANSPORT OF PARTICULATES FROM THE SCENE OF THE SPILL, AND AN ANALYSIS OF THESE FORCES IS GIVEN.

*ACCIDENT MODEL + *AEROSOL PRODUCTION + *FIRE + *FISSION PRODUCT RELEASE, GENERAL + *FISSION PRODUCT TRANSPORT + *SODIUM + AEROSOL + AEROSOL PROPERTIES + AIR CLEANING + COOLANT CHEMISTRY

7-11681 DADILLON J
IN PILE STUDIES OF CONTAMINATION RELEASED IN CO₂ GAS COOLED REACTORS
COMMISSARIAT A L ENERGIE ATOMIQUE
CONF-660904 +. 9 PAGES, 4 FIGURES, 2 TABLES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

EXPERIMENTS WERE MADE, USING AN IN-PILE LOOP IN WHICH UO₂ FUEL ELEMENTS WITH CLADDING FAILURE WERE IRRADIATED. WE WERE ABLE TO SHOW THE FOLLOWING MAIN RESULTS - (1) THERE WERE AT LEAST TWO IODINE COMPOUNDS IN THE LOOP, WITH DIFFERENT BEHAVIOR IN CHARCOAL, (2) THE EFFICIENCY OF 5 CM OF CHARCOAL FOR THE COMPOUNDS OR THE FORMS THAT HAD NOT BEEN TRAPPED BY THE IMPREGNATED PAPER OR THE KNIT-MESH WAS ABOUT 99 PERCENT, (3) THE CHARCOAL-IMPREGNATED PAPER TRAPPED FROM 3 TO 13 PERCENT OF THE ACTIVITY, (4) ONLY ABOUT 1 PERCENT OF THE IODINE GENERALLY REMAINED IN THE KNIT-MESH.

*CARBON DIOXIDE + *COOLANT CHEMISTRY + *FAILURE, FUEL ELEMENT + *FISSION PRODUCT, IODINE + *IN PILE LOOP + AEROSOL + AIR CLEANING + CHARCOAL + FILTER, EFFICIENCY OF + FILTER, TRAP + ORGANIC IODIDE

7-11682 BURCHSTED CA
REQUIREMENTS FOR FIRE-RESISTANT HIGH-EFFICIENCY PARTICULATE AIR FILTERS
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE
CONF-660904 +. 12 PAGES, 20 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

THE ESTABLISHMENT OF CERTAIN BASIC SPECIFICATION REQUIREMENTS IS ESSENTIAL TO THE PROCUREMENT OF SUITABLE HIGH-EFFICIENCY PARTICULATE AIR FILTERS WITH A MINIMUM OF DIFFICULTIES AND COST. PROBLEMS HAVE BEEN EXPERIENCED IN THE MANUFACTURE AND PROCUREMENT OF THESE FILTERS BECAUSE OF INCONSISTENT, AMBIGUOUS, AND CONFLICTING SPECIFICATION REQUIREMENTS, AS WELL AS REQUIREMENTS THAT ARE NOT RESTRICTIVE ENOUGH. THE REQUIREMENTS FOR FILTERS PRESENTED IN THIS PAPER ARE INTENDED TO GUIDE THE SPECIFICATION WRITER TOWARD STANDARDS THAT WILL PRODUCE UNIFORMITY IN CONSTRUCTION AND TESTING PRACTICES TO BRING THE COST DOWN TO REASONABLE LEVELS WITHOUT SACRIFICING PERFORMANCE.

*FILTER COST + *FILTER TEST REQUIREMENT + *FILTER, GLASS + *FILTER, HIGH EFFICIENCY + FILTER DESIGN + FILTER QUALITY ASSURANCE STATION + FILTER SYSTEM + FILTER, COMMERCIAL + PARTICULATE

7-11683 ALLAN AR
SUGGESTIONS ON SPECIFICATION WRITING FOR ABSOLUTE FILTERS
FLANDERS FILTERS, INC., RIVERHEAD, NEW YORK
CONF-660904 +. 2 PAGES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

SOME RECENT SPECIFICATIONS FOR ABSOLUTE FILTERS HAVE BEEN ISSUED AND ARE UNNECESSARILY BURDENSOME TO THE FILTER MANUFACTURERS. THEY APPEAR TO HAVE BEEN WRITTEN WITHOUT A FULL KNOWLEDGE OF EITHER THE PRODUCT OR THE PROCEDURE BY WHICH THEY ARE CUSTOMARILY PURCHASED. WE RECOMMEND THAT ALL PROPOSED SPECIFICATIONS BE SUBMITTED FOR COMMENT TO THE MANUFACTURERS IN ORDER THAT THE SPECIFICATION WRITER MAY HAVE THE BENEFIT OF THE MANUFACTURERS OPINION.

*FILTER COST + *FILTER, GLASS + *FILTER, HIGH EFFICIENCY + AIR CLEANING + FILTER DESIGN +

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-11683 *CONTINUED*
FILTER, COMMERCIAL

7-11684 ANDERSON WL + ANDERSON T
EFFECT OF SHOCK OVERPRESSURES ON HIGH EFFICIENCY FILTER UNITS
NAVAL RESEARCH LABORATORY + U. S. NAVAL ORDNANCE LABORATORY
CONF-660904 +. 11 PAGES, 9 FIGURES, 5 TABLES, 3 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE,
BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

THE PRESENT NONCOMBUSTIBLE HIGH-EFFICIENCY FILTER UNITS HAVE AS GOOD A RESISTANCE TO BLAST OVERPRESSURES AS THOSE REPORTED EARLIER FOR THE COMBUSTIBLE UNITS. IT IS APPARENT THAT THE PHYSICAL DIMENSIONS OF THE FILTER UNIT ITSELF IS ONE OF THE CONTROLLING FACTORS IN RUPTURE DUE TO SHOCK WAVES. IN GENERAL, THE LONGER AND THINNER THE UNSUPPORTED SPAN OF FILTER MEDIA, THE LOWER THE SHOCK WAVE REQUIRED FOR FAILURE. THE SIMPLE ADDITION OF HARDWARE WIRE CLOTH FOR THE PREVENTION OF PHYSICAL DAMAGE SEEMS TO INCREASE MATERIALLY THE RESISTANCE TO SHOCK. IT IS BELIEVED THAT ADDITIONAL WORK ON RESILIENT ADHESIVES AND METHODS OF SUPPORT FOR THE CENTER AREAS OF THE LARGER FILTER UNITS WOULD RESULT IN A UNIT THAT WOULD BE MARKEDLY IMPROVED WITH RESPECT TO BLAST RESISTANCE.

*FILTER + *FILTER DESIGN + *FILTER, GLASS + *FILTER, HIGH EFFICIENCY + AIR CLEANING + EXPLOSION + FAILURE, COMPONENT + FILTER

7-11685 MURROW JL
EFFECT OF FIRE INTRUSION AND HEAT ON HEPA FILTER UNITS
LAWRENCE RADIATION LABORATORY, LIVERMORE
CONF-660904 +. 9 PAGES, 4 FIGURES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

SPECIAL EQUIPMENT WAS DEVELOPED FOR THE DYNAMIC TESTING OF 1000-CFM HIGH-EFFICIENCY PARTICULATE AIR FILTERS WITH RESPECT TO FIRE INTRUSION OR HIGH TEMPERATURE. USNRL-TYPE MECHANICAL DOP GENERATOR AND PHOTOMETER SYSTEMS WERE USED TO DETERMINE BEFORE-AND-AFTER FILTER EFFICIENCIES. THE DEGREE OF PROTECTION OF THE HEPA FILTER FROM FIRE IS ALMOST DIRECTLY RELATED TO THE HEAT-ABSORBING CAPACITY OF THE PREFILTER. THREE NEW SEALING MATERIALS SUCCESSFULLY PASSED HOT GAS TESTS. PARTICLE-BOARD TREATED FOR FIRE RETARDANCE BY THE PRESSURE-SOAK METHOD WAS ACCEPTED AS FRAMING MATERIAL. PARTICLE BOARD HAVING THE FIRE-RETARDANT MATERIAL MIXED IN BEFORE PRESSING ALSO SHOWS PROMISE AS FRAMING MATERIAL AND IS LESS EXPENSIVE THAN PARTICLE BOARD OR PLYWOOD TREATED BY SOAKING.

*FILTER DESIGN + *FILTER SAFETY EVALUATION + *FILTER, DAMAGED + *FILTER, GLASS + *FILTER, HIGH EFFICIENCY + *FIRE + AIR CLEANING + FILTER + FILTER INSTALLATION + FILTER SYSTEM + IGNITION

7-11686 ADLEY FE
PROGRESS REPORT, FACTORS INFLUENCING HIGH-EFFICIENCY GASKET LEAKAGE
HANFORD OCCUPATIONAL HEALTH FOUNDATION
CONF-660904 + HOHF-1 +. 40 PAGES, 25 FIGURES, 3 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

THIS REPORT IDENTIFIES FACTORS WHICH ADVERSELY INFLUENCE THE SEALING PROPERTY OF HIGH EFFICIENCY, PARTICULATE, AIR (HEPA) FILTER GASKETS. BECAUSE OF THE PAUCITY OF INFORMATION ON THE PERFORMANCE OF THESE GASKETS WITH RESPECT TO THE OVERALL FILTER OPERATION, THIS STUDY WAS CONDUCTED SO THAT A MORE DETAILED STUDY COULD BE MADE OF THE SIGNIFICANT FACTORS. THE FINDINGS OF THIS STUDY HAVE IDENTIFIED CERTAIN AREAS OF GASKET SEALING THAT WARRANT MORE EXTENSIVE EVALUATION. THE MORE IMPORTANT OF THESE ARE - (1) THE EFFECT OF AGING ON GASKET LEAKAGE OF INSTALLED FILTERS OVER EXTENDED PERIODS OF OPERATION, (2) THE EFFECT OF HIGH COMPRESSION ON GASKET MATERIALS AND THEIR SEALING QUALITIES, (3) THE IMPORTANCE OF GASKET SKIN IN VARIOUS CELLULAR ELASTOMERS, (4) ALTHOUGH RELATED INDIRECTLY TO GASKET SEALING, THE MAGNITUDE AND SOURCE OF FRAME LEAKAGE FOR VARIOUS TYPES OF FILTER FRAMES UNDER INSTALLATION STRESSES.

*FAILURE, COMPONENT + *FILTER MAINTENANCE + *FILTER SAFETY EVALUATION + *FILTER SYSTEM + *FILTER, HIGH EFFICIENCY + AIR CLEANING + FILTER + FILTER, DAMAGED

7-11687 HAHS CA
DEVELOPMENTS IN CONTAMINATED FILTER REMOVAL EQUIPMENT
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE
CONF-660904 +. 9 PAGES, 6 FIGURES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

EQUIPMENT USED TO FILTER GASES EXHAUSTED FROM A NUCLEAR FACILITY, AND THE METHODS BY WHICH THIS EQUIPMENT WILL BE REMOVED AND REPLACED, REQUIRE CAREFUL PLANNING. AT OAK RIDGE NATIONAL LABORATORY, ONE FILTER-REMOVAL CARRIER WAS DESIGNED TO REMOVE FILTERS FROM BOTH THE OLDER AND THE NEWER FILTER-PIT INSTALLATIONS AND TO PROVIDE GAMMA AND/OR NEUTRON SHIELDING DURING THIS OPERATION. OTHER DEVELOPMENTS IN REMOVAL PROCEDURES ARE EXEMPLIFIED BY THE METHODS USED TO REMOTELY REMOVE, TRANSPORT, AND DEPOSIT IN-CELL CANISTER FILTERS IN DISPOSABLE CASKS, AND BY THE METHODS USED TO SEAL GLOVE-BOX EXHAUST FILTERS IN THEIR OWN POLYETHYLENE TUBES BEFORE REMOVING THEM.

*FILTER DESIGN + *FILTER MAINTENANCE + *RADIOCHEMICAL PLANT SAFETY + AIR CLEANING + FILTER + FILTER + FILTER, HIGH EFFICIENCY + GLOVE BOX

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-11688 COLLINS DA + TAYLOR LR + TAYLOR P
THE DEVELOPMENT OF IMPREGNATED CHARCOALS FOR TRAPPING METHYL IODIDE AT HIGH HUMIDITY
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, WINDSCALE
CONF-660904 +. 26 PAGES, 10 FIGURES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS.,
SEPTEMBER 13-16, 1966, SOURCE

METHYL IODIDE CAN BE PRESENT IN RELEASES OF IODINE FROM IRRADIATED FUEL, AND AT HIGH HUMIDITY MOST ACTIVATED CHARCOALS WILL NOT PROVIDE EFFICIENT PERMANENT RETENTION OF METHYL IODIDE. IMPREGNATION OF ACTIVATED CHARCOAL WITH CERTAIN AMINES OR INORGANIC HALIDES HAS BEEN FOUND TO IMPROVE THE RETENTION OF METHYL IODIDE AT HIGH HUMIDITY. THE BEST RESULTS ARE GIVEN BY TRIETHYLENEDIAMINE OR POTASSIUM IODIDE SUPPORTED ON 207B CHARCOAL. THE BEHAVIOUR OF THESE TWO IMPREGNATED CHARCOALS HAS BEEN EXAMINED IN MORE DETAIL. THE PROPERTIES OF THE TWO RECOMMENDED IMPREGNANTS ARE TO SOME EXTENT COMPLEMENTARY. POTASSIUM IODIDE IS NOT SENSITIVE TO CARBON DIOXIDE AT HIGH TEMPERATURES, BUT WILL NOT ACCEPT AS HIGH A LOADING OF METHYL IODIDE AS TRIETHYLENEDIAMINE AND LOWERS THE IGNITION POINT OF THE CHARCOAL. TESTS OF LARGE-SCALE BEDS FILLED WITH IMPREGNATED CHARCOAL HAVE GIVEN SATISFACTORY RESULTS BUT RE-EMPHASIZE THE IMPORTANCE OF ELIMINATING MECHANICAL DEFECTS WHICH CAN LEAD TO BY-PASSING OF THE CHARCOAL.

*CHARCOAL + *FILTER, TRAP + *FISSION PRODUCT, IODINE + *ORGANIC IODIDE + *WATER VAPOR + AIR CLEANING +
FILTER + FILTER, EFFICIENCY OF + FISSION PRODUCT TRANSPORT + IODINE + UNITED KINGDOM

7-11689 ACKLEY RD + ADAMS RE + BROWNING WE
REMOVAL OF RADIOACTIVE METHYL IODIDE FROM STEAM-AIR SYSTEMS
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE
CONF-660904 +. 15 PAGES, 3 FIGURES, 5 TABLES, 4 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE,
BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

CERTAIN SPECIALLY IMPREGNATED CHARCOALS HAVE BEEN OBSERVED TO EFFECTIVELY TRAP RADIOACTIVE METHYL IODIDE, BY AN ISOTOPIC EXCHANGE MECHANISM, FROM AIR STREAMS OF FAIRLY HIGH RELATIVE HUMIDITY AT TEMPERATURES AS HIGH AS 115 F. IN THE EVENT OF A NUCLEAR REACTOR ACCIDENT, HOWEVER, THE METHYL IODIDE TRAPPING PROBLEM MAY BE COMPLICATED BY THE PRODUCTION OF STEAM, WITH ATTENDANT ELEVATION OF THE AIR TEMPERATURE. THE OBJECTIVE OF THIS WORK WAS TO OBTAIN APPLICABLE DATA UNDER THESE MORE SEVERE CONDITIONS. REMOVAL OF RADIOACTIVE METHYL IODIDE FROM FLOWING STEAM-AIR BY IMPREGNATED CHARCOALS WAS INVESTIGATED IN TWO SERIES OF TESTS. TEMPERATURES AND PRESSURES FOR ONE SERIES WERE AROUND 212 F AND 14.4 PSIA, AND, FOR THE OTHER SERIES, GENERALLY AROUND 280 F AND 60 PSIA. ACCORDING TO THE RESULTS, METHYL IODIDE CAN STILL BE TRAPPED EFFECTIVELY AT THESE HIGHER TEMPERATURES AND, ALSO, AT THE HIGHER PRESSURES BY AN APPROPRIATELY SELECTED IMPREGNATED CHARCOAL, PROVIDED THAT THE CHARCOAL HAS NOT BEEN DAMAGED AND PROVIDED THAT THE PREVAILING RELATIVE HUMIDITY IN THE CHARCOAL DOES NOT EXCEED 90 PERCENT.

*CHARCOAL + *FILTER, EFFICIENCY OF + *FILTER, TRAP + *FISSION PRODUCT, IODINE + *ORGANIC IODIDE +
*WATER VAPOR + AIR CLEANING + FILTER + FISSION PRODUCT TRANSPORT + IODINE

7-11690 ACKERMAN FJ + GRENS JZ
MECHANISMS THAT AFFECT THE ADSORPTION OF METHYL IODIDE ON CHARCOAL UNDER HUMID CONDITIONS
LAWRENCE RADIATION LABORATORY, LIVERMORE
UCRL-14990 + CONF-660904 +. 21 PAGES, 5 FIGURES, 1 TABLE, 20 REFERENCES, PRESENTED AT 9TH AEC AIR
CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

BREAKTHROUGH CURVES OF THE ADSORPTION OF METHYL IODIDE FROM AIR ON CHARCOAL WERE EXPERIMENTALLY MEASURED OVER THE RANGE OF 20 TO 100 PERCENT HUMIDITY. THE CURVES CAN BE EXPLAINED BY ASSUMING TWO RATE-CONTROLLING MECHANISMS FOR MASS TRANSFER. BULK DIFFUSION CONTROLLED THE ADSORPTION RATE DURING THE EARLY PERIOD, WHILE PORE DIFFUSION WAS CONTROLLED LATER IN THE ADSORPTION PROCESS. WATER VAPOR GREATLY LIMITS THE CAPACITY OF THE CHARCOAL FOR METHYL IODIDE. WATER VAPOR ALSO HINDERS THE RATE OF MASS TRANSFER BY PORE DIFFUSION.

*CHARCOAL + *FILTER, TRAP + *FISSION PRODUCT, IODINE + *ORGANIC IODIDE + *WATER VAPOR + AIR CLEANING +
FILTER + FILTER, EFFICIENCY OF + FISSION PRODUCT TRANSPORT + IODINE

7-11691 MILHAM RC
HIGH TEMPERATURE CARBON FOR IODINE ADSORPTION
SAVANNAH RIVER LABORATORY, AIKEN, SOUTH CAROLINA
DP-MS-66-45 + CONF-660904 +. 12 PAGES, 4 FIGURES, 3 TABLES, 9 REFERENCES, PRESENTED AT 9TH AEC AIR
CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

THE SAVANNAH RIVER LABORATORY IS STUDYING ADSORBERS FOR REDUCING THE PROBABILITY OF IGNITING EXISTING TYPES OF ACTIVATED COCONUT-SHELL CARBON IN SOME REACTOR CONFINEMENT SYSTEMS. A NEW HIGH-TEMPERATURE COCONUT-SHELL CARBON (IGNITION TEMPERATURE, ABOUT 530 C) HAS BEEN DEVELOPED BY AN AMERICAN MANUFACTURER, AND, IN PRELIMINARY TESTS, MEETS SPECIFICATIONS FOR THE SAVANNAH RIVER PLANT CONFINEMENT SYSTEM. A STANDARDIZED PROCEDURE HAS BEEN DEVELOPED TO MEASURE IGNITION TEMPERATURE, TO EVALUATE PROMISING NEW TYPES OF CARBON, AND TO EVALUATE EFFECTS OF VARIABLES (SUCH AS AIR FLOW, BED DEPTH, IMPREGNANTS, PLANT SERVICE, AND HUMIDITY) ON IGNITION TEMPERATURE. RESULTS OF THESE EVALUATIONS ARE REPORTED.

*CHARCOAL + *IGNITION + *IODINE + AIR CLEANING + CARBON + FILTER + FILTER, HIGH TEMPERATURE +
FILTER, TRAP + FIRE + FISSION PRODUCT TRANSPORT + OXIDATION + THERMAL PROPERTY

7-11692 BOGARDUS HF + DIETZ VR + STAMULIS A
A NONDESTRUCTIVE METHOD FOR DETERMINING THE RESIDUAL GAS LIFE OF CHARCOAL BEDS
U. S. NAVAL RESEARCH LABORATORY

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-11692 *CONTINUED*
CONF-660904 +. 5 PAGES, 4 FIGURES, 3 TABLES, 2 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

A NONDESTRUCTIVE METHOD WAS DEVELOPED FOR DETERMINING THE RESIDUAL GAS LIFE OF CHARCOAL BEDS USED TO REMOVE GASES FROM AIR STREAMS. IT MAKES USE OF THE FACT THAT A DIRECT RELATIONSHIP EXISTS BETWEEN THE MANNER IN WHICH CO₂ PENETRATES A CHARCOAL BED AND THE CAPACITY OF THAT BED FOR STRONGLY ADSORBED GASES. A PULSE OF CO₂ IS INTRODUCED UPSTREAM OF THE CHARCOAL BED, AND A VERY SENSITIVE INDICATOR-RECORDER SYSTEM IS USED TO SAMPLE THE DOWNSTREAM AIR AND TO TRACE THE SHAPE OF THE CO₂ PULSE AS IT EMERGES FROM THE CHARCOAL BED. THE PULSE SHAPE IS DIRECTLY RELATABLE TO THE RESIDUAL GAS LIFE OF THE BED.

*CARBON DIOXIDE + *CHARCOAL + *TEST, FILTER + *TEST, FILTER SYSTEM + AIR CLEANING + FILTER + FILTER MAINTENANCE + FILTER, BED + FILTER, TRAP

7-11693 VILES FJ + SILVERMAN L
REMOVAL OF IODINE AND METHYL IODIDE BY AEROSOL FORMATION WITH HYDRAZINES
HARVARD AIR CLEANING LABORATORY, BOSTON
CONF-660904 +. 14 PAGES, 11 FIGURES, 2 TABLES, 7 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

STUDIES WERE MADE OF THE GAS-PHASE REACTIONS OF IODINE AND METHYL IODIDE WITH HYDRAZINE TO FORM AEROSOLS THAT COULD BE EFFECTIVELY REMOVED BY FILTRATION OR BY SETTLING, DIFFUSIONAL, OR SOLUBILITY PROCESSES. HIGH AND LOW (REALISTIC) CONCENTRATIONS OF REACTANTS WERE USED, UNDER DYNAMIC AND STATIC CONDITIONS. REMOVAL OF METHYL IODIDE BY GAS-PHASE REACTION WITH LOW CONCENTRATIONS OF UNSYMMETRICAL DIMETHYL HYDRAZINE IS ALSO INCLUDED.

*CHARCOAL + *COOLANT CHEMISTRY + *IODINE + *ORGANIC IODIDE + AIR CLEANING + DECONTAMINATION SPRAY + FILTER + FISSION PRODUCT TRANSPORT + FISSION PRODUCT, IODINE

7-11694 MISHIMA J + SCHWENDIMAN LC + BURGER LL + HASTY RA
REMOVAL OF METHYL IODIDE FROM SIMULATED REACTOR CONTAINMENT ATMOSPHERES WITH HYDPAZINE
BATTELLE NORTHWEST, PACIFIC NORTHWEST LABORATORY, RICHLAND
CONF-660904 +. 19 PAGES, 6 FIGURES, TABLES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

THE REACTION OF HYDRAZINE AND METHYL IODIDE IS UNDER STUDY TO DETERMINE THE FEASIBILITY OF USING HYDRAZINE IN REACTOR SPRAY SYSTEMS TO REMOVE ORGANIC AND MOLECULAR FORMS OF RADIOACTIVE IODINE. RATE STUDIES SHOWED THAT THE STATIC REMOVAL OF METHYL IODIDE FROM THE VAPOR PHASE OVER A 50 PERCENT HYDRAZINE SOLUTION PROCEEDS WITH A HALF-LIFE OF ABOUT 6 MIN AT 50 C. REACTION RATE AND/OR RATE OF TRANSFER TO THE SOLUTION VARIES WITH AIRBORNE METHYL IODIDE CONCENTRATION, LIQUID HYDRAZINE CONCENTRATION, AND THE AVAILABLE LIQUID SURFACE AREA. SPRAYING 35 PERCENT HYDRAZINE SOLUTIONS THROUGH AIR CONTAINING METHYL IODIDE AT ROOM TEMPERATURE AND AT 75 C EFFECTIVELY SCAVENGED METHYL IODIDE EVEN IN THE PRESENCE OF 50 MG OF MOLECULAR IODINE PER CU. METER.

AIR CLEANING + CHARCOAL + COOLANT CHEMISTRY + DECONTAMINATION SPRAY + FILTER + FISSION PRODUCT TRANSPORT + FISSION PRODUCT, IODINE + IODINE + ORGANIC IODIDE

7-11695 PARKER GW + CREEK CE + FERRELLI A
RETENTION OF METHYL IODIDE BY IMPREGNATED CARBONS UNDER AMBIENT CONDITIONS
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE
CONF-660904 +. 27 PAGES, 10 FIGURES, 6 TABLES, 4 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

THE EXTENT OF THE PRODUCTION OF METHYL IODIDE AND THE CONTAINMENT OF THIS FORM OF RADIOIODINE HAVE BECOME TWO OF THE MOST IMPORTANT FACTORS THAT MUST BE CONSIDERED IN THE PREPARATION OF REACTOR-SAFEGUARDS ANALYSES. VARIOUS ESTIMATORS OF THE AMOUNT AND MODE OF FORMATION OF METHYL IODIDE HAVE GENERALLY CONCLUDED THAT LESS THAN 5 PERCENT OF THE IODINE SHOULD BE PRESENT IN THIS FORM, HOWEVER, EVEN THIS AMOUNT LEADS TO SERIOUS IMPLICATIONS BECAUSE CONVENTIONAL CARBON-FILTER SYSTEMS ARE RELATIVELY INEFFECTIVE IN TRAPPING THIS COMPOUND. SIGNIFICANT ADVANCES IN METHODS OF TRAPPING METHYL IODIDE HAVE BEEN DISCOVERED INDEPENDENTLY IN THE U. S. AND IN ENGLAND. VERY PROMISING RESULTS FROM THE TESTING OF VARIOUS CHEMICAL ADDITIVES TO COCONUT CHARCOALS WERE OBTAINED. AN ISOTOPIC EXCHANGE REACTION APPARENTLY OCCURS WHEN THE ADDITIVE IS NATURAL MOLECULAR IODINE, AND A COMPOUND IS FORMED WHEN THE ADDITIVE IS AN ORGANIC AMINE. THE MECHANISM RESPONSIBLE FOR IMPROVED RETENTION WHEN THE ADDITIVE IS AN IODIDE SALT IS NOT CLEAR AT PRESENT. UNDER FAVORABLE CONDITIONS, VERY HIGH RETENTION EFFICIENCIES ARE OBTAINED WITH HIGH AIR VELOCITIES AND RELATIVELY SHALLOW BEDS. THE LOWER EFFICIENCY OBSERVED WHEN THE CARRIER GAS IS VERY HUMID IS A RELATIVELY MINOR PROBLEM THAT CAN BE EASILY CIRCUMVENTED BY AN INCREASE IN BED DEPTH. FOR MOST CONDITIONS, AN ATTENUATION FACTOR OF FROM 5 TO 10 PER CENTIMETER OF BED DEPTH CAN BE EXPECTED.

*CHARCOAL + *FILTER, EFFICIENCY OF + *FILTER, TRAP + *FISSION PRODUCT, IODINE + *ORGANIC IODIDE + *WATER VAPOR + AIR CLEANING + FILTER + FISSION PRODUCT TRANSPORT + IODINE

7-11696 DURANT WS
PERFORMANCE OF AIRBORNE ACTIVITY CONFINEMENT SYSTEMS IN SAVANNAH RIVER PLANT REACTOR BUILDINGS
SAVANNAH RIVER LABORATORY, Aiken, S. C.
CONF-660904 + DP-MS-66-52 +. 21 PAGES, 6 FIGURES, 1 TABLE, 21 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

A FILTRATION-ADSORPTION SYSTEM IS INSTALLED IN THE VENTILATION EXHAUST OF EACH REACTOR

ACCESSION NUMBER 7-11692 TO 7-11696

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-11696 *CONTINUED*

BUILDING AT THE SAVANNAH RIVER PLANT TO CONFINE AIRBORNE IODINE PARTICLES AND VAPOR THAT MIGHT BE RELEASED IN THE HIGHLY UNLIKELY EVENT OF A REACTOR ACCIDENT. AIR FROM THE PROCESS AREAS OF EACH BUILDING IS PASSED CONTINUOUSLY THROUGH MOISTURE SEPARATORS, THEN THROUGH PARTICULATE FILTERS, AND FINALLY THROUGH IODINE ADSORBER BEDS OF ACTIVATED CARBON. THE UNITS HAVE THE DEMONSTRATED ABILITY TO COLLECT OVER 99 PERCENT OF AIRBORNE PARTICULATE ACTIVITY AND OVER 99.9 PERCENT OF AIRBORNE HALOGEN ACTIVITY UNDER EMERGENCY CONDITIONS. A CONTINUING PROGRAM OF DEVELOPMENT, TESTING, AND MAINTENANCE ENSURES THAT THESE HIGH EFFICIENCIES WILL BE MAINTAINED DURING OPERATION. EXPERIENCE HAS BEEN SATISFACTORY FOR MORE THAN 3 YEARS OF OPERATION.

*CONTAINMENT FILTERING SYSTEM + *CONTAINMENT SYSTEM, OPERATION OF + *FILTER DESIGN + *SAVANNAH RIVER PLANT + *WATER VAPOR + AIR CLEANING + CONTAINMENT AIR COOLING + ENGINEERED SAFEGUARD + FILTER + FILTER INSTALLATION + FILTER OPERATION + FILTER SYSTEM

7-11697 FIRST MW + SILVERMAN L + PENDER D + DAWSON S
FLOATING ROOF CONTAINMENT VESSELS
HARVARD UNIVERSITY, BOSTON

CONF-660904 +. 18 PAGES, 5 FIGURES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

THE PURPOSE OF THIS INVESTIGATION WAS TO DEVELOP MECHANISMS FOR, AND TO STUDY THE PERFORMANCE CHARACTERISTICS OF, A FLOATING-ROOF REACTOR AND OFF-GAS CONTAINMENT VESSEL. THE PRESSURE SURGE FOLLOWING A MAJOR COOLANT LINE RUPTURE WOULD BE ABSORBED AND SUPPRESSED BY MOVEMENT OF A LEAK-TIGHT MOVABLE ROOF. ACTIVATION OF COOLING-WATER SPRAYS AFTER THE ACCIDENT WOULD CONDENSE STEAM AND PERMIT THE ROOF TO FALL SLOWLY TO ITS NORMAL POSITION. THE ADVANTAGES OF THIS SCHEME ARE - (1) IN THE EVENT OF A MAXIMUM CREDIBLE ACCIDENT, THE ROOF WOULD RISE IN RESPONSE TO THE APPLIED PRESSURE, PREVENTING THE SHELL FROM BEING SUBJECTED TO STRESSES IN EXCESS OF A FRACTION OF A POUND PER SQUARE INCH. AS RECOVERY MEASURES TOOK EFFECT, THE FLOATING ROOF WOULD SETTLE AND RETURN TO ITS ORIGINAL POSITION WHEN THE PRESSURE INSIDE THE CONTAINMENT VESSEL RETURNED TO NORMAL. (2) AS THE PRESSURE OF THE STATIONARY PARTS OF THE CONTAINMENT SHELL WOULD NOT EXCEED 0.25 PSI, IT MIGHT BE POSSIBLE TO LIGHTEN AND SIMPLIFY THE STRUCTURE AND THEREBY EFFECT SUBSTANTIAL SAVINGS WHILE MAINTAINING AN EQUAL DEGREE OF SAFETY.

*CONTAINMENT DESIGN + *CONTAINMENT LEAKAGE CONTROL + *CONTAINMENT RESEARCH AND DEVELOPMENT + *CONTAINMENT SPRAY + *CONTAINMENT STRUCTURE + *CONTAINMENT, SHOCK GENERATION AND PROTECTION + AIR CLEANING + CONTAINMENT CONSTRUCTION + CONTAINMENT, PRESSURE VESSEL

7-11698 SMITH ML

CONFINEMENT SYSTEMS TESTS PERFORMED DURING DEACTIVATION OF THE LOG-F REACTOR
DOUGLAS UNITED NUCLEAR, INC., RICHLAND

CONF-660904 + DUN-SA-15 +. 30 PAGES, 18 FIGURES, 5 TABLES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

PERMANENT SHUTDOWN OF THE 100-F PLUTONIUM PRODUCTION REACTOR AT HANFORD MADE THE SYSTEM FOR CONFINING THE PARTICLES AND HALOGEN IN THE EXHAUST AIR AVAILABLE FOR TESTING. THE FOLLOWING TESTS WERE PERFORMED, AND THE RESULTS ARE GIVEN THROUGHOUT THE TEXT - IODINE DEPOSITION FROM THE AIRSTREAM, IODINE REMOVED FROM AIRSTREAM BY FOG SPRAY, ENCAPSULATION OF THE REACTOR EXHAUST AIR IN FOAM, EFFECTIVENESS OF FOG SPRAY FOR REMOVING NOBLE GASES FROM THE AIR, EFFECTIVENESS OF THE FILTER SYSTEM FOR REMOVING IODINE FROM THE EXHAUST AIR. ABOUT 100 CURIES OF I-128 WAS RELEASED INTO THE DISCHARGE-AREA SUPPLY AIR WITH THE FOG SPRAY OPERATING. THE SPRAY REDUCED THE CONCENTRATION IN THE AIR EXHAUSTED FROM THE DISCHARGE AREA BY A FACTOR OF 500. ABOUT 10 CURIES OF KR-85 WAS RELEASED INTO THE EXHAUST AIR. THE DOSE WAS MEASURED UP AND DOWN STREAM OF A FOG SPRAY INSTALLED IN THE DUCT. NINETY-FIVE PERCENT OF THE KR-85 WAS STILL IN THE EXHAUST AIR AFTER IT PASSED THROUGH THE FOG SPRAY. THE EXPOSURE OF THE AIR TO THE FOG WAS LESS THAN 3 SECONDS.

*DECONTAMINATION SPRAY + *FILTER SYSTEM + *FISSION PRODUCT, IODINE + *FOAM + *FOG + *NOBLE GAS + AIR CLEANING + CONTAINMENT, GENERAL + DECONTAMINATION + DEPOSITION + FISSION PRODUCT TRANSPORT + SPRAY, GENERAL

7-11699 COLLINS RD + HILLARY JJ + TAYLOR JC
AIR CLEANING FOR REACTORS WITH VENTED CONTAINMENT

UNITED KINGDOM ATOMIC ENERGY AUTHORITY, WINDSCALE

CONF-660904 +. 36 PAGES, 11 FIGURES, 6 TABLES, 9 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

A PROGRAMME OF EXPERIMENTAL WORK HAS BEEN CARRIED OUT UNDER CONDITIONS APPROPRIATE TO POSSIBLE DEPRESSURIZATION-TYPE ACCIDENTS TO THE STEAM GENERATING HEAVY WATER REACTOR (SGHW) AT WINFRITH HEATH WHICH HAS VENTED CONTAINMENT. THE WORK HAS INCLUDED SMALL-SCALE EXPERIMENTS IN GLASS OR SILICA APPARATUS IN WHICH MEASUREMENTS HAVE BEEN MADE OF THE EXTENT AND FORM OF THE IODINE RELEASE FROM ZIRCALOY-CLAD UO₂ INTO STEAM UNDER MELTING CONDITIONS AND AT ABOUT 1000 C. A NUMBER OF TESTS HAVE BEEN CONDUCTED WITH SIMULATED FORMS OF IODINE ON TWO LARGE-SCALE STEEL MODELS OF THE REACTOR WATER-LUTE STEAM SUPPRESSION SYSTEM. TESTS HAVE ALSO BEEN CARRIED OUT ON 1000-CFM FILTER UNITS TO DEVELOP DROPLET DISENTRAINMENT DEVICES. WORK ON THE DEVELOPMENT OF CHARCOALS TO DEAL WITH PENETRATING IODINE (METHYL IODIDE) UNDER WET CONDITIONS IS REPORTED SEPARATELY. THE RESULTS OF THIS WORK SHOW THAT - (A) AN EFFECTIVE TRAPPING PLANT CAN BE SPECIFIED TO DEAL WITH FISSION PRODUCT IODINE IN WET ATMOSPHERES. (B) AT LEAST UP TO 1000 MW/D/TE U FUEL BURN-UP, A CAN-RETENTION FACTOR OF 10 APPLIES FOR IODINE EXPECTED TO BE FREE WITHIN THE CAN, ALSO THAT PASSAGE THROUGH A WATER LUTE IS LIKELY TO REDUCE THE IODINE RELEASE BY A FURTHER FACTOR OF 10.

*CHARCOAL + *CONTAINMENT DESIGN + *CONTAINMENT, PRESSURE VENTING + *FISSION PRODUCT, IODINE + *ORGANIC IODIDE + *WATER VAPOR + AIR CLEANING + CONTAINMENT FILTERING SYSTEM +

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-11699 *CONTINUED*

CONTAINMENT RESEARCH AND DEVELOPMENT + CONTAINMENT, PRESSURE RELIEF + CONTAINMENT, PRESSURE SUPPRESSION + CONTAINMENT, WATER FILLED

7-11700 PARKER GW + CREEK GE + MARTIN WJ + PARSLY LF
EFFECTS OF CONTAINMENT SYSTEM SIZE ON FISSION PRODUCT BEHAVIOR
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE

CONF-660904 +. 13 PAGES, 2 FIGURES, 3 TABLES, 10 REFERENCES, PRESENTED AT 9TH AEC AIR CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

DATA ON IODINE DEPOSITION IN THE CMF (CONTAINMENT MOCKUP FACILITY), THE CRI (CONTAINMENT RESEARCH INSTALLATION), AND NSPP (NUCLEAR SAFETY PILOT PLANT) WERE EXAMINED TO TRY TO CORRELATE THE RESULTS WITH THE SIZE OF THE CONTAINMENT TANKS INVOLVED, AND AN EQUATION WAS DEVELOPED THAT ADEQUATELY CORRELATES THE DEPOSITION RATES DURING THE INITIAL OR REACTIVE PHASE OF THE DEPOSITION PROCESS. PUBLISHED DATA, AND INFORMATION OBTAINED AT THIS LABORATORY ON THE PRODUCTION OF METHYL IODIDE IN REACTOR-SAFETY EXPERIMENTS, WERE COMPILED TO ASSESS THE IMPORTANCE OF THIS FORM OF RADIOIODINE. IT APPEARS THAT A ROUGH CORRELATION CAN BE MADE BETWEEN FRACTION OF IODINE CONVERTED TO METHYL IODIDE, THE CONTAINMENT-VESSEL SIZE, AND THE RESIDENCE TIME OF IODINE IN THE VESSEL. IN NEARLY ALL CASES, THE AMOUNT OF AIRBORNE IODINE FOUND AS METHYL IODIDE WAS 1 PERCENT OR LESS.

*CONTAINMENT FILTERING SYSTEM + *CONTAINMENT RESEARCH AND DEVELOPMENT + *FISSION PRODUCT RELEASE, GENERAL + *FISSION PRODUCT, IODINE + *ORGANIC IODIDE + AEROSOL + AIR CLEANING + CONTAINMENT ANALYSIS + CONTAINMENT DESIGN + DEPOSITION

7-11701 ACKERMAN J + BUNDRICK R + COWLES J + DUVAL V + GRENS J + HOLZMAN R + HANNON C + HARRAR J + MORRIS C + RIGDON L + HECKMAN R + SNOEBERGER D

VENT GAS TREATMENT PLANT
LAWRENCE RADIATION LABORATORY, LIVERMORE

VUF-3016 + CONF-660904 +. 14 PAGES, 2 FIGURES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

AS PART OF THE VELA UNIFORM PROGRAM, PROJECT DRIBBLE WAS CONCERNED WITH THE MEASUREMENT OF SEISMIC SIGNALS GENERATED BY A NUCLEAR DETONATION IN A SALT DOME. THE VENT-GAS TREATMENT FACILITY MUST REMOVE RADIOIODINE AND RADIOACTIVE NOBLE GASES TO ELIMINATE ANY POSSIBLE PUBLIC SAFETY PROBLEMS. THE PROBLEM WAS TO RELEASE AT A CONTROLLED AND SAFE RATE APPROXIMATELY 560,000 CU. FT. OF GAS INITIALLY AT A PRESSURE OF 10 PSI OR LESS. THE FACILITY IS A REMOTELY OPERATED GAS SCRUBBING AND FILTERING SYSTEM WITH CHARCOAL ADSORPTION UNITS INCORPORATED WITH THE FILTERS. IT IS SIZED TO TAKE UP TO 200 CFM OF CAVITY GAS MIXED WITH 2000 CFM OF AIR TO DILUTE HYDROGEN. EFFLUENT GAS IS DISCHARGED FROM A 150 FT STACK AFTER MIXING WITH 20,000 CFM OF ADDITIONAL AIR. LIQUID WASTES FROM THE SCRUBBERS ARE STORED IN FOUR 25,000-GAL TANKS FOR LATER DISPOSAL. FROM THE MEASURED PERFORMANCE OF THE CHARCOAL SCRUBBERS, WE BELIEVE MUCH OF THE RADIOIODINE RELEASED WAS PRESENT AS ORGANIC COMPOUNDS, POSSIBLY CH₃I. BASIC STUDIES OF THE CHEMICAL NATURE OF AN UNDERGROUND NUCLEAR EXPLOSION ARE UNDERWAY.

*CONTAINMENT, GENERAL + *CONTAINMENT, SHOCK GENERATION AND PROTECTION + *FILTER DESIGN + *FILTER INSTALLATION + AIR CLEANING + CONTAINMENT FILTERING SYSTEM + CONTAINMENT SYSTEM, OPERATION OF + CONTAINMENT, PRESSURE VENTING

7-11705 REIST PC

SIZE DISTRIBUTION SAMPLING ERRORS INTRODUCED BY THE POINT-PLANE ELECTROSTATIC PRECIPITATOR SAMPLING DEVICE
HARVARD UNIVERSITY

CONF-660904 +. 12 PAGES, 3 FIGURES, 3 TABLES, 10 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

IN USING THE POINT-PLANE ELECTROSTATIC PRECIPITATOR IT IS GENERALLY ASSUMED THAT THE SIZE DISTRIBUTION OF THE SAMPLE COLLECTED REPRESENTS REASONABLY WELL THE ACTUAL PARTICLE-SIZE DISTRIBUTION OF THE TEST AEROSOL. THIS PAPER REPORTS AN INVESTIGATION MADE TO DETERMINE THE MAGNITUDE OF THIS SAMPLING ERROR.

*ELECTROSTATIC PRECIPITATION + *PARTICLE SIZE + *PARTICLE SIZE DISTRIBUTION + *SAMPLING + AIR CLEANING + FILTER, EFFICIENCY OF + FILTER, ELECTROSTATIC

7-11706 SPIEGLER P + MORGAN JG + GREENFIELD MA + KOONTZ RL
EVALUATION OF THE EQUATION THAT GOVERNS THE COAGULATION OF AN AEROSOL
ATOMICS INTERNATIONAL, CANOGA PARK

CONF-660904 +. 21 PAGES, 13 FIGURES, 14 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

AN IBM 7094 DIGITAL COMPUTER WAS USED IN SOLVING THE EQUATION THAT DESCRIBED IN TIME THE BEHAVIOR OF AN AEROSOL. THE TOPICS INVESTIGATED INCLUDE COAGULATION OF A HETEROGENEOUS AEROSOL, COAGULATION COUPLED WITH STIRRED SETTLING, AND AN EXTERNAL SOURCE THAT CONTINUOUSLY GENERATES NEW PARTICLES. IN SOME INSTANCES, APPROXIMATIONS TO THE CODE RESULTS MAY BE OBTAINED, PROVIDED THAT SIMPLIFYING ASSUMPTIONS ARE MADE. THE RESULTS INDICATE THAT THE AEROSOL CONCENTRATION IS A MORE IMPORTANT FACTOR THAN THE INITIAL PARTICLE SPECTRUM. ONE OF THE STRIKING FACTS TO EMERGE FROM EVEN THE LIMITED NUMBER OF PROBLEMS WORKED BY THE CODE IS THE RAPID DISAPPEARANCE OF SMALL PARTICLES, PROVIDED THAT THE INITIAL CONCENTRATION IS HIGH ENOUGH.

*AEROSOL PROPERTIES + *ANALYTICAL MODEL + *PARTICLE SIZE + *PARTICLE SIZE DISTRIBUTION + *THEORETICAL INVESTIGATION + AEROSOL + AIR CLEANING + COMPUTER PROGRAM

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-11707 DAWSON SV
MECHANICS OF COLLECTION OF PARTICLES BY INERTIA AND INTERCEPTION IN A FIBROUS AIR FILTER
HARVARD UNIVERSITY
CONF-660904 +. 11 PAGES, 7 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS.,
SEPTEMBER 13-16, 1966, SOURCE

AN APPROXIMATE EXPRESSION WAS DEVELOPED FOR THE EFFICIENCY OF COLLECTION OF PARTICLES BY SMALL INERTIAL FORCE AND BY DIRECT INTERCEPTION FROM AN AIR STREAM AROUND A CIRCULAR CYLINDER. THE FIELD USED TO DESCRIBE THE FLUID FLOW IS IN AGREEMENT WITH THE LAW OF D'ARCY FOR PRESSURE DROP THROUGH AN ARRAY OF CYLINDERS. THE USUAL METHOD OF CALCULATION, BASED ON THE LOCATION OF A GRAZING TRAJECTORY OF A SPHERICAL PARTICLE, IS USED EXCEPT THAT THE EQUATIONS OF MOTION ARE MANIPULATED TO FACILITATE AN ANALYTIC APPROXIMATION VALID FOR SMALL VALUES OF THE IMPACTION AND INTERCEPTION PARAMETERS. COMPARISON OF THE PREDICTED EFFICIENCY WITH VALUES GIVEN IN AN EXPERIMENTAL REPORT IS INCONCLUSIVE IN ASSESSING THE VALIDITY OF THE PREDICTION. PERTINENT EXPERIMENTAL VARIABLES ARE - (1) A HOMOGENEOUS AEROSOL SHOULD BE USED. IT SHOULD BE CHARACTERIZED NOT ONLY BY MEAN DIAMETER BUT ALSO BY STANDARD DEVIATION. (2) THE FILTER SHOULD BE UNIFORM AND WITH KNOWN POROSITY AND DARCY COEFFICIENT. THE FLOW THROUGH THE FILTER SHOULD BE UNIFORM.

*AEROSOL PROPERTIES + *ANALYTICAL MODEL + *PARTICLE SIZE + *PARTICLE SIZE DISTRIBUTION +
*THEORETICAL INVESTIGATION + AEROSOL + AIR CLEANING + FILTER + FILTER THEORY, DIFFUSION +
FILTER THEORY, IMPACTION + FILTER THEORY, INTERCEPTION

7-11708 BILLINGS CE
EFFECTS OF PARTICLE ACCUMULATION ON AEROSOL FILTER LIFE
CALIFORNIA INSTITUTE OF TECHNOLOGY, PASADENA
CONF-660904 +. 21 PAGES, 5 FIGURES, 2 TABLES, 23 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING
CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

THE ACCUMULATION OF DEPOSITED MATERIAL DURING FIBER FILTRATION OF SOLID AEROSOL PARTICLES CAUSES A DECREASE IN FILTER PENETRATION AND INCREASE IN FILTER RESISTANCE. THE OPERATING CHARACTERISTICS OF A FIBROUS FILTER ARE SHOWN TO BE FUNCTIONS OF THIS ACCUMULATION. TEST DATA ARE PRESENTED FOR THE EFFECTS ON PERFORMANCE OF 1.3-MICRON POLYSTYRENE PARTICLES COLLECTED IN 10-MICRON CLASS-FIBER FILTER MATS. IN GENERAL, FILTER EFFICIENCY IS ADEQUATE FOR THE DESIGNATED TASK AT THE START OF FILTRATION, AND AN INCREASE IN FILTER EFFICIENCY AS A RESULT OF ACCUMULATION IS OF NO CONSEQUENCE. FOR HIGH-EFFICIENCY FILTERS, A TWO-FOLD INCREASE IN THE SIZE OF THE INITIAL INSTALLATION OF A FILTER SYSTEM SHOULD PRODUCE APPROXIMATELY A FOUR-FOLD INCREASE IN FILTER LIFE. THE RELATIVE COST OF INCREASING THE SIZE OF A FILTER SYSTEM AS OPPOSED TO MORE FREQUENT FILTER CHANGES DEPENDS UPON CAPITAL CHARGES AND OTHER CONSIDERATIONS UNIQUE TO A GIVEN SYSTEM. IT SHOULD BE POSSIBLE TO OPTIMIZE SYSTEM DESIGN VELOCITY WITH THE INFORMATION RESULTING FROM THIS STUDY. THE EFFECT OF VELOCITY ON FILTER EFFICIENCY HAS BEEN WELL ESTABLISHED.

*FILTER LIFE + *FILTER, EFFICIENCY OF + AEROSOL + AIR CLEANING + FILTER MAINTENANCE + FILTER, FIBER +
FILTER, HIGH EFFICIENCY + OPERATING EXPERIENCE

7-11709 SILVERMAN MD + TRUITT J + BROWNING WE + FRANZEN LF + ADAMS RE
CHARACTERIZATION OF RADIOACTIVE PARTICULATE AEROSOLS BY THE FIBROUS FILTER ANALYZER
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE
CONF-660904 +. 21 PAGES, 7 FIGURES, 3 TABLES, 18 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING
CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

THE FIBROUS FILTER ANALYZER (FFA) WAS DEVELOPED FOR MEASURING THE CHARACTERISTICS OF RADIOACTIVE AEROSOLS IN TERMS OF THEIR RESPONSE TO FILTRATION BY DETERMINING THEIR DISTRIBUTION VS DEPTH IN A FILTER UNDER CAREFULLY CONTROLLED CONDITIONS. MOISTURE HAD NO SIGNIFICANT EFFECT ON THE PERFORMANCE OF THE FFA, ALTHOUGH THE AEROSOL ITSELF WAS AFFECTED BY MOISTURE. THE EFFICIENCY DATA AGREED WELL WITH THE THEORETICAL TREATMENT OF FILTRATION DEVELOPED BY TORGESON. THE ANALYZER WAS CALIBRATED WITH PARTICLES HAVING DIAMETERS FROM 150 TO 1500 ANGSTROMS, MEASURED BY ELECTRON MICROSCOPY.

*ANALYTICAL TECHNIQUE, AIR + *ANALYTICAL TECHNIQUE, CALIBRATION + *FILTER THEORY, DIFFUSION +
*FILTER THEORY, IMPACTION + *FILTER THEORY, INTERCEPTION + *FILTER, FIBER + *PARTICLE SIZE DISTRIBUTION +
AEROSOL + AIR CLEANING + FILTER + FILTER EFFICIENCY + FILTER, HIGH EFFICIENCY

7-11710 HARSTAD JB + DECKER HM + BUCHANAN LM + FILLER ME
PENETRATION OF SUBMICRON T1 BACTERIOPHAGE AEROSOLS AND BACTERIAL AEROSOLS THROUGH COMMERCIAL AIR FILTERS
U. S. ARMY BIOLOGICAL CENTER, FT. DETRICK, MD.
CONF-660904 +. 12 PAGES, 5 FIGURES, 1 TABLE, 10 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE,
BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

A NEW METHOD IS DESCRIBED FOR EVALUATING FILTERS FOR THE REMOVAL OF SUBMICRON PARTICLES FROM AIR. THE METHOD IS UNIQUE IN THAT THE AEROSOLS USED TO TEST THE FILTERS WERE VIABLE, OF A HIGH CONCENTRATION, AND COMPOSED ENTIRELY OF SUBMICRON PARTICLES. THEY WERE PRODUCED WITH A DOUTREBANDE AEROSOL GENERATOR FROM CONCENTRATED AQUEOUS SUSPENSIONS OF A HIGHLY PURIFIED T1 BACTERIOPHAGE. TESTS WERE CONDUCTED TO COMPARE THE EFFECTIVENESS OF SEVERAL ULTRAHIGH-EFFICIENCY AIR FILTERS IN REMOVING T1 PHAGE AEROSOLS AND BACTERIAL AEROSOLS OF BACILLUS SUBTILIS (VARIETY NIGER) SPORES. THE T1 PHAGE AEROSOLS HAD A NUMBER MEDIAN DIAMETER (NMD) OF 0.1 MICRON. THE BACTERIAL AEROSOLS WERE COMPOSED MAINLY OF SINGLE SPORES AND HAD AN NMD OF 1 MICRON. THE FILTERS EXHIBITED A HIGH REMOVAL OF SUBMICRON PARTICLES BUT, AS EXPECTED, WERE MORE EFFECTIVE AGAINST THE LARGER PARTICLES OF BACTERIA. SUBMICRON AEROSOL PENETRATION AVERAGED 0.003 PERCENT. THE COMPARABLE VALUE FOR BACTERIAL AEROSOLS WAS 0.0004. ARCHITECTS, ENGINEERS, AND RESEARCH INVESTIGATORS CONCERNED WITH THE CONTROL OF SUBMICRON PARTICLES MIGHT CONSIDER FILTRATION RATHER THAN OTHER WAYS OF AIR CLEANING.

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-11710 *CONTINUED*

*AEROSOL, BIOLOGICAL + *ANALYTICAL TECHNIQUE, AIR + *PARTICLE SIZE + AEPOSOL + AEROSOL PROPERTIES +
AIR CLEANING + ANALYTICAL TECHNIQUE, CALIBRATION + FILTER, EFFICIENCY OF + TEST, FILTER + TRACER, GENERAL

7-11711 ADAMS RE + GILL JS + YUILLE WD + BROWNING WE + PARSLY LF + GUTHRIE CE
PERFORMANCE OF FILTER SYSTEMS UNDER ACCIDENT CONDITIONS

OAK RIDGE NATIONAL LABORATORY

CONF-660904 +. 24 PAGES, 14 FIGURES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS.,
SEPTEMBER 13-16, 1966, SOURCE

THE EFFECT OF ACCIDENT ENVIRONMENTS ON THE PERFORMANCE OF FILTER SYSTEMS IS BEING STUDIED ON BOTH A LABORATORY AND A PILOT-PLANT SCALE. IN THE LABORATORY THE WORK HAS INCLUDED THE DEVELOPMENT OF A SIMPLE METHOD FOR GENERATING A SIMULANT AEROSOL, TESTS OF THESE AEROSOLS TO DETERMINE THEIR VALIDITY AS SIMULANTS, AND MEASUREMENTS, UNDER VARIOUS ATMOSPHERES, OF THE EFFICIENCY OF HIGH-EFFICIENCY FILTER MEDIA FOR REMOVING THESE AEROSOLS. MOISTURE HAS BEEN NOTED TO HAVE A SIGNIFICANT EFFECT ON THE BEHAVIOR OF THE AEROSOLS. A LIMITED NUMBER OF LARGE-SCALE FILTER TESTS HAVE BEEN CONDUCTED AT THE NUCLEAR SAFETY PILOT PLANT.

*ACCIDENT, RADIOISOTOPE + *AEROSOL PROPERTIES + *CONTAINMENT FILTERING SYSTEM + *FILTER EFFICIENCY +
*FISSION PRODUCT, IODINE + *ORGANIC IODIDE + ACCIDENT ANALYSIS + AEROSOL + AIR CLEANING + FILTER +
FILTER, HIGH EFFICIENCY + SAMPLING

7-11712 KESSIE RW

REMOVAL OF PLUTONIUM HEXAFLUORIDE FROM CELL EXHAUST AIR BY HYDROLYSIS AND FILTRATION

ARGONNE NATIONAL LABORATORY

CONF-660904 +. 20 PAGES, 8 FIGURES, 2 TABLES, 7 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE,
BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

THE FLUORIDE VOLATILITY PROCESS FOR RECOVERING FISSIONABLE PLUTONIUM FROM SPENT REACTOR FUEL AS THE VOLATILE PLUTONIUM HEXAFLUORIDE (PUF₆) REQUIRES A DEMONSTRATED ABILITY TO CONTAIN THE HIGHLY TOXIC PLUTONIUM. THE EXPERIMENTAL STUDIES INDICATE THAT AT LOW CONCENTRATIONS OF PUF₆ AND MOISTURE, THE HYDROLYSIS REACTION RATE IS DIRECTLY PROPORTIONAL TO BOTH THE PARTIAL PRESSURE OF THE PUF₆ AND MOISTURE AND TO THE AREA OF THE SOLID SURFACES AVAILABLE FOR REACTION. ADSORBED PUF₆ AND HF REDUCE THE REACTION RATE AT PARTIAL PRESSURES GREATER THAN 0.001 MM HG. AT HIGH CONCENTRATIONS OF PUF₆ AND MOISTURE, THE REACTION PROCEEDS RAPIDLY IN THE GAS PHASE TO PRODUCE A FINELY DISPERSED PRODUCT PUO₂F₂. MOST OF THE PARTICLES ARE SMALLER THAN 0.1 MICRON. WITH AIR CONTAINING EXCESS MOISTURE, THE FRACTION OF RELEASED PLUTONIUM PENETRATING TWO HIGH-EFFICIENCY FILTERS IN SERIES AMOUNTS TO BETWEEN 10 (MINUS 9TH) AND 10 (MINUS 6TH) AT A FILTER-MEDIA VELOCITY OF 1.0 CM/SEC. FILTER EFFICIENCY IS INCREASED BY THE AGGLOMERATION OF PARTICLES BEFORE FILTRATION AND BY LOADING EFFECTS OF THE COLLECTED PARTICLES ON THE FILTERS. WHEN AN EXCESS OF MOISTURE IS AVAILABLE, AGGLOMERATION EFFECTS TEND TO LIMIT THE MAXIMUM DISCHARGE RATE OF PLUTONIUM, AND LOADING EFFECTS TEND TO LIMIT THE MAXIMUM AMOUNT OF PLUTONIUM THAT CAN BE DISCHARGED FROM A SINGLE FILTER.

*ALPHA EMITTER + *FILTER EFFICIENCY + *FILTRATION + *PLUTONIUM + *WATER VAPOR + AEROSOL + AIR CLEANING +
FILTER + PARTICLE SIZE + PLUTONIUM OXIDE

7-11713 KNUTH RH

AN EVALUATION OF TWO PORTABLE THERMAL AEROSOL GENERATORS FOR IN-PLACE FILTER TESTING

NEW YORK OPERATIONS OFFICE, USAEC, HEALTH AND SAFETY LABORATORY

CONF-660904 +. 18 PAGES, 8 FIGURES, 3 TABLES, 5 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE,
BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

TWO COMMERCIAL, PORTABLE, THERMAL AEROSOL GENERATORS WERE EVALUATED TO DETERMINE THEIR PRACTICABILITY FOR IN-PLACE TESTING OF HIGH-EFFICIENCY FILTERS. PENETRATION VALUES OF VARIOUS FILTERS WERE DETERMINED WITH THE TWO THERMAL GENERATORS, AND RESULTS WERE COMPARED WITH VALUES OBTAINED BY USING STANDARD AIR-OPERATED AEROSOL GENERATORS OF THE TYPE DEVELOPED BY THE NAVAL RESEARCH LABORATORY. VERY CLOSE AGREEMENT WAS FOUND. ALSO, THE AEROSOL PRODUCED BY THE THERMAL GENERATORS WAS QUITE STABLE, AND THE PARTICLE-SIZE DISTRIBUTION WAS VERY CLOSE TO THAT OF THE AIR-OPERATED GENERATORS. THE THERMAL GENERATORS HAVE THE IMPORTANT ADVANTAGE THAT COMPRESSED AIR IS NOT REQUIRED, AND A SMALL, COMPACT UNIT CAN SERVICE A LARGE FILTER INSTALLATION, FOR EXAMPLE 20,000 CFM. ALTHOUGH THE THERMAL GENERATORS HAVE MINOR DESIGN LIMITATIONS, THEIR USE FOR IN-PLACE TESTING, PARTICULARLY OF HIGH VOLUME SYSTEMS, IS RECOMMENDED. THE TWO THERMAL TYPE GENERATORS STUDIED IN THIS EVALUATION USE 2-1/2-LR CYLINDERS OF CO₂, RATHER THAN COMPRESSED AIR, AND OPERATE ON 110- OR 220-V ELECTRICAL SUPPLY.

*AEROSOL PRODUCTION + *AEROSOL PROPERTIES + *FILTER + *FILTER INSPECTION + *TEST, FILTER + AEROSOL +
AEROSOL + AEROSOL + AEROSOL + AIR CLEANING + FILTER + FILTER SAFETY EVALUATION +
FILTER SAFETY EVALUATION + THERMAL EXPERIMENT + THERMAL EXPERIMENT

7-11715 BLUMKIN S + BRIGGS H + DOUNOUCOS A + VON HALLE E + HOLMES JM + RAINFY RH

PRELIMINARY RESULTS OF DIFFUSION MEMBRANE STUDIES FOR THE SEPARATION OF NOBLE GASES FROM REACTOR ACCIDENT ATMOSPHERES

OAK RIDGE GASEOUS DIFFUSION PLANT + GENERAL ELECTRIC COMPANY, SCHENECTADY + OAK RIDGE NATIONAL LABORATORY

CONF-660904 +. 23 PAGES, 10 FIGURES, 3 TABLES, 10 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING
CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

RECENTLY, THE GE RESEARCH AND DEVELOPMENT CENTER DEVELOPED A THIN SILICONE-RUBBER MEMBRANE THAT HAS ATTRACTIVE SELECTIVE-PERMEABILITY PROPERTIES FOR THE RARE GASES AND CAN BE OPERATED AT AMBIENT TEMPERATURE. INITIAL RESULTS OF A STUDY TO DEVELOP A SEPARATION PROCESS USING THIS MEMBRANE ARE REPORTED. A DIFFUSION CASCADE WAS DESIGNED TO REDUCE THE KRYPTON LEVEL IN A CONTAINMENT VESSEL (3 MILLION CU. FT.) BY A FACTOR OF 100 IN ONE WEEK. IT IS PROPOSED THAT

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-11715 *CONTINUED*

SUCH A SYSTEM BE MADE PORTABLE SO THAT IT COULD SERVE AS AN EMERGENCY STANDBY FOR SEVERAL REACTORS AND THUS SAVE PART OF THE COST OF A PERMANENT INSTALLATION AT EACH REACTOR SITE.

*KRYPTON + *NOBLE GAS + *POROUS DIFFUSION + *SEPARATOR + *XENON + AIR CLEANING + DIFFUSION + RADIOISOTOPE

7-11716 UNDERHILL D
MASS TRANSFER OF KRYPTON-85 IN CHARCOAL ADSORPTION BEDS
HARVARD UNIVERSITY

CONF-660904 +. 19 PAGES, 9 FIGURES, 1 TABLE, 5 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

A FUNDAMENTAL FACTOR IN THE DESIGN OF CHARCOAL ADSORPTION BEDS FOR FISSION GASES IS THE NUMBER OF MASS-TRANSFER UNITS (THEORETICAL PLATES) OF THE BED - THE GREATER THE NUMBER OF TRANSFER UNITS THE MORE EFFICIENT THE BED. WITH THE USE OF KR-85 IN AN AIR CARRIER, THE NUMBER OF TRANSFER UNITS IN CHARCOAL BEDS COOLED WITH DRY ICE WAS DETERMINED OVER A WIDE RANGE OF FLOW VELOCITIES AND CHARCOAL PARTICLE DIAMETERS FOR BOTH ADSORPTION AND DESORPTION. FROM AN ANALYSIS OF MASS TRANSFER AS A FUNCTION OF REDUCED VELOCITY, THE MECHANISMS OF MASS TRANSFER WERE IDENTIFIED AND THE APPLICABILITY OF THE VAN DEEMTER EQUATION CONFIRMED.

*ADSORPTION + *CHARCOAL + *KRYPTON + *NOBLE GAS + AIR CLEANING + DIFFUSION + POROUS DIFFUSION + POROUS MEDIA + RADIOISOTOPE

7-11717 KOONTZ RL + NELSON CT + BAURMASH L
STANDARDIZED GENERATION OF VAPOR-PRODUCED SODIUM AEROSOLS AND THEIR BEHAVIOR
ATOMICS INTERNATIONAL, CANOGA PARK

CONF-660904 +. 13 PAGES, 5 FIGURES, 2 TABLES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

A METHOD FOR GENERATING REPRODUCIBLE SODIUM AEROSOLS IN GAS MEDIA OF KNOWN COMPOSITION IS REQUIRED TO ESTABLISH GROWTH PHENOMENON AND MEASUREMENT TECHNIQUES FOR PARTICLES PRODUCED FROM A SODIUM FIRE FOLLOWING A PRIMARY-COOLANT SPILL IN A SODIUM-COOLED REACTOR. SODIUM AEROSOLS WERE PRODUCED BY CONTACTING SODIUM VAPOR IN THE PRESENCE OF NITROGEN WITH VARIOUS MIXTURES OF NITROGEN AND AIR. BY SUITABLE VARIATION OF THE CONDITIONS OF GENERATION, THE CONCENTRATION AND DISTRIBUTION DATA ARE PRESENTED AS MEASURED BY DIFFERENT SIZING TECHNIQUES, AND ARE COMPARED WITH THOSE PRODUCED BY THE REACTION BETWEEN LIQUID SODIUM AND AIR.

*AEROSOL PRODUCTION + *AEROSOL PROPERTIES + *FIRE + *PARTICLE SIZE + *SODIUM + AEROSOL + AIR CLEANING + FISSION PRODUCT TRANSPORT + METAL, LIQUID

7-11718 NELSON CT + BAURMASH L + KOONTZ RL
TECHNIQUES FOR SAMPLING SODIUM SMOKE AND FISSION PRODUCTS
ATOMICS INTERNATIONAL, CANOGA PARK

CONF-660904 +. 17 PAGES, 5 FIGURES, 1 TABLE, 7 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

VARIOUS SAMPLING TECHNIQUES ARE DESCRIBED WHICH ALLOW ONE TO CHARACTERIZE THE AEROSOLS PRODUCED FROM SODIUM FIRES IN A CONTROLLED-ENVIRONMENT TEST CHAMBER. BY USING PLATING AND FALLOUT-DEPOSITION SAMPLERS COMBINED WITH CASCADE IMPACTORS, ELECTROSTATIC PRECIPITATORS, AND MILLIPORE AIR SAMPLERS, STUDIES WERE MADE OF THE SPATIAL AND TEMPORAL BEHAVIOR DURING THE PRODUCTION, DISPERSION GROWTH, AND REMOVAL OF THE SUSPENDED PARTICULATES. THE ROLE OF EACH SAMPLING TECHNIQUE IN VERIFYING ANALYTICAL MODELS IS DISCUSSED.

*AEROSOL PROPERTIES + *FILTER IMPACTION + *FILTER, CASCADE IMPACTOR + *FILTER, ELECTROSTATIC + *FILTER, MEMBRANE + *SAMPLING + *SODIUM + AEROSOL + AIR CLEANING + DEPOSITION + FISSION PRODUCT TRANSPORT + SMOKE

7-11719 HIMOT P + VILES FJ + SULLIVAN J + FIRST MW
SODIUM AEROSOL, ITS GENERATION, PROPERTIES AND FILTRATION
HARVARD UNIVERSITY

CONF-660904 +. 16 PAGES, 10 FIGURES, 9 TABLES, 5 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

ACCIDENTAL LOSS OF COOLANT FROM A SODIUM-COOLED REACTOR CAN RESULT IN RAPID VAPORIZATION AND BURNING OF THE METAL TO PRODUCE AN AIRBORNE FUME. RESTRICTIONS ON THE QUANTITY DISCHARGED TO THE ATMOSPHERE REQUIRE 99 PERCENT REMOVAL TO PREVENT A HEALTH HAZARD IN THE SURROUNDING AREA. VARIOUS CONFIGURATIONS OF GRADED, DEEP-BED FILTERS RANGING IN FILTER SIZES FROM 1000 TO 2.0 MICRONS WERE TESTED AT FACE VELOCITIES RANGING FROM 5 TO 40 AND OPERATED TO A TOTAL RESISTANCE OF 20 IN. (WATER GAGE) TO DETERMINE MAXIMUM FILTER LOADING CAPACITY. TOTAL FILTER STORAGE OF ABOUT 0.75 LB OF SODIUM PER SQUARE FOOT OF FILTER AREA CAN BE OBTAINED BY PROPER FILTER DESIGN AND OPERATION. IN EXCESS OF 99 PERCENT BY WEIGHT OF SODIUM FUME, WITH SIZE AVERAGING 1.5 MICRONS MMD, WAS RETAINED IN THE DEEP BED FILTER PACK. AN ABSOLUTE-TYPE FILTER WAS USED AS THE FINAL STAGE. NO IODINE, AS ELEMENTAL IODINE OR SODIUM IODIDE, PENETRATED THE FILTER PACK WHEN THE SODIUM MELT CONTAINED 3.5 PPM OF IODINE AS SODIUM IODIDE, ALTHOUGH IT WAS DETECTED AT THE FILTER ENTRANCE.

*AEROSOL PRODUCTION + *AEROSOL PROPERTIES + *FILTER, BED + *FILTRATION + *SODIUM + AIR CLEANING + FILTER IMPACTION + FILTER, HIGH EFFICIENCY + FISSION PRODUCT TRANSPORT + FISSION PRODUCT, IODINE + PARTICLE SIZE + SAMPLING

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-11720 ETTINGER HJ + MOSS WD + BUSEY H
CHARACTERISTICS OF THE AEROSOL PRODUCED FROM BURNING PLUTONIUM
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS + DOUGLAS AIRCRAFT COMPANY
CONF-660904 +. 22 PAGES, 12 FIGURES, 3 TABLES, 10 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING
CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

SAFETY ANALYSIS OF SODIUM-COOLED, PLUTONIUM-FUELED, FAST-REACTOR PLANTS MUST BE CONCERNED WITH THE POSSIBILITY OF FIRES INVOLVING THESE MATERIALS. THUS, DESIGN OF AN AIR-CLEANING SYSTEM REQUIRES BASIC DATA DEFINING THE AEROSOL CHARACTERISTICS OF SODIUM AND PLUTONIUM RELEASED DURING A FIRE. SIZE CHARACTERISTICS OF THE AEROSOL PRODUCED DURING PLUTONIUM FIRES WERE DETERMINED FOR DIFFERENT ATMOSPHERES RANGING FROM 20.8 PERCENT OXYGEN, 79.2 PERCENT NITROGEN TO 0.5 PERCENT OXYGEN, 99.5 PERCENT NITROGEN. PLUTONIUM-COBALT-CERIUM ALLOY, AND ALPHA- AND DELTA-PHASE PLUTONIUM WERE BURNED. DATA WERE OBTAINED TO ESTIMATE THE FRACTION OF PLUTONIUM ALLOY AIRBORNE DURING A PLUTONIUM FIRE. FIRES SIMULATING A REACTOR ACCIDENT INVOLVING BOTH FUEL AND COOLANT DEFINED THE RELATIVE AIRBORNE CONCENTRATION OF PLUTONIUM AND SODIUM.

*FIRE + *PARTICLE SIZE + *PARTICLE SIZE DISTRIBUTION + *PLUTONIUM + *PLUTONIUM OXIDE + AEROSOL +
AEROSOL PRODUCTION + AEROSOL PROPERTIES + AIR CLEANING + AIRBORNE RELEASE + ALPHA EMITTER + SODIUM

7-11721 CHEEVER CL + MCFEE DR + SEDLET J + DUFFY TL
ZPR ROOF SAND FILTRATION OF URANIUM, PLUTONIUM AND URANINE AEROSOLS
ARGONNE NATIONAL LABORATORY
CONF-660904 +. 18 PAGES, 13 FIGURES, 4 TABLES, 3 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING
CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

THE FILTRATION SYSTEM (REACTOR ACCIDENTS) FOR ARGONNE NATIONAL LABORATORY'S PROPOSED ZERO POWER PLUTONIUM REACTOR CONSISTS OF A SAND-AND-GRAVEL ROOF FOLLOWED BY HEPA FILTERS. FILTRATION EFFICIENCY TESTS WERE RUN WITH URANIUM, PLUTONIUM, AND URANINE AEROSOLS TO PREDICT THE EFFECTIVENESS OF THIS SYSTEM FOR CONTAINMENT OF PLUTONIUM FUMES. PENETRATION OF URANIUM AND PLUTONIUM FUMES THROUGH 30 IN. OF SAND RANGED FROM 0.0004 TO 0.02 PERCENT. WITH THE BACKUP HEPA FILTERS, THE OVERALL PENETRATION OF PLUTONIUM FUME FROM A REACTOR ACCIDENT SHOULD NOT EXCEED 0.0001 PERCENT. RESULTS INDICATE THAT URANINE AEROSOL WILL BE SATISFACTORY FOR IN-PLACE TESTING OF THE SAND AND GRAVEL ROOF.

*FILTER EFFICIENCY + *FILTER, BED + *FILTER, SAND + *PLUTONIUM + *URANIUM + AEROSOL PRODUCTION +
AIR CLEANING + FILTER + FILTER, HIGH EFFICIENCY + FILTRATION + FISSION PRODUCT TRANSPORT + TEST, FILTER

7-11722 MCCLINTOCK RO
THE DESIGN, TEST AND USE OF THE BROOKHAVEN NATIONAL LABORATORY (BNL) REACTOR BYPASS FILTER FACILITY
BROOKHAVEN NATIONAL LABORATORY
CONF-660904 +. 8 PAGES, 3 FIGURES, 7 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON,
MASS., SEPTEMBER 13-16, 1966, SOURCE

THE PURPOSE OF THE BNL REACTOR BYPASS FILTER FACILITY IS TO PROVIDE IMPROVED AIR CLEANING IN THE EVENT OF A FUEL ELEMENT FAILURE AT EITHER THE BROOKHAVEN GRAPHITE RESEARCH REACTOR (BGRR) OR THE HIGH FLUX BEAM REACTOR (HFBR). IT ALSO PROVIDES SUFFICIENT AIR CLEANING TO ALLOW THE USE OF AIR COOLING AS A METHOD OF COMBATING A GRAPHITE FIRE AT THE BGRR. FOR NORMAL BGRR COOLING, ABOUT 365,000 CFM IS REQUIRED. ALTHOUGH THE FILTERS PROVIDED ARE SUFFICIENT FOR NORMAL OPERATION, ADDITIONAL CLEANING IS REQUIRED FOR FUEL RUPTURE AND GRAPHITE FIRE SITUATIONS. THIS SYSTEM WAS THEREFORE DESIGNED TO ACCOMMODATE 100,000 CFM WITH HIGH FILTERING EFFICIENCY UNDER EMERGENCY CONDITIONS. EACH FILTER UNIT WAS TESTED FOR BOTH PARTICLE-RETENTION EFFICIENCY AND IODINE RETENTION. THE PARTICLE-EFFICIENCY TEST USED DOP SMOKE, AND THE IODINE TEST WAS MADE WITH I-128 VAPOR. IN-PLACE TESTS WERE MADE WITH DOP AND THE RADIOACTIVE EFFLUENT FROM THE BGRR DURING A GRAPHITE-ANNEALING RUN. ALL TESTS SHOWED THE FACILITY TO BE OVER 99.98 PERCENT EFFICIENT FOR PARTICLE REMOVAL WHILE AT THE SAME TIME REMOVING 99.9 PERCENT OF THE DETECTABLE IODINE VAPORS.

*BNL (BROOKHAVEN NATIONAL LABORATORY) + *CHARCOAL + *FILTER DESIGN + *IODINE + *TEST, DOP FILTER +
AIR CLEANING + FILTER + FILTER EFFICIENCY + FILTER SYSTEM + FILTER, HIGH EFFICIENCY +
FISSION PRODUCT, IODINE + TEST, FILTER

7-11723 SCHINDLER RE
CONTINUOUS SAMPLER - MONITOR FOR FISSION PRODUCTS IN CONTAMINATED ATMOSPHERES
IDAHO NUCLEAR CORPORATION, IDAHO FALLS
CONF-660904 +. 3 PAGES, 1 FIGURE, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER
13-16, 1966, SOURCE

A CONTINUOUS SAMPLER-MONITOR IS BEING DEVELOPED FOR USE IN SAMPLING FISSION-PRODUCT CONCENTRATIONS IN THE CONTAINMENT-BUILDING ATMOSPHERE DURING THE LOSS-OF-FLUID TEST. A SPRAY SCRUBBER, PLACED IN THE CONTAINMENT ATMOSPHERE, WASHES NEARLY ALL THE IODINE AND OTHER CONDENSIBLE FISSION PRODUCTS FROM A CONTINUOUSLY DRAWN ATMOSPHERE SAMPLE, LEAVING ESSENTIALLY ONLY RARE-GAS FISSION PRODUCTS IN THE GAS STREAM. THE GAS AND LIQUID STREAMS THEN FLOW OUTSIDE THE CONTAINMENT BUILDING FOR SEPARATE MONITORING OF THEIR GROSS GAMMA ACTIVITY.

*FISSION PRODUCT, IODINE + *MONITOR, RADIATION, AIR + *MONITOR, RADIATION, STACK + *SAMPLING + *SCRUBBER +
AIR CLEANING + FISSION GAS RELEASE + FISSION PRODUCT TRANSPORT + FISSION PRODUCT, AIRBORNE +
MONITOR, RADIATION, EMERGENCY + MONITOR, RADIATION, SAMPLING + NOBLE GAS

7-11724 HUNTER HH + MITCHELL RI
PORTABLE SMOKE PHOTOMETER
BATTTELLE MEMORIAL INSTITUTE, COLUMBUS
CONF-660904 +. 14 PAGES, 4 FIGURES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS.,

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-11724 *CONTINUED*
SEPTEMBER 13-16, 1966, SOURCE

IN THE EVALUATION OF ABSOLUTE FILTERS IT IS NECESSARY TO TEST THEM WITH AN AEROSOL AND MEASURE THE CONCENTRATION OF THE AEROSOL BEFORE AND AFTER IT PASSES THROUGH THE FILTER. THE PRESENT PROCEDURE IS TO MEASURE THESE AEROSOL CONCENTRATIONS WITH A SMOKE PHOTOMETER WHICH DETERMINES CONCENTRATION BY MEASURING THE AMOUNT OF LIGHT SCATTERED BY THE AEROSOL PARTICLES. THE AMOUNT OF LIGHT SCATTERED IS PROPORTIONAL TO THE NUMBER OF PARTICLES OF A GIVEN SIZE IN THE VIEW VOLUME OF THE INSTRUMENT. THE PURPOSE OF OUR RESEARCH PROGRAM IS TO MINIATURIZE THE SMOKE PHOTOMETER AND TO INCREASE ITS RELIABILITY BY THE USE OF SEMICONDUCTORS IN PLACE OF VACUUM TUBES. TO DATE, THE ELECTRONICS PORTION OF THE INSTRUMENT HAS BEEN COMPLETED AND WILL BE DESCRIBED IN THIS PAPER. THE OPTICS PORTION OF THE INSTRUMENT IS STILL UNDER DEVELOPMENT.

*FILTER, HIGH EFFICIENCY + *INSTRUMENTATION, AIR SAMPLING + *INSTRUMENTATION, RADIATION MONITORING + *SMOKE + AEROSOL + AIR CLEANING + PARTICLE SIZE + TEST, FILTER

7-11725 PANCHUK F + RACHUK W
THE FILTER TESTING PROGRAM OF ATOMIC ENERGY OF CANADA LIMITED
ATOMIC ENERGY OF CANADA LIMITED, CHALK RIVER
CONF-660904 +. 41 PAGES, 27 FIGURES, 3 TABLES, 3 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

AT THE CHALK RIVER NUCLEAR LABORATORIES, AIR EXHAUSTED FROM EQUIPMENT, SYSTEMS, AND AREAS WHICH MAY ACT AS SOURCES OF AIRBORNE RADIOACTIVE PARTICLES IS CLEANED WITH HIGH-EFFICIENCY AIR FILTERS. A PROGRAM OF TESTING THE INTEGRITY OF FILTERS AND FILTRATION SYSTEMS WAS STARTED IN 1964. THE BASIC EQUIPMENT AND TECHNIQUE USED ARE THOSE DEVELOPED BY THE USAEC, THE U. S. NAVAL RESEARCH LAB, AND THE OAK RIDGE NATIONAL LAB. THE FILTER-TEST RIG AND MOBILE EQUIPMENT MADE FOR LABORATORY AND FIELD USE AT CHALK RIVER NUCLEAR LABORATORIES ARE DESCRIBED, AS ARE TYPICAL FILTER INSTALLATIONS. THE TESTS ARE ALSO DESCRIBED AND THE RESULTS ARE SUMMARIZED. FIELD TESTS SHOWED THAT THE PERFORMANCE OF THE SELF-CONTAINED FILTERS HAS BEEN EXCELLENT. HOWEVER, WITH OPEN-FACED FILTERS, UNLESS THE INSTALLATION IS CAREFULLY DESIGNED AND MAINTAINED, EXCESSIVE PENETRATION COULD OCCUR.

*AEROSOL PRODUCTION + *FILTER SYSTEM + *FILTER TEST REQUIREMENT + *TEST, FILTER SYSTEM + AEROSOL + AIR CLEANING + CANADA + CHALK RIVER + FILTER EFFICIENCY + FILTER, HIGH EFFICIENCY + INSTRUMENTATION, AIR SAMPLING + TEST, DOP FILTER + TEST, FILTER

7-11726 BILLARD F + BRION J
TESTING OF AIR CLEANING SYSTEMS - TESTING OF THE COMPONENTS - IN-PLACE TESTS
COMMISSARIAT A L ENERGIE ATOMIQUE, CENTRE D ETUDES NUCLEAIRES, FONTENAY-AUX-ROSES
CONF-660904 +. 10 PAGES, 16 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

ALTHOUGH IN-PLACE TESTS OF AIR-CLEANING SYSTEMS ARE THE MOST IMPORTANT BECAUSE THEY ACT AS FINAL TESTS UPON ACHIEVED PLANTS, COMPONENT TESTS ARE NECESSARY TOO. SUCH TESTS ALLOW DETECTION OF DEFECTIVE UNITS BEFORE THEY ARE INSTALLED, PARTITION OF UNIT DEFECTS FROM MOUNTING DEFECTS, AND THEY ARE MORE SENSITIVE. FOR SIMILAR REASONS, MATERIAL TESTS ARE MOST USEFUL. VARIOUS TESTS ARE DESCRIBED FOR AEROSOL FILTERS AND IODINE TRAPS. THE TESTS INCLUDE THOSE FOR MATERIALS, EFFICIENCY, AIR RESISTANCE, FLAMMABILITY, HUMIDITY RESISTANCE, TEMPERATURE RESISTANCE, ETC.

AEROSOL + AIR CLEANING + CHARCOAL + FILTER + FILTER EFFICIENCY + FILTER SYSTEM + FILTER, HIGH EFFICIENCY + FILTER, TRAP + FISSION PRODUCT, IODINE + ORGANIC IODIDE + TEST, FILTER + TEST, FILTER SYSTEM

7-11727 FLYGER H + ROSENBAUM HC
ON-SITE TESTING OF FILTERS WITH SPECIAL REFERENCE TO SOLID AEROSOLS
DANISH ATOMIC ENERGY COMMISSION
CONF-660904 +. 13 PAGES, 9 FIGURES, REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

A LITHIUM FLAME-PHOTOMETER TEST IS PROPOSED FOR ON-SITE TESTING OF FILTER INSTALLATIONS. THE TEST IS INTERCALIBRATED WITH THE STANDARD SODIUM FLAME TEST. THE SPRAYING TIME NEEDED TO INTRODUCE THE LITHIUM SALT INTO A VENTILATION SYSTEM IS CONSIDERED INCONVENIENT FOR SYSTEMS HANDLING MORE THAN 100,000 CU. M/HR. FOR SUCH SYSTEMS, PHOTOELECTRIC PARTICLE COUNTERS CAN BE USED WITH THE DUST NATURALLY PRESENT IN THE LOCAL ATMOSPHERE. WHERE THE DUST LEVEL IS TOO LOW, AITKEN NUCLEI CAN EASILY BE ARTIFICIALLY GENERATED IN SUFFICIENT AMOUNTS. THE RELATION BETWEEN FILTER EVALUATION BY SUCH PARTICLE COUNTING AND BY LITHIUM MEASUREMENTS IS ESTABLISHED.

*INSTRUMENTATION, AIR SAMPLING + *LITHIUM + *TEST, FILTER + *TEST, FILTER SYSTEM + AEROSOL + AIR CLEANING + DENMARK + PARTICLE SIZE DISTRIBUTION

7-11728 CUKEISEN CA + MALABY KL
IN-PLACE TESTING OF CHARCOAL FILTER BANKS AT AMES LABORATORY RESEARCH REACTOR (ALRR)
AMES LABORATORY, AMES, IOWA
CONF-660904 +. 6 PAGES, 1 FIGURE, 2 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

THE AIR EXHAUST SYSTEM AT THE ALRR IS DESCRIBED. AN EXPERIMENTAL PROGRAM WAS CONDUCTED TO DEVELOP AN APPROPRIATE IN-PLACE IODINE TEST FOR THE CHARCOAL FILTER BANKS. THREE TECHNIQUES WERE TESTED - (1) SPECTROPHOTOMETRIC ANALYSIS, (2) NEUTRON ACTIVATION, AND (3) I-131 TRACER. COMPARISONS OF THE RESULTS WITH EXPERIENCE ARE ENUMERATED, WITH COMMENTS AND RECOMMENDATIONS.

CATEGORY 7
FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

7-11728 *CONTINUED*
THE NEUTRON ACTIVATION AND THE I-131 TRACER TECHNIQUES WERE THE MOST APPROPRIATE METHODS FOR IN-PLACE IODINE TESTING OF THE CHARCOAL FILTER BANKS.

*ACTIVATION + *CHARCOAL + *FILTER EFFICIENCY + *TEST, FILTER + *TEST, FILTER SYSTEM +
*TRACER, RADIOACTIVE + AIR CLEANING + FILTER, HIGH EFFICIENCY + FILTER, TRAP + FISSION PRODUCT, IODINE +
IODINE + SAMPLING

7-11729 MUHLBAIER DR
IN-PLACE NONDESTRUCTIVE LEAK TEST FOR IODINE ADSORBERS
SAVANNAH RIVER LABORATORY, AIKEN
CONF-660904 + DP-MS-66-46 +. 23 PAGES, 5 FIGURES, 4 TABLES, 8 REFERENCES, PRESENTED AT 9TH AEC AIR
CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

A NONDESTRUCTIVE IN-PLACE TEST FOR DETECTING LEAKS IN A BANK OF INSTALLED CARBON BEDS WITH FREON-112 TRACER WAS DEVELOPED BY THE SAVANNAH RIVER LABORATORY AND DEMONSTRATED IN THE REACTOR-CONFINEMENT FACILITIES OF THE SAVANNAH RIVER PLANT. LEAKAGE FLOW (FLOW THAT BYPASSES THE CARBON) OF 0.01 PERCENT THROUGH THE BEDS IS DETECTED READILY. CARBON BEDS WITH ABOUT 2 YEARS OF EXPOSURE TO EXHAUST AIRFLOW IN THE CONFINEMENT SYSTEM WERE EVALUATED SUCCESSFULLY WITH THE TEST. AN EQUATION WAS ALSO DEVELOPED THAT CORRELATES THE CONDITIONS FOR F-112 TESTING OF CARBON BEDS OF DIFFERENT DESIGN.

*CHARCOAL + *FILTER SYSTEM + *FILTER, BED + *LEAK DETECTION + *TEST, FILTER SYSTEM + AIR CLEANING +
FILTER, TRAP + FISSION PRODUCT, IODINE + IODINE + WATER VAPOR

7-11730 SWANKS JH
IN-PLACE IODINE FILTER TESTING
OAK RIDGE NATIONAL LABORATORY
CONF-660904 +. 13 PAGES, 5 FIGURES, 5 TABLES, 3 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE,
BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

A SERIES OF IN-PLACE IODINE FILTER TESTS WAS PERFORMED ON THE CHARCOAL IODINE FILTERS AT THE HIGH FLUX ISOTOPE REACTOR. TWO SETS OF CHARCOAL FILTERS WERE TESTED - THE FIRST FOR ELEMENTAL IODINE RETENTION AND THE SECOND FOR METHYL IODIDE AND ELEMENTAL IODINE RETENTION. THIS PAPER PRESENTS THE RESULTS OF THOSE TESTS AND DISCUSSES THE CONCLUSIONS DRAWN FROM THOSE RESULTS.

*CHARCOAL + *FILTER EFFICIENCY + *FISSION PRODUCT, IODINE + *TEST, FILTER + *TEST, FILTER SYSTEM +
AIR CLEANING + FILTER, BED + FILTER, TRAP + IODINE + TRACER, RADIOACTIVE

7-11731 VILES FJ + SILVERMAN L
IN-PLACE IODINE REMOVAL EFFICIENCY TEST
HARVARD UNIVERSITY
CONF-660904 +. 10 PAGES, 3 FIGURES, 2 TABLES, 8 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE,
BOSTON, MASS., SEPTEMBER 13-16, 1966

STUDIES WERE MADE OF ULTRASENSITIVE ANALYTICAL METHODS FOR DETERMINING IODIDE FOR USE IN IN-PLACE IODINE-REMOVAL-EFFICIENCY TESTS. INVESTIGATION OF THE VARIOUS TECHNIQUES, USING THE IODIDE CATALYTIC REDUCTION OF CERIC IONS LED TO SELECTION OF A METHOD. BEDS OF COPPER READS WERE USED AS IODINE SAMPLING UNITS AND WERE INVESTIGATED FOR COLLECTION EFFICIENCY AT VERY LOW CONCENTRATIONS OF IODINE. THE UNITS WERE VERY USEFUL.

*CHARCOAL + *COPPER + *FILTER EFFICIENCY + *FISSION PRODUCT, IODINE + *TEST, FILTER +
*TEST, FILTER SYSTEM + AIR CLEANING + FILTER, TRAP + IODINE + TRACER, RADIOACTIVE

7-11732 THOMSON WG + GROSSMAN RE
IN-PLACE TESTING FOR IODINE REMOVAL EFFICIENCY USING AN ELECTRONIC DETECTOR
TODD SHIPYARDS CO. + U. S. ATOMIC ENERGY COMMISSION
CONF-660904 +. 17 PAGES, 5 FIGURES, 2 TABLES, 7 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE,
BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

TECHNICAL SPECIFICATIONS OF THE N. S. SAVANNAH REQUIRE QUARTERLY QUALIFICATIONS OF THE AIR CLEANING SYSTEMS FOR ABILITY TO REMOVE IODINE. SUCH PERIODIC TESTING CAN BE ACCOMPLISHED AT LOW COST USING AN ELECTRONIC DETECTOR-RECORDER THAT IS SENSITIVE TO ELEMENTAL IODINE VAPOR CONCENTRATIONS OF ONE PART IN A BILLION PARTS OF AIR. THIS TEST METHOD HAS PROVEN SATISFACTORY ABOARD THE N. S. SAVANNAH, ALTHOUGH A CAREFUL LABORATORY-TYPE OPERATING TECHNIQUE IS REQUIRED. THE COMBINATION OF EQUIPMENT AND OPERATING TECHNIQUE HAS QUALIFIED THE AIR-CLEANING SYSTEM WITH GOOD CORRELATION TO MORE EXPENSIVE, TEDIOUS, AND TIME-CONSUMING TESTS USING RADIOIODINE 131.

*CHARCOAL + *FILTER EFFICIENCY + *FISSION PRODUCT, IODINE + *INSTRUMENTATION, AIR SAMPLING +
*TEST, FILTER + *TEST, FILTER SYSTEM + AIR CLEANING + ANALYTICAL TECHNIQUE, CALIBRATION + IODINE +
N S SAVANNAH + SAMPLING

CATEGORY 8
SOURCES OF ENERGY RELEASE UNDER ACCIDENT CONDITIONS

8-09971 SAUER MC
A METHOD FOR AUTOMATIC ANALYSIS OF DATA ON THE KINETICS OF FAST CHEMICAL REACTIONS IN THE FORM OF PICTURES OF OSCILLOSCOPE TRACES
ARGONNE NATIONAL LABORATORY
ANL-7113 +. 15 PAGES, 10 FIGURES- OCTOBER 1965- CFSTI, \$1.00 CY, \$0.50 MN

THE CHLOE SYSTEM FOR DIRECT DIGITIZATION OF PHOTOGRAPHIC DATA WAS USED IN CONJUNCTION WITH THE CONTROL DATA CORPORATION 3600 COMPUTER SYSTEM TO ANALYZE DATA, IN THE FORM OF PICTURES OF OSCILLOSCOPE TRACES, ON THE KINETICS OF FAST CHEMICAL REACTIONS. ALL MEASUREMENTS AND ANALYTICAL PROCESSES WERE DONE BY MACHINE IN A COMPLETELY AUTOMATIC METHOD.

*ANALYTICAL MODEL + *CHEMICAL KINETICS + *CHEMICAL REACTION + *COMPUTER PROGRAM + *COMPUTER, DIGITAL

8-10294 GENS TA
VAPOR PRESSURES OF GASEOUS PRODUCTS FROM CHEMICAL REACTIONS OF SOL-GEL FUELS
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE
ORNL-TM-1418 +. 13 PAGES, 2 FIGURES, 2 TABLES, 16 REFERENCES, FEBRUARY 1966, CFSTI, \$1.00 CY, \$0.50 MN

CALCULATIONS HAVE BEEN MADE OF THE PARTIAL PRESSURES OF GASES EXPECTED TO BE FORMED IN VARIOUS REACTOR-FUEL MATERIALS. THESE CALCULATIONS ARE BASED ON DATA FROM THE CHEMICAL LITERATURE. THE CO PRESSURE DUE TO REACTION BETWEEN COATING AND OXIDE INSIDE CARBON-COATED UO₂ AND THO₂ MICROSPHERES WILL REACH 450 PSI WHEN THE TEMPERATURES ARE 2400 AND 2300 DEGREES C RESPECTIVELY. NITROGEN PRESSURES FROM THERMALLY DECOMPOSING UN AND PIN MICROSPHERES WILL REACH EQUILIBRIUM VALUES OF 450 PSI AT 3000 AND 2800 DEGREES C RESPECTIVELY. THIS IS THE HELIUM PRESSURE EXPECTED IN THE TARGET GAS-COOLED REACTOR. THEREFORE, IT APPEARS THAT THESE COATED-FUEL MICROSPHERES WOULD NOT DEVELOP EXCESSIVE INTERNAL PRESSURES AT THE PRESSURE AND RESPECTIVE TEMPERATURES LISTED ABOVE. PRESSURES EXPECTED AT OTHER TEMPERATURES ARE ALSO TABULATED.

*CHEMICAL REACTION + *COATED PARTICLE + *SOL-GEL PROCESS + *VAPOR, VAPOR PRESSURE + CARBON + NITRIDE + OXIDE + THORIUM + URANIUM

8-10295 PITTS SH
CRITICAL TEMPERATURE OF PLUTONIUM-CHLORINATED SOLVENT REACTIONS
DOW CHEMICAL COMPANY, ROCKY FLATS
RFP-688 +. 9 PAGES, 4 FIGURES, 3 TABLES, FEBRUARY 1966, CFSTI, \$1.00 CY, \$0.50 MN

IN PLUTONIUM-PRODUCTION MACHINING AND HANDLING OPERATIONS, A HAZARD EXISTS IN THE COMPATIBILITY OF PLUTONIUM AND CERTAIN CHLORINATED SOLVENTS. BURNING PLUTONIUM, AT 750-800 DEGREES C, READILY AND VIOLENTLY REACTS WITH CARBON TETRACHLORIDE BUT NOT WITH SOME OTHER CHLORINATED SOLVENTS. CRITICAL TEMPERATURES WERE DETERMINED FOR SOME REACTIONS BETWEEN PLUTONIUM AND CHLORINATED SOLVENTS. CCL₄ CONSISTENTLY HAD THE LOWEST CRITICAL TEMPERATURES. CHLOROTHENE AND FREON TB-1 SOLVENTS HAD ALMOST THE SAME CRITICAL TEMPERATURE, WHICH WAS LOWER THAN FOR PERCHLOROETHYLENE AND 1,1,2-TRICHLOROETHYLENE. OF THE SOLVENTS STUDIED, TRICHLOROETHYLENE WAS THE LEAST REACTIVE AND THEREFORE THE SAFEST UNDER THESE TEST CONDITIONS. THE CRITICAL TEMPERATURE OF PLUTONIUM IN CCL₄ WAS INCREASED BY ADDING TEXACO REGAL CUTTING OIL.

*CHEMICAL REACTION + *PLUTONIUM + CHLORINE + HIGH TEMPERATURE

8-10311 MARKS RE + ROGERS LA
SHOCK FRONT STUDIES OF THE HANDCAR EVENT
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
PNE-801F +. 61 PAGES, 47 FIGURES, 13 TABLES, 9 REFERENCES, APRIL 1966- CFSTI, \$3.00 CY

CLOSE-IN SHOCK-WAVE AND SEISMIC EFFECTS WERE MEASURED SUBSEQUENT TO A 12-KT DETONATION IN A NEVADA TEST SITE DOLOMITE MEDIUM AND COMPARED WITH PREDETONATION CODE-PREDICTED RESULTS. COMPARATIVE AGREEMENT OF EXPERIMENTAL STRESSES WITH CALCULATED STRESSES IN THE HYDRODYNAMIC PRESSURE REGION WAS WITHIN 13 PERCENT, WHEREAS SIMILAR COMPARISONS IN THE LOW-PRESSURE AREA INDICATED A MAXIMUM DISAGREEMENT OF 390 PERCENT. BRIEF DESCRIPTIONS OF THE CODE, CODE INPUT DATA, AND CODE-PREDICTED RESULTS ARE ALSO PRESENTED ALONG WITH MORE DETAILED DESCRIPTIONS OF THE SHOCK-WAVE INSTRUMENTATION, ITS INSTALLATION AND CHECKOUT, AND THE MEASURED RESULTS.

*COMPARISON, THEORY AND EXPERIENCE + *PLOWSHARE PROGRAM + *SHOCK WAVE + SEISMOLOGY

8-10341 RUTHERFORD JL + BLAKELY JP + OVERHOLSER LG
OXIDATION OF UNFUELED AND FUELED GRAPHITE SPHERES BY STEAM
OAK RIDGE NATIONAL LABORATORY
ORNL-3947 +. 37 PAGES, 14 FIGURES, 7 TABLES, MAY 1966, CFSTI \$2.00 CY

THE OXIDATION OF VARIOUS UNFUELED AND FUELED GRAPHITE SPHERES BY STEAM WAS STUDIED AT 800, 900, AND 1000 C, USING A PARTIAL PRESSURE OF ABOUT 730 TORR AND FLOW RATES OF 600 TO 1200 CM³/MIN (STP) OF STEAM. THE FUELED SPHERES CONTAINED PYROLYTIC-CARBON COATED UC₂ OR (U,TH) C₂ PARTICLES DISPERSED IN GRAPHITE MATRICES. REACTION RATES WERE DETERMINED FROM WEIGHT CHANGES AND ANALYSES OF THE EFFLUENT GASES. PRONOUNCED EFFECTS OF BURNOFF ON REACTION RATES AND CO/CO₂ RATIOS WERE OBSERVED. REACTION RATES MEASURED FOR THE FUELED SPHERES WERE, IN GENERAL, COMPARABLE TO THOSE FOUND FOR THE UNFUELED SPHERES. THE GRAPHITE MATRICES APPEAR TO HAVE AFFORDED CONSIDERABLE PROTECTION FOR THE COATED FUEL PARTICLES AGAINST ATTACK BY STEAM.

*GRAPHITE + *OXIDATION + *STEAM + CHEMICAL REACTION + COATED PARTICLE + PYROLYTIC

CATEGORY 8
SOURCES OF ENERGY RELEASE UNDER ACCIDENT CONDITIONS

8-10359 MUENCHOW HO
REVIEW OF ATOMIC POWER DEVELOPMENT ASSOCIATES SODIUM-WATER REACTION PROGRAM
ATOMIC POWER DEVELOPMENT ASSOCIATES, INC.
CONF-650620 +. 12 PAGES, 8 FIGURES, PP. 232-243 OF PROCEEDINGS OF SODIUM COMPONENTS DEVELOPMENT PROGRAM
INFORMATION MEETING, CHICAGO, JUNE 16-17, 1965, CFSTI \$3.00 CY

THE STEAM GENERATOR IS RECOGNIZED AS THE WEAKEST LINK IN THE HEAT-TRANSPORT CHAIN OF SODIUM-COOLED REACTORS. ADPA HAS BEEN AWARDED A CONTRACT TO CONDUCT A SERIES OF SODIUM-WATER REACTION TESTS WHICH WILL ESTABLISH A MEANS OF ESTIMATING THE EXTENT OF TUBE WASTAGE DURING A SMALL LEAK OF WATER INTO THE SODIUM OF A SODIUM-HEATED STEAM GENERATOR, AND DETERMINE THE DOMINANT PARAMETERS OF TUBE WASTAGE DURING A SMALL WATER LEAK SO THAT THEY MAY BE APPLIED TO THE DESIGN OF A UNIT.

*FERMI + *METAL WATER REACTION + *SODIUM + EQUIPMENT DESIGN + REACTOR, LIQUID METAL COOLED

8-10410 GREENBANK JC + HARPER S
THE MECHANISM OF BREAKAWAY OXIDATION IN ZIRCONIUM ALLOYS
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, RISLEY
TRG-1174 (C/X) +. 11 PAGES, 6 FIGURES, 1 TABLE, 7 REFERENCES, JANUARY 1966, UKAEA

THE OXIDE FILMS FORMED ON SEVERAL ZIRCONIUM ALLOYS IN A VARIETY OF OXIDIZING ATMOSPHERES WERE STUDIED IN BOTH PRE- AND POSTBREAKAWAY CONDITIONS. IT IS SUGGESTED THAT BREAKAWAY OCCURS DUE TO THE MECHANICAL FAILURE OF THE OXIDE FILM, WITH THE STRESSES GENERATED IN THE GROWING FILM BEING SUCH THAT IN POSTBREAKAWAY CONDITIONS THE OUTER LAYER OF OXIDE IS CRACKED PROGRESSIVELY DEEPER, WHILE THE RATE OF OXIDATION IS CONTROLLED BY DIFFUSION THROUGH THE INNERMOST UNCRACKED OXIDE LAYER, WHICH REMAINS OF CONSTANT THICKNESS.

*ALLOY + *OXIDATION + *ZIRCONIUM

8-10530 DREVON GA + FALGAYRETTES MF + WALFORD FJ
COMPARISON OF PRESSURE LOADING PRODUCED BY CONTAINED EXPLOSIONS IN WATER AND SODIUM
CENTRE D ETUDES NUCLEAIRES DE SACLAY + CENTRE D ETUDES NUCLEAIRE DE CADARACHE + UNITED KINGDOM ATOMIC
ENERGY AUTHORITY, SOUTHEND-ON-SEA, ESSEX
ANL-7120 +. 14 PAGES, 11 FIGURES, 4 TABLES, 5 REFERENCES, PP. 720-733 OF PROCEEDINGS OF THE CONFERENCE ON
SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

JOINT EXPERIMENTS BY THE CEA-EURATOM AND THE UKAEA WERE CARRIED OUT AT CADARACHE, FRANCE, USING WATER AND HOT SODIUM COOLANT IN A SMALL-SCALE MODEL REPRESENTATIVE OF CURRENT FAST-REACTOR DESIGN. THE SINGLE, STAINLESS-STEEL COOLANT TANK WAS ABOUT 9.5 IN. IN DIAMETER AND 16.5 IN. DEEP, AND CONTAINED A MODEL BREEDER AND REFLECTOR. IT IS CLEAR THAT FOR A GIVEN EXPLOSIVE RELEASE OF ENERGY IN A FIXED GEOMETRY, THE BLAST EFFECTS WILL BE GREATER IN SODIUM THAN IN WATER.

*EXPLOSION + *METAL WATER REACTION + *SODIUM + *WATER, GENERAL +
CONTAINMENT, SHOCK GENERATION AND PROTECTION + PRESSURE, INTERNAL + REACTOR, FAST

8-10531 SAMUELS DE
DESIGN FACTORS INFLUENCING THE CONTAINMENT OF INTERNAL EXPLOSION IN FAST REACTORS
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, SOUTHEND-ON-SEA, ESSEX
ANL-7120 +. 15 PAGES, 3 FIGURES, 3 REFERENCES, PP. 734-740 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY,
FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

IN RECENT YEARS THE FOULNESS ESTABLISHMENT OF THE U.K.A.E.A. HAS BEEN ENGAGED IN A CONTINUING INVESTIGATION OF THE CONTAINMENT OF CORE EXPLOSIONS IN FAST REACTOR SYSTEMS. IN THIS WORK SMALL CHARGES OF CHEMICAL HIGH EXPLOSIVE HAVE BEEN DETONATED IN SCALED MODELS OF THE REACTOR STRUCTURE. GEOMETRICAL ARRANGEMENTS ARE STUDIED IN INSTRUMENTED, OVERSTRONG MODELS, WHILE INFORMATION ON MODES OF DEFORMATION AND ENERGY ABSORPTION IS OBTAINED FROM MODELS HAVING CORRECTLY SCALED STRUCTURAL STRENGTH. PROCESSES STUDIED INCLUDE THE PLASTIC FLOW AND RUPTURE OF METALS, SHOCK-WAVE INTERACTIONS, VENTING AND PRESSURE RISE IN GAS SPACES, CRUSHING OF POROUS MATERIALS, AND THE IMPACT OF SHOCK-DRIVEN LIQUIDS. THIS HAS LED TO THE POSSIBILITY OF ADJUSTING THE BALANCE BETWEEN THESE PROCESSES BY APPROPRIATE DESIGN SO AS TO ACHIEVE THE NECESSARY STRUCTURAL INTEGRITY WITH THE LEAST ECONOMIC PENALTY OR INTERFERENCE WITH NORMAL WORKING.

*CONTAINMENT, SHOCK GENERATION AND PROTECTION + *DESIGN CRITERIA + *EXPLOSION + *REACTOR, FAST + MOCKUP +
PRESSURE, INTERNAL + TESTING

8-10872 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS REPORT INDIAN POINT NUCLEAR GENERATING UNIT
NO. 2
CONSOLIDATED EDISON COMPANY OF NEW YORK
2 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS REPORT. INDIAN POINT NUCLEAR GENERATING UNIT
NO. 2, MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 2 -- ZIRCONIUM-WATER REACTION IS QUENCHED AND CORE REFLOODED IN 430 SEC WITH ONLY 5 PERCENT REACTION FOLLOWING A DOUBLE-ENDED PIPE RUPTURE WITH ONLY 2 OF 3 DIESELS, ONLY 1 OF 3 SAFETY INJECTION PUMPS, AND 1 OF 2 RESIDUAL HEAT REMOVAL PUMPS WORKING. RESULT -- CONTAINMENT DESIGN PRESSURE NOT EXCEEDED.

*DESIGN CRITERIA + *METAL WATER REACTION + *REGULATION, AEC +
*SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + REACTOR, PRESSURIZED WATER +
SAFETY INJECTION

CATEGORY 8
SOURCES OF ENERGY RELEASE UNDER ACCIDENT CONDITIONS

8-10887 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2. CONSOLIDATED EDISON COMPANY OF NEW YORK
3 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2, MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 17 -- IN ANALYSIS WHEREIN NO SAFETY WATER INJECTION ALLOWED BUT ONLY ONE EACH CONTAINMENT SPRAY PUMPS OR AIR COOLERS FAILED, PRESSURE PEAK WAS 43.4 PSIG (HYDROGEN BURNS AFTER 44 PERCENT ZIRCONIUM REACTION). IN OTHER DOUBLE-ENDED PIPE RUPTURES, PRESSURE PEAK WAS 40 PSIG.

*CONTAINMENT DESIGN + *DESIGN CRITERIA + *PRESSURE, INTERNAL + *REGULATION, AEC + INDIAN POINT II + LOSS OF COOLANT + METAL WATER REACTION + REACTOR, PRESSURIZED WATER + SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS

8-10899 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2 CONSOLIDATED EDISON COMPANY OF NEW YORK
37 PAGES, 21 FIGURES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2, MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 4 IS REALLY FIVE QUESTIONS RELATING TO CALCULATION OF DOUBLE-ENDED PIPE RUPTURE CONTAINMENT-PRESSURE TRANSIENT AND EFFECT OF VARIOUS ENGINEERED SAFEGUARDS - (A) RELATES TO METAL-WATER, HYDROGEN REACTION, AND OTHER ENERGY SOURCES, (B) SHOWS THE ENERGY DISSIPATION FOR THE FIRST 30 MIN. POST INCIDENT, (C) SHOWS PERCENTAGE OF CORE ZIRCONIUM ABOVE CERTAIN TEMPERATURES VS TIME, (D) (E) (F) PROVIDES GRAPHS OF PRESSURE TRANSIENTS WITH VARIOUS ENGINEERED SAFEGUARDS NOT WORKING, AND WITH VARIOUS STEP INCREASES OF ENERGY.

*ENGINEERED SAFEGUARD + *LOSS OF COOLANT + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + PRESSURE, INTERNAL + REACTOR, PRESSURIZED WATER

8-11366 QUAD-CITIES STATION, UNIT 1 - PLANT DESIGN ANALYSIS, VOLUME 1
COMMONWEALTH EDISON COMPANY, CHICAGO
14 PAGES, 3 REFERENCES, 1 TABLE, PAGES V-1-16 TO 31, DOCKET NO. 50-254, MAY 31, 1966 PDR

IMMEDIATELY AFTER THE MAJOR PIPE RUPTURE, THE TEMPERATURE OF THE WATER IN THE SUPPRESSION CHAMBER APPROACHES 130 F, AND THE MAXIMUM SYSTEM PRESSURE APPROACHES 39 PSIG DURING THE BLOWDOWN OF THE PRIMARY COOLANT INTO THE DRYWELL. THE CONTAINMENT PRESSURE IS A FUNCTION OF THE METAL-WATER REACTION RATE. ALTHOUGH THE CORE-COOLING SYSTEMS ARE ASSUMED NOT TO FUNCTION IN ORDER TO PROVIDE A BASIS FOR METAL-WATER REACTIONS, ONE OF THE TWO CONTAINMENT COOLING SYSTEMS IS ASSUMED TO FUNCTION NORMALLY. THE DRYWELL SPRAY IS SUFFICIENT TO TRANSPORT THE DECAY HEAT, THE HEAT STORED IN THE CORE, AND ANY HEAT RESULTING FROM THE METAL-WATER REACTION TO THE WET-Well IN THE FORM OF HOT LIQUID. THE ENERGY TRANSPORTED TO THE WATER IN THE SUPPRESSION CHAMBER IS REMOVED FROM THE CONTAINMENT SYSTEM BY HEAT EXCHANGERS. TO ORBITATE THE POSSIBILITY OF AN ENERGY RELEASE WITHIN THE PRIMARY CONTAINMENT FROM A HYDROGEN-OXYGEN REACTION UNDER CONDITIONS MORE SEVERE THAN CAN CURRENTLY BE FORESEEN, THE DESIGN INCLUDES AN INERTING SYSTEM TO REDUCE THE OXYGEN CONCENTRATION OF THE ATMOSPHERE WITHIN THE PRIMARY CONTAINMENT.

*CONTAINMENT SPRAY + *CONTAINMENT, PRESSURE SUPPRESSION + *METAL WATER REACTION + *QUAD CITIES 1 + *ZIRCALOY + CHEMICAL REACTION + CONTAINMENT ATMOSPHERE, INERT + HYDROGEN + OXYGEN + REACTOR, BOILING WATER + SAFEGUARDS REPORT, PRELIMINARY

8-11413 SKARPÉLOS JM
CHEMISTRY OF ESADE-VBWR NUCLEAR SUPERHEAT LOOP
GENERAL ELECTRIC COMPANY, SAN JOSE, CALIFORNIA
GEAP-4813 +. 38 PAGES, FEBRUARY 1964, CFSTI, \$2.00 CY, \$0.50 MN

THE CHEMISTRY PROGRAM ASSOCIATED WITH THE ESADE-VBWR NUCLEAR SUPERHEAT LOOP WAS CARRIED ON WITH THE PRIMARY PURPOSE OF DETECTING THE FAILURE OF FUEL CLADDING AND MEASURING THE FISSION-PRODUCT RELEASE RATE. TO ACCOMPLISH THIS OBJECTIVE, NOBLE-GAS FISSION PRODUCTS AND RADIOIODINES WERE MONITORED IN THE LOOP INLET AND OUTLET STEAM. RADIOCHEMISTRY MEASUREMENTS MADE DURING IRRADIATION GAVE NO INDICATION OF DEFECTIVE FUEL. RESULTS AFTER SIPPING THE FUEL BUNDLE AT THE COMPLETION OF THE IRRADIATION INDICATED THAT A FUEL ELEMENT MIGHT HAVE BEEN DEFECTIVE. HOWEVER, THE SIGNAL WAS SUFFICIENTLY WEAK THAT IF A DEFECT WERE PRESENT IT WAS VERY SMALL. PROBLEMS ASSOCIATED WITH STEAM SAMPLING DID NOT DETRACT FROM THE MAJOR OBJECTIVE, WHICH WAS TO DETERMINE OPERATING LIMITS FOR SUPERHEAT FUEL ELEMENTS OF INTEREST.

*CHEMICAL REACTION + *FAILURE, FUEL ELEMENT + *VBWR (VALLECITOS BOILING WATER REACTOR) + REACTOR, BOILING WATER + REACTOR, SUPERHEAT

CATEGORY 9
NUCLEAR INSTRUMENTATION, CONTROL, AND SAFETY SYSTEMS

9-C8716 CORNELL DC
SAFE-PCRS. A COMPUTER PROGRAM FOR THE STRESS ANALYSIS OF COMPOSITE BODIES OF REVOLUTION. INPUT INSTRUCTIONS
GENERAL ATOMIC
GA-6588 +. 40 PAGES, FIGURES, TABLES, 2 REFERENCES- AUGUST 1, 1965- CFSTI, \$2.00 CY, \$0.75 MN.

A COMPUTER PROGRAM FOR THE STRESS ANALYSIS OF COMPOSITE BODIES OF REVOLUTION. INPUT INSTRUCTIONS.

*COMPUTER PROGRAM + *STRESS ANALYSIS + DESIGN STUDY + PROPERTY, PHYSICAL

9-09416 ZIEMANN DL
MODIFICATION OF PNPFC CONTROL ROD CABLES DUE TO EXCESSIVE ROD DROPS
PIQUA NUCLEAR POWER FACILITY
PNPF-69-66 +. 4 PAGES, MARCH 22, 1966, DOCKET NO. 115-2, PDR

MANY CASES OF SHORTING-TO-GROUND HAVE OCCURRED DUE TO COOLANT CARRURIZATION AND MECHANICAL CAMAGE. VARIOUS MODIFICATIONS WILL BE MADE RATHER THAN CHANGE TO A COMPLETELY SEALED SYSTEM.

*FAILURE, COMPONENT + *PIQUA + *REACTOR, ORGANIC COOLED + *SCRAM, FALSE + MODIFICATION, SYSTEM OR EQUIPMENT

9-10040 WASHBURN B + HUDSON CE
PIN TECHNIQUE FOR DISPLACEMENT MEASUREMENTS IN KIWI TNT
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS
LA-3388-MS +. 21 PAGES, 14 FIGURES, JUNE 1965, CFSTI, \$1.00 CY, \$0.05 MN

A PIN TECHNIQUE THAT WAS USED TO MEASURE RELATIVELY SMALL, EARLY, OUTWARD DISPLACEMENTS OF THE TNT REACTOR CORE AND REFLECTOR CYLINDER COMPONENTS DURING THE KIWI TRANSIENT NUCLEAR TEST IS DESCRIBED. CONSIDERATIONS NECESSARY TO ADAPT THIS METHOD TO THE ENVIRONMENT OF THE REACTOR TRANSIENT AND THE RESULTS ARE PRESENTED. AN EXPERIMENT TO DETERMINE THE TIMES OF CLOSING OF SELECTED PROPELLANT PASSAGES BY USING COAXIAL WIRES IS ALSO GIVEN.

*KIWI TNT (TRANSIENT NUCLEAR TEST) + INSTRUMENTATION, GENERAL

9-10156 RUDY GC + SWANSON DH + GREGORY JG + PEARCE WR + SHULTZ TG + STONE JT
SAFETY INSTRUMENTATION REVIEW AND RESULTING MODIFICATIONS FOR PATHFINDER POWER PLANT
ALLIS-CHALMERS MANUFACTURING COMPANY, BETHESDA
ACNP-64638 +. 83 PAGES, 74 FIGURES, FEBRUARY 12, 1966, DOCKET NO. 50-130, PDR

THE AS-BUILT NUCLEAR AND PROCESS SAFETY INSTRUMENTATION WAS GIVEN A COMPLETE REVIEW BY EVALUATING IT AGAINST A MODERN GENERAL SAFETY POLICY AND A SET OF SPECIFIC DESIGN SPECIFICATIONS. THE ORIGINAL DESIGN WAS DEFICIENT IN MANY AREAS, AND MODIFICATIONS WERE MADE TO SATISFY THE DESIGN SPECIFICATIONS. SEVERAL NEW PROTECTIVE CHANNELS WERE ADDED, AND SECOND CHANNELS WERE ADDED TO MOST OF THE PROCESS CHANNELS. PROVISION WAS MADE TO TEST ALL THE CHANNELS AT POWER. RELAY MATRICES WERE ADDED TO BACK UP THE SOLID-STATE LOGIC SCRAM CIRCUITS.

*DESIGN CRITERIA + *MODIFICATION, SYSTEM OR EQUIPMENT + *PATHFINDER + *PLANT PROTECTIVE SYSTEM + *SAFETY PRINCIPLES AND PHILOSOPHY + REACTOR SAFETY SYSTEM + REACTOR, BOILING WATER + REGULATION, AEC

9-10282 MIROWSKY BJ
EFFECTS OF SHORT-DURATION POWER INTERRUPTIONS ON THE COMPUTERIZED CHECKOUT SYSTEM FOR NASA
GENERAL ELECTRIC COMPANY, DAYTONA BEACH, FLA.
36 PAGES, 18 FIGURES, 2 TABLES, PRESENTED AT THE AMERICAN POWER CONFERENCE 28TH ANNUAL MEETING, APRIL 26-28, 1966, CHICAGO, ILLINOIS, APC, \$0.25 CY

PROBLEM - EXAMINE AND FIND CORRECTIVE METHODS FOR THE DISTURBANCES TO ONLINE COMPUTERS CAUSED BY BRIEF POWER INTERRUPTIONS. APPROACHES - (1) THEORETICAL EVALUATION OF TIME RESPONSES, (2) TEST RESPONSE OF SYSTEM TO VARIABLE DISTURBANCES. RESULTS - (1) COMPUTER PERFORMANCE WAS UNACCEPTABLE FOR INTERRUPTIONS LONGER THAN 1 MSEC, (2) MINIMUM RECOVERY TIME FOR COMMERCIAL POWER SYSTEMS IS 80 MSEC. CONCLUSIONS - (1) IT IS NOT PRACTICAL TO MODIFY THE COMPUTER SYSTEMS OR THE COMMERCIAL POWER SYSTEMS TO GIVE SATISFACTORY RECOVERY, (2) PRACTICAL ANSWER IS TO INTERPOSE A LOCAL, CONTINUOUS, AC-POWER SYSTEM OF EITHER A DIESEL-DRIVEN CLUTCH, CONNECTED ROTATING SYSTEM, OR A BATTERY-BACKED, STATIC, AC GENERATOR.

*COMPUTER, DIGITAL + *ELECTRIC POWER, VITAL + *EMERGENCY POWER, ELECTRIC + *FAILURE, GENERAL + COMPARISON, THEORY AND EXPERIENCE + TEST, SYSTEM OPERABILITY

9-10290 WHITTEN LG
POSITION MONITORING DEVICES
UNION CARBIDE CORP., OAK RIDGE, Y-12 PLANT
Y-1506 +. 32 PAGES, 41 FIGURES, APRIL 1966, CFSTI, \$2.00 CY, \$0.50 MN

A BRIEF REVIEW OF POSITION-MEASURING SYSTEMS IS PRESENTED. MECHANICAL, OPTICAL, AND ELECTRICAL SYSTEMS ARE COVERED. THE EMPHASIS IS ON SYSTEMS THAT ARE USED WITH MACHINE TOOLS. HOWEVER, SOME SYSTEMS MAY BE USEFUL FOR ACCURATE POSITION MEASUREMENTS OF CONTROL-ROD DRIVES.

*INSTRUMENTATION, GENERAL + *MEASUREMENT, GENERAL + CONTROL ROD DRIVE

CATEGORY 9
NUCLEAR INSTRUMENTATION, CONTROL, AND SAFETY SYSTEMS

9-1C291 ROUX DP
PARALLEL-PLATE MULTISECTION IONIZATION CHAMBERS FOR HIGH-PERFORMANCE REACTORS
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE
ORNL-3929 +. 17 PAGES, 9 FIGURES, 6 TABLES, APRIL 1966, CFSTI, \$2.00 CY

A NEW MODEL OF PARALLEL-PLATE MULTISECTION IONIZATION CHAMBERS WAS DEVELOPED FOR REACTOR CONTROL APPLICATIONS IN HIGH-PERFORMANCE REACTORS. THE ARRANGEMENT OF THE CHAMBER ALLOWS THE COMBINATION OF DIFFERENT ACTIVE SECTIONS IN A SINGLE REACTOR PENETRATION. EACH ACTIVE SECTION IS COMPRISED OF PARALLEL-PLATE ELECTRODES, EACH 1.8 IN. IN DIAMETER AND 0.005 IN. THICK. THE ELECTRODES ARE COATED WITH B-10 FOR USE AS NEUTRON-SENSITIVE CHAMBERS, WITH U-235 FOR USE AS FISSION CHAMBERS, OR LEFT UNCOATED FOR USE AS GAMMA-SENSITIVE CHAMBERS. ALSO, A GAMMA-COMPENSATED NEUTRON-SENSITIVE CHAMBER CAN BE MADE BY USING BORON-COATED AND UNCOATED ELECTRODES. A NEW ELECTRODE CONFIGURATION IS USED TO ACHIEVE AN ELECTRICALLY ADJUSTABLE GAMMA COMPENSATION. EXPERIMENTAL RESULTS SHOW THE INSENSITIVITY OF THE GAMMA COMPENSATION TO WIDE VARIATIONS IN INTENSITY, ENERGY, AND GEOMETRY OF THE GAMMA BACKGROUND.

CHAMBER, COMPENSATED + CHAMBER, FISSION + CHAMBER, ION + CHAMBER, NEUTRON + CHAMBER, UNCOMPENSATED + EQUIPMENT DESIGN + INSTRUMENTATION, NUCLEAR + ORNL (OAK RIDGE NATIONAL LABORATORY) + TEST, COMPONENT

9-10292 KING W
REACTOR CONTROL AND PROTECTION SYSTEMS FUNCTIONAL REQUIREMENTS AND PERFORMANCE
WESTINGHOUSE ELECTRIC CORPORATION, PITTSBURGH, ATOMIC POWER DIV.
WCAP-3269-45 +. 114 PAGES, 60 FIGURES, MARCH 1965, CFSTI, \$4.00 CY, \$0.75 MN

PURPOSE - DESIGN STUDY FOR CONTROL AND PROTECTION SYSTEMS FOR A 395-MWE PWR. APPROACH - (1) DETERMINE FUNCTIONAL REQUIREMENTS, (2) EXAMINE PERFORMANCE OF PROPOSED SYSTEMS WITH AN ANALOG COMPUTER SIMULATION, (3) EXAMINE THE SENSITIVITY OF PLANT RESPONSES TO CHANGES IN THE PLANT DESIGN PARAMETERS. RESULTS - (1) PROPOSED CONTROL SYSTEM SHOWED GOOD TRANSIENT RESPONSES TO VARIOUS CHANGES IN ELECTRICAL LOAD, (2) PROPOSED PROTECTION SYSTEM GAVE ADEQUATE PERFORMANCE FOR VARIOUS POSTULATED ACCIDENTS.

*CONTROL SYSTEM + *DESIGN CRITERIA + *DESIGN STUDY + *PLANT PROTECTIVE SYSTEM + *REACTOR CONTROL + *REACTOR SAFETY SYSTEM + COMPUTER, ANALOG + MATHEMATICAL STUDY + REACTOR STABILITY + REACTOR, PRESSURIZED WATER

9-10388 BATES AEG
DESCRIPTION AND OPERATING INSTRUCTIONS FOR THE LTR REACTOR CONTROL AND INSTRUMENTATION SYSTEMS
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE
ORNL-TM-1190 +. 41 PAGES, 9 FIGURES, 2 TABLES, JULY 1965, CFSTI, \$2.00 CY, \$0.50 MN

THE REACTOR CONTROL AND INSTRUMENTATION SYSTEMS FOR THE LTR WERE UPGRADED. THE PROCESS-SYSTEM HARDWARE WAS COMPLETELY REPLACED WITH THE MOST MODERN AND VERSATILE ALL-ELECTRONIC EQUIPMENT. THE NUCLEAR-SYSTEM ASSEMBLIES WERE REBUILT AND IMPROVED SO THAT THEY WOULD BE INTERCHANGEABLE DIRECTLY, OR AFTER MINOR MODIFICATION, WITH COMPATIBLE OAK RIDGE RESEARCH REACTOR (ORR) ASSEMBLIES. ALL CONTROL-SYSTEM HARDWARE WAS REPLACED WITH NEW ASSEMBLIES AND COMPONENTS. THIS REPORT DESCRIBES THE SYSTEMS AND DISCUSSES THEIR OPERATION.

*CONTROL SYSTEM + *MODIFICATION, SYSTEM OR EQUIPMENT + *REACTOR SAFETY SYSTEM + INSTRUMENTATION, GENERAL + ORNL (OAK RIDGE NATIONAL LABORATORY) + REACTOR, RESEARCH + SERVOMECHANISM + SYSTEM DESCRIPTION

9-10434 COSTRELL L
STANDARD NUCLEAR INSTRUMENT MODULES
NATIONAL BUREAU OF STANDARDS
TID-20893 (REV.) +. 21 PAGES, 3 FIGURES, 1 TABLE- JANUARY 1966 GPO, \$0.20

REPORT PRESENTS THE SPECIFICATIONS FOR TRANSISTORIZED MODULAR INSTRUMENTS ADOPTED BY THE AEC COMMITTEE ON NUCLEAR INSTRUMENT MODULES FOR STANDARD NUCLEAR INSTRUMENT MODULES. REPORT INCLUDES CORRECTIONS AND CHANGES MADE TO THE ORIGINAL SPECIFICATIONS.

DESIGN CRITERIA + INSTRUMENTATION, GENERAL + INSTRUMENTATION, NUCLEAR

9-10439 BUMP TR + SIMMONS WR
HOLD-DOWN REQUIREMENTS FOR POISON CONTROL RODS
ARGONNE NATIONAL LABORATORY, ARGONNE
3 PAGES, 3 REFERENCES, PRESENTED AT ANS ANNUAL MEETING, JUNE 20-23, 1966, DENVER, COLORADO

PROBLEM--IN REACTORS WITH LIQUID-METAL COOLANTS, THE VESSEL OR CLOSURE DESIGN MAY BE DICTATED BY THE ROD HOLD-DOWN REQUIREMENTS, RATHER THAN BY COOLANT PRESSURE. IT IS NECESSARY TO ENSURE THAT A MINOR ACCIDENT CANNOT FORCE THE RODS OUT OF THE REACTOR CORE AND CAUSE A MORE SERIOUS ACCIDENT. APPROACH--FOUR POSSIBLE MECHANISMS THAT MIGHT FORCE THE RODS FROM THE CORE WERE EXAMINED FOR THE FARET DESIGN.

ACCIDENT, REACTIVITY + CONTROL ROD DRIVE + DESIGN CRITERIA + EXCURSION, LARGE + REACTOR, LIQUID METAL COOLED

9-10447 HIGH-TEMPERATURE MATERIALS PROGRAM. PROGRESS REPORT NO. 41, PART A
GENERAL ELECTRIC COMPANY, CINCINNATI 15, OHIO
GEMP-41A +. 76 PAGES, 49 FIGURES, 21 TABLES, NOVEMBER 30, 1964, CFSTI, \$3.00 CY

THIS REPORT IS ONE OF A SERIES OF SUCH REPORTS ON THE SUBJECTS ENUMERATED BELOW. NO FURTHER

CATEGORY 9
NUCLEAR INSTRUMENTATION, CONTROL, AND SAFETY SYSTEMS

9-10447 *CONTINUED*

REPORTS IN THE SERIES WILL BE SUMMARIZED UNLESS A SIGNIFICANT CHANGE IN THE PROGRAM OR A SIGNIFICANT ITEM OF INTEREST TO NSIC IS REPORTED. TOPICS COVERED IN THIS REPORT ARE (1) HIGH-TEMPERATURE THERMOCOUPLE AND ELECTRICAL MATERIALS RESEARCH, (2) ERRORS IN THERMOCOUPLES PRODUCED BY RADIATION EXPOSURE, (3) ELECTRICAL RESISTANCE OF MATERIALS IN HIGH-TEMPERATURE ENVIRONMENTS.

*INSTRUMENTATION, TEMPERATURE + *MEASUREMENT, TEMPERATURE + HIGH TEMPERATURE + RADIATION EFFECT

9-10448 SYMPOSIUM ON IN-CORE INSTRUMENTATION, OSLO, JUNE 15-19, 1964, VOLUME I AND II
EUROPEAN NUCLEAR ENERGY AGENCY, PARIS AND NORWAY + OECD HALDEN REACTOR PROJECT
CONF-640607 +. 1023 PAGES, FIGURES, TABLES, JUNE 15, 1964, DEP/MN

A SERIES OF PAPERS REVIEW THE WORK ON IN-CORE INSTRUMENTATION IN THE MAJORITY OF THE EUROPEAN COUNTRIES AND THE USA AND CANADA. ALSO PAPERS ON INDIVIDUAL INSTRUMENTS SUCH AS TURBINE FLOWMETERS, VOID MEASUREMENT, STEAM-QUALITY MEASUREMENT, BURNOUT-PROTECTION DEVICES, THERMOCOUPLES, CHAMBERS, AND FAILED-FUEL-ELEMENT DETECTORS. THE MAJORITY OF THE PAPERS ARE ON INSTRUMENTS ASSOCIATED WITH THE HALDEN REACTOR PROJECT.

*IN CORE MEASUREMENT + *INSTRUMENTATION, IN CORE + INSTRUMENTATION, DETECTION FAILED FUEL ELEMENT + INSTRUMENTATION, FLOW + INSTRUMENTATION, NUCLEAR + INSTRUMENTATION, TEMPERATURE + REVIEW

9-10461 WILMER WB + BICKLEY JD + STUDLEY RV + TAYLOR WM + THOMPSON JJ
REACTOR ON-LINE COMPUTER

SAVANNAH RIVER PLANT

DPSPU 66-30-6 + CONF-660408-3 +. 27 PAGES, MARCH 1966, PRESENTED AT INSTRUMENT SOCIETY OF AMERICA
SOUTHEASTERN CONFERENCE AND EXHIBIT, AUGUSTA, GEORGIA, APRIL 19-21, 1966, CFSTI, \$2.00 CY, \$0.50 MN

PROBLEM - MONITOR 3000 SENSORS FOR THE REACTOR AND COOLING SYSTEMS OF A LARGE PRODUCTION REACTOR. APPROACH - ON-LINE DIGITAL COMPUTER IS USED TO MONITOR THE LARGE NUMBER OF OPERATING VARIABLES AND ALARM WHEN LIMITS ARE EXCEEDED. THE COMPUTER PROVIDES OPERATORS WITH DATA FOR ADJUSTING RADIAL AND AXIAL POWER DISTRIBUTIONS. REPORT GIVES DETAILS OF THE COMPUTER HARDWARE, MAINTENANCE, AND PROCUREMENT. RESULTS - THE SYSTEM HAS BEEN OPERATING SATISFACTORILY FOR OVER A YEAR AND WILL BE PROTOTYPE FOR THREE OTHER REACTORS. THE INPUT SYSTEM IS DESCRIBED IN DPSPU 66-30-6 (NSIC NO. 10569).

*COMPUTER, DIGITAL + *DATA PROCESSING + *INSTRUMENTATION, GENERAL + *INSTRUMENTATION, IN CORE + *MONITORING SYSTEM + *REACTOR, HEAVY WATER + *SAVANNAH RIVER PRODUCTION REACTORS

9-10469 REACTOR INSTRUMENTATION AND CONTROL. PROGRESS REPORT NO. 87
GENERAL ELECTRIC COMPANY, CINCINNATI, OHIO
GEMP-87 +. 19 PAGES, 12 FIGURES, 1 TABLE, MARCH 31, 1965, CFSTI, \$1.00 CY

THIS REPORT IS ONE OF A SERIES OF SUCH REPORTS ON THE SUBJECTS ENUMERATED BELOW. NO FURTHER REPORTS IN THE SERIES WILL BE SUMMARIZED UNLESS A SIGNIFICANT CHANGE IN THE PROGRAM OR A SIGNIFICANT ITEM OF INTEREST TO NSIC IS REPORTED. TOPICS COVERED ARE (1) DEVELOPMENT OF A CAPACITANCE PROBE-TYPE TEMPERATURE SENSOR, (2) DEVELOPMENT OF A-C NEUTRON CHAMBERS, (3) DEVELOPMENT OF AN A-C FLUX CONTROL SYSTEM, AND (4) CHARGED-FRAGMENT NEUTRON DETECTORS.

*CHAMBER, GENERAL + *INSTRUMENTATION, CONTROL + *INSTRUMENTATION, NUCLEAR + *INSTRUMENTATION, TEMPERATURE + HIGH TEMPERATURE + MEASUREMENT, TEMPERATURE + TEST, INSTRUMENT RESPONSE

9-10470 REACTOR INSTRUMENTATION AND CONTROL. PROGRESS REPORT NO. 83
GENERAL ELECTRIC COMPANY, CINCINNATI, OHIO
GEMP-83 +. 25 PAGES, 15 FIGURES, JULY 31, 1964, CFSTI, \$0.50 CY

SEE NSIC 10469 FOR A LIST OF THE PROBLEMS BEING STUDIED ON THIS PROJECT.

*CHAMBER, GENERAL + *INSTRUMENTATION, CONTROL + *INSTRUMENTATION, NUCLEAR + *INSTRUMENTATION, TEMPERATURE + HIGH TEMPERATURE + MEASUREMENT, TEMPERATURE + TEST, INSTRUMENT RESPONSE

9-10471 REACTOR INSTRUMENTATION AND CONTROL. PROGRESS REPORT NO. 85
GENERAL ELECTRIC COMPANY, CINCINNATI, OHIO
GEMP-85 +. 23 PAGES, 14 FIGURES, NOVEMBER 30, 1964, CFSTI, \$2.00 CY

SEE NSIC 10469 FOR A LIST OF THE PROBLEMS BEING STUDIED ON THIS PROJECT.

*CHAMBER, GENERAL + *INSTRUMENTATION, CONTROL + *INSTRUMENTATION, NUCLEAR + *INSTRUMENTATION, TEMPERATURE + HIGH TEMPERATURE + MEASUREMENT, TEMPERATURE + TEST, INSTRUMENT RESPONSE

9-10472 WILDE N + BOLAND TJ + ANDERSON SD
INSTRUMENT DEVELOPMENT BRANCH ANNUAL REPORT, 1964
PHILLIPS PETROLEUM COMPANY, IDAHO

ID0-17112 +. 94 PAGES, 79 FIGURES, 8 TABLES, 36 REFERENCES, DECEMBER 1965, CFSTI, \$4.00 CY, \$1.00 MN

PHILLIPS PETROLEUM COMPANY, NRTS, INSTRUMENT DEVELOPMENT BRANCH ANNUAL REPORT, 1964. THIS REPORT IS ONE OF A SERIES OF SUCH REPORTS ON THE SUBJECTS ENUMERATED BELOW. NO FURTHER REPORTS IN THE SERIES WILL BE SUMMARIZED UNLESS A SIGNIFICANT CHANGE IN THE PROGRAM OR A

CATEGORY 9
NUCLEAR INSTRUMENTATION, CONTROL, AND SAFETY SYSTEMS

9-10472 *CONTINUED*

SIGNIFICANT ITEM OF INTEREST TO NSIC IS REPORTED. TOPICS COVERED ARE - (1) TRANSIENT ANALYSIS, (2) MEASUREMENT OF KINETIC PARAMETERS, (3) INSTRUMENT COMPONENT AND SYSTEMS DEVELOPMENT.

*HYDRAULIC ANALYSIS + *INSTRUMENTATION, GENERAL + *MATHEMATICAL STUDY + *MEASUREMENT, GENERAL + *NRTS (NATIONAL REACTOR TEST STATION) + *REACTOR DYNAMICS

9-10473 PRESSURIZED WATER REACTOR (PWR) PROJECT. TECHNICAL PROGRESS REPORT, OCTOBER 24, 1964 - JANUARY 23, 1965
BETTIS ATOMIC POWER LABORATORY, PITTSBURGH, PENNSYLVANIA
WAPD-MRP-111 +. 98 PAGES, 10 FIGURES, 14 TABLES, CFSTI, \$2.50 CY

BETTIS ATOMIC POWER LABORATORY PROGRESS REPORT, OCTOBER - JANUARY, 1965. THIS REPORT IS ONE OF A SERIES OF SUCH REPORTS ON THE SUBJECTS ENUMERATED BELOW. NO FURTHER REPORTS IN THE SERIES WILL BE SUMMARIZED UNLESS A SIGNIFICANT CHANGE IN THE PROGRAM OR A SIGNIFICANT ITEM OF INTEREST TO NSIC IS REPORTED. TOPICS COVERED IN THIS REPORT ARE (1) SHIPPINGPORT PWR OPERATING EXPERIENCE, (2) PLANT DEVELOPMENT, (3) ANALYSIS OF PLANT DYNAMICS AND SAFETY LIMITS, (4) XENON OSCILLATIONS, AND (5) FEEDBACK OR FAILED FUEL ELEMENT DETECTION SYSTEM.

*INSTRUMENTATION, GENERAL + *MATHEMATICAL STUDY + *MODIFICATION, SYSTEM OR EQUIPMENT + *OPERATING EXPERIENCE + CONTROL SYSTEM + INSTRUMENTATION, DETECTION FAILED FUEL ELEMENT + REACTOR DYNAMICS + REACTOR SAFETY SYSTEM + REACTOR, PRESSURIZED WATER + SHIPPINGPORT + XENON OSCILLATION

9-10504 QUARTERLY TECHNICAL PROGRESS REPORT - AEC UNCLASSIFIED PROGRAMS - JANUARY TO MARCH 1965
ATOMICS INTERNATIONAL, CANOGA PARK, CALIFORNIA
NAA-SR-11200 +. 256 PAGES, FIGURES, TABLES, APRIL 15, 1965, CFSTI, \$6.00 CY

ATOMICS INTERNATIONAL PROGRESS REPORT, JANUARY TO MARCH, 1965 - THIS REPORT IS ONE OF A SERIES OF SUCH REPORTS ON THE SUBJECTS ENUMERATED BELOW. NO FURTHER REPORTS IN THE SERIES WILL BE SUMMARIZED UNLESS A SIGNIFICANT CHANGE IN THE PROGRAM OR A SIGNIFICANT ITEM OF INTEREST TO NSIC IS REPORTED. TOPICS COVERED IN THIS REPORT ARE FAST-REACTOR DEVELOPMENT, BOILING STUDIES FOR SODIUM REACTOR SAFETY, SODIUM FIRES AND FISSION PRODUCT RELEASE, FUEL ELEMENT TRANSIENT HEATING, HALLAM FUEL SURVEILLANCE PROGRAM, MEASUREMENT OF DOPPLER COEFFICIENTS, FAST-SPECTRUM DOPPLER MEASUREMENTS, FISSION-PRODUCT RETENTION BY REACTOR COOLANTS, CONTINUOUS NEUTRON FLUX MONITOR AND ATMOSPHERIC DECONTAMINATION IN REACTOR ACCIDENTS.

*AIR CLEANING + *DOPPLER COEFFICIENT + *FILTER + *FIRE + *FISSION PRODUCT RELEASE, GENERAL + *FISSION PRODUCT RETENTION + *FUEL INTEGRITY + *HALLAM + *INSTRUMENTATION, IN CORE + *REACTOR, FAST + *REACTOR, LIQUID METAL COOLED + *SODIUM + REACTOR, GRAPHITE MODERATED

9-10508 SCHNEIDER MF
ADVANCED SPACEBORNE DOSIMETRY INSTRUMENTATION
KIRTLAND AIR FORCE BASE, NEW MEXICO
AFWL-TDR-64-96 +. 168 PAGES, 80 FIGURES, 12 TABLES, 15 REFERENCES, DECEMBER 1965

PROBLEM - MEASURE THE RADIATION DOSE TO PERSONNEL IN MANNED SPACE FLIGHTS. APPROACH - A BASIC DOSIMETER SYSTEM WAS DEVELOPED CONSISTING OF - TISSUE-EQUIVALENT ION CHAMBER, A LOGARITHMIC ELECTROMETER, MAGNETIC AMPLIFIERS, A DECADE SWITCHING UNIT, AND AN AUTOMATIC CALIBRATION CIRCUIT FOR PULSING THE CHAMBER HIGH VOLTAGE. THE BASIC UNIT WAS ADAPTED FOR A GEMINI DOSIMETER, AIR FORCE SATELLITE DOSIMETER, AND MANNED-SPACE-SYSTEMS PORTABLE SURVEY DOSIMETER. RESULTS-- PERFORMANCE UNDER EXTENSIVE TESTING PROGRAMS AND IN THE GEMINI GT-4 FLIGHT IS PRESENTED.

*DOSE MEASUREMENT, EXTERNAL + *INSTRUMENTATION CALIBRATION + *INSTRUMENTATION, RADIATION MONITORING + *MONITOR, RADIATION, PERSONNEL + COMPARISON, THEORY AND EXPERIENCE + EQUIPMENT DESIGN + SPACECRAFT + TEST, INSTRUMENT RESPONSE

9-10509 ANALOG MODELS FOR HNPFC CONTROL AND PROTECTION STUDIES
ATOMICS INTERNATIONAL, CANOGA PARK
NAA-SR-8579 +. 69 PAGES, 16 FIGURES, 7 TABLES, 10 REFERENCES, JUNE 1964, CFSTI, \$1.50 CY

PROBLEM - DEVELOP A MODEL FOR THE DYNAMIC BEHAVIOR OF THE HNPFC. APPROACH - AN ANALOG COMPUTER MODEL WAS DEVELOPED FOR USE IN STUDIES OF THE CONTROL AND SAFETY SYSTEMS. THE MODEL INCLUDES - NEUTRON KINETICS, AFTERHEAT, CORE HEAT-TRANSFER FOR AVERAGE CHANNEL AND HOT CHANNEL, PRIMARY-COOLANT HYDRAULICS FOR FORCED AND CONVECTION FLOWS, PUMP DRIVES, CONTROL SYSTEM, AND PROTECTIVE SYSTEM. THE SIMULATIONS OF THE VARIOUS SECTIONS ARE DESCRIBED IN DETAIL.

*ANALYTICAL MODEL + *COMPUTER PROGRAM + *COMPUTER, ANALOG + *REACTOR DYNAMICS + CONTROL SYSTEM + HALLAM + MATHEMATICAL STUDY + REACTOR SAFETY SYSTEM + REACTOR, LIQUID METAL COOLED

9-10512 RUSSELL JA + KNOWLES DJ
DESCRIPTION OF FACILITY RADIATION AND CONTAMINATION ALARM SYSTEMS INSTALLED IN THE HIGH-FLUX ISOTOPE REACTOR FACILITY, BUILDING 7900
OAK RIDGE NATIONAL LABORATORY
ORNL-TM-1393 +. 21 PAGES, 8 FIGURES, 2 TABLES, DECEMBER 8, 1965, CFSTI \$1.00 CY, \$0.50 MN

PROBLEM - TO MONITOR THE GAMMA-RADIATION LEVEL AND AIR-CONTAMINATION LEVEL IN THE ENTIRE FACILITY. APPROACH - NINE MONITORS CONTINUOUSLY MONITOR FOR GAMMA RADIOACTIVITY. NINE CONSTANT AIR-MONITORS CONTINUOUSLY SAMPLE THE AIR IN THE BUILDING FOR RADIOACTIVE

CATEGORY 9
NUCLEAR INSTRUMENTATION, CONTROL, AND SAFETY SYSTEMS

9-10512 *CONTINUED*

(BETA-GAMMA) PARTICLES. ABNORMAL RADIATION LEVELS OR AIR ACTIVITY PRODUCE THE FOLLOWING ACTIONS - SOUND LOCAL ALARM, SOUND ALARM IN REACTOR-CONTROL ROOM, SOUND THE BUILDING-EVACUATION AIR HORNS, AND ACTIVATE AN ALARM IN THE LABORATORY EMERGENCY CONTROL CENTER.

EQUIPMENT DESIGN + INSTRUMENTATION, RADIATION MONITORING + MONITOR, RADIATION, AIR + MONITOR, RADIATION, BACKGROUND + MONITOR, RADIATION, ENVIRONMENTAL + SYSTEM DESCRIPTION

9-10515 BYRD JS + DEXTER AH + GOOSEY MH + HUTTER CR + LEEP RW + WILSON JN
DESCRIPTION OF A TEMPERATURE MONITOR FOR LARGE REACTORS. PART III, PERFORMANCE
SAVANNAH RIVER LABORATORY, DUPONT
DP-944 +. 28 PAGES, 21 FIGURES, JANUARY 1965, CFSTI \$2.00 CY, \$0.50 MN

PROBLEM - EVALUATE TWO ANALOG AND SCANNING DEVICES FOR A DIGITAL COOLANT-TEMPERATURE MONITORING SYSTEM. THE DESIGN OF THE PROTOTYPE SYSTEM IS DESCRIBED IN EARLIER REPORTS, DP-834 AND DP-836. APPROACH - TEST AND COMPARE THE PERFORMANCE OF THE RELAY-COMMUTATOR AND SOLID-STATE COMMUTATOR DESIGNS. RESULTS - THE RELAY-COMMUTATOR SYSTEM GAVE LESS NOISE AND HAD GREATER UNIFORMITY THAN DID THE SOLID-STATE COMMUTATOR, BUT THE LATTER GAVE CONSIDERABLY MORE OVERALL RELIABILITY. CONCLUSION - MONITORING SYSTEM SHOULD BE ADEQUATE FOR TEMPERATURE MONITORING IN A REACTOR, AND THE SOLID-STATE COMMUTATOR WILL BE USED IN PREFERENCE TO THE RELAY TYPE.

*COMPUTER, DIGITAL + *INSTRUMENTATION, GENERAL + *INSTRUMENTATION, TEMPERATURE +
*TEST, SYSTEM OPERABILITY + CONTROL, COMPUTER + EQUIPMENT DESIGN + MONITORING SYSTEM

9-10566 WITHERS WT
ROD DRIVE VENTED AT BONUS TO RELIEVE RADIOLYTIC GASES, JUNE 15, 1966
PUERTO RICO WATER RESOURCES AUTHORITY
3 PAGES, JUNE 15, 1966, DOCKET 115-4, ATOMIC ENERGY CLEARING HOUSE, 12(27), PAGES 21-23, (JULY 4, 1966)

SEVENTY-SEVEN PERCENT HYDROGEN AND 17 PERCENT OXYGEN WERE FOUND IN RACK-HOUSING 9. THREE DAYS AT FULL POWER IS ENOUGH FOR THE MIXTURE TO PRODUCE A HYDROGEN-OXYGEN REACTION. VENTS WERE INSTALLED TO THE MAIN STEAM LINE WITH ORIFICES. TESTS SHOWED THAT A BROKEN VENT LINE WOULD NOT SIGNIFICANTLY AFFECT THE ROD-DROP TIME. SAFETY ANALYSIS DESCRIBED.

*CONTROL ROD DRIVE + *MODIFICATION, SYSTEM OR EQUIPMENT + *RADIOLYTIC GAS +
BONUS (BOTLING NUCLEAR SUPERHEAT PROJECT) + EXPLOSION + OPERATING EXPERIENCE + REACTOR, SUPERHEAT

9-10569 STUOLEY RV + BICKLEY JD
REACTOR ON-LINE COMPUTER INPUT SIGNAL SYSTEM
E. I. DU PONT DE NEMOURS AND COMPANY, SAVANNAH RIVER PLANT
DPSPU-66-30-3 + CONF-660408-2 +. 34 PAGES, 17 FIGURES, TABLES, MARCH 1966, PRESENTED AT INSTRUMENT SOCIETY OF AMERICA SOUTHEASTERN CONFERENCE AND EXHIBIT, AUGUSTA, GEORGIA, APRIL 19-21, 1966, CFSTI, \$1.00 CY, \$0.50 MN

PROBLEM - COUPLE 3300 SENSOR OUTPUTS TO AN ON-LINE DIGITAL COMPUTER USED FOR MONITORING A LARGE PRODUCTION REACTOR. APPROACH - ELEVEN SIGNAL-CONDITIONING SYSTEMS ARE REQUIRED FOR THE LARGE NUMBER AND VARIETY OF INPUT SIGNALS. A MATRIX SWITCHING SYSTEM, USING CROSSBAR SWITCHES, PROVIDES RANDOM SELECTION OF 3600 SIGNAL CIRCUITS FOR CONNECTION TO 36 COMPUTER INPUTS. RESULTS - THE INPUT SYSTEMS GIVE GOOD PERFORMANCE AND ACCURACY. THE SWITCHING SYSTEM HAS A LOW COST OF LESS THAN TEN DOLLARS PER SIGNAL. THE COMPLETE MONITORING SYSTEM IS DESCRIBED IN DPSPU 66-30-3 (NSIC NO. 10461).

*COMPUTER, DIGITAL + *DATA PROCESSING + *INSTRUMENTATION, GENERAL + *MONITORING SYSTEM +
INSTRUMENTATION, IN CORE + REACTOR, HEAVY WATER

9-10620 LEAMER RD + HANLEN DF + HAMILTON GN + TAYLOR EG
CRITICAL EXPERIMENTS PERFORMED WITH CLUSTERED AND UNIFORM ARRAYS OF RODDED ABSORBERS
WESTINGHOUSE ELECTRIC CORPORATION, PITTSBURGH
WCAP-3269-39 +. 103 PAGES, 67 FIGURES, 15 TABLES, 2 REFERENCES, NOVEMBER 1965, CFSTI, \$4.00 CY, \$0.75 MN

CRITICALITY EXPERIMENTS ON REACTIVITY WORTHS OF CLUSTERS AND UNIFORM ARRAYS OF AG-IN-CD ABSORBER RODS WERE MEASURED IN WATER-MODERATED URANIUM OXIDE CORES OF LOW ENRICHMENT. EXPERIMENTAL FACTORS INCLUDED ENRICHMENT, LATTICE PITCH, DIAMETER OF POISON AND FUEL RODS, AND ABSORBER-ROD-CLADDING THICKNESS. FUEL INCLUDED STAINLESS-STEEL-CLAD FUEL RODS OF 2.7, 3.7, AND 5.7 PERCENT ENRICHMENTS, AND ZIRCALOY-4-CLAD RODS OF 2.72 PERCENT ENRICHMENT.

*CONTROL ROD WORTH + *CRITICALITY EXPERIMENT + REACTOR, WATER + URANIUM OXIDE

9-10709 EICKELPASCH N
NUCLEAR SAFETY IN THE DESIGN OF POWER REACTORS
NUCLEAR ENERGY AND RADIATION PROTECTION GROUP, GERMANY, TECHNISCHER UBERWACHUNGSVEREIN BAYERN
ORNL-TR-930 +. 14 PAGES, 2 TABLES, 2 FIGURES, TRANSLATED FROM ATOMKERNENERGIE 10 (5-6)- 187-190 (1965)

THE MOST IMPORTANT SAFETY FEATURES OF POWER REACTORS ARE LISTED, AND THEIR MECHANISM OF ACTION IS EXPLAINED. THE IMPORTANCE OF THE REACTIVITY COEFFICIENTS IS ILLUSTRATED IN PARTICULAR WITH THE EXAMPLE OF SPECIAL REACTOR ACCIDENTS. A CONCEPT OF THE ORDER OF MAGNITUDE OF THE SAFETY FACTORS CITED IS TO BE ESTABLISHED.

CATEGORY 9
NUCLEAR INSTRUMENTATION, CONTROL, AND SAFETY SYSTEMS

9-10709 *CONTINUED*
FAILURE, FUEL ELEMENT + FUEL MELTDOWN + GERMANY + REACTIVITY COEFFICIENT + REACTIVITY, EXCESS +
REACTOR, BOILING WATER + REACTOR, PRESSURIZED WATER + SAFETY PRINCIPLES AND PHILOSOPHY

9-10714 DIETZ KA + MELLOW EW + PACE NE
QUARTERLY TECHNICAL REPORT - STEP PROJECT - JULY 1964-SEPTEMBER 1964 - OCTOBER 1964-DECEMBER 1964
PHILLIPS PETROLEUM COMPANY, IDAHO FALLS, IDAHO
IDO-17077 +. 219 PAGES, 154 FIGURES, 29 TABLES, 37 REFERENCES, MARCH 1966, CFSTI, \$6.00 CY, \$1.25 MN

BRIEF DISCUSSION OF ANALYSIS OF SNAPTRAN 2/10A-3 FUEL WATER-IMMERSSION TEST. SNAPTRAN 2/10A-1
NON-DAMAGE, STEP-REACTIVITY-INSERTION, TRANSIENT TESTS. EXPERIMENTAL MEASUREMENTS AND
INSTRUMENTATION. TESTS INITIATED FROM AMBIENT TEMPERATURES OF LESS THAN 100 F. DIGITAL
COMPUTER CALCULATIONS OF THE POWER AND ENERGY RESPONSE OF THE SNAPTRAN 2/10A-1 REACTOR DURING
AN IMPULSE REACTIVITY INSERTION. PROPOSED SNAPTRAN 2/10A-2 DESTRUCTIVE TEST.

*SNAPTRAN (SNAP TRANSIENT REACTOR TEST SERIES) + COMPUTER, DIGITAL + REACTOR TRANSIENT + TEST, DESTRUCTIVE

9-10716 MAGNUSON DW
STATIC AND DYNAMIC TRANSPORT CALCULATIONS FOR PULSED-NEUTRON EXPERIMENTS WITH SPHERES OF URANYL NITRATE
SOLUTION
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TENNESSEE
ORNL-TM-1213 +. 15 PAGES, 1 FIGURE, 3 TABLES, APRIL 26, 1966, CFSTI, \$1.00 CY, \$0.50 MN

IN STATIC REACTOR CALCULATIONS, THE NEUTRON BALANCE IS MAINTAINED BY ADDING NEUTRONS AT
FISSION ENERGIES. IN DYNAMIC REACTOR CALCULATIONS, THE BALANCE MAY BE MAINTAINED BY ADDING
NEUTRONS WHICH HAVE A SPECTRUM PROPORTIONAL TO THE FLUXES AND INVERSELY PROPORTIONAL TO THE
NEUTRON VELOCITY. SINCE THE NEUTRONS ADDED IN THE TWO METHODS HAVE UNEQUAL IMPORTANCES, THE
REACTIVITIES ARE UNEQUAL. CALCULATIONS FOR APPLICATION TO PULSED-NEUTRON EXPERIMENTS ON
SPHERES OF URANYL NITRATE SOLUTION.

*PULSED NEUTRON TECHNIQUE

9-10717 FOULKE LR + GYFTOPOULOS EP
THE USE OF OSCILLATION TESTS TO INVESTIGATE FLUX TILTING
MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASSACHUSETTS
4 PAGES, 1 FIGURE, 6 REFERENCES, 1966 ANNUAL MEETING AMERICAN NUCLEAR SOCIETY, DENVER, COLORADO, JUNE
20-23, 1966, TRANSACTIONS OF AMERICAN NUCLEAR SOCIETY 9(1)- 271

SMALL-AMPLITUDE OSCILLATION TESTS CAN BE USED TO MEASURE CERTAIN MODAL EIGENVALUES, WHICH MAY
BE USED TO INFER THE SUSCEPTIBILITY OF A POWER REACTOR TO FLUX TILTING. THE PROCEDURE HAS
BEEN APPLIED BOTH TO COMPUTER EXPERIMENTS AND TO EXPERIMENTAL DATA FROM THE NORA REACTOR,
WITH SATISFACTORY RESULTS. IT IS SUGGESTED THAT THE OSCILLATION TECHNIQUE BE USED TO MONITOR
CHANGING SPACE-TIME CHARACTERISTICS OF A REACTOR CORE DURING ITS LIFETIME.

*FLUX TILT + *OSCILLATOR, REACTIVITY + NORWAY + SPACE DEPENDENT DYNAMICS

9-10851 SAKATA H + SCHMID LC
SAFETY ROD INTERACTION IN THE PRCF
BATTELLE-NORTHWEST, RICHLAND, WASHINGTON
BNWL-130 +. 18 PAGES, AUGUST, 1965, CFSTI, \$1.00 CY, \$0.50 MN

IN THE D20-MODERATED PLUTONIUM RECYCLE CRITICAL FACILITY (PRCF), THE AVERAGE WORTH OF A SAFETY
ROD IS 26.1 MK, AND THE WORTH OF ALL THREE RODS INSERTED SIMULTANEOUSLY IS 34 PERCENT LARGER
(ANTISHADOWING EFFECT) THAN THE SUMS OF THE RODS. THE INTERACTION EFFECTS WERE CALCULATED BY
THE METHOD OF NORDHEIM AND SCALETTER AS A FUNCTION OF RADIUS, AND COMPARED WITH THE
EXPERIMENTAL RESULTS. A 31 PERCENT ANTISHADOWING EFFECT IS CALCULATED FOR A RADIUS OF 16
IN., AND THE EFFECT DEPENDS ON THE LOCATION OF THE RODS IN THE CORE.

CONTROL ROD INTERACTION + HEAVY WATER + PLUTONIUM

9-10855 HAEGGBLOM H
THEORETICAL WORK FOR FAST ZERO-POWER REACTOR FRO
AKTIEBOLAGET ATOMENERGI, STOCKHOLM, SWEDEN
AE-194 +. 45 PAGES, TABLES, FIGURES, REFERENCES, AUGUST, 1965, DEP/MN

FOR THE FRO REACTOR, CALCULATIONS OF CONTROL ROD WORTH, PROMPT NEUTRON LIFETIME, EFFECTIVE
DELAYED NEUTRON FRACTION AND OTHER ITEMS. USE OF CARLSON CODES IN SPHERICAL AND CYLINDRICAL
GEOMETRY, AND OF PERTURBATION THEORY AND VARIATIONAL CALCULUS.

*REACTOR, FAST + *SWEDEN + CONTROL ROD WORTH + DELAYED NEUTRON + PROMPT NEUTRON LIFETIME

9-10877 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2.
CONSOLIDATED EDISON COMPANY OF NEW YORK
2 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 7 -- OF THE 53 MAGNETIC-LATCH-DRIVEN RODS, HALF ARE FULL OUT FOR POWER
OPERATION, AND REST LIMITED IN SPEED BY DRIVE MOTOR. BORON SHIM CONTROL THUS LIMITS

CATEGORY 9
NUCLEAR INSTRUMENTATION, CONTROL, AND SAFETY SYSTEMS

9-10877 *CONTINUED*

REACTIVITY AVAILABLE FOR RAPID INSERTION. CONTROL-ROD EJECTION IS CONSIDERED INCREDIBLE.

*ACCIDENT, CONTROL ROD WITHDRAWAL + *DESIGN CRITERIA + *REGULATION, AEC +
*SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + REACTOR, PRESSURIZED WATER9-10878 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2.
CONSOLIDATED EDISON COMPANY OF NEW YORK
1 PAGE OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDRQUESTION 2, CRITERION 8 -- MAXIMUM AVAILABLE EXCESS REACTIVITY IS 0.305, COLD CLEAN. SHUTDOWN
GROUP OF RODS MAKE REACTOR K-EFFECTIVE EQUAL TO 0.99 IN HOT ZERO-POWER FROM HOT POWER
CONDITION. WITH MOST WORTHWHILE ROD STUCK OUT, CHEMICAL SHIM KEEPS REACTOR SHUT DOWN.*DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + *SHUTDOWN MARGIN +
INDIAN POINT II + REACTOR, PRESSURIZED WATER9-10879 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2
CONSOLIDATED EDISON COMPANY OF NEW YORK
1 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDRQUESTION 2, CRITERION 9 -- BACKUP REACTIVITY IS INDEPENDENT OF CONTROL PROVISIONS, AS POWER TO
ROD MECHANISMS SHUT OFF ON SCRAM, REGARDLESS OF CONTROL SIGNALS. BORIC ACID INJECTION WITH
ONE PUMP WILL SHUT REACTOR DOWN IN 15 MIN WITH NO ROD INSERTION, AND IN ANOTON MAY THEN BE
INJECTED FOR COLD SHUTDOWN.*DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS +
*SHUTDOWN SYSTEM, SECONDARY + CHEMICAL SHIM + INDIAN POINT II + REACTOR, PRESSURIZED WATER9-10882 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2
CONSOLIDATED EDISON COMPANY OF NEW YORK
1 PAGE OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDRQUESTION 2, CRITERION 12 -- ROD-CLUSTER CONTROL ASSEMBLIES ARE FULLY GUIDED AND FLEXIBLE.
TESTS SHOW NO FUNCTIONAL IMPAIRMENT WITH MISALIGNMENTS IN EXCESS OF MAXIMUM POSSIBLE.*CONTROL ROD + *DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS +
INDIAN POINT II + REACTOR, PRESSURIZED WATER9-10884 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2.
CONSOLIDATED EDISON COMPANY OF NEW YORK
2 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDRQUESTION 2, CRITERION 14 -- PERIODIC BORON CONCENTRATION SAMPLES ARE TAKEN AT POWER AND DURING
SHUTDOWN. DURING REFUELING, BF3 MONITORING GIVES AN AUDIBLE INDICATION OF DECREASING
SHUTDOWN MARGIN. THE MAXIMUM DILUTION RATE (580 PPM/HR) GIVES AMPLE TIME FOR CORRECTIVE
ACTION.*CHEMICAL SHIM + *DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS +
INDIAN POINT II + INSTRUMENTATION, NUCLEAR + REACTOR, PRESSURIZED WATER9-10885 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2
CONSOLIDATED EDISON COMPANY OF NEW YORK
3 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDRQUESTION 2, CRITERION 15 -- COINCIDENCE ALLOWS ON-LINE TESTING, USING SIMULATED SIGNALS, OF
SCRAM CHANNELS UP TO THE THREE RELAYS PROVIDING TWO-OF-THREE MATRICES FOR TRIPPING THE TWO
SCRAM BREAKERS. ALSO; ENGINEERED SAFEGUARDS. CORE IS COUPLED SO THAT ALL OUT-OF-CORE
INSTRUMENTS WILL SEE A ROD EJECTION ACCIDENT.*COUPLED CORES + *DESIGN CRITERIA + *INSTRUMENTATION, COINCIDENT + *REGULATION, AEC +
*SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + *TEST, SYSTEM OPERABILITY + EMERGENCY SYSTEM +
PLANT PROTECTIVE SYSTEM9-10886 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2.
CONSOLIDATED EDISON COMPANY OF NEW YORK
2 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDRQUESTION 2, CRITERION 16 -- LOSS OF ELECTRIC POWER CAUSES ROD INSERTION, EITHER DIRECTLY OR
THROUGH THE INSTRUMENTS. COMPONENTS ARE DESIGNED SO THAT ACCIDENT WILL NOT INTERFERE WITH
FUNCTIONING.

CATEGORY 9
NUCLEAR INSTRUMENTATION, CONTROL, AND SAFETY SYSTEMS

9-10886 *CONTINUED*

*DESIGN CRITERIA + *LOSS OF POWER + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + INSTRUMENTATION, GENERAL + REACTOR, PRESSURIZED WATER + SAFE FAILURE CRITERION

9-10891 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2. CONSOLIDATED EDISON COMPANY OF NEW YORK
1 PAGE OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2, MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 21 -- TWO OF THE THREE DIESELS PROVIDE ADEQUATE POWER FOR ENGINEERED SAFEGUARDS. VITAL INSTRUMENTS AND CONTROLS ARE SUPPLIED FROM 125-V DC BATTERIES.

*DESIGN CRITERIA + *EMERGENCY POWER, ELECTRIC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + ELECTRIC POWER, VITAL + INDIAN POINT II + REACTOR, PRESSURIZED WATER + REGULATION, AEC

9-10897 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2. CONSOLIDATED EDISON COMPANY OF NEW YORK
1 PAGE OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2, MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 27 - MONITORING OF ACCIDENT-RELEASED RADIOACTIVITY -- VARIOUS SYSTEMS PROVIDED TO INHIBIT CONTAINMENT-PENETRATION LEAKAGE AND TO MONITOR LOCATIONS AND SYSTEMS.

*DESIGN CRITERIA + *MONITOR, RADIATION, EMERGENCY + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + REACTOR, PRESSURIZED WATER

9-10928 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2. CONSOLIDATED EDISON COMPANY OF NEW YORK
1 PAGE OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2, MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 19J - DESIGN CRITERIA AND JUSTIFICATION, HOW FULFILLED, AND TEST METHOD -- FOR THE OPERATIONAL RELIABILITY OF REACTOR SAFETY, CONTAINMENT ISOLATION, AND ENGINEERED SAFEGUARDS SYSTEM, THE DESIGN INCLUDES FAIL-SAFE AND/OR REDUNDANCE, ETC. ANSWERS ARE DISCUSSED IN QUESTION 2 (CRITERIA 15, 22, 23), QUESTIONS 6 THROUGH 10.

*DESIGN CRITERIA + *ENGINEERED SAFEGUARD + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + REACTOR, PRESSURIZED WATER + REDUNDANCE + SAFE FAILURE CRITERION

9-10935 MCVEAN RL + GOIN RH + WEITZREPG A + LEPIDON A
CRITICAL ASSEMBLY MOCKUP OF THE SEFOR REACTOR IN ZPR-3
ARGONNE NATIONAL LABORATORY, IDAHO + GENERAL ELECTRIC COMPANY, VALLECITOS ATOMIC POWER LABORATORY + CENTRE NUCLEAIRE DE CADARACHE, FRANCE
1 PAGE, 1 TABLE, 5 REFERENCES, ANS TRANSACTIONS, 9(1), PAGE 226 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

AVERAGE CONTROL-ROD WORTH IS 117 CENTS. ONE HUNDRED, THIRTY-NINE CENTS REACTIVITY REDUCTION DUE TO HALF-INCH ELONGATION OF FUEL RODS. MEASUREMENTS OF CENTRAL REACTIVITY WORTHS, DOPPLER EFFECT, AND ROSSI ALPHA.

*SEFOR (SOUTHWEST EXP. FAST OXIDE REACTOR) + *ZPR III (ANL ZERO POWER REACTOR) + CONTROL ROD WORTH + CRITICAL ASSEMBLY FACILITY + DOPPLER EFFECT + FUEL EXPANSION COEFFICIENT + REACTIVITY EFFECT + REACTOR, BREEDER + REACTOR, FAST + ROSSI ALPHA

9-10937 REYNOLDS AB + STEWART SL
ANALYSIS OF SEFOR MOCKUP IN ZPR-III
GENERAL ELECTRIC COMPANY, SAN JOSE
2 PAGES, 13 REFERENCES, ANS TRANSACTIONS, 9(1), PAGES 227-228 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

COMPUTED REACTIVITY REDUCTION DUE TO HALF-INCH ELONGATION OF FUEL - 130 CENTS COMPARED WITH A MEASURED VALUE OF 140. COMPUTED AVERAGE CONTROL-ROD WORTH - 127 CENTS, COMPARED WITH 131 CENTS, MEASURED.

*SEFOR (SOUTHWEST EXP. FAST OXIDE REACTOR) + *ZPR III (ANL ZERO POWER REACTOR) + COMPUTER, DIGITAL + CONTROL ROD WORTH + CRITICAL ASSEMBLY FACILITY + FUEL EXPANSION COEFFICIENT + REACTOR, BREEDER + REACTOR, FAST

9-10944 SHOMO RB + HAMILTON GN + LEAVER PD
ANALOG COMPUTER TECHNIQUES IN CRITICAL EXPERIMENTS
WESTINGHOUSE ELECTRIC CORPORATION, ATOMIC POWER DIVISION
1 PAGE, 1 FIGURE, 2 REFERENCES, ANS TRANSACTIONS, 9(1), PAGE 261 (JUNE 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

EXPERIMENTS AT THE WESTINGHOUSE REACTOR EVALUATION CENTER (WREC) WERE PERFORMED ALMOST EXCLUSIVELY USING ON-LINE ANALOG COMPUTERS FOR THE MEASUREMENT OF BOTH POSITIVE AND NEGATIVE VALUES OF REACTIVITY. THIS METHOD OF REACTIVITY MEASUREMENT WAS USED IN BOTH HEAVY-WATER- AND LIGHT-WATER-MODERATED SYSTEMS AND WITH CORES CONTAINING BOTH HIGHLY ENRICHED AND

CATEGORY 9
NUCLEAR INSTRUMENTATION, CONTROL, AND SAFETY SYSTEMS

9-10944 *CONTINUED*

LOW-ENRICHED URANIUM FUEL, AND RECENTLY WITH SYSTEMS CONTAINING URANIUM DIOXIDE AND PLUTONIUM/URANIUM DIOXIDE FUEL. A UNIQUE CIRCUIT WAS DESIGNED AND BUILT AT THE WREC TO IMPROVE THE ACCURACY, GAIN AND READ-OUT TIME ON THE RECORDER.

9-10945 COHN CE

FURTHER USE OF AN ON-LINE COMPUTER IN REACTOR PHYSICS EXPERIMENTS

ARGONNE NATIONAL LABORATORY

1 PAGE, 3 REFERENCES, ANS TRANSACTIONS, 9(1), PAGE 262 (JUNE 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

DIGITAL COMPUTER FOR ON-LINE DATA REDUCTION IN CRITICAL-ASSEMBLY EXPERIMENTS USED FOR REACTOR NOISE MEASUREMENTS, USING THE CROSS-CORRELATION TECHNIQUE TO REDUCE REQUIREMENTS FOR DETECTOR EFFICIENCY. A STUDY LOOKING TOWARD THE AUTOMATIC CONTROL OF CRITICAL EXPERIMENTS WAS STARTED WITH EXPERIMENTS ON THE STARTUP OF THE ZPR-9 FAST CRITICAL. UNDER COMPUTER CONTROL, THE LAST CONTROL DRAWER IS INSERTED TO TAKE THE REACTOR THROUGH CRITICAL TO A DEMAND PERIOD AND UP TO A DEMAND POWER.

*ZPR IX (ANL ZERO POWER REACTOR) + COMPUTER, DIGITAL + CRITICAL ASSEMBLY FACILITY + CRITICALITY EXPERIMENT + NOISE ANALYSIS + REACTOR, FAST + SHUTDOWN MARGIN

9-10946 STANLEY L + HOLLAND LK + HOLLADAY RL

DEVELOPMENT OF A CONTROL-ROD WORTH MINIMIZER

GENERAL ELECTRIC COMPANY, SAN JOSE, CALIFORNIA + CONTROL DATA CORPORATION

1 PAGE, ANS TRANSACTIONS 9(1), PAGE 265 (JUNE, 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

THE ROD-WORTH MINIMIZER (RWM) WAS DEVELOPED FOR INCORPORATION INTO THE NUCLEAR POWER PLANT TO SIGNIFICANTLY REDUCE THE PROBABILITY OF REACTOR-VESSEL DAMAGE DUE TO SUDDEN UNEXPECTED WITHDRAWAL OF ANY CONTROL ROD FROM THE CORE. THE RWM ENSURES THAT ALL CONTROL RODS IN THE CORE DO NOT EXCEED A PREDETERMINED ROD-WORTH LIMIT BY APPROPRIATE RESTRICTIONS ON CONTROL-ROD-DRIVE MOVEMENTS.

*CONTROL ROD WORTH + ENGINEERED SAFEGUARD + REACTOR, BOILING WATER

9-10955 WILLOUGHBY W + NATH RJ + WYKE TF

COMPARISON OF ANALYTICAL AND EXPERIMENTAL LIFETIME AND CONTROL ROD WORTHS FOR CVTR

CAROLINAS-VIRGINIA NUCLEAR POWER ASSOCIATION + WESTINGHOUSE ELECTRIC CORPORATION, ATOMIC POWER DIVISION
2 PAGES, 1 FIGURE, 1 TABLE, 5 REFERENCES, ANS TRANSACTIONS, 9(1), PAGES 276-277, (JUNE 1966), AMERICAN NUCLEAR SOCIETY ANNUAL MEETING, DENVER, COLORADO, JUNE 20-23, 1966

THE RESULTS OF ANALYTICAL AND EXPERIMENTAL DETERMINATIONS OF ROD GROUP WORTHS ARE GIVEN.

*CONTROL ROD WORTH + *CVTR (CAROLINAS VIRGINIA TUBE REACTOR) + COMPUTER, DIGITAL + FUEL BURNUP + REACTOR, HEAVY WATER + REACTOR, PRESSURE TUBE

9-10960 LAWRENCE BR

DETERMINATION OF THE POWER VS REACTIVITY FREQUENCY RESPONSE FUNCTION OF A POWER REACTOR, WITH APPLICATION TO THE HIGH FLUX ISOTOPE REACTOR

OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TENNESSEE

ORNL-TM-1471 +. 21 PAGES, 2 TABLES, 2 FIGURES, 5 REFERENCES- JULY 5, 1966, CFSTI, \$2.00 CY, \$0.50 MN

A NUMERICAL TECHNIQUE IS PRESENTED FOR CALCULATING THE POWER VS REACTIVITY-FREQUENCY-RESPONSE FUNCTION OF A POWER REACTOR. THE APPROACH AVOIDS THE EVALUATION OF TRANSFER FUNCTIONS IN AN ALGEBRAIC FORM. THE SPACE-INDEPENDENT REACTOR-KINETICS MODEL IS USED IN CONJUNCTION WITH A GENERAL SET OF FIRST-ORDER EQUATIONS TO REPRESENT THE THERMAL PERFORMANCE OF THE REACTOR. RESULTS OBTAINED BY APPLYING THE TECHNIQUE TO THE OAK RIDGE HIGH FLUX ISOTOPE REACTOR INDICATE THAT THE REACTOR OPERATING AT FULL POWER OF 100 MW WITH THE FLUX CONTROLLER OFF HAS A FREQUENCY RESPONSE WHICH PEAKS BROADLY AT 10 CPS WITH A PARTIAL-DERIVATIVE-OF-P OVER P-SUPERSCRIP-T-ZERO VS PARTIAL-DERIVATIVE-OF-K OVER K-SUPERSCRIP-T-ZERO GAIN OF 140.

*HFIR (HIGH FLUX ISOTOPE REACTOR) + REACTOR DYNAMICS + REACTOR, RESEARCH + REACTOR, TEST + TRANSFER FUNCTION

9-10978 REACTOR PHYSICS EFFORTS REQUIRED IN SUPPORT OF THE FAST BREEDER DEVELOPMENT PROGRAM

DIVISION OF REACTOR DEVELOPMENT AND TECHNOLOGY, U.S. ATOMIC ENERGY COMMISSION, WASHINGTON, D. C.
WASH-1066 +. 41 PAGES, 3 TABLES, JANUARY 1966, CFSTI, \$3.00 CY, \$0.50 MN

SCATTERED THROUGHOUT THE REPORT ARE REFERENCES TO SODIUM COEFFICIENT, DOPPLER COEFFICIENT, CONTROL SYSTEM, AND DYNAMICS OF LARGE SYSTEMS.

*CONTROL SYSTEM + *SODIUM COEFFICIENT + CRITICAL ASSEMBLY FACILITY +
EBR I AND II (EXPERIMENTAL BREEDER REACTORS) + FERMI + REACTOR DYNAMICS + REACTOR, BREEDER +
REACTOR, FAST + REACTOR, FAST + REACTOR, LARGE + REACTOR, LIQUID METAL COOLED +
SEFOR (SOUTHWEST EXP. FAST OXIDE REACTOR) + SPACE DEPENDENT DYNAMICS +
ZPPR (ANL ZERO POWER PLUTONIUM REACTOR) + ZPR III (ANL ZERO POWER REACTOR) +
ZPR IX (ANL ZERO POWER REACTOR) + ZPR VI (ANL ZERO POWER REACTOR)

CATEGORY 9
NUCLEAR INSTRUMENTATION, CONTROL, AND SAFETY SYSTEMS

9-11006 JAKEMAN D
PHYSICS OF NUCLEAR REACTORS. CHAPTER 9 - REACTIVITY CHANGES AND CONTROL
356 PAGES, THE ENGLISH UNIVERSITIES PRESS LTD (1966)

CHAPTER 9 CONTAINS A FEW TOPICS OF SAFETY INTEREST. THESE INCLUDE REACTIVITY EFFECTS OF TEMPERATURE IN THERMAL REACTORS, REACTIVITY EFFECTS IN FAST REACTORS DUE TO FUEL EXPANSION, SODIUM VOIDS AND DOPPLER EFFECT, CONTROL METHODS, THEORY OF CONTROL RODS, AND REACTOR KINETICS.

CONTROL ROD + CONTROL, GENERAL + DOPPLER EFFECT + FUEL EXPANSION COEFFICIENT + REACTOR DYNAMICS + REACTOR, FAST + REACTOR, THERMAL + SODIUM COEFFICIENT + TEMPERATURE COEFFICIENT

9-11043 MCEWEN LH
EVCER CONTROL BLADES TO USE ZIRCALOY INSTEAD OF STAINLESS STEEL
GENERAL ELECTRIC COMPANY, SAN JOSE, CALIFORNIA
1 PAGE, JULY 12, 1966, DOCKET 50-183, ATOMIC ENERGY CLEARING HOUSE, 12(31), PAGE 17, (AUGUST 1, 1966)

CHANGES INCLUDE DIFFERENT DESIGN AND USE OF ZIRCALOY INSTEAD OF STAINLESS STEEL IN THE FOUR GRAY CONTROL RODS LOCATED IN THE CENTER OF THE CORE.

*CONTROL ROD, SHIM SAFETY + REACTOR, SUPERHEAT + VESR (VALLECITOS EXP. SUPERHEAT REACTOR-ESADA) + ZIRCALOY

9-11049 WOLTER EE
ELK RIVER CONTROL ROD DAMAGE AND VESSEL INSPECTION
RURAL COOPERATIVE POWER ASSOCIATION, ELK RIVER, MINN.
2 PAGES, JUNE 22, 1966, DOCKET 115-1, ATOMIC ENERGY CLEARING HOUSE, 12(28), PAGES 18-19, (JULY 11, 1966)

THE APRIL 1966 INSPECTION SHOWED CRACKS AT SHIM-ROD RIVETS AND CRACKS IN REGULATING ROD MATERIAL, ALL OF BORON-STAINLESS-STEEL CONSTRUCTION. BORON CARBIDE RODS ARE REPLACING SOME RODS. DYE-PENETRANT INSPECTION OF THE REACTOR VESSEL SHOWED SHALLOW CRACKS JUST BELOW HEAD FLANGE IN MARTENSITIC WELDING. CRACKS SHOULD NOT PRESENT A PROBLEM. STRESSED U-BEND CORROSION SPECIMENS IN THE EVAPORATORS SHOWED CRACKING AFTER 22 MONTHS. ULTRASONIC TESTS OF TEN WELDS SHOWED NO DEFECTS.

*CONTROL ROD, SHIM SAFETY + *DAMAGE + CONTAINMENT, PRESSURE VESSEL + ELK RIVER + EXAMINATION + REACTOR, BOILING WATER

9-11240 KALKER KJ
STUDY OF SHUT-DOWN INSTRUMENTATION AND CONDITIONS FOR STEADILY INCREASING PERTURBATIONS IN 10-MW OPERATION OF FRJ-2 (D100)
NP-TR-1267 + JUL-239-RE +. 60 PAGES, 1965, JCL, \$5.60 FS, \$2.00 MF

AN ANALOG SIMULATION, USING COMPONENTS FROM THE REACTOR-CONTROL SYSTEM, WAS MADE. CALCULATIONS FOR THE MAXIMUM PERMISSIBLE TIME DELAYS BEFORE ROD DROP ARE GIVEN. THE REACTOR SHUTDOWN SYSTEM IS EXAMINED ACCORDING TO THE RESULTS OF THE SIMULATION AND CALCULATIONS.

*ACCIDENT ANALYSIS + *SAFETY PRINCIPLES AND PHILOSOPHY + ACCIDENT, REACTIVITY + COMPUTER, ANALOG + INSTRUMENTATION, PROTECTIVE + PERIOD METER

9-11252 BUDGE E
OPERATIONAL AMPLIFIERS FOR MAXIMUM FLEXIBILITY IN REACTOR CONTROLS
EDGERTON, GERMESHAUSEN AND GRIER, INCORPORATED, LAS VEGAS, NEVADA
EGG-1183-1130 + CNF-650412-1 +. 23 PAGES, APRIL 13, 1965, CFSTI, \$1.00 CY

A REVIEW AND DISCUSSION OF THE CHARACTERISTICS OF OPERATIONAL AMPLIFIERS IS GIVEN. APPLICATIONS TO REACTOR CONTROL SYSTEMS ARE DISCUSSED.

*INSTRUMENTATION, AMPLIFIER + INSTRUMENTATION, GENERAL

9-11304 KRIZIC TP
BORON POISON SYSTEM EVALUATION
ALLIS-CHALMERS MANUFACTURING COMPANY, BETHESDA
ACNP-65541 +. 16 PAGES, JULY 1965, CFSTI, \$1.00 CY, \$0.50 MN

ERR SODIUM PENTABORATE SYSTEM; ELIMINATING CRYSTALLIZATION OF SODIUM PENTABORATE. SUCH CRYSTALLIZATION HAS PREVIOUSLY CAUSED VALVE AND LINE BLOCKAGE. A MINOR, SIMPLE AND CHEAP MODIFICATION TO THE PRESENT SYSTEM IS SUGGESTED WHICH WOULD PROVIDE FOR IMMEDIATE DILUTION OF ANY PENTABORATE SOLUTION LEAKING PAST THE CLOSURE VALVES. THE PRESENT SOLUTION-INJECTION TIME WOULD BE MAINTAINED, AND NO CHANGES TO THE TECHNICAL SPECIFICATIONS WOULD BE REQUIRED.

*ELK RIVER + *POISON, SOLUBLE + REACTOR, POILING WATER

9-11416 BORKOWSKI CJ + HARRILL CS
INSTRUMENTATION AND CONTROLS DIVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING SEPTEMBER 1, 1965
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TENNESSEE
ORNL-3875 +. 187 PAGES, AUGUST 1966, CFSTI, \$3.00 CY, \$1.00 MN

THIS IS A COLLECTION OF 141 ARTICLES DEALING WITH NEW AND CONTINUING PROJECTS IN THE FOLLOWING

ACCESSION NUMBER 9-11006 TO 9-11416

CATEGORY 9
NUCLEAR INSTRUMENTATION, CONTROL; AND SAFETY SYSTEMS

9-11416 *CONTINUED*

FIELDS OF INSTRUMENTATION - NANOSECOND CIRCUITRY, - PULSE COUNTING, ELECTROMETERS, ELECTRONICS DEVELOPMENT, FABRICATION, AUTOMATIC CONTROL, BIOMEDICAL RESEARCH, PARTICLE DETECTORS, RADIATION MONITORING, DATA COLLECTION, PROCESS INSTRUMENTATION AND CONTROL-SYSTEM ENGINEERING, PROCESS-INSTRUMENT DEVELOPMENT, REACTOR INSTRUMENTATION AND CONTROLS.

*INSTRUMENTATION, GENERAL + INSTRUMENTATION, CONTROL + INSTRUMENTATION, FLOW + INSTRUMENTATION, NUCLEAR + INSTRUMENTATION, PROCESS + INSTRUMENTATION, TEMPERATURE + MONITORING SYSTEM + PLANT PROTECTIVE SYSTEM

9-11417 PETERSON RE

CONTROL ELEMENT DRIVE MECHANISMS FOR LAMPRE I

LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO

LA-DC-6608 + CONF-756-1 +. 23 PAGES, FROM MEETING OF FAST REACTOR CONTROL ROD DRIVES, GERMANTOWN, MARYLAND, SEPTEMBER 1964, CFSTI, \$1.00 CY

THE USE OF HYDRAULICALLY POWERED CONTROL-ROD-DRIVE SYSTEMS MAY IN SOME APPLICATIONS OFFER CERTAIN ADVANTAGES OVER THE MORE CONVENTIONAL CONTROL-ELEMENT ACTUATORS. THIS PAPER DEALS WITH AN INSTANCE IN WHICH SUCH A ROD DRIVE WAS SUCCESSFULLY USED ON AN EXPERIMENTAL REACTOR.

*CONTROL ROD DRIVE + *LAMPRE I (LASL MOLTEN PU REACTOR EXPERIMENT) + CONTROL ROD SCRAM MECHANISM + REACTOR, FAST

9-11418 DEAN RA

HYDRAULIC DESIGN OF A ROD CLUSTER CONTROL FUEL ASSEMBLY

WESTINGHOUSE ELECTRIC CORP., PITTSBURGH, ATOMIC POWER DIVISION

WCAP-3269-62 +. 43 PAGES, 3 FIGURES, 3 TABLES, 6 REFERENCES, SEPTEMBER 1965, CFSTI \$3.00 CY, \$0.50 MN

A TEST WAS MADE TO EVALUATE THE HYDRAULIC CHARACTERISTICS OF THE ROD-CLUSTER CONTROL AND THE CONTROL-ROD SYSTEM. FLOW PATTERNS AND HYDRAULIC RESISTANCES ARE DETERMINED. AN ANALYTICAL MODEL FOR PREDICTING THE PRESSURE-LOSS COEFFICIENT IS PRESENTED. PRESSURE-DROP MEASUREMENTS WERE ALSO MADE TO DETERMINE THE FRICTION FACTOR FOR FLOWS IN ANNULI 0.014 TO 0.053 IN. WIDE. MEASUREMENTS WERE MADE FOR THE RANGE OF FLOW FROM LAMINAR TO THAT HAVING A REYNOLDS NUMBER OF 15,000.

*CONTROL ROD + *HYDRAULIC ANALYSIS + *SAN ONOFRE + FUEL ELEMENT + REACTOR, PRESSURIZED WATER

9-11424 HORST KM

SOUTHWEST EXPERIMENTAL FAST OXIDE REACTOR DEVELOPMENT PROGRAM. THIRD QUARTERLY REPORT, OCTOBER 1964 - JANUARY 1965

GENERAL ELECTRIC, SAN JOSE

GEAP-4799 +. 150 PAGES, FEBRUARY 1965, CFSTI \$4.00 CY, \$1.00 MN

THIS REPORT IS ONE OF A SERIES OF SUCH REPORTS ON THE FOLLOWING SUBJECTS - PLANNING, EXPERIMENTAL PROGRAM IN ZPR-III, FUEL DEVELOPMENT, INSTRUMENTATION, CORE DYNAMICS, REACTIVITY CONTROL, FUEL HANDLING, AND CORE DESIGN

*RESEARCH CONTRACT + *SEFOR (SOUTHWEST EXP. FAST OXIDE REACTOR) + *ZPR III (ANL ZERO POWER REACTOR) + CRITICAL ASSEMBLY FACILITY + DOPPLER COEFFICIENT + FUEL ELEMENT + FUEL HANDLING + HEAT TRANSFER + INSTRUMENTATION, GENERAL + INSTRUMENTATION, TEMPERATURE + REACTOR, BREEDER + REACTOR, FAST + REACTOR, LIQUID METAL COOLED + TEST, PHYSICS

9-11433 DAVIES NF

DEVELOPMENTAL IRRADIATION TEST OF SNAP-8 ELECTRICAL COMPONENTS (HF-8)

ATOMICS INTERNATIONAL

NAA-SR-11924 +. 25 PAGES, 7 FIGURES, 5 TABLES, JULY 15, 1966, CFSTI \$2.00 CY, \$0.50 MN

FOUR TYPES OF ELECTRICAL CONNECTORS, TWO TYPES OF CABLES, AND FIVE TYPES OF INSULATION SPECIMENS WERE IRRADIATED FOR 2250 HR AT 900 TO 1200 F AND A VACUUM OF 10 TO THE MINUS 6 TORR. TOTAL EXPOSURE WAS FROM 8 TIMES 10 TO THE 9 TO 9 TIMES 10 TO THE 10R (GAMMA) AND FROM 10 TO THE 17 TO 10 TO THE 19 FAST NEUTRONS (NVT). THE EVALUATION WAS IN SUPPORT OF THE SNAP 8 PROGRAM AND SHOWED THAT ALL BUT TWO CONNECTORS WERE SUITABLE.

*INSTRUMENTATION, GENERAL + *RADIATION DAMAGE + ELECTRIC POWER, GENERAL + SNAP 8 (SYSTEMS FOR NUCLEAR AUXILIARY POWER)

9-11436 JOHNSON TR + TEATS FG + PIERCE RD

AN INDUCTION PROBE FOR MEASURING LIQUID LEVELS IN LIQUID METALS

ARGONNE NATIONAL LABORATORY, ARGONNE

ANL-7153 +. 24 PAGES, 13 FIGURES, 1 TABLE, 17 REFERENCES, FEBRUARY 1966, CFSTI \$2.00 CY, \$0.50 MN

A MUTUAL-INDUCTANCE PROBE WAS DEVELOPED TO DETERMINE THE LOCATION OF THE INTERFACE BETWEEN GAS AND LIQUID METAL AND BETWEEN LIQUID SALT AND LIQUID METAL. PROBES 5 AND 14 IN. LONG WERE CALIBRATED IN LIQUID CADMIUM, BISMUTH, AND SODIUM AT TEMPERATURES FROM 200 TO 700 C. THE AVERAGE DEVIATION IN MEASURED LIQUID LEVEL WAS 2 TO 3 PERCENT OF PROBE LENGTH.

*MOLTEN FUEL + *RADIOCHEMICAL PROCESSING + INSTRUMENTATION, LIQUID LEVEL DETECTION + INSTRUMENTATION, PROCESS + METAL, LIQUID

CATEGORY 9
NUCLEAR INSTRUMENTATION, CONTROL, AND SAFETY SYSTEMS

9-11437 PANGHER JD + NICHOLS LL
A PRECISION LONG COUNTER FOR MEASURING FAST NEUTRON FLUX DENSITY
BATTELLE-NORTHWEST, RICHLAND
BNWL-260 +. 63 PAGES, 16 FIGURES, 11 TABLES, 23 REFERENCES, JUNE 1966, CFSTI \$3.00 CY, \$0.75 MN

A REPRODUCIBLE VERSION OF THE HANSON-MCKIRREN PRECISION LONG COUNTER (PLC) WAS BUILT, AND A COMPREHENSIVE EXPERIMENTAL INVESTIGATION OF ITS CHARACTERISTICS WAS MADE. THE COUNTER IS MADE FROM POLYETHYLENE AND ALUMINUM. IT HAS CLOSELY REPRODUCIBLE PROPERTIES AND CAN BE CALIBRATED TO WITHIN PLUS OR MINUS 1 PERCENT. THE PROBLEM OF USING A PLC WITH ACCELERATOR-PRODUCED NEUTRONS IS DISCUSSED.

*CHAMBER, NEUTRON + *FAST NEUTRON + INSTRUMENTATION, NUCLEAR + MEASUREMENT, REACTIVITY

9-11450 MELSA JL + SCHULTZ DG
RESEARCH IN AND APPLICATION OF MODERN AUTOMATIC CONTROL THEORY TO NUCLEAR ROCKET DYNAMIC AND CONTROL.
VOLUME II
UNIVERSITY OF ARIZONA, TUCSON
N-65-21462 + NASA-CR-62187 +. 165 PAGES, REFERENCES, MARCH 1965, CFSTI \$5.00 CY, \$1.00 MN

THIS REPORT REPRESENTS THE COMPLETION OF ONE PHASE OF THE STUDY OF SUBOPTIMAL CONTROL METHODS AS APPLIED TO THE THEORY OF MODERN AUTOMATIC CONTROL, MODERN-ROCKET DYNAMICS AND CONTROL. THE SECOND METHOD OF LIAPUNOV WAS USED AS A BASIS FOR DEVELOPING A METHOD OF CLOSED-LOOP, APPROXIMATELY TIME-OPTIMAL CONTROL OF LINEAR SYSTEMS WITH BOUNDED CONTROL NORMS. THERE ARE THREE MAJOR CONTRIBUTIONS - (1) EIGNEVECTOR SCALAR PRODUCT SOLUTIONS TO THE HAMILTON-JACOBI EQUATIONS ARE SHOWN TO EXIST, (2) A METHOD OF JUDGING THE QUALITY OF THE SUBOPTIMAL SYSTEM IS DEVELOPED, (3) THE EIGNEVECTOR SCALAR PRODUCT SOLUTIONS ARE USED TO DEVELOP SEVERAL METHODS OF CLOSED-LOOP, SUBOPTIMAL CONTROL.

*LIAPUNOV'S FUNCTION + *MATHEMATICAL STUDY + CONTROL, GENERAL

9-11451 KEETON DC
A COMPUTER STUDY OF A RATE-OF-CHANGE-OF-PRESSURE SCRAM SYSTEM
TENNESSEE VALLEY AUTHORITY, OAK RIDGE
TID-22754 +. 15 PAGES, MARCH 7, 1965, CFSTI \$1.00 CY, \$0.50 MN

THIS REPORT DESCRIBES A PROPOSED RATE-OF-CHANGE-OF-PRESSURE SCRAM SYSTEM TO BE USED DURING PHASE-IVA EGCR PHYSICS TEST. THE RESULTS OF CALCULATIONS TO DETERMINE AN OPTIMUM PNEUMATIC SYSTEM ARE PRESENTED ALONG WITH A METHOD FOR CALIBRATING THE FLOW ORIFICE. RESULTS OF TESTS TO DETERMINE THE ORIFICE SIZE ARE SHOWN. NO DETAILED PLANS FOR THE ELECTRICAL PORTION OF THE SYSTEM ARE PRESENTED.

*CONTAINMENT INSTRUMENTATION + EGCR (EXPERIMENTAL GAS COOLED REACTOR) + INSTRUMENTATION, PROCESS + MATHEMATICAL STUDY

CATEGORY 10
ELECTRICAL POWER SYSTEMS

10-10282 MIROWSKY RJ
EFFECTS OF SHORT-DURATION POWER INTERRUPTIONS ON THE COMPUTRIZED CHECKOUT SYSTEM FOR NASA
GENERAL ELECTRIC COMPANY, DAYTONA BEACH, FLA.
36 PAGES, 18 FIGURES, 2 TABLES, PRESENTED AT THE AMERICAN POWER CONFERENCE 28TH ANNUAL MEETING, APRIL
26-28, 1966, CHICAGO, ILLINOIS, APC, \$0.25 CY

PROBLEM - EXAMINE AND FIND CORRECTIVE METHODS FOR THE DISTURBANCES TO ONLINE COMPUTERS CAUSED
BY BRIEF POWER INTERRUPTIONS. APPROACHES - (1) THEORETICAL EVALUATION OF TIME RESPONSES, (2)
TEST RESPONSE OF SYSTEM TO VARIABLE DISTURBANCES. RESULTS - (1) COMPUTER PERFORMANCE WAS
UNACCEPTABLE FOR INTERRUPTIONS LONGER THAN 1 MSEC, (2) MINIMUM RECOVERY TIME FOR COMMERCIAL
POWER SYSTEMS IS 80 MSEC. CONCLUSIONS - (1) IT IS NOT PRACTICAL TO MODIFY THE COMPUTER
SYSTEMS OR THE COMMERCIAL POWER SYSTEMS TO GIVE SATISFACTORY RECOVERY, (2) PRACTICAL ANSWER
IS TO INTERPOSE A LOCAL, CONTINUOUS, AC-POWER SYSTEM OF EITHER A DIESEL-DRIVEN CLUTCH,
CONNECTED ROTATING SYSTEM, OR A BATTERY-BACKED, STATIC, AC GENERATOR.

*COMPUTER, DIGITAL + *ELECTRIC POWER, VITAL + *EMERGENCY POWER, ELECTRIC + *FAILURE, GENERAL +
COMPARISON, THEORY AND EXPERIENCE + TEST, SYSTEM OPERABILITY

CATEGORY 11
CONTAINMENT OF NUCLEAR FACILITIES

11-C9393 YOSHIDA T + MIYANO K + YOSHIKAWA A
STEEL PLATE FOR NUCLEAR POWER REACTORS
JAPAN ATOMIC ENERGY RESEARCH INSTITUTE, TOKYO, JAPAN
NSJ-TR-37 +. 30 PAGES, 17 TABLES, 8 FIGURES, REFERENCES- FEBRUARY 1965- TRANSLATED FROM JAPAN STEEL WORKS
TECH. REV. (116)- 1782-1796 (MARCH 1964),- JAERI

THIS REPORT SUMMARIZES CURRENT PROCEDURES AND PROBLEMS RELATED TO THE PRODUCTION OF
HIGH-QUALITY STEEL PLATE FOR NUCLEAR SERVICE IN JAPAN. PROBLEMS AND QUALITY-CONTROL
PROCEDURES RELATED TO BRITTLENESS AND RADIATION DAMAGE ARE DISCUSSED.

*MATERIAL + *METAL + BRITTLE FRACTURE + CODES AND STANDARDS + DESIGN CRITERIA +
NDT DATA (NIT DUCTILITY TRANSITION) + RADIATION DAMAGE

11-G9394 OOI H + HARIMA T + IIZUKA H + KATAOKA G
RESEARCH ON THE COLLISION RESISTING CONSTRUCTION OF THE SIDES OF A NUCLEAR POWERED SHIP (REPORT NO. 3)
JAPAN ATOMIC ENERGY RESEARCH INSTITUTE, TOKYO, JAPAN
NSJ-TR-30 +. 29 PAGES, 2 TABLES, 29 FIGURES, JANUARY 1965- TRANSLATED FROM TECH. REV. MITSUBISHI NIPPON
HEAVY-IND., 4 (2)- 145-155 (DECEMBER 1963), JCL \$2.60 CY

COLLISION EXPERIMENTS WERE MADE WITH FIVE TYPES OF CONSTRUCTION MODELS FOR THE SIDES OF SHIPS.
THE MODELS WERE ABOUT 1/15 THE SIZE OF THE COLLISION-RESISTING COMPARTMENT OF THE NUCLEAR
POWERED OCEANOGRAPHIC RESEARCH AND TENDER SHIP AND WERE SUBJECTED TO BOTH IMPACT AND STATIC
LOADING AT THE CENTER. THE RELATIONSHIP BETWEEN ENERGY ABSORPTION AND DEFORMATION OF THE
SIDE, THE MECHANISM OF DESTRUCTION OF BOW AND SIDE, AND HOW TO PREDICT THE DEFORMATION OF THE
SIDES AT COLLISION WERE MADE CLEAR.

*DESIGN STUDY + *IMPACT SHOCK + FAILURE, GENERAL + SHELL

11-C9618 EICHLER JB + GALLAGHER EV + LIEBERMAN P
STUDIES OF REACTOR CONTAINMENT
ILLINOIS INSTITUTE OF TECHNOLOGY RESEARCH INSTITUTE, CHICAGO
IITRI-578P21-17 + IITRI-T6042-17 +. 11 PAGES, DECEMBER 1965 - JANUARY 1966, CFSTI, \$1.00 CY, \$0.50 MN

IN THIS PROGRESS REPORT, COVERING WORK PERFORMED BETWEEN DECEMBER 1965 AND JANUARY 1966, THREE
TASKS OF THE IITRI PROGRAM CONCERNING STUDIES OF REACTOR CONTAINMENT ARE DESCRIBED. THE
THREE TASKS ARE (1) CRUSHABLE SHIELD ANALYSIS AND DESIGN (2) SHOCK IMPINGEMENT EXPERIMENTS ON
CRUSHABLE SHIELDS (3) COOLANT DECOMPRESSION EXPERIMENTS AND ANALYSIS.

*CONTAINMENT ANALYSIS + *CONTAINMENT, SHOCK GENERATION AND PROTECTION + COMPUTER PROGRAM +
CSE (CONTAINMENT SYSTEMS EXPERIMENT) + PRESSURE, INTERNAL + REACTOR, PRESSURIZED WATER

11-C9676 FERGUSON KR
UNITED STATES PRACTICES IN THE CONTROL AND CONTAINMENT OF RADIOACTIVE CONTAMINATION
ARGONNE NATIONAL LABORATORY
29 PAGES, 1965, PP. 889-917 OF VOL. 2, PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN
HIGH ACTIVITY HUI LABORATORIES, GRENoble, JUNE 15-18, 1965, ENEA, OECD, PUBLISHERS

THE TYPES OF RADIOLOGICAL CONTAINMENT SYSTEMS AND OPERATING PRACTICES USED IN RESEARCH
OPERATIONS REQUIRING THICK BIOLOGICAL SHIELDING ARE SURVEYED. SOME CONTAINMENT ENCLOSURES
ARE AN INTEGRAL PART OF THE SHIELDING, AND OTHERS ARE SEPARATE AND REMOVABLE. THE MANY PARTS
OF THE COMPLETE CONTAINMENT SYSTEM ARE CHOSEN ON THE BASIS OF NUMEROUS SAFETY AND ECONOMIC
FACTORS, SUCH AS SITE LOCATION, AEROSOL-HANDLING HAZARD, TYPE AND SIZE OF THE OPERATIONS,
MANIPULATORS, AND THE LONG-RANGE OBJECTIVES. INITIAL OPERATING EXPERIENCE HAS BEEN OBTAINED
RECENTLY WITH SEVERAL LARGE CONTAINMENT COMPLEXES. NEW DEVELOPMENTS ARE REVIEWED IN
VENTILATION, FIRE CONTROL AND MASTER-SLAVE MANIPULATION.

*CONTAINMENT DESIGN + *CONTAINMENT, GENERAL + AEROSOL, RADIOACTIVE + CONTAINMENT ANALYSIS +
CONTAINMENT RESEARCH AND DEVELOPMENT + CONTAINMENT SYSTEM, OPERATION OF + CONTAMINATION +
ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + FIRE + UNITED STATES + VENTILATION SYSTEM

11-C9746 SIMMONS WR + PERSIANI PJ + RUMP TR
FAST REACTOR TEST FACILITY (FARET) AND INITIAL EXPERIMENTAL PROGRAM
ARGONNE NATIONAL LABORATORY, ARGONNE, ILLINOIS
ANS-100(SUPPL.) + CONF. 650417(SUPPL.) +. 19 PAGES, 3 FIGURES, PAGES 37-55 OF FAST REACTOR OF TECHNOLOGY,
ANS NATIONAL TOPICAL MEETING, DETROIT, MICHIGAN, APRIL 26-29, 1965, SMIRCF

THE FAST REACTOR TEST FACILITY SITE, BUILDING, CONTAINMENT STRUCTURE, FUEL-HANDLING SYSTEMS,
SHIELDING, COOLANT SYSTEMS, REACTOR PROPER, CONTROL SYSTEMS, EXPERIMENTAL CAPABILITIES,
DESIGN SPECIFICATIONS, LOADING, AND FUEL-TESTING PROGRAM AND OBJECTIVES ARE DESCRIBED.

*CONTAINMENT STRUCTURE + *FARET (FAST ARGONNE REACTOR EXPERIMENT TEST) + *REACTOR DESCRIPTION +
CONTAINMENT, HIGH PRESSURE + CONTAINMENT, PRESSURE VESSEL + REACTOR, BREEDER + REACTOR, FAST +
REACTOR, LIQUID METAL COOLED

11-C9747 BELLIER J
PRESTRESSED CONCRETE PRESSURE VESSEL
COMMISSARIAT A L ENERGIE ATOMIQUE, FRANCE
BRITISH PAT. 1,012,262 +. 3 PAGES, 2 FIGURES, DECEMBER 8, 1965- PATENT (FOREIGN)

THE INVENTION IS A PRESTRESSED CONCRETE PRESSURE VESSEL WITH A STEEL LINER FOR USE IN NUCLEAR

CATEGORY 11
CONTAINMENT OF NUCLEAR FACILITIES

11-C9747 *CONTINUED*
REACTORS USING A GASEOUS COOLANT.

*CONCRETE, PRESTRESSED + *CONTAINMENT, PRESSURE VESSEL + CYLINDER + REACTOR, GAS COOLED + STEEL LINER

11-09748 ARRANGEMENT FOR CONTROLLING AN ESCAPE OF PRESSURIZED FLUID FROM A NUCLEAR REACTOR
WESTINGHOUSE ELECTRIC CORPORATION
BRITISH PAT. 1,011,137 +. 3 PAGES, 2 FIGURES, NOVEMBER 24, 1965- PATENT (FOREIGN)

THE INVENTION IS A PRESSURE-SUPPRESSION CONTAINMENT SYSTEM FOR A PRESSURIZED-WATER REACTOR.

*CONTAINMENT DESIGN + *CONTAINMENT, PRESSURE SUPPRESSION + *REACTOR, PRESSURIZED WATER + SCRUBBER

11-09751 JOHNSON RM
PWR REACTOR PLANT CONTAINER LEAK RATE TEST, DLCS 57201
BETTIS ATOMIC POWER LABORATORY, WEST MIFFLIN, PA.
WAPD-PWR-TE-201 +. 19 PAGES, 10 FIGURES, AUGUST 6, 1965, CFSTI, \$1.00 FS, \$0.50 MN

IN APRIL 1965 THE PWR REACTOR PLANT CONTAINER WAS SUCCESSFULLY LEAK-RATE TESTED BY THE REFERENCE VESSEL METHOD AT A PRESSURE OF 10 PSIG AND AN AVERAGE AMBIENT AIR TEMPERATURE OF 74.4 DEGREES F. THE CONTAINER LEAK RATE WAS IN THE ORDER OF 0.0120 TO 0.0137 PERCENT OF CONTAINER VOLUME PER 24 HR, WHICH IS WELL BELOW THE 0.065 PERCENT PER 24 HR ALLOWABLE. A SUPERIMPOSED LEAK RATE EQUAL TO THE TEST ALLOWABLE VALUE WAS APPLIED TO THE CONTAINER BY A SPECIAL FLOWMETER DURING THE LAST 12 HOURS OF THIS TEST. USE OF THIS CALIBRATED LEAK RATE VERIFIED THE ACCURACY OF THE TEST INSTRUMENTATION FOR OBTAINING DATA TO BE USED IN CALCULATING THE CONTAINER LEAK RATE. THE SUPERIMPOSED LEAK-RATE PORTION OF THE TEST PRODUCED A LEAK RATE WHICH WAS WITHIN 14 PERCENT OF THE CALCULATED RATE PRIOR TO THIS PHASE OF THE TEST.

*CONTAINMENT LEAKAGE + *LEAK RATE + *SHIPPINGPORT + *TEST, LEAK RATE +
CONTAINMENT REFERENCE MEASURING SYSTEM + REACTOR, PRESSURIZED WATER + THERMAL CONSIDERATION

11-C9917 GROZIN BD + CHERNENKO VS
POSSIBILITY OF STRENGTHENING STEEL BY ELECTRON BOMBARDMENT
JPRS-32107 + TT-65-32600 +. 7 PAGES, SEPTEMBER 22, 1965, TRANSLATED FROM DOPOVIDI AKADEMIYI NAUK UKRAYINSKOYI RSR, (2), PAGES 202-5 (1963), CFSTI, \$1.00 CY, \$0.50 MN

THEORETICAL CONSIDERATIONS PERMIT THE POSSIBILITY OF STRENGTHENING STEEL BY ELECTRON BOMBARDMENT. EXPERIMENTS HAVE CONFIRMED THE CORRECTNESS OF THIS PREMISE. THE HARDNESS OF STEEL IS RAISED TO 900-950 KG/MM SQUARED BY ELECTRON BOMBARDMENT. THE IRRADIATED ZONE HAS A SPECIFIC MICROSTRUCTURE.

*RADIATION EFFECT + *STEEL + *TENSILE PROPERTY + ALLOY + CREEP PROPERTY + RADIATION DAMAGE + X-RAY

11-C9918 SMITH BE
AN X-RAY STUDY OF FISSION FRAGMENT DAMAGE IN STEELS
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, HARWELL
5 PAGES, 4 TABLES, 1 FIGURE, 11 REFERENCES, JOURNAL OF NUCLEAR MATERIALS, 17(1), PAGES 167-171 (1965)

LATTICE-PARAMETER MEASUREMENTS WERE MADE ON STEELS BOMBARDED WITH FISSION FRAGMENTS AT ABOUT 60 C. THE RESULTS FOR ONE AUSTENITIC STEEL (CR, 20 WT PERCENT, NI, 20 WT PERCENT, NR, 0.44 WT PERCENT) ARE DISCUSSED IN CONJUNCTION WITH PUBLISHED RESULTS OBTAINED BY ELECTRON MICROSCOPY AND ARE CONSIDERED CONSISTENT WITH THE HYPOTHESIS THAT THE PROPORTION OF SMALL DEFECTS IN THIS STEEL IS GREATEST WHEN IRRADIATION DOSE RATES ARE HIGH. IN TWO OTHER AUSTENITIC STEELS (CR, 18 WT PERCENT, NI, 37 WT PERCENT) AND (CR, 18 WT PERCENT, NI, 12 WT PERCENT) AND A FERRITIC STEEL (CR, 15 WT PERCENT, NI, 5 WT PERCENT), A MEASURABLE PROPORTION OF SMALL DEFECTS WAS PRESENT AFTER IRRADIATION AT A DOSE RATE INTERMEDIATE BETWEEN THE TWO USED FOR THE 20/20 AUSTENITE.

*ALLOY + *RADIATION DAMAGE + *STEEL + ELECTRON MICROSCOPY + RADIATION EFFECT + X-RAY

11-C9920 COWAN A
METALLURGICAL TESTING AT CULCHETH
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, REACTOR MATERIALS LABORATORY, CULCHETH
4 PAGES, 3 FIGURES, ATOM(112), PAGES 33-36 (FEBRUARY, 1966)

A LARGE PROPORTION OF THE WORK AT THE REACTOR MATERIALS LABORATORY IS METALLURGICAL, AND EXTENSIVE FACILITIES HAVE BEEN DEVELOPED TO ALLOW FULL-SCALE INVESTIGATIONS OF THE BEHAVIOUR OF METALS RANGING IN SECTION FROM THIN FOIL TO THICK STEEL PLATES. IN ADDITION TO CONVENTIONAL TESTS, EQUIPMENT HAS BEEN DEvised TO GIVE BETTER SIMULATION OF ACTUAL SERVICE CONDITIONS, ESPECIALLY WHERE APPLICATION OF NORMAL TEST DATA IS INADEQUATE OR EVEN UNREALISTIC. IN SEVERAL CASES THIS INCLUDED TESTS ON EITHER THE FULL-SIZE COMPONENT OR LARGE SAMPLES, NECESSARY TO BE REASONABLY REPRESENTATIVE OF THE FINAL PRODUCT. CREEP TESTING. BRITTLE FRACTURE TESTS. TESTS ON MODEL VESSELS. POSTIRRADIATION TESTING FACILITIES. OTHER FACILITIES.

*EQUIPMENT DESIGN + *METAL + *TESTING + BRITTLE FRACTURE + CORROSION + CREEP PROPERTY + IMPACT PROPERTY +
RADIATION EFFECT + TENSILE PROPERTY + TEST, PRESSURE VESSEL

CATEGORY 11
CONTAINMENT OF NUCLEAR FACILITIES

11-09921 JABLONOWSKI EJ + RITZMAN RL + DEMASTRY JA
FISSION-FRAGMENT EFFECTS IN STRUCTURAL MATERIALS. QUARTERLY PROGRESS REPORT, JULY-SEPTEMBER 1965
BATTELLE MEMORIAL INSTITUTE
BMT-X-1C146 + EURAEC-1527 +. 7 PAGES, OCTOBER 1, 1965, CFSTI, \$1.00 CY, \$0.50 MN

THE OBJECTIVE OF THIS PROGRAM IS TO DETERMINE THE TYPE AND MAGNITUDE OF MECHANICAL-PROPERTY CHANGES PRODUCED ANNEALED AISI TYPE 304 STAINLESS STEEL AND ANNEALED ZIRCALOY-2 BY FISSION-FRAGMENT IRRADIATIONS. TESTING OF TUBE-BURST AND BEND SPECIMENS OF RECOIL-IMPREGNATED ZIRCALOY-2 AND TYPE 304 STAINLESS STEEL WAS COMPLETED. NOMINAL INCREASES OF 8 TO 10 PERCENT IN AVERAGE PROPORTIONAL LIMIT AND YIELD-STRENGTH VALUES OF FISSION-FRAGMENT-DAMAGED OVER NEUTRON-DAMAGED MATERIALS WERE NOTED FROM BOTH THE BEND AND TUBE-BURST DATA. LIGHT AND ELECTRON METALLOGRAPHIC ANALYSES OF THE RECOIL-IMPREGNATED MATERIALS WERE COMPLETED. NO STRUCTURAL CHANGES WERE NOTED AS THE RESULT OF FISSION-FRAGMENT OR NEUTRON DAMAGE. FRACTURE ANALYSIS OF RUPTURES PRODUCED IN THE TUBE-BURST EXPERIMENTS INDICATED NO CHANGE IN FRACTURE MODE (DUCTILE) AS A RESULT OF FISSION-FRAGMENT IRRADIATION. THE MAXIMUM RADIATION-INDUCED TENSILE AND COMPRESSIVE STRESSES IN ZIRCALOY-2 AND TYPE 304 STAINLESS STEEL WERE CALCULATED ON THE BASIS OF EXPERIMENTALLY DETERMINED VALUES OF RADIATION EXPANSION COEFFICIENTS AND FISSION-FRAGMENT CONCENTRATIONS. ALTHOUGH CALCULATED TENSILE STRESSES WERE NOMINAL, COMPRESSIVE STRESSES OF 14,300 PSI (STAINLESS STEEL) AND 42,400 PSI (ZIRCALOY-2) WERE OBTAINED.

*RADIATION DAMAGE + *STEEL, STAINLESS + *TENSILE PROPERTY + ALLOY + ELECTRON MICROSCOPY + FAILURE, PIPE + TESTING + ZIRCONIUM

11-09922 ROMUALDI JP
THE EFFECT OF LOADING GEOMETRY ON THE FRACTURE TOUGHNESS OF BIAXIAL BRITTLE FRACTURE SPECIMENS
CARNEGIE INSTITUTE OF TECHNOLOGY
WAPC-TM-554 +. 45 PAGES, TABLES, FIGURES, APRIL, 1964, CFSTI, \$2.00 CY, \$0.50 MN

EXPERIMENTS ON THE MANJOINE BRITTLE-FRACTURE TEST SPECIMEN CONDUCTED DURING 1963 INDICATED THAT FRACTURE TOUGHNESS DEPENDS ON THE GEOMETRY OF LOADING. THIS EFFECT IS ASSOCIATED WITH THE STRESS GRADIENT IMMEDIATELY AHEAD OF THE TIP OF THE CRACK. WITH A MANJOINE TEST SPECIMEN SCALED UP TENFOLD DIMENSIONALLY, STRAINS WERE MEASURED NEAR THE CRACK TIP, AND CONVERTED TO STRESSES IN ORDER TO OBTAIN THE STRESS-INTENSITY FACTOR AS A FUNCTION OF APPLIED LOAD. THE ENERGY RELEASED PER UNIT CRACK EXTENSION IS DIRECTLY RELATED TO THE STRESS-INTENSITY FACTOR. IT APPEARS THAT THE CRITICAL-STRAIN-ENERGY RELEASE RATE FOR A MANJOINE TEST SPECIMEN IS ABOUT ONE-THIRD THE VALUE FOR A WIDE-PLATE TEST.

*BRITTLE FRACTURE + *TENSILE PROPERTY + CONTAINMENT, PRESSURE VESSEL + ELASTICITY + FAILURE, PRESSURE VESSEL + MEASUREMENT, STRAIN GAGE + METAL + STRESS

11-09923 CONSTANT + PRUDHOMME + WEISZ + LE BRET + OBERMOSSE
STUDIES ON THE BRITTLE FRACTURE STRENGTH OF HEAVY-GAGE STEEL PLATE. FINAL REPORT NO. 1
INSTITUT DE RECHERCHES DE LA SIDERURGIE, ST. GERMAINE-EN-LAYE (FRANCE) + COMMISSARIAT A L ENERGIE ATOMIQUE, SACLAY (FRANCE), CENTRE D ETUDES NUCLEAIRES
EURAEC-1520 + EUR-2672 +. 29 PAGES, 1965, CFSTI, \$2.00 CY, \$0.50 MN

THE DEVELOPMENT OF A BEND TEST TO OBTAIN DETAILED DATA ON THE BRITTLE-FRACTURE PHENOMENA ENCOUNTERED IN WELDED AND UNWELDED STEEL PLATES 200 MM THICK IS DESCRIBED. PRELIMINARY RESULTS INDICATE THAT THE TRANSITION TEMPERATURE OF SPECIMENS CONTAINING FIVE SCATTERED WELDS IS HIGHER THAN THAT OF SPECIMENS CONTAINING ONE SINGLE CENTRAL WELD, REGARDLESS OF WHETHER THIS WELD CONSISTS OF ONE BEAD OR FIVE JOINED BEADS. THE BRITTLE ZONE CAUSED BY SEVERAL BEADS DEPOSITED ALONGSIDE EACH OTHER WAS NOT GREATER THAN THAT CAUSED BY ONE BEAD.

*BRITTLE FRACTURE + *NOT DATA (NIL DUCTILITY TRANSITION) + *TENSILE PROPERTY + CONTAINMENT, PRESSURE VESSEL + METAL + STRESS + WELDS

11-09924 RIPLING EJ + CROSLLEY P
DEVELOPMENT OF TEST PROCEDURES. FRACTURE TOUGHNESS OF REACTOR PRESSURE VESSEL STEELS
MATERIALS RESEARCH LABORATORY, INC.
CCO-1477-1 +. 5 PAGES, JULY 1965- CFSTI, \$1.00 CY, \$0.50 MN

A DOUBLE CANTILEVER BEAM (DCB) DEVICE IS BEING DEVELOPED TO MEASURE THE FRACTURE TOUGHNESS OF MILD STEEL. BECAUSE IRRADIATED SAMPLES MUST BE TESTED, A MAJOR REQUIREMENT IS THAT THE SPECIMENS BE AS SMALL AS POSSIBLE. AN ADDITIONAL ADVANTAGE OF THE DCB SPECIMEN IS THAT CRACK ARREST AS WELL AS CRACK INITIATION CAN BE PRODUCED. THIS IS IMPORTANT BECAUSE, IN A WELDED STRUCTURE, CRACKS ARE LIKELY TO ORIGINATE IN A WELD REGION, AND A DESIGN SPECIFICATION SHOULD BE BASED ON THE ABILITY OF THE MILD-STEEL BASE METAL TO ARREST THE EXPANDING CRACK. EPOXY AND ALUMINUM SPECIMENS HAVE BEEN TESTED.

*BRITTLE FRACTURE + *TENSILE PROPERTY + CONTAINMENT, PRESSURE VESSEL + METAL + NOT DATA (NIL DUCTILITY TRANSITION) + STRESS + WELDS

11-09925 KILSBY ER + IMHOFF DH
REACTOR PRIMARY COOLANT SYSTEM RUPTURE STUDY. QUARTERLY PROGRESS REPORT NUMBER 2
GENERAL ELECTRIC, ATOMIC POWER EQUIPMENT DEPT
GEAP-4964 +. 60 PAGES, 18 REFERENCES, 18 FIGURES, 4 TABLES- OCTOBER 1965- CFSTI, \$4.00 CY, \$1.00 MN.

FOUR ASPECTS OF THE STRUCTURAL PERFORMANCE OF REACTOR PRIMARY PIPING SYSTEMS ARE BEING STUDIED. THESE ASPECTS ARE (1) RELIABILITY, (2) STRESS ANALYSIS, (3) FRACTURE MECHANICS, AND (4) FATIGUE. INITIAL CRACKS AND FATIGUE CRACKS ARE THE MOST LIKELY CAUSES OF FLAWS. STRESS ANALYSIS DETERMINES THE CONDITIONS IN THE NEIGHBORHOOD OF FLAWS. FRACTURE MECHANICS IS USED

CATEGORY 11
CONTAINMENT OF NUCLEAR FACILITIES

11-09925 *CONTINUED*

TO DETERMINE IF AND WHEN CRACKS WILL PROPAGATE. RELIABILITY ANALYSIS DETERMINES THE PROBABILITY OF FAILURE. A LIST OF FACTORS GOVERNING RELIABILITY IS PRESENTED, TOGETHER WITH AN EXAMPLE OF A RELIABILITY CALCULATION. METHODS OF STRESS ANALYSIS FOR DIFFICULT PIPING COMPONENTS ARE BEING DEVELOPED. CRACK GROWTH UNDER FATIGUE CONDITIONS IS AN IMPORTANT PROBLEM IN PIPING DESIGN. FATIGUE CRACKING IN AREAS OF STRESS CONCENTRATION IS BEING EXAMINED.

*BRITTLE FRACTURE + *FAILURE, FATIGUE + *FAILURE, PIPE + *PIPING + *RELIABILITY ANALYSIS + BIBLIOGRAPHY + COMPUTER PROGRAM + CONTAINMENT RESEARCH AND DEVELOPMENT + CONTAINMENT STRUCTURE + ELASTICITY + LOSS OF COOLANT + METAL + STRESS ANALYSIS

11-C9926 STEELE LE

RADIATION EMBRITTLEMENT OF REACTOR PRESSURE VESSEL STEELS

U.S. NAVAL RESEARCH LABORATORY, WASHINGTON, D.C.

12 PAGES, 6 TABLES, 7 FIGURES, 8 REFERENCES, NUCLEAR ENGINEERING AND DESIGN, 3(2), PAGES 287-298 (1966)

THE PROBLEM OF RADIATION EMBRITTLEMENT OF REACTOR PRESSURE VESSEL STEELS IS CONSIDERED WITHIN THE FRAMEWORK OF NEW NAVAL RESEARCH LABORATORY CONCEPTS OF FRACTURE ANALYSIS AND IN REFERENCE TO THE PRIMARY VARIABLES, COMPOSITION OF THE STEEL, NEUTRON EXPOSURE, AND EXPOSURE TEMPERATURE. THIS PAPER SUMMARIZES THE STATUS OF THE NRL EMBRITTLEMENT STUDY, WITH EMPHASIS ON MAJOR FACTORS SUCH AS THE EFFECTS ON DIFFERENT STEELS AND THE EFFECTS OF NUCLEAR AND THERMAL ENVIRONMENT DURING IRRADIATION. IN ADDITION, POSTIRRADIATION HEAT TREATMENT TO RESTORE NOTCH DUCTILITY WAS INVESTIGATED OVER A RANGE OF IRRADIATION AND ANNEALING CONDITIONS. CURRENT AND PLANNED PROGRAMS ARE REVIEWED WITH REFERENCE TO SUMMARY OBSERVATIONS.

*BRITTLE FRACTURE + *EMBRITTLEMENT + *FAILURE, PRESSURE VESSEL + *IMPACT PROPERTY + *RADIATION DAMAGE + *RADIATION EFFECT + *STEEL + ALLOY + ANALYTICAL TECHNIQUE, CALIBRATION + CONTAINMENT, PRESSURE VESSEL + FLAW + IMPACT SHOCK + NDT DATA (NIL DUCTILITY TRANSITION) + REACTOR, PRESSURIZED WATER + STRESS + STRESS ANALYSIS + TENSILE PROPERTY + TEST, DESTRUCTIVE

11-10007 THIN WALLED NUCLEAR REACTOR

AKTIEBOLAGET ATOMENERGI

FRENCH PAT. 1,368,813 + ORNL-TR-1327 +. 8 PAGES, JUNE 1964, PATENT (FOREIGN)

THE INVENTION CONCERNS A REACTOR VESSEL HAVING RELATIVELY THIN WALLS FOR A BOILING-WATER REACTOR. THE VESSEL CAN BE THIN-WALLED SINCE IT IS NOT REQUIRED TO SUPPORT THE FULL WORKING PRESSURE. THE REACTOR CONSISTS OF A PRESSURE VESSEL OF PRESTRESSED CONCRETE, HAVING AN ORIFICE AT THE TOP END, WHICH IS CLOSED BY A PLUG. THE INTERIOR OF THE VESSEL IS LINED WITH A SEALING SKIN OF CARBON STEEL. THIS VESSEL CONTAINS A REACTOR VESSEL HAVING THIN WALLS OF STAINLESS STEEL. THE LATTER RESERVOIR IS PROVIDED WITH AN ORIFICE AT ITS TOP END, THROUGH WHICH THE REACTOR VESSEL IS IN FREE COMMUNICATION WITH THE SPACE FORMED BETWEEN THE REACTOR VESSEL AND THE PRESSURE VESSEL. THIS SPACE IS FILLED WITH A GAS WHICH DOES NOT CONDENSE AT NORMAL TEMPERATURES AND WHICH IS AT THE SAME PRESSURE AS THE PRESSURE OF THE STEAM IN THE REACTOR VESSEL.

*STEEL, STAINLESS + *THICKNESS + CONCRETE, PRESTRESSED + CONTAINMENT, PRESSURE VESSEL + DESIGN CRITERIA + STEEL LINER

11-10034 MCGHIE RD

DEFORMATION, VIBRATION, AND STABILITY OF SHELLS. A PARTIALLY ANNOTATED BIBLIOGRAPHY

UNIVERSITY OF CALIFORNIA

UCRL-13196 +. 70 PAGES (APPROX.), JUNE 1965

THE LITERATURE CONCERNING DEFORMATION, VIBRATION, AND STABILITY OF SHELLS WAS SURVEYED, AND A BIBLIOGRAPHY WAS PREPARED, PLACING PARTICULAR EMPHASIS ON LITERATURE RELEVANT TO THE FAILURE MECHANISMS OF SHELLS CONFINED IN RIGID CAVITIES. THIS BIBLIOGRAPHY COVERS THE PERIOD 1957 TO 1965. A PREVIOUS ONE COVERED THE PERIOD 1880 TO 1957.

*BIBLIOGRAPHY + *SHELL + *STRESS ANALYSIS + BUCKLING + BURST PRESSURE + CONTAINMENT STRUCTURE + CREEP BEHAVIOR + ELASTICITY + INSTABILITY + PLASTICITY + STRESS + STRESS ANALYSIS

11-10035 TASI J + FELDMAN A + STANG DA

THE BUCKLING STRENGTH OF FILAMENT-WOUND CYLINDERS UNDER AXIAL COMPRESSION

MARTIN-MARIETTA CORPORATION, DENVER

NASA-CR-266 +. 58 PAGES, 24 FIGURES, 4 TABLES, 17 REFERENCES, JULY 1965, CFSJI, \$3.00 CY

THE BUCKLING STRENGTHS OF 11 AXIALLY COMPRESSED FILAMENT-WOUND CYLINDERS WITH DIAMETER-TO-THICKNESS RATIOS RANGING FROM 167 TO 643 ARE DETERMINED EXPERIMENTALLY AND ANALYTICALLY. THE ANALYTICAL PREDICTIONS OF BUCKLING LOADS ARE MADE BY USING LINEAR ANISOTROPIC SHELL THEORY. THE RESULTS OF THE COMPRESSION TESTS GENERALLY INDICATE THAT THE CYLINDERS BUCKLED AT 65 TO 85 PERCENT OF THE LOADS PREDICTED BY LINEAR ANALYSIS. THE COMPOSITE MODULI FOR EACH OF THE CYLINDERS ARE DETERMINED EXPERIMENTALLY AND ARE IN REASONABLE AGREEMENT WITH THE THEORY OF S. TSAI.

*BUCKLING + *COMPARISON, THEORY AND EXPERIENCE + *INSTABILITY + *MEASUREMENT, STRAIN GAGE + *PRESSURE, EXTERNAL + *SHELL + *STRESS ANALYSIS + COMPUTER PROGRAM + CONTAINMENT STRUCTURE + ELASTICITY + STRESS + STRESS ANALYSIS

11-10293 JOHNSON BM

CATEGORY 11
CONTAINMENT OF NUCLEAR FACILITIES

11-10293 *CONTINUED*
CONTAINMENT SYSTEMS EXPERIMENT. PART III. MATHEMATICAL MODELS OF PRESSURE-TEMPERATURE TRANSIENTS
BATTELLE NORTHWEST, PACIFIC NORTHWEST LABORATORY
BNWL-233 +. 150 PAGES, FIGURES, TABLES, REFERENCES, MAY 1966, CFSTI, \$5.00 CY, \$1.00 MN

DOCUMENT SUMMARIZES THE INITIAL EFFORTS TO DEVELOP A MATHEMATICAL MODEL OF PRESSURE-TEMPERATURE TRANSIENTS. THESE MODELS, AFTER REFINEMENT AND ADJUSTMENT, MAY PROVIDE A SATISFACTORY SIMULATION OF TEST DATA FROM CONTAINMENT SYSTEMS EXPERIMENT (CSE). SINCE IT IS A CONTINUING SEGMENT OF THE CSE PROGRAM, THIS DOCUMENT IS INTENDED TO PROVIDE A MANUAL FOR THE COMPLETE UNDERSTANDING OF THE WORK THROUGH 1965, WITH SUGGESTIONS FOR REFINEMENT AS DATA BECOMES AVAILABLE. ALTHOUGH MODELS OF PRESSURE AND TEMPERATURE TRANSIENTS IN CONTAINMENT SYSTEMS HAVE BEEN DEVELOPED ELSEWHERE, THEY ARE PROPRIETARY AND NOT AVAILABLE FOR UNRESTRICTED USES OR DETAILED SCRUTINY. SEVERAL PROGRAMS WERE DEVELOPED AND RUN, UTILIZING THE MIDAS (MODIFIED INTEGRAL DIGITAL ANALOG SIMULATOR) GENERALIZED PROGRAM. THIS APPROACH UTILIZES THE DIGITAL COMPUTER TO SIMULATE THE BEHAVIOR OF AN ANALOG SYSTEM IN THE SOLUTION OF SIMULTANEOUS DIFFERENTIAL EQUATIONS. IT HAS THE PARTICULAR ADVANTAGE OF PERMITTING A RAPID DEVELOPMENT OF THE PROBLEM ON THE ANALOG COMPUTER (WHEN IT BECOMES DESIRABLE TO DO SO) TO ATTEMPT A FIT BETWEEN THE MATHEMATICAL MODEL AND EXPERIMENTAL DATA BY THE VARYING OF PARAMETERS.

*ACCIDENT MODEL + *CONTAINMENT RESEARCH AND DEVELOPMENT + *CONTAINMENT VESSEL LOADING + *CSE (CONTAINMENT SYSTEMS EXPERIMENT) + COMPUTER PROGRAM + COMPUTER, ANALOG + COMPUTER, DIGITAL + CONTAINMENT ANALYSIS + CONTAINMENT, GENERAL + CONTAINMENT, PRESSURE SUPPRESSION + LOSS OF COOLANT + PRESSURE, INTERNAL + TEMPERATURE TRANSIENT + THERMAL ANALYSIS

11-10308 SPALLER AE + SHOBE LR
STRUCTURAL ANALYSIS OF SHIPPING CASKS VOL. I. ANALYSIS OF A SHIPPING CASK SUBJECTED TO INTERNAL PRESSURE
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE
ORNL-TM-1312 +. 58 PAGES, 19 FIGURES, 9 TABLES, MARCH 1966, CFSTI, \$3.00 CY, \$0.75 MN

FORMULAS TO BE USED BY THE DESIGN ENGINEER TO CALCULATE THE MAXIMUM STRESS PRODUCED IN A CASK USED TO SHIP RADIOACTIVE MATERIALS WHEN IT IS SUBJECTED TO INTERNAL PRESSURE ARE PRESENTED. THE FORMULAS WERE DEVELOPED FOR USE AS A GUIDE TO INDICATE COMPLIANCE WITH THE PROPOSED AEC REGULATION PERTAINING TO THE DESIGN REQUIREMENT FOR RESISTANCE TO INTERNAL PRESSURE. HOWEVER, USE OF THESE FORMULAS, WHICH TAKE INTO ACCOUNT THE ELASTIC NATURE OF THE LEAD SHIELDING, ARE DERIVED TO DETERMINE THE THICKNESS OF THE CAVITY WALL FOR CASKS OF BOTH PRISMATIC AND CYLINDRICAL CONFIGURATION, THE FORMULAS ARE TABULATED, AND EXAMPLE PROBLEMS ARE GIVEN. CREEP OF THE LEAD SHIELD IS EVALUATED, AND IT IS CONCLUDED THAT THE CREEP PROBLEM TENDS TO BE SELF-ALLEVIATING.

*PRESSURE, INTERNAL + *SHIPPING CONTAINER + *STRESS ANALYSIS + *TRANSPORTATION AND HANDLING

11-10325 MOBERG CA
FLANGED JOINT
AKTIEBOLAGET ATOMENERGI
U.S. PAT. 3,219,370 +. 6 PAGES, 4 FIGURES, REFERENCES, NOVEMBER 1965, PATENT (U.S.)

A FLANGED JOINT IS DESCRIBED FOR CONNECTING DIFFERENT PARTS OF CONTAINERS, RECEIVERS, PIPES, OR, PARTICULARLY, DIFFERENT PARTS OF A REACTOR PRESSURE VESSEL. THE JOINT IS SUBSTANTIALLY FREE FROM STRESSING CAUSED BY EITHER THE FORCES KEEPING THE PARTS TOGETHER OR BY THE LARGE INTERNAL PRESSURE OR TEMPERATURE DIFFERENCES THAT MAY OCCUR BETWEEN THE DIFFERENT PARTS OF THE JOINT. THE TWO FLANGES ARE FIXED BY WELDING TO THE PARTS TO BE JOINED, AND SEVERAL TENSION MEMBERS (E.G., BOLTS) EXTENDED OBLIQUELY FROM EACH FLANGE AND OUTSIDE THE ADJACENT ONE. EACH TENSION MEMBER IS CONNECTED WITH A THRUST MEMBER RESTING AGAINST THE ADJACENT FLANGE AND ALSO CONNECTED WITH TWO ADJACENT IDENTICAL THRUST ELEMENTS ASSOCIATED WITH TWO ADJACENT TENSION MEMBERS FROM THE OTHER FLANGE, PREFERABLY THROUGH SPECIAL SPACING MEMBERS. A PART OF THE COMMON FACE BETWEEN THE FLANGES IS DESIGNED TO ACT AS A PACKING AREA AND IS TAKEN UP BY A SEAL.

*CONTAINMENT, PRESSURE VESSEL + *FLANGE + *SEAL + DESIGN CRITERIA

11-10331 NICHOLS RW + QUIRK A + IRVINE WH + BEVITT E
A LIMIT APPROACH TO THE PREVENTION OF PRESSURE VESSEL FAILURE
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, RISLEY
TRG-1004 (C) +. 46 PAGES, 19 FIGURES, 5 TABLES, 17 REFERENCES, MAY 1965, UKAEA

THE CONDITIONS GIVING RISE TO FAST-FRACTURE INITIATION AND PROPAGATION ARE DISCUSSED IN RELATION TO THE CASE OF A PRESSURE VESSEL CONTAINING COMPRESSIBLE FLUID, WITH PARTICULAR REFERENCE TO THE SIZE OF DEFECT LEADING TO ULTIMATE FAILURE. EXPERIMENTAL WORK CARRIED OUT TO PROVIDE NUMERICAL DATA IS SUMMARIZED AND INTERPRETED. THE SIGNIFICANCE OF THE RESULTS IS THEN CONSIDERED IN RELATION TO THE PROPOSED USE OF HIGHER DESIGN STRESSES, OF NEW MATERIALS, AND OF PARTICULAR ENVIRONMENTS, AND WITH RESPECT TO THE OPERATIONAL SAFETY OF REACTOR PRESSURE CIRCUITS.

*BRITTLE FRACTURE + *CONTAINMENT, PRESSURE VESSEL + *FAILURE, PRESSURE VESSEL + *FLOW THEORY AND EXPERIMENTS + *TEST, PRESSURE VESSEL + BURST PRESSURE + COMPARISON, THEORY AND EXPERIENCE + CONTAINMENT INTEGRITY + CONTAINMENT RESEARCH AND DEVELOPMENT + CONTAINMENT, HIGH PRESSURE + CYLINDER + INSTABILITY + NDT DATA (NIL DUCTILITY TRANSITION) + PLASTICITY + PRESSURE, INTERNAL + SHELL + STEEL + STRESS + TENSILE PROPERTY

11-10529 REES NJ
A MODEL INVESTIGATION OF EXPLOSION CONTAINMENT IN SINGLE TANK FAST REACTORS

CATEGORY 11
CONTAINMENT OF NUCLEAR FACILITIES

11-10529 *CONTINUED*

UNITED KINGDOM ATOMIC ENERGY AUTHORITY, SOUTHBEND-ON-SEA, ESSEX
ANL-7120 +. 28 PAGES, 24 FIGURES, 11 TABLES, 4 REFERENCES, PP. 692-719 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

THE PRESSURE VESSELS OF FAST REACTORS MUST BE DESIGNED TO RESIST THE EXPLOSIVE LOADS WHICH COULD BE CAUSED BY AN ACCIDENTAL SUPER-PROMPT CRITICAL EXCURSION. EXPERIMENTS WERE PERFORMED WITH CHEMICAL EXPLOSIVES DETONATED INSIDE WATER-FILLED MODEL STEEL PRESSURE VESSELS. MILD STEEL AT ROOM TEMPERATURE WAS USED TO SIMULATE STAINLESS STEEL AT ELEVATED TEMPERATURES. DIRECT AND REFLECTED PRESSURES WERE RECORDED. EJECTION OF THE CORE ACCESS PLUG AND FAILURE OF THE PRESSURE VESSEL WERE OBSERVED. DESIGN DATA WERE OBTAINED.

*ACCIDENT, EXPLOSION + *CONTAINMENT VESSEL LOADING + *CONTAINMENT, MISSILE GENERATION AND PROTECTION + *CONTAINMENT, SHOCK GENERATION AND PROTECTION + *EXPLOSION + *REACTOR, FAST + BURST PRESSURE + *CONTAINMENT RESEARCH AND DEVELOPMENT + *CONTAINMENT, HIGH PRESSURE + EXCURSION, LARGE + *FAILURE, PRESSURE VESSEL + IMPACT SHOCK + PLASTICITY + PRESSURE, INTERNAL + SHOCK WAVE

11-10530 DREYON GA + FALGAYRETTES MF + WALFORD FJ
COMPARISON OF PRESSURE LOADING PRODUCED BY CONTAINED EXPLOSIONS IN WATER AND SODIUM CENTRE D ETUDES NUCLEAIRES DE SACLAY + CENTRE D ETUDES NUCLEAIRES DE CADARACHE + UNITED KINGDOM ATOMIC ENERGY AUTHORITY, SOUTHBEND-ON-SEA, ESSEX
ANL-7120 +. 14 PAGES, 11 FIGURES, 4 TABLES, 5 REFERENCES, PP. 720-733 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

JOINT EXPERIMENTS BY THE CEA-EURATOM AND THE UKAEA WERE CARRIED OUT AT CADARACHE, FRANCE, USING WATER AND HOT SODIUM COOLANT IN A SMALL-SCALE MODEL REPRESENTATIVE OF CURRENT FAST-REACTOR DESIGN. THE SINGLE, STAINLESS-STEEL COOLANT TANK WAS ABOUT 9.5 IN. IN DIAMETER AND 16.5 IN. DEEP, AND CONTAINED A MODEL BREEDER AND REFLECTOR. IT IS CLEAR THAT FOR A GIVEN EXPLOSIVE RELEASE OF ENERGY IN A FIXED GEOMETRY, THE BLAST EFFECTS WILL BE GREATER IN SODIUM THAN IN WATER.

*EXPLOSION + *METAL WATER REACTION + *SODIUM + *WATER, GENERAL + *CONTAINMENT, SHOCK GENERATION AND PROTECTION + PRESSURE, INTERNAL + REACTOR, FAST

11-10531 SAMUELS DE
DESIGN FACTORS INFLUENCING THE CONTAINMENT OF INTERNAL EXPLOSION IN FAST REACTORS
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, SOUTHBEND-ON-SEA, ESSEX
ANL-7120 +. 15 PAGES, 3 FIGURES, 3 REFERENCES, PP. 734-740 OF PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, OCTOBER 11-14, 1965, CFSTI, \$9.25 CY

IN RECENT YEARS THE FOULNESS ESTABLISHMENT OF THE U.K.A.E.A. HAS BEEN ENGAGED IN A CONTINUING INVESTIGATION OF THE CONTAINMENT OF CORE EXPLOSIONS IN FAST REACTOR SYSTEMS. IN THIS WORK SMALL CHARGES OF CHEMICAL HIGH EXPLOSIVE HAVE BEEN DETONATED IN SCALED MODELS OF THE REACTOR STRUCTURE. GEOMETRICAL ARRANGEMENTS ARE STUDIED IN INSTRUMENTED, OVERSTRESS MODELS, WHILE INFORMATION ON MODES OF DEFORMATION AND ENERGY ABSORPTION IS OBTAINED FROM MODELS HAVING CORRECTLY SCALED STRUCTURAL STRENGTH. PROCESSES STUDIED INCLUDE THE PLASTIC FLOW AND RUPTURE OF METALS, SHOCK-WAVE INTERACTIONS, VENTING AND PRESSURE RISE IN GAS SPACES, CRUSHING OF POROUS MATERIALS, AND THE IMPACT OF SHOCK-DRIVEN LIQUIDS. THIS HAS LED TO THE POSSIBILITY OF ADJUSTING THE BALANCE BETWEEN THESE PROCESSES BY APPROPRIATE DESIGN SO AS TO ACHIEVE THE NECESSARY STRUCTURAL INTEGRITY WITH THE LEAST ECONOMIC PENALTY OR INTERFERENCE WITH NORMAL WORKING.

*CONTAINMENT, SHOCK GENERATION AND PROTECTION + *DESIGN CRITERIA + *EXPLOSION + *REACTOR, FAST + MOCKUP + PRESSURE, INTERNAL + TESTING

11-10699 GROUNDEN M
SWEDISH WORK ON BRITTLE-FRACTURE PROBLEMS IN NUCLEAR REACTOR PRESSURE VESSELS
AKTIEBOLAGET ATOMENERGI, STOCKHOLM, SWEDEN
AE-221 +. 50 PAGES, 23 FIGURES, 31 REFERENCES, MARCH 1966, DEP/MN

FOR A REACTOR PRESSURE VESSEL TO BE SAFE AGAINST BRITTLE FRACTURE, THE CRACK-PROPAGATION TRANSITION TEMPERATURE FOR A GIVEN STRESS MUST NOT EXCEED THE ACTUAL TEMPERATURE FOR THAT STRESS. THREE TYPES OF STEEL HAVE BEEN CONSIDERED FOR NUCLEAR SERVICE - MILD STEEL, LOW-ALLOY INTERMEDIATE-STRENGTH STEEL, AND ALLOY HIGH-STRENGTH STEEL. THE USE OF HIGH-STRENGTH STEEL HELPS MINIMIZE WALL THICKNESSES AND TOTAL WEIGHT. MINIMIZING WALL THICKNESSES FACILITATES WELD INSPECTION. MINIMIZING WEIGHT FACILITATES TRANSPORTATION. THE FINAL TRANSITION TEMPERATURE DEPENDS ON THE TYPE OF STEEL, FABRICATION METHODS, WELDING TECHNIQUES, SHAPE, AGE, AND IRRADIATION. TEST DATA ON IRRADIATED STEELS ARE PRESENTED.

*BRITTLE FRACTURE + *CONTAINMENT, PRESSURE VESSEL + *EMBRITTEMENT + *IRRADIATION TESTING + *NDT DATA (NIL DUCTILITY TRANSITION) + *CONTAINMENT INTEGRITY + *CONTAINMENT RESEARCH AND DEVELOPMENT + *FAILURE, PRESSURE VESSEL + FLAW + HIGH RADIATION + IMPACT PROPERTY + RADIATION DAMAGE + STEEL + STRESS + TENSILE PROPERTY + WELDS

11-10720 MARIN J
NEW EVALUATIONS FOR MULTIAXIAL-STRESS PROPERTIES OF CERAMIC MATERIALS
PAGES 162-170 OF EXPERIMENTAL STRESS ANALYSIS, PROCEEDINGS, VOL. XXIII, NO. 1, E. ROSSI, EDITOR, 1966, SOCIETY FOR EXPERIMENTAL STRESS ANALYSIS, WESTPORT, CONNECTICUT

A THEORY FOR EVALUATING THE MULTIAXIAL STRESS PROPERTIES OF BRITTLE-TYPE MATERIALS WITH UNEQUAL TENSILE AND COMPRESSIVE YIELD STRENGTHS IS PRESENTED. THE THEORY IS BASED ON A NONLINEAR RELATIONSHIP BETWEEN THE MAXIMUM SHEAR STRESS AND THE NORMAL STRESS ON THE SAME

CATEGORY 11
CONTAINMENT OF NUCLEAR FACILITIES

11-10720 *CONTINUED*

PLANE. THE DEFORMATION THEORY OF PLASTICITY IS USED TO DERIVE EXPRESSIONS FOR THE TOTAL PRINCIPAL PLASTIC STRAINS. THEREFORE, THE PLASTIC VOLUME CHANGE IS ZERO. EXPERIMENTAL PROCEDURES FOR DETERMINING MATERIAL PROPERTIES ARE DESCRIBED. STIFFNESS, RESILIENCE, MULTIAXIAL STRENGTH, DUCTILITY, TOUGHNESS, DYNAMIC RESPONSE, AND CREEP ARE DISCUSSED IN TERMS OF THE PROPOSED THEORY.

*PLASTICITY + *STRESS ANALYSIS + CONCRETE + CREEP BEHAVIOR + DEFORMATION + STRESS

11-10743 YOUNGDAHL CK + STERNBERG E

THREE-DIMENSIONAL STRESS CONCENTRATION AROUND A CYLINDRICAL HOLE IN A SEMI-INFINITE ELASTIC BODY
ARGONNE NATIONAL LABORATORY, ARGONNE, ILLINOIS
ANL-7C97 +. 159 PAGES, 25 FIGURES, 4 TABLES, 26 REFERENCES, SEPTEMBER 1965, CFSTI, \$5.00 CY, \$1.00 MN

AN UNCONVENTIONAL INTEGRAL TRANSFORM TECHNIQUE IS USED TO ANALYZE THE STRESSES AROUND A CYLINDRICAL HOLE RUNNING NORMAL TO THE BOUNDARY OF A SEMI-INFINITE ELASTIC HALF-SPACE. THE RESULTS ILLUSTRATE THE LIMITATIONS INHERENT IN A TWO-DIMENSIONAL ANALYSIS AND ARE RELEVANT TO FAILURE CONSIDERATIONS AND EXPERIMENTAL STRESS ANALYSIS.

*ELASTICITY + *STRESS ANALYSIS + COMPUTER PROGRAM + NOZZLE + THICKNESS

11-10806 REPORT OF INVESTIGATION OF THE AMERICIUM SHIPPING CONTAINER EXPLOSION IN BUILDING 71 ON SEPTEMBER 25, 1964

THE DOW CHEMICAL COMPANY, DENVER, COLORADO
15 PAGES, 12 FIGURES, OCTOBER 20, 1964, SOURCE

ON SEPTEMBER 25, 1964, A SHIPPING CONTAINER AT DOW CHEMICAL COMPANY, ROCKY FLATS SITE, CONTAINING 5 G OF AMERICIUM AQUEOUS CHLORIDE SOLUTION, EXPLODED. INVESTIGATION INDICATED THAT THERE WAS INSUFFICIENT DATA TO DETERMINE WHETHER THE SHIPPING CONTAINER FAILED DUE TO CHEMICAL EXPLOSION OR SLOW PRESSURE BUILDUP. EITHER IS POSSIBLE BECAUSE OF RADIOLYTIC DECOMPOSITION OF THE SOLUTION. THE MAIN RECOMMENDATION FOR FUTURE RADIOACTIVE SHIPMENTS IS TO AVOID SENDING THE MATERIAL IN SOLUTION FORM WHEN POSSIBLE.

*AMERICIUM + *EXPLOSION + *STORAGE CONTAINER

11-10867 MILLER CE + BROWNING WE

THE ADEQUACY OF SCALE-UP IN EXPERIMENTS ON FISSION PRODUCT BEHAVIOR IN REACTOR ACCIDENTS. PART I. AN ANALYSIS OF SCALE-UP IN THE U. S. NUCLEAR SAFETY PROGRAM
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TENNESSEE
ORNL-3901 +. 48 PAGES, 2 TABLES, 17 FIGURES, 17 REFERENCES, JULY 1966, CFSTI, \$3.00 CY, \$0.50 MN

FOUR AREAS DISCUSSED - (1) RELEASE OF FISSION PRODUCTS FROM FUEL, (2) THEIR TRANSPORT TO CONTAINMENT VESSEL, (3) THEIR BEHAVIOR IN A CONTAINMENT SYSTEM, AND (4) THEIR BEHAVIOR IN GAS-CLEANING SYSTEMS. IN GENERAL, LARGE-SCALE EXPERIMENTS SUCH AS LOFT WERE THE UPPER BOUND OF THE STUDY. CONCLUSION - ITEMS (3) AND (4) ARE WELL SCALED OVER RANGE, BUT INTERMEDIATE-SCALE EXPERIMENTS (JUST BELOW LOFT) ARE NEEDED FOR ITEMS (1) AND (2). CONTAINS GOOD GENERAL INTRODUCTION TO PROBLEM, PLUS COMPARISON OF LOFT WITH POWER REACTORS AND BENCH-SCALE EXPERIMENTS.

*CONTAINMENT FILTERING SYSTEM + *CONTAINMENT RESEARCH AND DEVELOPMENT + *DEPOSITION + *FISSION PRODUCT RELEASE, GENERAL + *FISSION PRODUCT TRANSPORT + FUEL MELTDOWN + LOFT (LOSS OF FLUID TEST) + REACTOR, PRESSURIZED WATER

11-10873 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2 CONSOLIDATED EDISON COMPANY OF NEW YORK
2 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2, MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 3 -- GIVES DETAILED CRITERIA TO WHICH PLANT WILL BE DESIGNED, EXAMPLES OF MISSILES.

*DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + CONTAINMENT, MISSILE GENERATION AND PROTECTION

11-10887 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2 CONSOLIDATED EDISON COMPANY OF NEW YORK
3 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2, MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 17 -- IN ANALYSIS WHEREIN NO SAFETY WATER INJECTION ALLOWED BUT ONLY ONE EACH CONTAINMENT SPRAY PUMPS OR AIR COOLERS FAILED, PRESSURE PEAK WAS 43.4 PSIG (HYDROGEN BURNS AFTER 44 PERCENT ZIRCONIUM REACTION). IN OTHER DOUBLE-ENDED PIPE RUPTURES, PRESSURE PEAK WAS 40 PSIG.

*CONTAINMENT DESIGN + *DESIGN CRITERIA + *PRESSURE, INTERNAL + *REGULATION, AEC + INDIAN POINT II + LOSS OF COOLANT + METAL WATER REACTION + REACTOR, PRESSURIZED WATER + SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS

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CONTAINMENT OF NUCLEAR FACILITIES

11-10892 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2 CONSOLIDATED EDISON COMPANY OF NEW YORK
5 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2, MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 22 -- SIX CLASSES OF CONTAINMENT-ISOLATION VALVE SCHEME ARE SET UP, WITH VARIOUS COMBINATIONS OF AUTOMATIC AND OR REMOTE MANUAL VALVE CLOSURE, AND AUTOMATIC OR MANUAL SEAL-WATER INJECTION INTO THE CLOSED LINE.

*CONTAINMENT PENETRATION, CLOSURE OF + *DESIGN CRITERIA + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + REACTOR, PRESSURIZED WATER

11-10929 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2 CONSOLIDATED EDISON COMPANY OF NEW YORK
25 PAGES, 1 TABLE OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2, MARCH 31, 1966, DOCKET NO. 50-247, PDR

ELEVEN QUESTIONS ON CONTAINMENT DESIGN ARE ANSWERED; RELATED TO LOAD CARRIED BY THE LINER, SPLICING OF RE-BARS, PENETRATION REINFORCEMENT, EARTHQUAKE DESIGN, DAMPING FACTORS, ADDITIVE STRESSES, AND WIND LOADING.

*CONTAINMENT STRUCTURE + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + *SEISMOLOGY + INDIAN POINT II + REACTOR, PRESSURIZED WATER + STRESS ANALYSIS

11-11009 A STUDY ON PLASTIC FATIGUE EMBRITTLEMENT OF REACTOR VESSEL STEELS
CENTRE NATIONAL DE RECHERCHES METALLURGIQUES, BELGIUM
EURAEC-1547 + EUR-2689 +. 46 PAGES, QUARTERLY REPORT NO. 8, OCTOBER 1-DECEMBER 31, 1965, CFSTI, \$2.00 CY, \$0.50 MN

DURING THE QUARTER, A SERIES OF CHARPY V IMPACT-STRENGTH TESTS WERE MADE ON SAMPLES THAT HAD BEEN SUBJECTED TO PLASTIC FATIGUE AT 20 AND AT 300 C. THE RESULTS SHOWED THAT THE INCREASE OF THE TRANSITION TEMPERATURE WITH 50 PERCENT OF CRYSTALLINITY IS NOT A CONTINUOUS FUNCTION OF THE NUMBER OF CYCLES OF DAMAGE BY FATIGUE, AND THAT A FEW CYCLES OF PLASTIC FATIGUE AT 300 C ARE ALREADY ENOUGH FOR CAUSING QUITE A NOTEWORTHY EMBRITTLEMENT OF THE STEEL. THIS CONFIRMS THE EXPECTED EXISTENCE OF EMBRITTLEMENT MAXIMA NOTICED IN THE IMPACT STRENGTH TEST AFTER MONOAXIAL FATIGUE AT 300 C.

*EMBRITTLEMENT + *STEEL + BRITTLE FRACTURE + CONTAINMENT, PRESSURE VESSEL + FAILURE, FATIGUE + IMPACT SHOCK

11-11010 RIPLING EJ + CROSLLEY P
FRACTURE TOUGHNESS OF REACTOR PRESSURE VESSEL STEELS. DEVELOPMENT OF TEST PROCEDURES, MAY 1, 1965-MAY 1, 1966.
MATERIALS RESEARCH LABORATORY, INCORPORATED, RICHTON PARK, ILLINOIS
COO-1477-4 +. 17 PAGES, MAY 31, 1966, CFSTI, \$1.00 CY, \$0.50 MN

A TAPERED, DOUBLE-CANTILEVER BEAM SPECIMEN FOR FRACTURE-TOUGHNESS TESTING WAS DEVELOPED, AND EXPERIMENTAL COMPLIANCE CALIBRATIONS OF THE SPECIMEN WERE MADE. THE EFFECT OF SIDE GROOVES WAS INVESTIGATED WITH ALUMINUM ALLOYS. THE RESULTS INDICATE THAT THE USE OF SIDE GROOVES PROMOTES PLANE-STRAIN FRACTURING. VERY HIGH LOADING RATES WERE USED FOR ROOM-TEMPERATURE TESTING OF A302-B SPECIMENS PRECRACKED IN FATIGUE. WITH PULSE LOADING, CRACK ARRESTS WERE OBTAINED. THE PROCEDURE OFFERS THE PROMISE OF YIELDING ROOM-TEMPERATURE PLANE-STRAIN FRACTURE-TOUGHNESS DATA, FOR FRACTURE INITIATION AND ARREST OF A302-B STEEL WITH SPECIMENS OF A REASONABLE SIZE.

*FAILURE, FATIGUE + *TEST, DESTRUCTIVE + ALLOY + ALUMINUM + CONTAINMENT, PRESSURE VESSEL + STEEL

11-11011 HAMADA K
REACTOR PRESSURE VESSEL WITH REDUCED SECONDARY STRESSES
HIDACHI SEISAKUSHO COMPANY
JAP. PATENT 1964-15090 + ORNL-TR-1328 +. 3 PAGES, PATENT (FOREIGN), JULY 30, 1964

A REACTOR PRESSURE VESSEL MADE WITH A CURVED BOTTOM PLATE AND CYLINDRICAL BODY WITH CONSIDERABLY REDUCED SECONDARY STRESSES IS PROPOSED. A MATERIAL WITH A LARGER THERMAL EXPANSION COEFFICIENT THAN THE BOTTOM-PLATE MATERIAL IS WELDED ALONG THE PERIPHERY OF THE JUNCTION OF THE BODY. THIS JOINT TENDS TO EXPAND THE BOTTOM PLATE BY THE LARGER THERMAL EXPANSION COEFFICIENT, THUS SECONDARY STRESSES IN THE VESSEL WALLS ARE REDUCED TO A MINIMUM, WITH THE DESIGN LIMITATIONS BEING LARGELY ELIMINATED.

*CONTAINMENT, PRESSURE VESSEL + *STRESS + *THERMAL MECHANICAL EFFECT + STEEL

11-11012 BELLERMANN W + SCHWIERS HG
REACTOR PRESSURE VESSEL AND STRUCTURAL COMPONENTS
1 PAGE, ATOMWIRTSCHAFT, XI(5), PAGE 239 (MAY 1966), IN GERMAN

TWO PRINCIPAL MEASURES WERE TAKEN IN DESIGNING THE AVR PRESSURE VESSEL TO PROVIDE FOR THE LEVEL OF ACTIVITY PERMITTED IN THE PRIMARY LOOP - INTEGRAL CONSTRUCTION AND ENCLOSURE IN A SECOND PRESSURE VESSEL. SPECIAL PROBLEMS OCCURRED IN CONNECTION WITH PASSAGE THROUGH THE DOME AND COVER OF THE VESSEL, ESPECIALLY IN THE CASE OF THE FAN SUPPORTS, THE MOUNTING OF THE COVER, THE CONSTRUCTION OF THE PEDIMENT, AND THE SUPPORT OF THE VESSEL. AMONG THE COMPONENTS, THE RADIAL SUPPORTING FRAMEWORK AND THE CARBON AND GRAPHITE MEMBERS WERE OF

CATEGORY 11
CONTAINMENT OF NUCLEAR FACILITIES

11-11012 *CONTINUED*
PARTICULAR INTEREST.

*CONTAINMENT CONSTRUCTION + *CONTAINMENT, PRESSURE VESSEL + FLANGE + GERMANY + PFACTOR, GAS COOLED

11-11013 BUVAT + FOUCAULT
THERMAL BEHAVIOR OF CONCRETE - FIRST RESULTS OF STUDIES AND TESTS TOWARDS APPLICATION OF A PRESTRESSED CONCRETE CONTAINMENT IN A NUCLEAR REACTOR
ORNL-TR-1227 +. 10 PAGES, 7 FIGURES, TRANSLATED FROM ANN. INST. TECH. BATIMENT TRAV. PUBLICS NO. 214, 1280-1289, OCTOBER 1965, JCL, \$2.60 FS, \$1.07 MF

THE REPORT CONSISTS ESSENTIALLY OF A DESCRIPTION OF THE FIRST RESULTS OF STUDIES AND TESTS OF THE THERMAL BEHAVIOR OF CONCRETE FOR ITS APPLICATION IN PRESTRESSED CONCRETE CONTAINMENTS FOR NUCLEAR REACTORS. THE TWO STEPS FIXED INITIALLY FOR THE RESEARCH PROGRAM ARE - (1) A SO-CALLED LUKEWARM CONCRETE SOLUTION, WHICH DID NOT MODIFY THE PRESENT DESIGN OF CONTAINMENTS. IT WAS INTENDED ONLY TO SIMPLIFY THE COOLING CIRCUIT AND TO REDUCE THE INSULATION BY AN INCREASE OF THE CONCRETE TEMPERATURE FROM 40-50 C. (2) A SO-CALLED HOT CONCRETE SOLUTION, PERMITTING THE CONTAINMENT TO BE BROUGHT TO THE LOWEST TEMPERATURE OBSERVED IN THE PRIMARY CIRCUIT, ABOUT 250 C.

*CONCRETE, PRESTRESSED + *CONTAINMENT, PRESSURE VESSEL + *THERMAL EXPERIMENT +
CONTAINMENT RESEARCH AND DEVELOPMENT + FRANCE

11-11014 BRITTAN RO
REACTOR CONTAINMENT AND ENVIRONMENTAL CONDITIONS
ARGONNE NATIONAL LABORATORY, ILL.
2 PAGES, PROCEEDINGS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS, 92(UP1), PAGES 81-82 (MAY, 1966)

THE CONCLUDING DISCUSSION FOR A PAPER ON REACTOR CONTAINMENT BY P. O. BRITTAN THAT APPEARED IN SEPTEMBER 1964 IS PRESENTED. THE INFLUENCE OF SAFEGUARDS ON POPULATION DISTANCE IS BRIEFLY TREATED. ELEVEN ITEMS OF ERRATA FOR THE ORIGINAL PAPER ARE ALSO GIVEN.

*CONTAINMENT, GENERAL + CONTAINMENT, MULTIPLE + ENGINEERED SAFEGUARD + SITING, REACTOR

11-11016 YAO JC
AN ANALYTICAL AND EXPERIMENTAL STUDY OF CYLINDRICAL SHELLS UNDER LOCALIZED IMPACT LOADS
NORTHROP CORPORATION
11 PAGES, 7 FIGURES, 9 REFERENCES, AERONAUTICAL QUARTERLY, 17(1), PAGES 72-82 (FEBRUARY, 1966)

NONSYMMETRIC RESPONSE OF ELASTIC SHELLS TO LOCALIZED IMPACT LOADS IS STUDIED. CLOSED-FORM SOLUTIONS FOR THE RESPONSE TO FOUR PARTICULAR KINDS OF PULSE SHAPES ARE GIVEN. MEASURED VALUES OF THE STRAIN RESPONSE OF A CYLINDER TO IMPACT LOADS ARE OBTAINED AND COMPARED SATISFACTORILY WITH THEORETICALLY PREDICTED VALUES.

*CYLINDER + *IMPACT SHOCK + SHELL + STRESS STRAIN DATA

11-11017 HOLTBECKER H + MONTAGNANI M
DEVELOPMENTS IN INSTRUMENTATION FOR THE MEASUREMENT OF FAST MECHANICAL TRANSIENTS IN RELATION TO THE ANALYSIS OF REACTOR VESSEL FAILURES
8 PAGES, INGEGNERIA NUCLEARE (5), PAGES 1-8 (1965), IN ITALIAN

AUTHOR DEFINES THE FUNDAMENTAL CONCEPTS CHARACTERIZING THE MECHANISM GOVERNING THE DYNAMIC DEFORMATIONS OF A STRUCTURE AS A RESULT OF PRESSURE SURGE. THE CHARACTERISTIC PARAMETERS OF THE PROCESS ARE OUTLINED. THE CAUSES OF SHOCK-WAVE FORMATION ARE EXAMINED FOR REACTORS IN CASE OF ACCIDENTAL OPERATION. A DESCRIPTION IS GIVEN OF EXPERIMENTAL DEVICES DESIGNED FOR THE STUDY OF THE DEFORMATIONS AS A FUNCTION OF THE PRESSURE SURGE. THESE ARE - PRESSURE TRANSDUCERS FOR DYNAMIC PRESSURE MEASUREMENTS, STRAIN GAUGES FOR DYNAMIC STRAIN MEASUREMENTS, AND THE SHOCK TUBE.

*CONTAINMENT, PRESSURE VESSEL + *CONTAINMENT, SHOCK GENERATION AND PROTECTION +
*INSTRUMENTATION, COMPONENT + *INSTRUMENTATION, TESTING + *SHOCK WAVE + FAILURE, COMPONENT +
IMPACT SHOCK + MEASUREMENT, STRAIN GAGE + TEST, PRESSURE VESSEL

11-11020 WILLIAMS HE
AN EVALUATION OF THE EFFECT OF FINITE SHEAR STRAIN IN A SHALLOW, SPHERICAL SHELL
CALIFORNIA INSTITUTE OF TECHNOLOGY
JPL-TR-32-780 +. 23 PAGES, 10 FIGURES, 1 TABLE, 6 REFERENCES, OCTOBER 1965, SOURCE

IN AN EFFORT TO ASSESS THE EFFECT OF INCLUDING TRANSVERSE SHEAR STRAIN IN THE ANALYSIS OF THIN SHELLS, THE EQUATIONS PROPOSED BY E. REISSNER ARE SPECIALIZED FOR SHALLOW, SPHERICAL SHELLS AND ARE SOLVED FOR CASES OF LOADING FOR WHICH THE EFFECT MIGHT BE EXPECTED TO BE APPRECIABLE. IT IS FOUND THAT, FOR MATERIALS THAT ARE NEARLY ISOTROPIC, THE SOLUTION FOR AN EDGE-LOADED SHELL DIFFERS SLIGHTLY FROM THAT OF THE CLASSICAL EQUATION. HOWEVER, THE SOLUTION IN THE NEIGHBORHOOD OF A CONCENTRATED LOAD APPLIED AT THE APEX IS FOUND TO DIFFER SIGNIFICANTLY FROM ITS CLASSICAL COUNTERPART.

*SHELL + *SPHERE + *STRESS ANALYSIS + CREEP BEHAVIOR

CATEGORY 11
CONTAINMENT OF NUCLEAR FACILITIES

11-11272 JOHNSON RE
FRACTURE MECHANICS- A BASIS FOR BRITTLE FRACTURE PREVENTION
WESTINGHOUSE ELECTRIC CORP., BETTIS ATOMIC POWER LAB
WAPD-TM-505 +. 82 PAGES, 32 FIGURES, 2 TABLES, 81 REFERENCES, NOVEMBER 1965, CFSTI \$3.00 CY

THE DEVELOPMENT OF FRACTURE MECHANICS IS PRESENTED HISTORICALLY AND MATHEMATICALLY. THE CENTRAL PROBLEMS AND LIMITATIONS OF EXPERIMENTAL FRACTURE MECHANICS ARE DETAILED, ALONG WITH THE ASSUMPTIONS AND APPROXIMATIONS USED. THE MEANING, MEASUREMENT, AND UTILITY OF PLANE STRAIN FRACTURE TOUGHNESS (CRITICAL STRAIN ENERGY RELEASE RATE OR CRITICAL STRESS INTENSITY FACTOR) ARE DISCUSSED. THE ROLE OF DEFECTS IN COMPONENTS IS DISCUSSED, SPECIFICALLY WITH RESPECT TO THE RELATIONSHIPS BETWEEN STRESS FIELDS, DEFECT GEOMETRY, AND MATERIAL CONDITION. BASIC ASPECTS OF ULTRASONIC TESTING ARE DISCUSSED WITH RESPECT TO QUANTITATIVE MEASUREMENT OF DEFECT GEOMETRIES IN STRUCTURES. SELECTED EXPERIMENTS DEALING WITH APPLICATION OF FRACTURE MECHANICS TO PREDICT ACTUAL COMPONENT FAILURES ARE REVIEWED. IT IS SHOWN THAT THE RELATIONSHIPS BETWEEN STRESS STATE, DEFECT GEOMETRY, ELASTIC CONSTANTS, AND FRACTURE TOUGHNESS EMPLOYED IN APPLIED FRACTURE MECHANICS CAN BE UTILIZED TO PREDICT BRITTLE FAILURE CONDITIONS IN A MORE QUANTITATIVE MANNER THAN TRANSITION TEMPERATURE CONCEPTS. BASED ON A DETAILED REVIEW OF THE METHODS AND PHYSICAL SIGNIFICANCE OF THE ENGINEERING METHOD OF FRACTURE MECHANICS, THE FOLLOWING CONCLUSIONS WERE REACHED - (1) THE METHODS OF FRACTURE MECHANICS CAN PROVIDE MORE ACCURATE PREDICTIONS OF BRITTLE FRACTURE CONDITIONS THAN IT CONCEPTS. (2) THE FRACTURE MECHANICS PARAMETER, PLANE STRAIN FRACTURE TOUGHNESS, APPEARS TO PROVIDE A MEASURE OF THE FRACTURE RESISTANCE OF METALS. (3) PLANE STRAIN FRACTURE TOUGHNESS CAN BE MEASURED USING LABORATORY FRACTURE TESTS AND APPLIED TO COMPONENTS. (4) GEOMETRY FACTORS ENTER FRACTURE MECHANICS EQUATIONS THROUGH ELASTIC NOTCH STRESS ANALYSES. (5) THE FRACTURE MECHANICS APPROACH TO OPERATIONAL LIMITATIONS IS COMPATIBLE WITH OTHER DESIGN CRITERIA AND WITH OBSERVED FRACTURE BEHAVIOR. (6) A POSSIBLE METHOD BY WHICH OPERATIONAL STRESS LIMITS CAN BE CALCULATED AND USED TO PROTECT COMPONENTS FROM BRITTLE FRACTURE WAS PRESENTED.

*BRITTLE FRACTURE + *COMPARISON, THEORY AND EXPERIENCE + *IMPACT PROPERTY + *TEST, PRESSURE VESSEL + CONTAINMENT, PRESSURE VESSEL + NDT DATA (NIL DUCTILITY TRANSITION) + STRESS + STRESS ANALYSIS + * STRESS RUPTURE + SUPPORT STRUCTURE + TENSILE PROPERTY

11-11274 MARTIN WR + WEIR JR
IRRADIATION EMBRITTLEMENT OF LOW- AND HIGH-CARBON STAINLESS STEELS AT 700, 800, AND 900 DEGREES C.
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE
ORNL-TM-1516 + CONF-660 613-1 +. 27 PAGES, 19 FIGURES, 3 TABLES, JUNE, 1966, CFSTI \$2.00 CY, \$0.50 MN

IN GENERAL, THE DUCTILITY OF THE IRRADIATED ALLOY DECREASES WITH INCREASING IRRADIATION TEMPERATURE WHEN THESE DUCTILITIES ARE DETERMINED AT TENSILE TEST TEMPERATURES WITHIN THE 650 TO 842 C TEMPERATURE RANGE. A MARKED DIFFERENCE IN THE DUCTILITY OF LOW- AND HIGH-CARBON IRRADIATED STAINLESS STEELS WAS OBSERVED AND APPEARS TO BE RELATED TO THE QUANTITY OF GRAIN-BOUNDARY CARBIDES. THESE DATA ARE INTERPRETED AS INDICATING THAT GRAIN-BOUNDARY CARBIDES FORMED IN IRRADIATED MATERIAL IN THIS TEMPERATURE RANGE ARE CAPABLE OF INCREASING THE STRESS AT WHICH WEDGE-TYPE GRAIN-BOUNDARY CRACKS ARE NUCLEATED AND ALSO REDUCING THE RATE OF CRACK PROPAGATION. THUS, IT APPEARS THAT AGGLOMERATED CARBIDES IN THE GRAIN BOUNDARY ARE CAPABLE OF REDUCING THE MAGNITUDE OF IRRADIATION EMBRITTLEMENT.

*EMBRITTLEMENT + *RADIATION EFFECT + *STEEL, STAINLESS + ALLOY + BRITTLE FRACTURE + CARBIDE + CLAD + RADIATION DAMAGE

11-11678 WATSON GM + PEREZ RB + FONTANA MH
EFFECTS OF CONTAINMENT SYSTEM SIZE ON FISSION PRODUCT BEHAVIOR
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE
CONF-660904 +. 2 PAGES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

SIMPLE MATHEMATICAL MODELS TO AID IN THE DETERMINATION OF EFFECT OF CONTAINMENT SIZE ON PLATE-OUT BEHAVIOR OF IODINE HAVE BEEN POSTULATED. TWO GENERAL CLASSES OF SYSTEMS HAVE BEEN CONSIDERED, DEPENDING ON THE ABSENCE OR ON THE PRESENCE OF STEAM. IN THE ABSENCE OF STEAM THE PRINCIPAL ASSUMPTIONS MADE WERE - (1) HOMOGENEOUS MIXING, (2) BOUNDARY GAS LAYER ENVELOPING ALL SURFACES, (3) DIFFUSION THROUGH BOUNDARY LAYER TO BE THE RATE LIMITING PROCESS, (4) MOLECULAR IODINE PRESENT, METHYL IODIDE ABSENT. MATHEMATICAL RELATIONS IN TERMS OF MASS TRANSFER COEFFICIENTS AND SURFACE-TO-VOLUME RATIOS OF CONTAINERS AND SURFACE CHARACTERIZATION PARAMETERS WERE DEVELOPED FOR CASES WITH AND WITHOUT DESORPTION FROM PARTIALLY COVERED SURFACES. IN THE PRESENCE OF CONDENSING STEAM, THERE IS BULK FLOW OF STEAM TOWARD THE WALLS. IN SUCH CASES, IT WAS ASSUMED THAT DIFFUSIVE AND BULK FLOW COMPONENTS MAY BE APPROXIMATED BY THE BULK-FLOW COMPONENT ALONE, NEGLECTING THE DIFFUSIVE COMPONENT. FURTHERMORE, IT HAS BEEN ASSUMED THAT THE SOLUBILITY OF IODINE IN STEAM-CONDENSATE IS HIGH ENOUGH TO PERMIT THE IODINE AND THE STEAM TO CONDENSE TOGETHER WITH THE SAME COMPOSITION AS THE GAS PHASE. AS A RESULT OF THESE ASSUMPTIONS, MATHEMATICAL RELATIONS WERE DERIVED FOR THE CONCENTRATION OF IODINE AS A FUNCTION OF TIME IN TERMS OF THE SURFACE-TO-VOLUME RATIOS, CONDENSING STEAM FLUXES, AND STEAM CONCENTRATIONS.

*ANALYTICAL MODEL + *CONTAINMENT FILTERING SYSTEM + *DEPOSITION + *FISSION PRODUCT, IODINE + AIR CLEANING + CONTAINMENT, GENERAL + IODINE + MASS TRANSFER + ORGANIC IODIDE + STEAM + SURFACE TO VOLUME RATIO + WATER VAPOR

11-11696 DURANT WS
PERFORMANCE OF AIRBORNE ACTIVITY CONFINEMENT SYSTEMS IN SAVANNAH RIVER PLANT REACTOR BUILDINGS
SAVANNAH RIVER LABORATORY, AIKEN, S. C.
CONF-66C904 + DP-MS-66-52 +. 21 PAGES, 6 FIGURES, 1 TABLE, 21 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

CATEGORY 11
CONTAINMENT OF NUCLEAR FACILITIES

11-11696 *CONTINUED*

A FILTRATION-ADSORPTION SYSTEM IS INSTALLED IN THE VENTILATION EXHAUST OF EACH REACTOR BUILDING AT THE SAVANNAH RIVER PLANT TO CONFINE AIRBORNE IODINE PARTICLES AND VAPOR THAT MIGHT BE RELEASED IN THE HIGHLY UNLIKELY EVENT OF A REACTOR ACCIDENT. AIR FROM THE PROCESS AREAS OF EACH BUILDING IS PASSED CONTINUOUSLY THROUGH MOISTURE SEPARATORS, THEN THROUGH PARTICULATE FILTERS, AND FINALLY THROUGH IODINE ADSORBER BEDS OF ACTIVATED CARBON. THE UNITS HAVE THE DEMONSTRATED ABILITY TO COLLECT OVER 99 PERCENT OF AIRBORNE PARTICULATE ACTIVITY AND OVER 99.9 PERCENT OF AIRBORNE HALOGEN ACTIVITY UNDER EMERGENCY CONDITIONS. A CONTINUING PROGRAM OF DEVELOPMENT, TESTING, AND MAINTENANCE ENSURES THAT THESE HIGH EFFICIENCIES WILL BE MAINTAINED DURING OPERATION. EXPERIENCE HAS BEEN SATISFACTORY FOR MORE THAN 3 YEARS OF OPERATION.

*CONTAINMENT FILTERING SYSTEM + *CONTAINMENT SYSTEM, OPERATION OF + *FILTER DESIGN + *SAVANNAH RIVER PLANT + *WATER VAPOR + AIR CLEANING + CONTAINMENT AIR COOLING + ENGINEERED SAFEGUARD + FILTER + FILTER INSTALLATION + FILTER OPERATION + FILTER SYSTEM

11-11697 FIRST MW + SILVERMAN L + PENDER D + DAWSON S
FLOATING ROOF CONTAINMENT VESSELS
HARVARD UNIVERSITY, BOSTON

CONF-660904 +. 18 PAGES, 5 FIGURES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

THE PURPOSE OF THIS INVESTIGATION WAS TO DEVELOP MECHANISMS FOR, AND TO STUDY THE PERFORMANCE CHARACTERISTICS OF, A FLOATING-ROOF REACTOR AND OFF-GAS CONTAINMENT VESSEL. THE PRESSURE SURGE FOLLOWING A MAJOR COOLANT LINE RUPTURE WOULD BE ABSORBED AND SUPPRESSED BY MOVEMENT OF A LEAK-TIGHT MOVABLE ROOF. ACTIVATION OF COOLING-WATER SPRAYS AFTER THE ACCIDENT WOULD CONDENSE STEAM AND PERMIT THE ROOF TO FALL SLOWLY TO ITS NORMAL POSITION. THE ADVANTAGES OF THIS SCHEME ARE - (1) IN THE EVENT OF A MAXIMUM CREDIBLE ACCIDENT, THE ROOF WOULD RISE IN RESPONSE TO THE APPLIED PRESSURE, PREVENTING THE SHELL FROM BEING SUBJECTED TO STRESSES IN EXCESS OF A FRACTION OF A POUND PER SQUARE INCH. AS RECOVERY MEASURES TOOK EFFECT, THE FLOATING ROOF WOULD SETTLE AND RETURN TO ITS ORIGINAL POSITION WHEN THE PRESSURE INSIDE THE CONTAINMENT VESSEL RETURNED TO NORMAL. (2) AS THE PRESSURE OF THE STATIONARY PARTS OF THE CONTAINMENT SHELL WOULD NOT EXCEED 0.25 PSI, IT MIGHT BE POSSIBLE TO LIGHTEN AND SIMPLIFY THE STRUCTURE AND THEREBY EFFECT SUBSTANTIAL SAVINGS WHILE MAINTAINING AN EQUAL DEGREE OF SAFETY.

*CONTAINMENT DESIGN + *CONTAINMENT LEAKAGE CONTROL + *CONTAINMENT RESEARCH AND DEVELOPMENT + *CONTAINMENT SPRAY + *CONTAINMENT STRUCTURE + *CONTAINMENT, SHOCK GENERATION AND PROTECTION + AIR CLEANING + CONTAINMENT CONSTRUCTION + CONTAINMENT, PRESSURE VESSEL

11-11698 SMITH ML

CONFINEMENT SYSTEMS TESTS PERFORMED DURING DEACTIVATION OF THE 100-F REACTOR
DOUGLAS UNITED NUCLEAR, INC., RICHLAND

CONF-660904 + DUN-SA-15 +. 30 PAGES, 18 FIGURES, 5 TABLES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

PERMANENT SHUTDOWN OF THE 100-F PLUTONIUM PRODUCTION REACTOR AT HANFORD MADE THE SYSTEM FOR CONFINING THE PARTICLES AND HALOGEN IN THE EXHAUST AIR AVAILABLE FOR TESTING. THE FOLLOWING TESTS WERE PERFORMED, AND THE RESULTS ARE GIVEN THROUGHOUT THE TEXT - IODINE DEPOSITION FROM THE AIRSTREAM, IODINE REMOVED FROM AIRSTREAM BY FOG SPRAY, ENCAPSULATION OF THE REACTOR EXHAUST AIR IN FOAM, EFFECTIVENESS OF FOG SPRAY FOR REMOVING NOBLE GASES FROM THE AIR, EFFECTIVENESS OF THE FILTER SYSTEM FOR REMOVING IODINE FROM THE EXHAUST AIR. ABOUT 100 CURIES OF I-129 WAS RELEASED INTO THE DISCHARGE-AREA SUPPLY AIR WITH THE FOG SPRAY OPERATING. THE SPRAY REDUCED THE CONCENTRATION IN THE AIR EXHAUSTED FROM THE DISCHARGE AREA BY A FACTOR OF 500. ABOUT 10 CURIES OF KR-85 WAS RELEASED INTO THE EXHAUST AIR. THE DOSE WAS MEASURED UP AND DOWN STREAM OF A FOG SPRAY INSTALLED IN THE DUCT. NINETY-FIVE PERCENT OF THE KR-85 WAS STILL IN THE EXHAUST AIR AFTER IT PASSED THROUGH THE FOG SPRAY. THE EXPOSURE OF THE AIR TO THE FOG WAS LESS THAN 3 SECONDS.

*DECONTAMINATION SPRAY + *FILTER SYSTEM + *FISSION PRODUCT, IODINE + *FOAM + *FOG + *NOBLE GAS + AIR CLEANING + CONTAINMENT, GENERAL + DECONTAMINATION + DEPOSITION + FISSION PRODUCT TRANSPORT + SPRAY, GENERAL

11-11699 COLLINS RD + HILLARY JJ + TAYLOR JC
AIR CLEANING FOR REACTORS WITH VENTED CONTAINMENT
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, WINDSCALE

CONF-660904 +. 36 PAGES, 11 FIGURES, 6 TABLES, 9 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

A PROGRAMME OF EXPERIMENTAL WORK HAS BEEN CARRIED OUT UNDER CONDITIONS APPROPRIATE TO POSSIBLE DEPRESSURIZATION-TYPE ACCIDENTS TO THE STEAM GENERATING HEAVY WATER REACTOR (SGHW) AT WINFRITH HEATH WHICH HAS VENTED CONTAINMENT. THE WORK HAS INCLUDED SMALL-SCALE EXPERIMENTS IN GLASS OR SILICA APPARATUS IN WHICH MEASUREMENTS HAVE BEEN MADE OF THE EXTENT AND FORM OF THE IODINE RELEASE FROM ZIRCALOY-CLAD UO₂ INTO STEAM UNDER MELTING CONDITIONS AND AT ABOUT 1000 C. A NUMBER OF TESTS HAVE BEEN CONDUCTED WITH SIMULATED FORMS OF IODINE ON TWO LARGE-SCALE STEEL MODELS OF THE REACTOR WATER-LUTE STEAM SUPPRESSION SYSTEM. TESTS HAVE ALSO BEEN CARRIED OUT ON 1000-CFM FILTER UNITS TO DEVELOP DROPLET DISENTRAINMENT DEVICES. WORK ON THE DEVELOPMENT OF CHARCOALS TO DEAL WITH PENETRATING IODINE (METHYL IODIDE) UNDER WET CONDITIONS IS REPORTED SEPARATELY. THE RESULTS OF THIS WORK SHOW THAT - (A) AN EFFECTIVE TRAPPING PLANT CAN BE SPECIFIED TO DEAL WITH FISSION PRODUCT IODINE IN WET ATMOSPHERES. (B) AT LEAST UP TO 1000 MW/DTE U FUEL BURN-UP, A CAN-RETENTION FACTOR OF 10 APPLIES FOR IODINE EXPECTED TO BE FREE WITHIN THE CAN, ALSO THAT PASSAGE THROUGH A WATER LUTE IS LIKELY TO REDUCE THE IODINE RELEASE BY A FURTHER FACTOR OF 10.

*CHARCOAL + *CONTAINMENT DESIGN + *CONTAINMENT, PRESSURE VENTING + *FISSION PRODUCT, IODINE +

CATEGORY 11
CONTAINMENT OF NUCLEAR FACILITIES

11-11699 *CONTINUED*

*ORGANIC IODIDE + *WATER VAPOR + AIR CLEANING + CONTAINMENT FILTERING SYSTEM +
CONTAINMENT RESEARCH AND DEVELOPMENT + CONTAINMENT, PRESSURE RELIEF + CONTAINMENT, PRESSURE SUPPRESSION +
CONTAINMENT, WATER FILLED

11-11700 PARKER GW + CREEK GE + MARTIN WJ + PARSLY LF
EFFECTS OF CONTAINMENT SYSTEM SIZE ON FISSION PRODUCT BEHAVIOR
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE

CONF-660904 +. 13 PAGES, 2 FIGURES, 3 TABLES, 10 REFERENCES, PRESENTED AT 9TH AEC AIR CONFERENCE, BOSTON,
MASS., SEPTEMBER 13-16, 1966, SOURCE

DATA ON IODINE DEPOSITION IN THE CMF (CONTAINMENT MOCKUP FACILITY), THE CRI (CONTAINMENT RESEARCH INSTALLATION), AND NSPP (NUCLEAR SAFETY PILOT PLANT) WERE EXAMINED TO TRY TO CORRELATE THE RESULTS WITH THE SIZE OF THE CONTAINMENT TANKS INVOLVED, AND AN EQUATION WAS DEVELOPED THAT ADEQUATELY CORRELATES THE DEPOSITION RATES DURING THE INITIAL OR REACTIVE PHASE OF THE DEPOSITION PROCESS. PUBLISHED DATA, AND INFORMATION OBTAINED AT THIS LABORATORY ON THE PRODUCTION OF METHYL IODIDE IN REACTOR-SAFETY EXPERIMENTS, WERE COMPILED TO ASSESS THE IMPORTANCE OF THIS FORM OF RADIOIODINE. IT APPEARS THAT A ROUGH CORRELATION CAN BE MADE BETWEEN FRACTION OF IODINE CONVERTED TO METHYL IODIDE, THE CONTAINMENT-VESSEL SIZE, AND THE RESIDENCE TIME OF IODINE IN THE VESSEL. IN NEARLY ALL CASES, THE AMOUNT OF AIRBORNE IODINE FOUND AS METHYL IODIDE WAS 1 PERCENT OR LESS.

*CONTAINMENT FILTERING SYSTEM + *CONTAINMENT RESEARCH AND DEVELOPMENT + *FISSION PRODUCT RELEASE, GENERAL +
*FISSION PRODUCT, IODINE + *ORGANIC IODIDE + AEROSOL + AIR CLEANING + CONTAINMENT ANALYSIS +
CONTAINMENT DESIGN + DEPOSITION

CATEGORY 12
PLANT SAFETY FEATURES

12-09311 HILL TM
RIVERTON, WYOMING. ADMINISTRATIVE CONTROL PREVENTS HIGH RADIATION EXPOSURE DURING ORE-CRUSHING
FEDERAL-RADOROCK-GAS HILLS PARTNERS
2 PAGES, MARCH 16, 1966, ATOMIC ENERGY CLEARING HOUSE, 12(14), PAGES 15-16 (APRIL 4, 1966)

SINCE EARLY 1965, HIGH-CLAY ORES ARE PROCESSED DURING DRY SEASONS. DRYING OPERATIONS (DURING WET SEASONS) CAUSES SEVERE DUSTING. LARGE VENT FANS ARE KEPT RUNNING DURING MAINTENANCE. NO ONE HAS EXCEEDED MPC SINCE THESE MEASURES STARTED.

*ADMINISTRATIVE CONTROLS AND PRACTICES + CONTAMINATION + MILLING

12-C9402 AIR COOLING UNIT FOR PROTECTIVE CLOTHING AND THE LIKE
SO. AF. PATENT 1822/64 +. APRIL 20, 1964, PATENT (FOREIGN)

THIS INVENTION PROVIDES A DEVICE FOR COOLING GAS SUPPLIED TO A PERSON WEARING PROTECTIVE CLOTHING AND COMPRISES A SOURCE OF PRESSURIZED GAS, A CONDUIT FOR CONDUCTING SAID GAS TO SAID PERSON, AND A VORTEX TUBE ATTACHABLE TO THE BODY OF SAID PERSON. THE CONDUIT IS ATTACHED TO THE INLET OF THE VORTEX TUBE. DISTRIBUTION CONDUITS CONNECTED TO THE COLD OUTLET OF THE VORTEX TUBE ARE PROVIDED FOR CONDUCTING THE COOLED GAS EITHER TO A FACE MASK ONLY OR TO VARIOUS POSITIONS WITHIN A PROTECTIVE SUIT PARTIALLY OR WHOLLY COVERING THE PERSON. A NOISE MUFFLER IS ALSO PROVIDED WHERE NECESSARY IN THE COLD OUTLET LINE OF THE VORTEX TUBE.

*PERSONNEL PROTECTIVE DEVICE

12-09602 MANN S + YOUNGBLOOD EL
DECONTAMINATION OF THE ORNL MOLTEN-SALT FLUORIDE-VOLATILITY PILOT PLANT AFTER PROCESSING IRRADIATED ZIRCONIUM-URANIUM ALLOY FUEL
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TENNESSEE
ORNL-3891 +. 35 PAGES, 13 TABLES, 2 FIGURES, 14 REFERENCES, FEBRUARY 1966- CFSTI, \$2.00 CY, \$0.50 MN

THE MOLTEN-SALT FLUORIDE-VOLATILITY PROCESS FOR RECOVERING URANIUM FROM IRRADIATED ZIRCONIUM-OR ZIRCALOY-2-CLAD FUEL ELEMENTS WAS DEMONSTRATED SUCCESSFULLY IN THE ORNL MOLTEN-SALT FLUORIDE-VOLATILITY PILOT PLANT. THIS REPORT DESCRIBES DECONTAMINATION METHODS THAT HAVE BEEN USED TWICE, FOLLOWING TWO PERIODS OF HOT OPERATION, TO REDUCE RADIATION LEVELS IN EXCESS OF 2000 R/HR TO VALUES SUFFICIENTLY LOW TO PERMIT EXTENSIVE DIRECT MAINTENANCE AND EQUIPMENT MODIFICATION. RADIATION DOSAGE TO INDIVIDUALS WHO DID THE MECHANICAL WORK IN NO CASE EXCEEDED THE QUARTERLY 1.3-R ALLOWANCE. FINAL BACKGROUNDS WERE LESS THAN 100 MR/HR IN THE MAJORITY OF CELL LOCATIONS, WITH MAXIMUM READINGS OF 500 MR/HR ADJACENT TO SOME PARTS OF THE PROCESS EQUIPMENT. THE DECONTAMINATION SEQUENCE WAS BASED ON LABORATORY DEVELOPMENT WORK. IT INCLUDES FLUSHING WITH A MOLTEN SALT, FOLLOWED BY TREATMENT WITH THREE TYPES OF AQUEOUS SOLUTIONS FOR REMOVING SALT FILM, METAL SCALE, AND DEPOSITED RADIATION EMITTERS. THE RESPECTIVE COMPOSITIONS WERE - AMMONIUM OXALATE (0.3 TO 0.35 M), ALUMINUM NITRATE (0.1 M), OR AL (NO-3)3-HNO-3 (0.1-0.01 M), SODIUM HYDROXIDE-HYDROGEN PEROXIDE-SODIUM TARTRATE (ABOUT 5-1-1 WT PERCENT). THIS PROCEDURE IS SUITABLE FOR RADIATION LEVELS AT LEAST AS HIGH AS THOSE ENCOUNTERED IN THE TWO RADIOACTIVE OPERATING PERIODS CITED.

*FUEL ELEMENT + *MOLTEN FUEL + *RADIOCHEMICAL PROCESSING + CLAD + DECONTAMINATION + SALT + URANIUM + ZIRCALOY + ZIRCONIUM

12-09607 DICE DT + WICKER CU
URETHANE MANIPULATOR GAUNTLETS
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TENNESSEE
ORNL-TM-1326 +. 13 PAGES, 4 FIGURES, NOVEMBER 9, 1965- CFSTI, \$1.00 CY, \$0.50 MN

RESEARCH SERVICES PERSONNEL IN COLLABORATION WITH THE CERAMICS AND PLASTICS DEPARTMENT OF THE Y-12 DEVELOPMENT DIVISION DEVELOPED A METHOD FOR MAKING MANIPULATOR GAUNTLETS FROM LIQUID URETHANE MONOMER. IN MOST HOT CELLS, THE EXPECTED SERVICE LIFE OF THESE GAUNTLETS IS NEARLY FIVE TIMES THAT OF THE NEOPRENE GAUNTLETS PREVIOUSLY USED. IT IS NECESSARY TO ADD A COATING OF NEOPRENE TO MAINTAIN THIS LIFE EXPECTANCY IN AREAS WHERE OXIDIZING ACIDS ARE ENCOUNTERED. AS AN ADDITIONAL BENEFIT, SPECIAL URETHANE BOOTS, BELLOWES, AND OTHER OBJECTS ARE EASILY MADE BY THIS METHOD.

*MAINTENANCE AND REPAIR + *PERSONNEL PROTECTIVE DEVICE + *REMOTE MANIPULATING AND VIEWING + GLOVE BOX + HOT CELL

12-09652 GRAF P + STAUFFER M
TRANSFER METHODS FOR IRRADIATION RIGS AND FUEL ELEMENTS FOR POSTIRRADIATION EXAMINATION IN THE HOT CELLS OF THE EIR - WURENLINGEN (SWITZERLAND)
SWISS FEDERAL INSTITUTE FOR REACTOR RESEARCH, WURENLINGEN
16 PAGES, 7 FIGURES, 5 REFERENCES- 1965- PP. 485-500 OF THE PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENoble, JUNE 15-18, 1965, VOL. 2- ENEA, OECD, PUBLISHERS

THE DIFFERENT TRANSFER METHODS FOR HIGHLY ACTIVE MATERIALS IN THE FIVE INTERCONNECTED HOT CELLS WITH ADEQUATE SHIELDING UP TO 100,000 MEV-CURIES OF THE HIGH-LEVEL LABORATORY OF THE SWISS REACTOR RESEARCH CENTRE ARE DESCRIBED. ALL TRANSFER SYSTEMS OF THE CELLS ARE BETA-GAMMA-SHIELDED AND TIGHT, BUT THEY ARE NOT ALPHA-SEALED. WORK WITH IRRADIATED FUEL WITH HIGH PLUTONIUM CONCENTRATION IS ACCOMPLISHED IN UNDERPRESSURED IN-CELL BOXES. THE TRANSFER METHODS USED BETWEEN THE SHIELDED CELL AND THE SEALED BOX WITH THE HELP OF THE POWER MANIPULATOR ARE BY THE ADAPTED GLOVE-BOX TECHNIQUE THROUGH AIRLOCKS.

*EXAMINATION + *FUEL ELEMENT + *FUEL HANDLING + *HOT CELL + *IRRADIATION TESTING + *SWITZERLAND +

CATEGORY 12
PLANT SAFETY FEATURES

12-C9652 *CONTINUED*

*TRANSPORTATION AND HANDLING + CONTAINMENT AIR LOCK + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + GLOVE BOX

12-C9653 DJURLE S + NANBERG R

GENERAL DESIGN PRINCIPLES AND EXPERIENCE OF THE FLOW, TRANSFER AND STORAGE OF RADIOACTIVE MATERIAL IN THE STUDEVIK HOT LABORATORY

AB ATOMENERGI, SWEDEN

10 PAGES, 3 FIGURES, 1 REFERENCE- 1965- PP. 501-510 OF VOL. 2, PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENoble, JUNE 15-18, 1965- ENEA, OECD, PUBLISHERS

THE ACTIVE LABORATORY FOR FUEL ELEMENTS AT STUDEVIK, SWEDEN, INCLUDES SEVEN CONCRETE CELLS AND A LEAD CELL. THE DESIGN OF THE LABORATORY WITH SPECIAL REGARD TO THE FLOW, TRANSFER, AND STORAGE OF MATERIALS IS DISCUSSED. THE OPERATING EXPERIENCE HAS INDICATED THAT THE DESIGN PRINCIPLES WERE CORRECT IN GENERAL, ALTHOUGH SOME MODIFICATIONS OF THE LABORATORY HAVE PROVED BENEFICIAL.

*FUEL HANDLING + *TRANSPORTATION AND HANDLING + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + FUEL STORAGE + HOT CELL + OPERATIONS REPORTS, GENERAL + SWEDEN

12-C9654 LARSEN FB

TRANSFER OF MATERIALS, EQUIPMENT AND PERSONNEL THROUGH ALPHA-GAMMA BARRIERS IN THE RISO HOT CELLS
DANISH ATOMIC ENERGY COMMISSION

12 PAGES, 6 FIGURES- 1965- PP. 511-522 OF VOL. 2, PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENoble, JUNE 15-18, 1965, ENEA, OECD, PUBLISHERS

THE HOT-CELL FACILITY AT THE RESEARCH ESTABLISHMENT RISO, DENMARK, WAS DESIGNED AS AN ALPHA-GAMMA FACILITY. THIS PAPER DESCRIBES HOW THE GAMMA SHIELD AND/OR THE ALPHA SEAL OF THE CONCRETE-SHIELDED CELL BANK ARE MAINTAINED DURING TRANSFER OF MATERIALS, EQUIPMENT, AND PERSONNEL BY THE USE OF SHUTTERS, MECHANICAL ALPHA SEALS, AIR BARRIERS, AND AIR LOCKS.

*DENMARK + *FUEL HANDLING + CONTAINMENT AIR LOCK + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + GROSS ALPHA + GROSS BETA + HOT CELL + RISO (RESEARCH LABORATORY, DENMARK) + TRANSPORTATION AND HANDLING

12-C9655 SCHULTE JW + PETERSON PJ + WILSON MT + DEILY GJ + FLEISCHER ES

METHODS USED IN THE UNITED STATES FOR TRANSFERRING MATERIALS THROUGH RADIATION BARRIERS
LOS ALAMOS SCIENTIFIC LABORATORY + SAVANNAH RIVER LABORATORY + LAWRENCE RADIATION LABORATORY

22 PAGES, 21 FIGURES, 32 REFERENCES- 1965- PP. 523-544 OF VOL. 2, PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENoble, JUNE 15-18, 1965, ENEA, OECD, PUBLISHERS

VARIOUS METHODS IN USE THROUGHOUT THE UNITED STATES ARE DESCRIBED BY WHICH MATERIALS ARE PASSED THROUGH THE SHIELDING OF HIGH-ACTIVITY HOT CELLS. DISTINCTIONS ARE MADE BETWEEN OPERATIONS INVOLVING (1) THE TRANSFER OF COLD MATERIALS INTO CELLS, (2) THE INTRODUCTION AND REMOVAL OF HOT MATERIALS THROUGH GAMMA BARRIERS, AND (3) THE INTRODUCTION AND REMOVAL OF HOT MATERIALS THROUGH ALPHA-GAMMA BARRIERS. THE PROCEDURES PRESENTED WERE TAKEN FROM PUBLISHED ARTICLES, PERSONAL OBSERVATIONS AT VARIOUS FACILITIES, AND CONTRIBUTIONS BY THE AUTHORS.

*FUEL HANDLING + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + HOT CELL + UNITED STATES

12-C9656 RITCHIE AB + WEBB GG

THE TRANSFER OF RADIOACTIVE SOURCES

UNITED KINGDOM ATOMIC ENERGY ESTABLISHMENT, HARWELL

20 PAGES, 10 FIGURES, 2 REFERENCES- 1965- PP. 551-570 OF VOL. 2, PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENoble, JUNE 15-18, 1965- ENEA, OECD, PUBLISHERS

A REVIEW OF METHODS IN USE AT A NUMBER OF ACTIVE HANDLING FACILITIES IN THE U.K.A.E.A. FOR THE TRANSFER OF KILOCURIE SOURCES OF RADIOACTIVE MATERIAL BETWEEN SHIELDED FLASKS AND BETA-GAMMA, ALPHA-BETA-GAMMA AND CONTROLLED-ATMOSPHERE CELLS.

*FUEL HANDLING + *TRANSPORTATION AND HANDLING + *UNITED KINGDOM + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + SOURCE, RADIATION + STORAGE CONTAINER

12-C9658 BOEHME G + GOTTLob P + NOWAK A

TRANSFER PROCEDURES USED IN THE ALPHA-GAMMA HOT LABORATORY AT KARLSRUHE
KARLSRUHE NUCLEAR RESEARCH CENTER, GERMANY

12 PAGES, 7 FIGURES, 5 REFERENCES- 1965- PP. 583-595 OF THE PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENoble, JUNE 15-18, 1965, VOL. 2- ENEA, OECD, PUBLISHERS

SEVERAL SYSTEMS ARE APPLIED FOR GAS-TIGHT INTER-CELL TRANSFER AND LOADING AND UNLOADING OF RADIOACTIVE MATERIALS AND PARTS OF CELL EQUIPMENT UNDER GAS-TIGHT AND ALPHA-TIGHT CONDITIONS WITHOUT PERSONNEL HAVING TO ENTER THE CELLS. TESTS HAVE BEEN CARRIED OUT TO SHOW THE RELIABILITY OF THE TRANSFER OPERATIONS.

*FUEL HANDLING + *GERMANY + *HOT CELL + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + TEST, PROOF + TRANSPORTATION AND HANDLING

12-C9659 HERREN M

CATEGORY 12
PLANT SAFETY FEATURES

12-09659 *CONTINUED*

DESIGN AND PROCEDURES FOR HANDLING HIGH-LEVEL ALPHA-GAMMA BOXES AT THE LABORATORY FOR RADIOACTIVE SOLIDS KERNFORSCHUNGSANLAGE JULICH, GERMANY
15 PAGES, 7 FIGURES, 5 REFERENCES- 1965- PP. 596-611 OF THE PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENABLE, JUNE 15-18, 1965, VOL. 2- ENEA, OECD, PUBLISHERS

CONCRETE HOT CELLS WITH SUFFICIENT SHIELDING FOR 10,000 CURIES OF A 1-MEV GAMMA EMITTER ARE DESIGNED FOR EXPERIMENTS ON HUMIDITY-SENSITIVE, VERY DUSTY, ALPHA-GAMMA-EMITTING REACTOR-FUEL MATERIALS. THIS PAPER DISCUSSES PROBLEMS ARISING FROM (1) TRANSFER OPERATIONS OF EXPERIMENTAL MATERIALS AND WASTES INTO AND OUT OF BOXES, AND OF BOXES THEMSELVES INTO AND OUT OF THE CELLS, (2) EXCHANGE, REPAIR, AND MAINTENANCE OF BOX EQUIPMENT, AND (3) PLASTIC-BAGGING TECHNIQUES.

*HOT CELL + CONTAINMENT DESIGN + DESIGN CRITERIA + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + FUEL HANDLING + GERMANY + MAINTENANCE AND REPAIR + STORAGE CONTAINER + TRANSPORTATION AND HANDLING

12-C9660 PESENTI P + CAZALIS JP

SPECIAL PROCEDURE FOR ALPHA-BETA-GAMMA TRANSFERS OF LARGE PIECES OF EQUIPMENT
EUROPEAN ATOMIC ENERGY COMMUNITY

23 PAGES, 7 FIGURES, 5 REFERENCES- 1965- PP. 612-635 OF THE PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENABLE, JUNE 15-18, 1965, VOL. 2- ENEA, OECD, PUBLISHERS

THE TELE M. F. EQUIPMENT HAS BEEN DESIGNED TO PROVIDE A MULTIPURPOSE TRANSFER SYSTEM CONSISTENT WITH THE LARGEST USEFUL SIZE AND THE MOST DANGEROUS RADIATION EMITTERS. ITS UTILIZATION REQUIRES A GAMMA-SHIELDED TRANSFER ZONE COMMUNICATION WITH THE HOT CELLS BY AN OPENING IN THEIR CEILING. A REMOTE-CONTROLLED TRAVELLING BELL EQUIPPED WITH A WINCH IS USED FOR HOISTING. AN M. F. MACHINE PERFORMS THE DOUBLE REMOTE WELDING OF THE JUNCTION SLEEVE TO SEPARATE THE BELL FROM THE CELL. PROTOTYPE EQUIPMENT HAS BEEN TESTED AT MOL (BELGIUM).

*BELGIUM + *TRANSPORTATION AND HANDLING + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + FUEL HANDLING + GROSS ALPHA + GROSS BETA + MAINTENANCE AND REPAIR

12-09661 RETZ A + SCHMIDDEM RJ + STEPHAN W + RAU J

PACKAGING DISASSEMBLED FUEL ELEMENTS AND RADIOACTIVE WASTE IN THE HOT CELLS AT THE KERNFORSCHUNGSANLAGE JULICH

KERNFORSCHUNGSANLAGE JULICH, GERMANY

17 PAGES, 7 FIGURES, 5 REFERENCES- 1965- PP. 636-653 OF THE PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENABLE, JUNE 15-18, 1965, VOL. 2- ENEA, OECD, PUBLISHERS

DEPENDING ON THE TYPE OF MATERIAL, ACTIVITY LEVEL, AND FIRE AND HEALTH HAZARD, SEVERAL METHODS OF WASTE AND FUEL PACKAGING ARE USED IN THE HOT CELLS AT THE KERNFORSCHUNGSANLAGE JULICH (K.F.A.). LOW-LEVEL WASTES SUCH AS PLASTICS, RAGS, AND SMALL TOOLS ARE REMOTELY WELDED INTO PLASTIC BAGS OF 0.2 TO 0.4 MM THICKNESS. FOR HIGHLY ACTIVE FUEL WASTES WHICH MUST BE MOST SECURELY PACKAGED AND STORED, THREE METHODS HAVE BEEN TESTED- (1) REMOTE ARGON-ARC WELDING OF STAINLESS STEEL AND ALUMINUM CANS, (2) ELECTROMAGNETIC CLOSING OF ALUMINUM CANS, AND (3) COLD-PRESSURE WELDING OF ALUMINUM CANS. AFTER COMPARISON OF LEAK-TIGHTNESS, RESISTANCE TO MECHANICAL DAMAGE, AND COSTS, THE METHOD OF COLD-PRESSURE WELDING WAS CHOSEN.

*DECONTAMINATION + *GERMANY + *WASTE HANDLING + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + FUEL ELEMENT + HOT CELL + SHIPPING CONTAINER + STORAGE CONTAINER

12-09662 BRINKMANN G + SCHENK W + SCHULZ W + STOCKSCHLADER F

IMPROVING ECONOMY WITH THE USE OF STANDARDIZED, MOVABLE, IN-CELL BOXES, AND THE DECONTAMINATION OF THEIR EQUIPMENT AT THE CENTRAL DECONTAMINATION FACILITY

KERNFORSCHUNGSANLAGE JULICH, GERMANY

13 PAGES, 7 FIGURES, 5 REFERENCES- 1965- PP. 654-667 OF THE PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENABLE, JUNE 15-18, 1965, VOL. 2- ENEA, OECD, PUBLISHERS

WHEN A NUCLEAR RESEARCH CENTER HAS SEVERAL HOT LABORATORIES, ALL OF WHICH USE IN-CELL BOXES, IT IS DESIRABLE TO STANDARDIZE THE CELLS AND BOXES AS FAR AS POSSIBLE TO ACHIEVE MAXIMUM ECONOMY, EFFICIENCY, AND CONVENIENCE. THE FOLLOWING REPORT SHOWS THE PRINCIPLES OF PLANNING WHICH ARE LAID DOWN AT KFA-JULICH, IN CONNECTION WITH THE CONSTRUCTION OF SEVERAL PLANTS. IT ENUMERATES THE ADVANTAGES AND DESCRIBES THE CONDITIONS WHICH MUST BE OBSERVED DURING PLANNING. THE SECTION ON THE DECONTAMINATION FACILITY IS INCLUDED AS AN IMPORTANT PART OF THE ENTIRE BOX-EXCHANGE SYSTEM. IN ADDITION, SOME OF THE MORE INTERESTING POINTS CONCERNING EQUIPMENT AND TECHNIQUES, ESPECIALLY A NEW MANIPULATOR EXCHANGE TECHNIQUE, ARE DESCRIBED.

*ADMINISTRATIVE CONTROLS AND PRACTICES + *DECONTAMINATION + *GERMANY + ECONOMICS + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + HOT CELL

12-C9663 TROTT AF

CONTAMINATION CONTROL AND WASTE DISPOSAL IN THE HIGH LEVEL ISOTOPE OPERATIONS AT ATOMIC ENERGY OF CANADA LIMITED COMMERCIAL PRODUCTS

ATOMIC ENERGY OF CANADA LIMITED

9 PAGES, 7 FIGURES, 5 REFERENCES- 1965- PP. 668-677 OF THE PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENABLE, JUNE 15-18, 1965, VOL. 2- ENEA, OECD, PUBLISHERS

CATEGORY 12
PLANT SAFETY FEATURES

12-09663 *CONTINUED*

TEN YEARS OF EXPERIENCE IN HANDLING MULTIKILOCURIE QUANTITIES OF CO-60 AND OTHER ISOTOPES IN A PLANT NEAR THE CENTRE OF THE CITY OF OTTAWA AND REMOTE FROM RADIOACTIVE-WASTE-DISPOSAL FACILITIES IS REVIEWED. CONTAMINATION CONTROL, INCLUDING VENTILATION DESIGN, CONTINUOUS EFFLUENT-AIR MONITORING AND FILTRATION, CONTINUOUS EFFLUENT-WATER MONITORING, IN-CELL MONITORING AND CONTAMINATION CONTROL, LIQUID AND DRY WASTE PROCESSING AND REMOVAL FROM HOT CELLS, AND CONTAMINATION CONTROL, LIQUID AND DRY WASTE PROCESSING AND REMOVAL FROM HOT CELLS, AND THE REMOVAL, PACKAGING, AND TRANSPORTATION OF WASTE FROM THE PLANT SITE TO BURIAL ARE DESCRIBED.

*CANADA + *CONTAMINATION + *WASTE DISPOSAL, GENERAL + EFFLUENT + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + FILTRATION + MONITOR, RADIATION, AIR + TRANSPORTATION AND HANDLING + VENTILATION SYSTEM

12-09664 WATSON CD + BERRETH EA + DUMMER JE + FULLER RK + STEARNS RF
POLICY AND PROCEDURES USED IN THE UNITED STATES FOR DECONTAMINATING HOT CELLS
OAK RIDGE NATIONAL LABORATORY + BATTELLE NORTHWEST + LOS ALAMOS SCIENTIFIC LABORATORY
36 PAGES, 7 FIGURES, 5 REFERENCES- 1965- PP. 678-705 OF THE PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENOBLE, JUNE 15-18, 1965, VOL. 2- ENEA, OECD, PUBLISHERS

IN THE UNITED STATES, HOT CELLS AND EQUIPMENT FOR HANDLING RADIOACTIVE SOLIDS OR LIQUIDS ARE SUCCESSFULLY DECONTAMINATED AS REQUIRED. THE FREQUENCY VARIES FROM ABOUT THREE TIMES A YEAR TO ONLY ONCE IN THREE YEARS FOR THE LARGER PILOT-PLANT UNITS. THE NORMAL TIME REQUIRED TO DECONTAMINATE A FACILITY IS ABOUT TWO TO SIX WEEKS. DECONTAMINATION IS USUALLY DONE REMOTELY, THROUGH APPROPRIATE DESIGN, PRECONTAMINATION APPLICATION OF PROTECTIVE COATINGS, EXPENDABLE EQUIPMENT, THE PROPER CHOICE OF CLEANING REAGENTS (DETERGENTS, ORGANIC SOLVENTS, ACIDS, ALKALIES, CHELATING AGENTS) AND PHYSICAL METHODS (GRINDING, ULTRASONIC CLEANING, BLASTING, AND ABRADING). METHODS HAVE BEEN DEVELOPED AND ARE PRESENTED IN THIS PAPER FOR DECONTAMINATING HOT CELLS AND ADJACENT AREAS SUBJECTED TO THE UNCONTROLLED RELEASE OF RADIOACTIVITY.

*ADMINISTRATIVE CONTROLS AND PRACTICES + *DECONTAMINATION + *HOT CELL + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + UNITED STATES

12-09665 CESARANO C + GHEZZI E + LAURO M
DECONTAMINATION EXPERIENCE AT THE HOT LABORATORY OF CASACCIA
CENTRO STUDI NUCLEARI DELLA CASACCIA, C.N.E.N.
13 PAGES, 7 FIGURES, 5 REFERENCES- 1965- PP. 706-719 OF THE PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENOBLE, JUNE 15-18, 1965, VOL. 2- ENEA, OECD, PUBLISHERS

THE EXPERIENCE GAINED IN THREE YEARS OF OPERATION IS DESCRIBED. THE KEY FACTORS FOR EFFICIENT AND FAST DECONTAMINATION CAN BE SUMMARIZED AS FOLLOWS. THE IN-CELL EQUIPMENT SHOULD BE AS SMALL AS POSSIBLE AND EASY TO DISASSEMBLE AND REMOVE. THE DECONTAMINATION PROCESS SHOULD BE PLANNED IN DETAIL. A SUITABLE TRANSFER TECHNIQUE SHOULD BE ADOPTED TO KEEP THE CONTAMINATION AS CONFINED AS POSSIBLE IN THE LOADING AREA. SINCE OUR LABORATORY IS NOT EQUIPPED WITH ISOLATION ROOMS, PLASTIC TENTS ARE BUILT IN THE BACK OF THE CELL DOOR. THE CONTAMINATED EQUIPMENT IS TRANSFERRED OUT OF THE HOT CELL BY PERSONNEL WEARING FROG SUITS OR PREFERABLY TUNNEL SUITS.

*DECONTAMINATION + *FRANCE + *HOT CELL + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + OPERATIONS REPORTS, GENERAL + TRANSPORTATION AND HANDLING

12-09666 WELLS H
DECONTAMINATION PROCEDURES FOR HIGH ACTIVITY CELLS AT A.E.R.E. HARWELL
ATOMIC ENERGY RESEARCH ESTABLISHMENT, HARWELL, UNITED KINGDOM
15 PAGES, 7 FIGURES, 5 REFERENCES- 1965- PP. 720-735 OF THE PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENOBLE, JUNE 15-18, 1965, VOL. 2- ENEA, OECD, PUBLISHER

DECONTAMINATION PROCEDURES, PARTICULARLY WHEN CARRIED OUT REMOTELY, ARE TIME-CONSUMING AND EXPENSIVE. IT FOLLOWS THAT EFFORTS AIMED AT PREVENTING CONTAMINATION ARE VERY WORTHWHILE. THIS PAPER ILLUSTRATES PREVENTIVE MEASURES TAKEN AT HARWELL, AND REPORTS PROCEDURES WHICH ENSURE THAT THE DECONTAMINATION OF CELLS AND EQUIPMENT IS CARRIED OUT EFFICIENTLY AND SAFELY.

*DECONTAMINATION + *HOT CELL + *UNITED KINGDOM + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + HARWELL (UK) + PERSONNEL PROTECTIVE DEVICE

12-09667 VALENTIN A + HAYET L
DECONTAMINATION PROCEDURES AND FREQUENCIES IN (ALPHA-BETA-GAMMA) METALLURGICAL HOT CELLS
CENTRE D ETUDES NUCLEAIRE FONTENAY-AUX-ROSES, FRANCE
23 PAGES, 7 FIGURES, 5 REFERENCES- 1965- PP. 736-759 OF THE PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENOBLE, JUNE 15-18, 1965, VOL. 2- ENEA, OECD, PUBLISHER

AN ALPHA-BETA-GAMMA LABORATORY AT SACLAY HAS BEEN USED FOR METALLURGICAL RESEARCH ON IRRADIATED PLUTONIUM SINCE 1961. IT COMPRISES ALPHA SEALED REMOVABLE BOXES WHICH ARE CONTAINED IN A BETA-GAMMA SHIELDED ENCLOSURE. ON THE COMPLETION OF AN OPERATION, THE BOX IS TAKEN BY A SPECIAL CRANE TO THE DECONTAMINATION ROOM. DECONTAMINATION IS ACCOMPLISHED MANUALLY. THE PROCESS HAS BEEN IMPROVED WITH USE AND THE PERIODS OF THE DECONTAMINATION CYCLES WERE LOWERED. PRE-EQUIPPED BOXES ARE USED TO REPLACE THOSE BEING DECONTAMINATED, THUS THE OPERATING SPEEDS ARE INCREASED. THE EXPERIENCE GAINED ON THIS INSTALLATION IS NOW BEING

CATEGORY 12
PLANT SAFETY FEATURES

12-09667 *CONTINUED*

USED IN THE BUILDING OF A NEW HOT LABORATORY, NAMED LABORATOIRE DE RADIOMETALLURGIE, AT THE FONTENAY-AUX-ROSES NUCLEAR CENTRE.

*ADMINISTRATIVE CONTROLS AND PRACTICES + *FRANCE + *HOT CELL + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + GROSS ALPHA + GROSS BETA + GROSS GAMMA + TRANSPORTATION AND HANDLING

12-09668 BITEAU J + GARRIC C + WILHELM A

DISMANTLING WORKSHOP FOR ORGEL FUEL ELEMENTS (ADECO)
EUROPEAN ATOMIC ENERGY COMMUNITY, ISPRA

19 PAGES, 7 FIGURES, 5 REFERENCES- 1965- PP. 760-779 OF THE PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORY, GRENoble, JUNE 15-18, 1965, VOL. 2- ENEA, OECD, PUBLISHERS

THE DISMANTLING WORKSHOP FOR ORGEL FUEL ELEMENTS (ADECO) IS CONNECTED TO THE ESSOR REACTOR BY A SWIMMING POOL. THIS WORKSHOP WILL BE USED FOR (1) CLEANING, VISUAL OBSERVATIONS AND RADIOGRAPHY OF THE ORGEL FUEL CLUSTER, (2) DISMANTLING OF THIS CLUSTER, (3) SECTIONING AND EVACUATION OF THE DIFFERENT PARTS, AND (4) ACCESSORILY, FOR OTHER USES. THE DIFFERENT CONCEPT AND INTERVENTION PRINCIPLES, AS WELL AS THE EQUIPMENT, ARE DESCRIBED IN THIS PAPER.

*FUEL HANDLING + *MAINTENANCE AND REPAIR + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + FUEL ELEMENT + ITALY

12-C9669 SCHMIDDEM PJ + STEPHAN W + ZAMJA K

DISASSEMBLY OF TEST IRRADIATIONS AND FUEL ELEMENTS IN SMALL CAST IRON, ALPHA-GAMMA CELLS AND THEIR SUBSEQUENT HANDLING

KERNFORSCHUNGSANLAGE JULICH, FEDERAL REPUBLIC OF GERMANY

12 PAGES, 1965, PP. 779-790 OF VOL. 2, PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENoble, JUNE 15-18, 1965, ENEA, OECD, PUBLISHERS

THREE FAIRLY SMALL ALPHA-GAMMA CELLS, MADE FROM CAST IRON BLOCKS, ARE BEING BUILT FOR DISASSEMBLING OF TEST IRRADIATIONS AND FUEL ELEMENTS. ASIDE FROM DISASSEMBLY EQUIPMENT, THE CELLS WILL ENABLE THE USUAL CRITICAL EVALUATION OF THE PERFORMANCE OF THE FUELLED SECTION TO BE MADE. THE CELLS USE GAS-TIGHT STAINLESS-STEEL BOXES. ON THE OUTSIDE, SPECIAL GAS-TIGHT, EXTENDED-REACH MANIPULATORS OF A SHORTENED DESIGN WITH A SHIELDED THROUGH-WALL PLUG ARE USED. THESE MANIPULATORS ARE GAS-TIGHT AND DO NOT REQUIRE PLASTIC BOOTINGS FOR SEALING TO THE BOXES. SOME EQUIPMENT (PERISCOPE, DIMENSIONAL MEASUREMENT, GAMMA-SCAN) IS OF SPECIAL DESIGN TO SAVE SPACE IN THE NARROW BOXES.

*FUEL HANDLING + *GERMANY + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + EXAMINATION + FUEL ELEMENT + HOT CELL + IRRADIATION TESTING + MAINTENANCE AND REPAIR

12-C9671 THOMAS MH

WORKSHOP CELL OPERATIONS AT CHALK RIVER NUCLEAR LABORATORIES
ATOMIC ENERGY OF CANADA LIMITED, CHALK RIVER

20 PAGES, 1965, PP. 805-824 OF VOL. 2, PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENoble, JUNE 15-18, 1965, ENEA, OECD, PUBLISHERS

THE CRNL EXPERIMENTAL PROGRAM HAS REQUIRED A FLEXIBLE WORKSHOP CELL. FLEXIBILITY TO CHANGE FROM ONE OPERATION TO ANOTHER WITH THE MINIMUM OF DIFFICULTY IS IMPORTANT WHEN FACILITIES ARE LIMITED. SUCCESSFUL HANDLING PROCEDURES ARE DESCRIBED FOR MOVING HIGHLY ACTIVE FUEL AND SAMPLES BETWEEN CELL AND REACTOR OR STORAGE POSITIONS. THE PRINCIPLES AND OPERATIONAL PROCEDURES FOR THE MAINTENANCE OF LOOP FUEL, THE EXAMINATION OF FUEL UNITS, THE DISMANTLING AND SECTIONING OF VARIOUS FUELS ARE ILLUSTRATED. SPECIAL PROCEDURES FOR RESEARCH AND DEVELOPMENT EXPERIMENTS ON IRRADIATED REACTOR MATERIALS ARE MENTIONED.

*CANADA + *HOT CELL + ADMINISTRATIVE CONTROLS AND PRACTICES + CHALK RIVER + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + FUEL HANDLING + TRANSPORTATION AND HANDLING

12-09672 SKINNER J + VAUGHAN GA + VALLEY J

TECHNIQUES AND WORKING METHODS FOR THE EXAMINATION OF IRRADIATED CERAMIC FUEL ELEMENTS AT WINDSCALE
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, WINDSCALE

18 PAGES, 1965, PP. 825-842 OF VOL. 2, PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENoble, JUNE 15-18, 1965, ENEA, OECD, PUBLISHERS

THE REMOTE HANDLING FACILITIES USED FOR EXAMINING IRRADIATED CERAMIC FUEL STRINGERS DISCHARGED FROM THE WINDSCALE AGR ARE BRIEFLY DESCRIBED. THESE FACILITIES ARE OF TWO TYPES, CONCRETE SHIELDED CAVES AND SEPARATE LINES OF LEAD SHIELDED CELLS, AND ARE CAPABLE OF EXAMINING SOME 3000 FUEL PINS PER YEAR. THE TECHNIQUES FOR DISMANTLING FUEL STRINGERS AND FOR CUTTING SAMPLES OF CAN AND FUEL FROM IRRADIATED FUEL PINS ARE DESCRIBED, WITH EMPHASIS ON THE METHODS. FOUR CUTTING TECHNIQUES HAVE BEEN DEVELOPED FOR CERAMIC FUEL PINS - SIMPLE PIPE CUTTING, UNDERWATER HIGH-SPEED DIAMOND CUTTING WHEELS, SPARK MACHINING, AND ULTRASONIC DRILLING. THE PAPER CONCLUDES WITH SOME GENERAL COMMENTS ON THE ADMINISTRATIVE CONTROL OF THE WORK.

*FUEL HANDLING + *HOT CELL + *UNITED KINGDOM + ADMINISTRATIVE CONTROLS AND PRACTICES + CERAMICS + DECONTAMINATION + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + EXAMINATION + IRRADIATION TESTING + MAINTENANCE AND REPAIR + TEST, NONDESTRUCTIVE + WINDSCALE AGR (UK)

12-C9673 BAIN AS + MACDONALD RD + KERR CB + KELM JR + CHENIER RJ

WORK METHODS FOR THE POST-IRRADIATION EXAMINATION OF EXPERIMENTAL FUEL ELEMENTS

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PLANT SAFETY FEATURES

12-09673 *CONTINUED*

ATOMIC ENERGY OF CANADA LIMITED, CHALK RIVER

14 PAGES, 1965, PP. 843-856 OF VOL. 2, PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENoble, JUNE 15-18, 1965, ENEA, OECD, PUBLISHERS

AT CHALK RIVER, THOSE ENGAGED ON MATERIALS RESEARCH OPERATE TWO HIGH-DENSITY CONCRETE HOT-CELLS AND A LINE OF SEVEN LEAD-SHIELDED DRY-BOXES FOR THE EXAMINATION OF IRRADIATED FUEL SPECIMENS, BOTH METALLIC AND CERAMIC. TRANSFER TECHNIQUES AND WORKING METHODS FOR A TYPICAL EXAMINATION ARE DESCRIBED. EXPERIENCE OVER THE PAST NINE YEARS HAS SHOWN THAT HAVING THE RESEARCHERS DIRECTLY IN CHARGE OF THE DETAILED POSTIRRADIATION EXAMINATION HAS SEVERAL ADVANTAGES, SUCH AS FLEXIBILITY IN SCHEDULING, KNOWLEDGE OF THE LIMITS OF REMOTE-CONTROL OPERATION TO PERMIT RAPID DEVELOPMENT OF SUITABLE EQUIPMENT, AND ELIMINATION OF MISUNDERSTANDINGS AND DELAYS IN THE DISSEMINATION OF RESULTS.

*CANADA + *FUEL HANDLING + *HOT CELL + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + EXAMINATION + FUEL ELEMENT + IRRADIATION TESTING + TRANSPORTATION AND HANDLING

12-09674 EDMONDS E

OPERATIONAL EXPERIENCE IN THE DOUNREAY BETA-GAMMA HOT CELLS

UNITED KINGDOM ATOMIC ENERGY AUTHORITY, DOUNREAY

12 PAGES, 1965, PP. 857-868 OF VOL. 2, PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENoble, JUNE 15-18, 1965, ENEA, OECD, PUBLISHERS

THE HIGH-ACTIVITY BETA-GAMMA FACILITY AT DOUNREAY HAS BEEN IN OPERATION FOR SIX YEARS. THE MAJOR ROLE OF THE CELLS HAS BEEN TO PROVIDE A RAPID FEEDBACK OF INFORMATION TO THE REACTOR OPERATORS ON THE BEHAVIOUR AND CONDITIONS OF FUEL ELEMENTS IN DOUNREAY FAST REACTOR. MANY MODIFICATIONS HAVE BEEN MADE IN THE LIGHT OF EXPERIENCE GAINED DURING OPERATION AND SOME OF THESE ARE DESCRIBED. CELL DECONTAMINATION CONTROL AND SPECIFIC RIG HANDLING ARE ALSO DISCUSSED.

*HOT CELL + *OPERATIONS REPORTS, GENERAL + *UNITED KINGDOM + CONTAMINATION + DECONTAMINATION + DOUNREAY (UK) + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + FUEL HANDLING + OPERATING EXPERIENCE

12-09675 PEREZ BL + NOGUEIRA ED + URIARTE A + SALVADOR LR

A PILOT PLANT FACILITY FOR THE REPROCESSING OF IRRADIATED MTR TYPE FUELS AT THE SPANISH J.E.N.

JUNTA DE ENERGIA NUCLEAR, MADRID

20 PAGES, 1965, PP. 869-888 OF VOL. 2, PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENoble, JUNE 15-18, 1965, ENEA, OECD, PUBLISHERS

THE GENERAL LAYOUT AND MAIN FEATURES OF A PILOT PLANT FOR REPROCESSING IRRADIATED MTR-TYPE FUELS UNDER CONSTRUCTION AT THE CENTRO NACIONAL DE ENERGIA JUAN VIGON, MADRID, ARE DISCUSSED. THE PLANT WILL BE USED FOR REPROCESSING THE JEN-1 REACTOR ELEMENTS, TO OBTAIN DIRECT INFORMATION ON THE SUBJECT, AND TO TRAIN PERSONNEL WITH A VIEW TO THE FUTURE NEEDS OF THE SPANISH NUCLEAR POWER PROGRAM.

*HOT CELL + *RADIOCHEMICAL PROCESSING + *SPAIN + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + FUEL ELEMENT + FUEL HANDLING + MTR (MATERIAL TESTING REACTOR)

12-09852 RENGEL JC

SAFETY RELATED ASPECTS OF LOCATING NUCLEAR POWER PLANTS IN CITIES

WESTINGHOUSE ELECTRIC CORPORATION, PITTSBURGH, ATOMIC POWER DIV.

5 PAGES, PRESENTED AT THE ANS SYMPOSIUM ON LOCATING NUCLEAR POWER PLANTS IN CITIES, MARCH 22, 1966, NEW YORK CITY

PUTS RELIABILITY AND ACCIDENT-PREVENTION SAFEGUARDS AHEAD OF CONSEQUENCE-LIMITING SAFEGUARDS. RELIABILITY ENSURED BY DESIGN, INTEGRITY OF MANUFACTURER, INSPECTION, TEST, AND OPERATION CRITERIA FOR URBAN SITING.

*SITING, REACTOR + CODES AND STANDARDS + DESIGN CRITERIA + ENGINEERED SAFEGUARD

12-09854 SZAWLEWICZ SA

THE AEC REACTOR SAFETY PROGRAM

U. S. ATOMIC ENERGY COMMISSION

7 PAGES, PRESENTED AT THE ANS SYMPOSIUM ON LOCATING NUCLEAR POWER PLANTS IN CITIES, MARCH 22, 1966, NEW YORK CITY

STEERING COMMITTEE ON SAFETY RESEARCH. ACCIDENT-PREVENTING AND CONSEQUENCE-LIMITING SAFEGUARDS. ENGINEERED SAFEGUARDS. LOSS-OF-COOLANT ACCIDENT AND MECHANICAL LOAD IT CREATES, IN-CORE SPRAY AND EMERGENCY COOLING SYSTEM, METAL-WATER REACTION, FUEL MELTDOWN, FISSION-PRODUCT RELEASE, RELIABILITY OF PIPING. LIST OF PLANNED ORNL SUMMARY REPORT BUDGET. IN-PLANT TEST PROGRAM. NUCLEAR SAFETY PILOT PLANT, CONTAINMENT SYSTEMS EXPERIMENT, LOFT, POWER BURST FACILITY.

CSE (CONTAINMENT SYSTEMS EXPERIMENT) + EMERGENCY COOLING + ENGINEERED SAFEGUARD + FISSION PRODUCT RELEASE, GENERAL + FUEL MELTDOWN + LOFT (LOSS OF FLUID TEST) + METAL WATER REACTION + NSPP (NUCLEAR SAFETY PILOT PLANT) + PBF (POWER BURST FACILITY) + REACTOR, PRESSURIZED WATER

12-09855 BECK CK

CURRENT TRENDS AND PERSPECTIVES IN REACTOR LOCATION AND SAFETY REQUIREMENTS

U. S. ATOMIC ENERGY COMMISSION, WASHINGTON

CATEGORY 12
PLANT SAFETY FEATURES

12-09855 *CONTINUED*

14 PAGES, PRESENTED AT THE ANS SYMPOSIUM ON LOCATING NUCLEAR POWER PLANTS IN CITIES, MARCH 22, 1966, NEW YORK CITY

SAFETY RECORD OF NUCLEAR PLANTS. HIGH STANDARDS. ACCIDENT PREVENTION AND CONSEQUENCE-LIMITING SAFEGUARDS. MCA ANALYSIS. ISOLATED SITES. REVIEWS BY EXPERTS. INCREASE IN FISSION INVENTORY. STANDARDIZATION. TREND TOWARD MORE CENTRAL LOCATION. REQUIREMENTS FOR LESS-ISOLATED LOCATION - HIGH STANDARDS, DEFINITION OF TECHNICAL AREAS OF UNCERTAINTY, ESTABLISHMENT OF ADEQUACY OF SAFEGUARD SYSTEM, SUFFICIENT EXPERIENCE. THESE REQUIREMENTS HAVE NOT YET BEEN FULLY MET.

*SITING, REACTOR + ACCIDENT, MAXIMUM CREDIBLE (MCA) + ACCIDENT, PROBABILITY OF + ENGINEERED SAFEGUARD + REGULATION, AEC + REVIEW + SAFETY PRINCIPLES AND PHILOSOPHY

12-C9856 CAHILL WJ

REMARKS BY WILLIAM J. CAHILL, JR. MECHANICAL PLANT ENGINEER CONSOLIDATED EDISON COMPANY OF NEW YORK, INC. AT THE SYMPOSIUM ON LOCATING NUCLEAR POWER PLANTS IN CITIES, AMERICAN NUCLEAR SOCIETY, MARCH 22, 1966 CONSOLIDATED EDISON COMPANY, NEW YORK
2 PAGES, PRESENTED AT THE ANS SYMPOSIUM ON LOCATING NUCLEAR POWER PLANTS IN CITIES, MARCH 22, 1966

BRIEF DESCRIPTION OF ENGINEERED SAFEGUARDS, SITES, LICENSING EXPERIENCE, AND PUBLIC ACCEPTANCE OF INDIAN POINT 1 AND 2, AND RAVENSWOOD.

*INDIAN POINT I + *INDIAN POINT II + *RAVENSWOOD + *SITING, REACTOR + ENGINEERED SAFEGUARD + REACTOR, PRESSURIZED WATER + REGULATION, AEC

12-10506 KIEFER RJ + WINKLER EO

GENERAL ATOMIC IN-PILE LOOP FISSION PRODUCT TRAPPING SYSTEM. REGENERATIVE H₂O-CO₂ TRAP AND LIQUID NITROGEN COOLED NO. 2 CHARCOAL TRAP ASSEMBLY. INFORMATION DATA PACKAGE AND DESIGN ANALYSIS
GENERAL ATOMIC DIVISION, SAN DIEGO, CALIFORNIA
GAMC-5434 +. 55 PAGES, 4 FIGURES, 5 TABLES, JULY 1964, CFSTI, \$3.00 CY, \$0.50 MN

THE FISSION PRODUCT TRAPPING SYSTEM (FPTS) INITIALLY INSTALLED IN THE GAIL, HAS BEEN IN CONTINUOUS SERVICE FOR APPROXIMATELY THREE YEARS SINCE THE LOOP WAS FIRST OPERATED WITH NUCLEAR FUEL. THROUGHOUT THIS TIME, THE SYSTEM HAS EFFECTIVELY PERFORMED ITS INTENDED FUNCTION OF REMOVING FISSION PRODUCTS AND IMPURITIES FROM THE PURGE GAS STREAM.

*CHARCOAL ADSORBER + *CRYOGENICS + *DESIGN CRITERIA + *FILTER, BED + *FISSION PRODUCT RETENTION + *NITROGEN + CHARCOAL + FILTER, TRAP + FISSION PRODUCT, VOLATILE + IN PILE LOOP + OPERATING EXPERIENCE

12-10564 FREDERICKSON RL

IODINE 131 RELEASE AT ABBOTT LABORATORIES, MAY 31, 1966
ABBOTT LABORATORIES

1 PAGE, MAY 31, 1966, ATOMIC ENERGY CLEARING HOUSE, 12(27), PAGE 28, (JULY 4, 1966)

A 48-HR AIR SAMPLE TAKEN FROM INSIDE A HOT-CELL EXHAUST DUCT OVERWHELMED THE GEIGER-TUBE COUNTING SYSTEM, GIVING FALSELY LOW READINGS. THE NEXT DAY, GAMMA SCINTILLATION INDICATED THAT THE SAMPLE WAS 3580 TIMES THE MPC. LATER ANALYSIS SHOWED THE AVERAGE AIR CONCENTRATION WAS 38,800 TIMES MPC, AND OUTDOOR SAMPLING DURING THE RELEASE SHOWED ONLY 0.69 MPC. NO UNUSUAL BUILDING CONCENTRATIONS NOR EXPOSURE OF PERSONS OUTSIDE RESULTED. A BUBBLE OF IODINE IS BELIEVED TO HAVE PASSED OUT OF THE VESSEL REACTING A TELLURIUM TARGET. VARIOUS CHANGES TO SYSTEMS AND PROCEDURES ARE BEING STUDIED.

*FAILURE, INSTRUMENT + *FISSION PRODUCT RELEASE, GENERAL + *HOT CELL + *INCIDENT, ACTUAL, NONREACTOR + *IODINE + MODIFICATION, SYSTEM OR EQUIPMENT + TRACER, RADIOACTIVE

12-10600 APPLICATION FOR LICENSES FPCE PLANT

ISOICHEM INC.

750 PAGES APPROX., 83 FIGURES, 71 TABLES, REFERENCES, JUNE 1966, DOCKET NO. 50-258, PDR

REPORT GIVES ALL THE GENERAL AND DETAILED TECHNICAL INFORMATION REQUIRED FOR AEC LICENSING OF A RADIOCHEMICAL PLANT. INCLUDED ARE SECTIONS ON - SITE DESCRIPTION, PLANT DESCRIPTION, PROCESS DESCRIPTION, EQUIPMENT DESCRIPTION, SYSTEMS ANALYSIS, PUBLIC PROTECTION, PERSONNEL PROTECTION, SAFETY, PLANT ORGANIZATION, AND STARTUP PLANS.

*APPLICATION FOR AEC LICENSE + *CERIUM + *CESIUM + *FPCE PLANT + *PROMETHIUM + *RADIOCHEMICAL PROCESSING + *SAFEGUARDS REPORT, GENERAL + *STRONTIUM + FISSION PRODUCT, SEPARATION FROM WASTE + FISSION PRODUCT, USE OF IN WASTES + HAZARDS ANALYSIS + ISOICHEM, INC. + RADIOCHEMICAL PLANT SAFETY

12-10687 PAXTON HC

THE CRISIS IN CRITICALITY

2 PAGES, NUCLEAR NEWS 9(8)- 27-28 (AUGUST 1966)

REASON FOR NATIONAL TOPICAL ANS MEETING ON CRITICALITY SAFETY, LAS VEGAS, DECEMBER 13-15, 1966. MAINLY TO BRING INDUSTRY INTO DISCUSSION WITH AEC AND ITS CONTRACTORS AND TO RESOLVE THE DOUBLE STANDARD OF REGULATION WHICH REGULATES LICENSEES AND AEC PRODUCTION PLANTS DIFFERENTLY.

*CRITICALITY SAFETY + *REGULATION, AEC

CATEGORY 12
PLANT SAFETY FEATURES

12-10707 RALEIGH HD
RADIOACTIVE DECONTAMINATION. A LITERATURE SEARCH
UNITED STATES ATOMIC ENERGY COMMISSION, DIVISION OF TECHNICAL INFORMATION EXTENSION, OAK RIDGE, TENNESSEE
TID-3535 (SUPPL. 1) +. 71 PAGES, APRIL 1965, CFSTI, \$3.00

INCLUDED ARE 336 REFERENCES TO UNCLASSIFIED PUBLICATIONS ON PHYSICAL AND CHEMICAL METHODS FOR
REMOVING RADIOACTIVE CONTAMINATION. THE REFERENCES COVER THE PERIOD FROM JULY 1959 THROUGH
CEMBER 1964. SUBJECT, AUTHOR, AND REPORT-NUMBER INDEXES ARE PROVIDED.

*BIBLIOGRAPHY + *DECONTAMINATION + *WASTE DISPOSAL, GENERAL

12-10809 WATSON HE
THE NRL HIGH LEVEL RADIATION LABORATORY. PART III. OPERATING EXPERIENCE
U. S. NAVAL RESEARCH LABORATORY
11 PAGES, 11 FIGURES, 1 REFERENCE, NUCLEAR ENGINEERING AND DESIGN, 4 (1) PAGES 97-107, (1966)

REPORT CONTAINS A GENERAL DESCRIPTION OF ALL PHASES OF THE OPERATIONAL, SAFETY, AND AUXILIARY
SYSTEMS OF A HIGH-LEVEL RADIATION LABORATORY.

*HOT CELL + DECONTAMINATION + VENTILATION SYSTEM + WASTE DISPOSAL, LIQUID

12-10827 MALONEY JC + MEREDITH JL
DECONTAMINATION OF LAND TARGETS, VEHICLES, AND EQUIPMENT
U.S. ARMY NUCLEAR DEFENSE LABORATORY, EDGEWOOD ARSENAL, MARYLAND
NDL-TR-66 + AD-632989 +. 72 PAGES, 9 TABLES, 13 FIGURES, REFERENCES, MAY 1966- CFSTI, \$3.00 CY, \$0.75 MN

THE OBJECTIVE OF THIS PROJECT IS TO DEVELOP AND TEST RADIOLOGICAL COUNTERMEASURES THAT CAN BE
USED IN POSTNUCLEAR-ATTACK RECOVERY OPERATIONS. THE SPECIFIC OBJECTIVE OF THIS PHASE OF THE
PROJECT WAS TO CONDUCT DECONTAMINATION EXPERIMENTS ON EXTERIOR SURFACES MADE RADIOACTIVE WITH
SMALL-PARTICLE SIMULANT, AND TO CONDUCT DECONTAMINATION STUDIES ON RAILROAD TRACKS,
TRANSPORTATION VEHICLES, AND MECHANICAL EQUIPMENT USED IN RADIOLOGICAL RECOVERY OPERATIONS.
TO ACCOMPLISH THESE OBJECTIVES, APPROXIMATELY 150 DECONTAMINATION TRIALS WERE CONDUCTED AT
CAMP MCCOY, WISCONSIN, DURING THE PERIODS JANUARY-JUNE 1964 AND FEBRUARY-MARCH 1965.

*CIVIL DEFENSE + *DECONTAMINATION + *PROCEDURES AND MANUALS + *TESTING + TEST, NONDESTRUCTIVE

12-10883 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2.
CONSOLIDATED EDISON COMPANY OF NEW YORK
1 PAGE OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 13 -- CONTROL-ROOM SHIELDING IS PROVIDED SO THAT A REFERENCE ACCIDENT
WOULD RESULT IN LESS THAN 1.5 REMS WHOLE BODY AND 3 REMS THYROID, EVEN IF WORKERS REMAIN
THERE INDEFINITELY.

*DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + *SHIELDING +
BUILDING + INDIAN POINT II + REACTOR, PRESSURIZED WATER

12-10888 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2.
CONSOLIDATED EDISON COMPANY OF NEW YORK
2 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 18 -- EITHER FOUR OF THE FIVE CONTAINMENT AIR COOLERS OR ONE OF THE TWO
SPRAY PUMPS IS ADEQUATE FOR HEAT REMOVAL FROM CONTAINMENT FOLLOWING A PIPING RUPTURE. ANY
TWO OF THE THREE DIESELS WILL SUPPLY THESE LOADS. AUTOMATIC BUS SWITCHING ARRANGEMENTS ALLOW
DIESEL B OR C TO SUPPLY CURRENT TO PUMP A IF DIESEL A FAILS.

*CONTAINMENT AIR COOLING + *CONTAINMENT SPRAY + *DESIGN CRITERIA + *LOSS OF COOLANT + *REGULATION, AEC +
*SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + EMERGENCY POWER, ELECTRIC + INDIAN POINT II +
PRESSURE, INTERNAL + REACTOR, PRESSURIZED WATER

12-10889 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2.
CONSOLIDATED EDISON COMPANY OF NEW YORK
1 PAGE OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2.,
MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 19 -- WITH THE DESIGN LEAK RATE AT 47 PSIG (0.1 PERCENT PER DAY) AND
FOUR FAN-FILTER UNITS OPERATING THE HYPOTHETICAL LOSS OF COOLANT (WITH NO SAFETY INJECTION)
OFFSITE DOSE WILL BE HALF THE 10-CFR-100 LIMITS. REFERENCE-VOLUME LEAK-RATE TEST IS USED
PLUS AIR MEASURED ON RETURN TO PRESSURE AFTER THE TEST. THICK-WALLED CONCRETE VESSEL WILL
MINIMIZE ATMOSPHERIC EFFECTS. TEST MUST BE MADE WITH PLANT SHUT DOWN.

*CONTAINMENT LEAKAGE + *DESIGN CRITERIA + *DOSE + *REGULATION, AEC +
*SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + LOSS OF COOLANT +
REACTOR, PRESSURIZED WATER + TEST, LEAK RATE

12-10890 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2.

CATEGORY 12
PLANT SAFETY FEATURES

12-10890 *CONTINUED*

CONSOLIDATED EDISON COMPANY OF NEW YORK

1 PAGE OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 20 -- CONTAINMENT PENETRATIONS ARE PRESSURIZED SLIGHTLY ABOVE
CONTAINMENT PRESSURE BY AIR BACKED WITH NITROGEN. EXCESSIVE LEAKAGE IS MONITORED BY
INTEGRATED AIR FLOW. EACH PENETRATION CAN BE TESTED SEPARATELY AT ANY TIME.

*CONTAINMENT PENETRATION + *DESIGN CRITERIA + *REGULATION, AEC +
*SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + CONTAINMENT LEAKAGE CONTROL + INDIAN POINT II +
REACTOR, PRESSURIZED WATER + TEST, LEAK RATE

12-10893 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2.
CONSOLIDATED EDISON COMPANY OF NEW YORK

4 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 23 -- LISTS VARIOUS TESTS OF ENGINEERED SAFEGUARDS THAT CAN BE PERFORMED
IN THE PLANT DURING ITS LIFE. FOR EXAMPLE, SAFETY INJECTION CAN INJECT WATER INTO REACTOR
DURING HEATUP OR COOLDOWN BY ENERGIZING SYSTEM AND OBSERVING PRESSURIZER WATER LEVEL. PUMPS
CAN BE TESTED BY USING MINIMUM FLOW RECIRCULATION LINE DURING OPERATION, AND CONTAINMENT AIR
COOLING AND FILTRATION UNITS BY ACTUATING VALVES AND BY AEROSOL INJECTION.

*ENGINEERED SAFEGUARD + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS +
*TEST, SYSTEM OPERABILITY + DESIGN CRITERIA + INDIAN POINT II + REACTOR, PRESSURIZED WATER

12-10894 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2
CONSOLIDATED EDISON COMPANY OF NEW YORK

1 PAGE OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 24 -- SPENT FUEL IS STORED IN A STAINLESS-STEEL-LINED CONCRETE PIT WITH
NO GRAVITY DRAINS. SPILLED LIQUID WASTE MOVES THROUGH FLOOR DRAINS TO A HOLDUP TANK.
CONTROLLED VENTILATION SWEEPS AIR FROM VARIOUS ROOMS TO THE PLANT VENTILATION SYSTEM.

*CONTAINMENT, GENERAL + *DESIGN CRITERIA + *REGULATION, AEC +
*SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + FUEL STORAGE + INDIAN POINT II +
REACTOR, PRESSURIZED WATER + WASTE HANDLING

12-10895 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2
CONSOLIDATED EDISON COMPANY OF NEW YORK

2 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 25 - FUEL STORAGE AND HANDLING -- REFUELING WATER IS BORATED. SPENT
ASSEMBLIES ARE STORED UNDERWATER WITH 12-IN. EDGE-TO-EDGE SPACING, SO THE RACK MULTIPLICATION
IS LESS THAN 0.9. WATER-FILLED CANALS, ETC., ARE LINED WITH STAINLESS STEEL.

*DESIGN CRITERIA + *FUEL HANDLING + *FUEL STORAGE + *REGULATION, AEC +
*SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + REACTOR, PRESSURIZED WATER

12-10896 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2.
CONSOLIDATED EDISON COMPANY OF NEW YORK

1 PAGE OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 26 - HOLDUP CAPACITY FOR RADIOACTIVE EFFLUENTS -- VARIOUS STORAGE AND
CLEANUP FACILITIES PROVIDED.

*DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + *WASTE STORAGE +
INDIAN POINT II + REACTOR, PRESSURIZED WATER

12-10897 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2
CONSOLIDATED EDISON COMPANY OF NEW YORK

1 PAGE OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 27 - MONITORING OF ACCIDENT-RELEASED RADIOACTIVITY -- VARIOUS SYSTEMS
PROVIDED TO INHIBIT CONTAINMENT-PENETRATION LEAKAGE AND TO MONITOR LOCATIONS AND SYSTEMS.

*DESIGN CRITERIA + *MONITOR, RADIATION, EMERGENCY + *REGULATION, AEC +
*SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + REACTOR, PRESSURIZED WATER

12-10966 COURTAULT J + DE KERDELLEAN J + MASTRE E
THE ULTRASONIC COPPER AND BRASS DECONTAMINATION STUDY
COMMISSARIAT A L ENERGIE ATOMIQUE, SACLAY, CENTRE D ETUDES NUCLEAIRES
CEA-R-2823 +. 20 PAGES, JULY, 1965, DEP/MN

CATEGORY 12
PLANT SAFETY FEATURES

12-10966 *CONTINUED*

THE OPTIMAL CONDITIONS FOR USING ULTRASONICS, AS A FUNCTION OF THE MATERIALS TO BE DECONTAMINATED, AND THE DEFINITION OF THE ULTRASONIC FACTORS AND THE CHEMICAL SOLUTIONS WHICH BRING ABOUT APPRECIABLE DECONTAMINATION WITHOUT CAUSING TOO MUCH CORROSION WERE FOUND. THIS REPORT GIVES THE RESULTS OF THIS STUDY, APPLIED TO COPPER AND BRASS. THE USE OF ULTRASONICS AS A DECONTAMINATION TECHNIQUE IS NOT AN ABSOLUTE SOLUTION, BUT THE STUDY ENABLED THE AUTHORS TO SELECT EFFECTIVE TREATMENT BATHS FOR TWO TYPES OF CONTAMINATION - PLUTONIUM AND FISSION PRODUCTS.

*COPPER + *DECONTAMINATION + *FISSION PRODUCT ACTIVITY, GROSS + *METAL + *PLUTONIUM

12-11012 BELLERMANN W + SCHWIERS HG
REACTOR PRESSURE VESSEL AND STRUCTURAL COMPONENTS
1 PAGE, ATOMWIRTSCHAFT, XI(5), PAGE 239 (MAY 1966), IN GERMAN

TWO PRINCIPAL MEASURES WERE TAKEN IN DESIGNING THE AVR PRESSURE VESSEL TO PROVIDE FOR THE LEVEL OF ACTIVITY PERMITTED IN THE PRIMARY LOOP - INTEGRAL CONSTRUCTION AND ENCLOSURE IN A SECOND PRESSURE VESSEL. SPECIAL PROBLEMS OCCURRED IN CONNECTION WITH PASSAGE THROUGH THE DOME AND COVER OF THE VESSEL, ESPECIALLY IN THE CASE OF THE FAN SUPPORTS, THE MOUNTING OF THE COVER, THE CONSTRUCTION OF THE PEDIMENT, AND THE SUPPORT OF THE VESSEL. AMONG THE COMPONENTS, THE RADIAL SUPPORTING FRAMEWORK AND THE CARBON AND GRAPHITE MEMBERS WERE OF PARTICULAR INTEREST.

*CONTAINMENT CONSTRUCTION + *CONTAINMENT, PRESSURE VESSEL + FLANGE + GERMANY + REACTOR, GAS COOLED

12-11056 MAKSIMOVIC ZB + NASSCOV PM + NIKOLIC RM + MARINKOVIC MD + JELIC LM
DECONTAMINATION OF THE HEAVY WATER SYSTEM OF THE RA REACTOR
ELECTROCHEMISTRY INSTITUTE, ACADEMY OF SCIENCES, USSR, MOSCOW
11 PAGES, 3 FIGURES, 5 TABLES, 6 REFERENCES, BULLETIN OF THE INSTITUTE OF NUCLEAR SCIENCES, BORIS KIDRIC, 16(4), PAGES 239-250 (MAY 1965)

THE HEAVY-WATER SYSTEM OF THE RA REACTOR WAS DECONTAMINATED OF CO-60. USED A MIXTURE OF 7 PERCENT PHOSPHORIC ACID AND 3 PERCENT CHROMIUM THIOXIDE. THE DECONTAMINATION FACTORS RANGED FROM 10 TO 100. FROM THE RESULTS, THE DISTRIBUTION OF CO-60 IN THE HEAVY WATER, AND ON STAINLESS AND ALUMINUM PARTS, WAS DETERMINED.

*ALUMINUM + *DECONTAMINATION + *STEEL, STAINLESS

12-11328 ULLMANN JW
ORNL FACILITIES CAPABLE OF CONTRIBUTING TO PLUTONIUM FUEL CYCLE DEVELOPMENT
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE
ORNL-TM-1268 +. 74 PAGES, FIGURES, NOVEMBER 1965, CFSTI \$3.00 CY, \$0.75 MN

THIS REPORT IS A COMPILATION OF BRIEF DESCRIPTIONS OF ORNL FACILITIES THAT COULD BE USED TO SUPPORT DEVELOPMENT OF A FUEL CYCLE BASED ON PLUTONIUM. THE CAPABILITY AND EXPERIENCE OF EACH FACILITY IS SUMMARIZED, WITH EMPHASIS PLACED ON HANDLING PLUTONIUM AND OTHER INTENSE ALPHA EMITTERS.

*ALPHA FACILITIES + *ORNL (OAK RIDGE NATIONAL LABORATORY) + *PLUTONIUM

12-11424 HORST KM
SOUTHWEST EXPERIMENTAL FAST OXIDE REACTOR DEVELOPMENT PROGRAM. THIRD QUARTERLY REPORT, OCTOBER 1964 - JANUARY 1965
GENERAL ELECTRIC, SAN JOSE
GEAP-4799 +. 150 PAGES, FEBRUARY 1965, CFSTI \$4.00 CY, \$1.00 MN

THIS REPORT IS ONE OF A SERIES OF SUCH REPORTS ON THE FOLLOWING SUBJECTS - PLANNING, EXPERIMENTAL PROGRAM IN ZPR-III, FUEL DEVELOPMENT, INSTRUMENTATION, CORE DYNAMICS, REACTIVITY CONTROL, FUEL HANDLING, AND CORE DESIGN

*RESEARCH CONTRACT + *SEFOR (SOUTHWEST EXP. FAST OXIDE REACTOR) + *ZPR III (ANL ZERO POWER REACTOR) + CRITICAL ASSEMBLY FACILITY + DOPPLER COEFFICIENT + FUEL ELEMENT + FUEL HANDLING + HEAT TRANSFER + INSTRUMENTATION, GENERAL + INSTRUMENTATION, TEMPERATURE + REACTOR, BREEDER + REACTOR, FAST + REACTOR, LIQUID METAL COOLED + TEST, PHYSICS

12-11444 ENGEL JR + HAUBENREICH PN + BALL SJ
ANALYSIS OF FILLING ACCIDENTS IN MSRE
OAK RIDGE NATIONAL LABORATORY
ORNL-TM-497 +. 41 PAGES, 14 FIGURES, 1 TABLE, AUGUST 16, 1966, CFSTI \$2.00 CY, \$0.50 MN

POSTULATED ACCIDENTS WERE ANALYZED TO HELP DESIGN FILLING-RATE VALVES AND GAS-CONTROL VALVES TO LIMIT SUCH EXCURSION. SEQUENTIAL FAILURE WOULD BE NEEDED TO CAUSE THE ACCIDENT, ALSO SELECTIVE SALT FREEZING TO CONCENTRATE THE FUEL.

*ACCIDENT, REFUELING + MSRE (MOLTEN SALT REACTOR EXPERIMENT) + REACTOR, CIRCULATING FUEL + REACTOR, MOLTEN SALT

CATEGORY 13
RADIOCHEMICAL PLANT SAFETY

13-C9657 LEFORT G
TRANSFER IN A HIGH ACTIVITY CHEMISTRY CELL
CENTRE D ETUDES NUCLEAIRE, FONTENAY-AUX-ROSES
12 PAGES- 1965- PP. 571-582 OF VOL. 2, PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN
HIGH ACTIVITY HOT LABORATORIES, GRENoble, JUNE 15-18, 1965- ENEA, OECD, PUBLISHERS

THE CYRANO-CELL WAS DESIGNED TO STUDY THE REPROCESSING OF VERY INTENSE, ALPHA-EMITTING, HIGHLY
IRRADIATED FUEL ELEMENTS. THE PAPER DESCRIBES THE TRANSFER AND MAINTENANCE PROCESSES CHOSEN,
NAMELY, (1) FIXED OR EXCHANGEABLE FLUID TUBING, (2) EJECTABLE AIR-TIGHT SLEEVES, (3)
AIR-TIGHT COMMUNICATION PROCEDURES BETWEEN TWO RIGID ALPHA-GAMMA CELLS, (4) TRANSFER OF HOT
SAMPLES TO THE ANALYTICAL CELL.

*FUEL HANDLING + *HOT CELL + *MAINTENANCE AND REPAIR + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY)

13-C9670 GANDOLFO JM
WORKING METHODS - EQUIPMENT IN USE AT THE 1000 CURIE - 1 MEV TRANSPLUTONIUM COMPLEX AT THE MEDIUM ACTIVITY
LABORATORY
EUROPEAN ATOMIC ENERGY COMMUNITY
14 PAGES, 1965, PP. 791-804 OF VOL. 2, PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN
HIGH ACTIVITY HOT LABORATORIES, GRENoble, JUNE 15-18, 1965, ENEA, OECD, PUBLISHERS

THIS PAPER DESCRIBES THE EQUIPMENT USED FOR THE CHEMICAL PROCESSING OF A SLUG CONTAINING 2.5 G
OF AM-241 IRRADIATED FOR FOUR YEARS IN THE MTR AT A MEAN FLUX OF 5 TIMES 10 TO THE 14. FOR
THIS PROCESSING, SPECIAL EQUIPMENT ADAPTABLE TO THE PRESENT FACILITIES HAD TO BE DESIGNED.

*BELGIUM + *GLOVE BOX + *HOT CELL + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + FUEL HANDLING +
TRANSURANIUM ELEMENT

13-10039 SECTION II - PHYSICS
11 PAGES, 1 FIGURE, 1 TABLE, 56 REFERENCES, FALL 1965, POWER REACTOR TECHNOLOGY 8(4), PAGES 210-220,
SECTION II

THE SUBSECTION ON CRITICAL AND EXPONENTIAL EXPERIMENTS WITH PLUTONIUM REVIEWS WORK ON POWER
AND TEMPERATURE COEFFICIENTS. INCLUDES U.S. AND FRENCH WORK WITH U-PU MIXTURES AND WITH PU
THAT CONTAINS PU-240 AND -241.

*CRITICALITY EXPERIMENT + *CRITICALITY SAFETY + *PLUTONIUM + FRANCE + POWER COEFFICIENT +
TEMPERATURE COEFFICIENT

13-10600 APPLICATION FOR LICENSES FPCE PLANT
ISOICHEM INC.
750 PAGES APPROX., 83 FIGURES, 71 TABLES, REFERENCES, JUNE 1966, DOCKET NO. 50-258, PDR

REPORT GIVES ALL THE GENERAL AND DETAILED TECHNICAL INFORMATION REQUIRED FOR AEC LICENSING OF
A RADIOCHEMICAL PLANT. INCLUDED ARE SECTIONS ON - SITE DESCRIPTION, PLANT DESCRIPTION,
PROCESS DESCRIPTION, EQUIPMENT DESCRIPTION, SYSTEMS ANALYSIS, PUBLIC PROTECTION, PERSONNEL
PROTECTION, SAFETY, PLANT ORGANIZATION, AND STARTUP PLANS.

*APPLICATION FOR AEC LICENSE + *CERIUM + *CESIUM + *FPCE PLANT + *PROMETHIUM + *RADIOCHEMICAL PROCESSING +
*SAFEGUARDS REPORT, GENERAL + *STRONTIUM + FISSION PRODUCT, SEPARATION FROM WASTE +
FISSION PRODUCT, USE OF IN WASTES + HAZARDS ANALYSIS + ISOICHEM, INC. + RADIOCHEMICAL PLANT SAFETY

13-10656 MALAKHOFF V + SIMON W
CRITICALITY OF FUEL REPROCESSING EQUIPMENT
GENERAL ATOMIC
GAMD-6623 +. 20 PAGES, AUGUST 17, 1965, CFSTI, \$1.00 CY, \$0.50 MN

A STUDY OF THE CRITICALITY OF FUEL-PARTICLE STORAGE CONTAINERS AND OF ARRAYS OF SUCH
CONTAINERS WAS CARRIED OUT. THE OBJECTIVE WAS TO COMPUTE THE MULTIPLICATION FACTOR AS A
FUNCTION OF LENGTH AND DIAMETER FOR CYLINDRICAL CONTAINERS AND TO COMPUTE MASS LIMITS FOR
VARIOUS KINDS OF FUEL PARTICLES THAT HAVE BEEN COATED WITH PYROLYTIC CARBON.

*CARBON + *CRITICALITY SAFETY + *PYROLYTIC + *URANIUM + COMPUTER, DIGITAL + THORIUM

13-10702 GOODE JH
HOT-CELL EVALUATION OF THE RELEASE OF TRITIUM AND KRYPTON-85 DURING PROCESSING OF THO2-UO2 FUELS
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TENNESSEE
ORNL-3956 +. 19 PAGES, 3 FIGURES, 4 TABLES, 11 REFERENCES, JUNE 1966, CFSTI, \$2.00 CY, \$0.50 MN

HOT-CELL EXPERIMENTS WITH PROTOTYPE THO2-UO2 POWER REACTOR FUEL SPECIMENS IRRADIATED TO 24,600
MWD/METRIC TON (TH + U) SHOWED THAT UP TO 0.2 PERCENT OF THE FISSION-PRODUCED TRITIUM AND 1
PERCENT OF THE KR-85 WERE RELEASED WHEN THE FUEL WAS SHEARED INTO SHORT LENGTHS. IN OUR
APPARATUS, ANOTHER 0.2 PERCENT OF THE TRITIUM AND THE BALANCE OF THE KRYPTON WERE RELEASED TO
THE ATMOSPHERE WHEN THE FUEL WAS DISSOLVED TO MAKE SOLVENT EXTRACTION FEED. THIS QUANTITY OF
TRITIUM IS LESS THAN 0.5 PERCENT OF THE ESTIMATED 1200 CURIES OF H-3 THAT MAY BE SAFELY
DISCHARGED TO THE ATMOSPHERE FROM A 6-TON-PER-DAY PROCESSING PLANT.

*RADIOCHEMICAL PLANT SAFETY + *WASTE DISPOSAL, ATMOSPHERIC + ATMOSPHERIC POLLUTION + KRYPTON +
RADIOCHEMICAL PROCESSING + THORIUM + TRITIUM + URANIUM DIOXIDE

CATEGORY 13
RADIOCHEMICAL PLANT SAFETY

13-10703 CLARK HK
CRITICAL AND SAFE MASSES AND DIMENSIONS OF LATTICES OF U AND UO₂ RODS IN WATER
SAVANNAH RIVER LABORATORY, AIKEN, SOUTH CAROLINA
DP-1014 + CONF-651103-29 +. 60 PAGES, 1 FIGURE, 8 TABLES, 11 REFERENCES, FEBRUARY 1966, CFSTI, \$3.00 CY, \$C.75 MN

A SURVEY IS GIVEN OF CRITICAL AND EXPONENTIAL DATA OBTAINED WITH WATER-REFLECTED LATTICES OF SLIGHTLY ENRICHED URANIUM AND URANIUM OXIDE RODS. CALCULATIONS ARE MADE FOR THESE LATTICES BY AN ASYMPTOTIC MULTIGROUP BUCKLING CODE AND BY A TWO-GROUP DIFFUSION THEORY CODE EMPLOYING PARAMETERS GENERATED IN THE FIRST CODE. COMPARISON BETWEEN CALCULATIONS AND EXPERIMENTS IS MADE IN TERMS OF A K-SUB-EFF, WHICH IS THE RATIO OF THE CALCULATED K TO THAT CALCULATED FROM THE EXPERIMENTAL DIMENSIONS AND FLUX TRAVERSES AND FROM THE CALCULATED MIGRATION AREAS AND EXTRAPOLATION DISTANCES. FOR SOME OF THE DATA, COMPARISONS ARE ALSO MADE BETWEEN THE PRESENT METHOD OF CALCULATION AND A MORE COMPLICATED METHOD.

*CRITICALITY SAFETY + *URANIUM + *URANIUM DIOXIDE + RADIOCHEMICAL PLANT SAFETY + SAVANNAH RIVER PLANT

13-10704 DREISSIGACKER H + FICHTNER H + REINARTZ W
CONSTRUCTION OF THE DISSOLVER FOR THE EUROCHEMIC REPROCESSING PLANT
1 PAGE, ATOMWIRTSCHAFT XI (4)- 170, APRIL 1966

PARTICULAR ATTENTION WAS PAID TO THE TECHNIQUES USED FOR WELDING THE SPECIAL ALLOY CS-M2 EMPLOYED FOR THE ACTIVE PARTS SINCE MICROCRACKS HAD OCCURRED IN TEST-WELDS MADE IN THIS MATERIAL. A SPECIAL WELDING PROCESS WAS DEVELOPED TO OBIATE THIS CRACKING. THE SAME CARE WAS DEVOTED TO THE MECHANICAL WORKING AND COLD FORMING AS TO THE WELDING. ALL TOOLS USED DURING THE TREATMENT OF THE SHEET METAL AND DURING ASSEMBLY WERE CASED WITH HIGH-GRADE STEEL. EXTREMELY SEVERE REQUIREMENTS WERE PLACED ON TOLERANCES FOR OPERATIONAL AND CRITICALITY REASONS.

*EUROCHEMIC + *RADIOCHEMICAL PLANT SAFETY + CRITICALITY SAFETY

13-10705 SMILEY SH + BRATER DC + PASHLEY JH
ORGDP FUEL REPROCESSING STUDIES - SUMMARY PROGRESS REPORT - JULY THROUGH DECEMBER, 1965
OAK RIDGE GASEOUS DIFFUSION PLANT, OAK RIDGE, TENNESSEE
K-1669 +. 56 PAGES, 9 FIGURES, 11 TABLES, JUNE 28, 1966, CFSTI, \$6.00 CY, \$0.50 MN

AMONG OTHER FLUORIDE VOLATILITY STUDIES, THE REPORT CONTAINS CRITICALITY CALCULATIONS FOR 2NAF-UF₆ MATERIALS (6 PERCENT URANIUM-235) REQUIRED FOR DESIGN OF MODERATED SODIUM FLUORIDE FLUID-BED SORBERS.

*CRITICALITY SAFETY + *URANIUM HEXAFLUORIDE + EQUIPMENT DESIGN + RADIOCHEMICAL PROCESSING

13-10806 REPORT OF INVESTIGATION OF THE AMERICIUM SHIPPING CONTAINER EXPLOSION IN BUILDING 71 ON SEPTEMBER 25, 1964
THE DOW CHEMICAL COMPANY, DENVER, COLORADO
15 PAGES, 12 FIGURES, OCTOBER 20, 1964, SOURCE

ON SEPTEMBER 25, 1964, A SHIPPING CONTAINER AT DOW CHEMICAL COMPANY, ROCKY FLATS SITE, CONTAINING 5 G OF AMERICIUM AQUEOUS CHLORIDE SOLUTION, EXPLODED. INVESTIGATION INDICATED THAT THERE WAS INSUFFICIENT DATA TO DETERMINE WHETHER THE SHIPPING CONTAINER FAILED DUE TO CHEMICAL EXPLOSION OR SLOW PRESSURE BUILDUP. EITHER IS POSSIBLE BECAUSE OF RADIOLYTIC DECOMPOSITION OF THE SOLUTION. THE MAIN RECOMMENDATION FOR FUTURE RADIOACTIVE SHIPMENTS IS TO AVOID SENDING THE MATERIAL IN SOLUTION FORM WHEN POSSIBLE.

*AMERICIUM + *EXPLOSION + *STORAGE CONTAINER

13-10809 WATSON HE
THE NRL HIGH LEVEL RADIATION LABORATORY. PART III. OPERATING EXPERIENCE
U. S. NAVAL RESEARCH LABORATORY
11 PAGES, 11 FIGURES, 1 REFERENCE, NUCLEAR ENGINEERING AND DESIGN, 4 (1) PAGES 97-107, (1966)

REPORT CONTAINS A GENERAL DESCRIPTION OF ALL PHASES OF THE OPERATIONAL, SAFETY, AND AUXILIARY SYSTEMS OF A HIGH-LEVEL RADIATION LABORATORY.

*HOT CELL + DECONTAMINATION + VENTILATION SYSTEM + WASTE DISPOSAL, LIQUID

13-10810 FRANK WS
TECHNICAL CRITERIA FOR THE PREVENTION OF CRITICALITY CHEMICAL PROCESSING DEPARTMENT
HANFORD ATOMIC PRODUCTS OPERATION
HW-81460 +. 8 PAGES, APRIL 8, 1964, CFSTI, \$1.00

THIS DOCUMENT SUPPLEMENTS THE OPG INFORMATION BY DEFINING THE TECHNICAL CRITERIA TO BE USED IN DEVELOPING THE LIMITS WITHIN WHICH CPD FACILITIES ARE TO BE DESIGNED AND OPERATED AT HANFORD.

*CRITICALITY SAFETY + *HANFORD SITE + RADIOCHEMICAL PROCESSING

13-10842 NEWLON CE + MALLETT AJ
HYDROGEN MODERATION - A PRIMARY NUCLEAR SAFETY CONTROL FOR HANDLING AND TRANSPORTING LOW-ENRICHMENT UF₆

CATEGORY 13
RADIOCHEMICAL PLANT SAFETY

13-10842 *CONTINUED*
OAK RIDGE GASEOUS DIFFUSION PLANT
K-1663 +. 20 PAGES, MAY 31, 1966, CFSTI, \$1.00 CY, \$0.50 MN

THE USE OF HYDROGEN MODERATION AS A PRIMARY NUCLEAR SAFETY CONTROL HAS BEEN IN EFFECT FOR MANY YEARS FOR LARGE-SCALE UF₆ SHIPMENTS AMONG AEC-OWNED CONTRACTOR OPERATED FACILITIES. THE EXTENSION OF THE USE OF MODERATION-CONTROLLED SHIPMENTS TO LICENSEES AS WELL AS CONTRACTOR ORGANIZATIONS IS DESIRABLE, AND THIS REPORT SUMMARIZES, IN SUPPORT OF THIS METHOD, THE WORK DONE IN DEVELOPING BASIC CRITICALITY DATA AND THE NECESSARY EQUIPMENT AND OPERATIONAL TECHNIQUES.

*TRANSPORTATION AND HANDLING + *URANIUM HEXAFLUORIDE + CONTROL, GENERAL + HYDROGEN + SAFETY REVIEW (OPERATIONS, EXPERIMENTS)

13-10981 REED PE
CRITICALITY SAFETY OF FISSILE MATERIALS IN THE CHEMICAL PROCESSING DIVISION
ISOICHEM INC., RICHLAND, WASHINGTON
ISO-270 +. 12 PAGES, APRIL 1, 1966, CFSTI, \$1.00 CY, \$0.50 MN

THESE PROCEDURES PROVIDE A UNIFORM BASIS FOR APPLYING CRITICALITY SAFETY CONTROLS WITH RESPECT TO THE SHIPPING AND RECEIVING OF FISSILE MATERIALS. THE TRANSFER OF FISSILE MATERIALS BETWEEN CHEMICAL PROCESSING DIVISION FACILITIES SHALL BE ACCORDING TO NUCLEAR SAFETY SPECIFICATIONS AS REQUIRED UNDER CPD OPG 11.9.

*CRITICALITY SAFETY

13-11133 HENSLEY G
NUCLEAR FUEL REPROCESSING - INSTRUMENTATION SAFETY CONSIDERATIONS
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, WARRINGTON
5 PAGES, 3 FIGURES, 3 REFERENCES, CHEMICAL AND PROCESS ENGINEERING, 47(3), PAGES 113-117, (MARCH, 1966)

SOLVENT-EXTRACTION-PLANT INSTRUMENTATION IN BRITISH PRODUCTION PLANTS IS COVERED FROM THE SAFETY AND PROCESS-CONTROL ASPECTS. SPECIFIC SUBJECTS DISCUSSED ARE - CRITICAL-INCIDENT PROTECTION, CRITICAL-INCIDENT DETECTION, AIRBORNE RADIOACTIVE CONTAMINATION, CONTAMINATED LIQUID EFFLUENTS, AND FIRE AND EXPLOSION. INSTRUMENT PERFORMANCE IS EVALUATED.

*INSTRUMENTATION, GENERAL + *RADIOCHEMICAL PLANT SAFETY + INSTRUMENTATION, NUCLEAR + INSTRUMENTATION, PROCESS + INSTRUMENTATION, PROTECTIVE + INSTRUMENTATION, TESTING + RADIOCHEMICAL PROCESSING + UNITED KINGDOM

13-11221 JAPAN RETURNING IRRADIATED FUEL ELEMENTS TO U.S. FOR REPROCESSING - FIRST TO BE SHIPPED FROM ASIA
ATOMIC ENERGY COMMISSION, WASHINGTON, D.C.
PRESS REL. J-194 +. 1 PAGE, AUGUST 15, 1966, DPI

THE FIRST CONSIGNMENT OF IRRADIATED NUCLEAR FUEL FROM ASIA TO BE REPROCESSED IN THE UNITED STATES WILL ARRIVE FROM JAPAN AT SEATTLE, WASHINGTON, ON AUGUST 16, 1966. TWENTY-FOUR IRRADIATED FUEL ELEMENTS, CONTAINED IN TWO 11-TON CASKS, WILL BE REMOVED FROM THE NIKKEI-MARU OF THE JAPANESE SHOWA LINE AND SHIPPED DIRECTLY BY TRUCK TO THE AEC IDAHO CHEMICAL PROCESSING PLANT AT THE NATIONAL REACTOR TESTING STATION IN IDAHO. SEATTLE IS AMONG THE 44 U.S. PORTS THAT HAVE NOTIFIED THE U.S. COAST GUARD THAT THEIR PORT AND COMMUNITY FACILITIES ARE AVAILABLE FOR THE ACCEPTANCE AND TRANSIT OF SHIPMENTS OF RADIOACTIVE MATERIALS, PROVIDED THAT THERE IS COMPLIANCE WITH THE REGULATIONS OF THE U.S. AGENCIES EXERCISING JURISDICTION OVER THE ENTRY AND MOVEMENT OF SUCH MATERIALS INTO AND WITHIN THE COUNTRY.

*FUEL HANDLING + JAPAN + SHIPPING CONTAINER + TRANSPORTATION AND HANDLING

13-11328 ULLMANN JW
ORNL FACILITIES CAPABLE OF CONTRIBUTING TO PLUTONIUM FUEL CYCLE DEVELOPMENT
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE
ORNL-TM-1268 +. 74 PAGES, FIGURES, NOVEMBER 1965, CFSTI \$3.00 CY, \$0.75 MN

THIS REPORT IS A COMPILATION OF BRIEF DESCRIPTIONS OF ORNL FACILITIES THAT COULD BE USED TO SUPPORT DEVELOPMENT OF A FUEL CYCLE BASED ON PLUTONIUM. THE CAPABILITY AND EXPERIENCE OF EACH FACILITY IS SUMMARIZED, WITH EMPHASIS PLACED ON HANDLING PLUTONIUM AND OTHER INTENSE ALPHA EMITTERS.

*ALPHA FACILITIES + *ORNL (OAK RIDGE NATIONAL LABORATORY) + *PLUTONIUM

13-11329 REPORT ON STATUS OF COMPLETION OF CONSTRUCTION AND RESEARCH AND DEVELOPMENT ASPECTS - RESULTS OF PRE-OPERATIONAL TESTING OF FACILITY, APRIL 1, 1966
NUCLEAR FUEL SERVICES, INC.
75 PAGES, APRIL 1, 1966, SUBMISSION NO. 27 FINAL SAFETY ANALYSIS REPORT, DOCKET NO. 50-201, PUR

THIS REPORT ON THE PREOPERATIONAL TESTING OF EQUIPMENT AND SYSTEMS OF THE NUCLEAR FUEL SERVICES, INC., FACILITY AS REQUESTED BY AEC-DML IS COMBINED WITH THE SEMI-ANNUAL REPORT TO DML ON THE STATUS OF COMPLETION OF CONSTRUCTION AND RESEARCH AND DEVELOPMENT ASPECTS FOR THE PERIOD ENDING APRIL 1, 1966. IT COVERS IN SOME DETAIL THE SPECIFIC TESTS, MECHANICAL, HYDRAULIC, PNEUMATIC, ELECTRICAL, CHEMICAL, AND ENVIRONMENTAL, PERFORMED BY NFS IN PLANT AREAS AND ENVIRONS IN PREPARATION FOR COMMERCIAL OPERATION.

CATEGORY 13
RADIOCHEMICAL PLANT SAFETY

13-11329 *CONTINUED*

*LICENSING STATUS OF NUCLEAR PROJECTS + *NFS (NUCLEAR FUEL SERVICES) + *RADIOCHEMICAL PROCESSING +
*TEST, PREOPERATIONAL + SOLVENT EXTRACTION PROCESS + WASTE MANAGEMENT

13-11330 PROVISIONAL OPERATING LICENSE - LICENSE CSF-1
NUCLEAR FUEL SERVICES INC.

83 PAGES, APRIL 27, 1966, DOCKET NO. 50-201, PDR

APPENDIX A OF TECHNICAL SPECIFICATIONS LICENSE CSF-1 FOR THE PLANT CONTAINS INFORMATION ON -
(1) PLANT SITE, LOCATION AND FLOW OF MATERIALS, (2) POSSESSION LIMITS AND FORM OF MATERIALS,
(3) SAFETY LIMITS FOR RADIOACTIVE MATERIALS, (4) MINIMUM OPERATING REQUIREMENTS, (5)
SURVEILLANCE REQUIREMENTS, (6) ADMINISTRATIVE REQUIREMENTS. SPECIFICATIONS COVER IN DETAIL
THE HANDLING AND STORAGE OF LIQUID, GASEOUS, AND SOLID RADIOACTIVE MATERIALS.

*LICENSING STATUS OF NUCLEAR PROJECTS + *NFS (NUCLEAR FUEL SERVICES) + *RADIOCHEMICAL PROCESSING +
CRITICALITY SAFETY + FUEL HANDLING + FUEL STORAGE + RADIOCHEMICAL PLANT SAFETY +
SOLVENT EXTRACTION PROCESS + WASTE DISPOSAL, ATMOSPHERIC + WASTE MANAGEMENT + WASTE TREATMENT, GENERAL

13-11704 MANNESCHMIDT JF

RECENT ADVANCES IN MONITORING OF RADIOACTIVE GASEOUS WASTES AT ORNL

OAK RIDGE NATIONAL LABORATORY, OAK RIDGE

CONF-66C904 +. 27 PAGES, 17 FIGURES, 6 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON,
MASS., SEPTEMBER 13-16, 1966, SOURCE

MANY ACTIVITIES AT THE OAK RIDGE NATIONAL LABORATORY ARE CONCERNED WITH THE CHEMICAL
PROCESSING OF RADIOACTIVE MATERIALS. GASEOUS EFFLUENTS FROM THESE OPERATIONS ARE TREATED TO
REMOVE DANGEROUS CONTAMINANTS BEFORE RELEASE TO THE ATMOSPHERE. ROUTINE MONITORING OF SUCH
EMISSIONS WAS STARTED IN 1966 WHEN MANUALLY OPERATED PARTICULATE MONITORS WERE INSTALLED AT
EACH OF THREE PROCESS STACKS. SINCE THAT DATE, COVERAGE HAS BEEN EXTENDED TO SIX STACKS, THE
SAMPLE WITHDRAWAL SYSTEM HAS BEEN REBUILT, AND THE DETECTION EQUIPMENT HAS BEEN ADDED TO AND
MODERNIZED. THE INTENSIVE MONITORING HAS LEAD TO PROCESS IMPROVEMENTS THAT HAVE REDUCED THE
ENVIRONMENTAL RELEASES OF RADIOACTIVITY IN THE GASEOUS WASTE EFFLUENTS BY A FACTOR OF 3 SINCE
1962.

*MONITOR, RADIATION, EMERGENCY + *MONITOR, RADIATION, GAS + *MONITOR, RADIATION, GENERAL PRACTICE +
*MONITOR, RADIATION, SAMPLING + *MONITOR, RADIATION, STACK + MONITOR, RADIATION, AIR +
MONITOR, RADIATION, BACKGROUND + MONITOR, RADIATION, ENVIRONMENTAL + MONITOR, RADIATION, GENERAL

CATEGORY 14
RADIONUCLIDE RELEASE AND MOVEMENT IN THE ENVIRONMENT

14-C8712 GOODE JH
FIXATION OF INTERMEDIATE LEVEL RADIOACTIVE WASTE IN ASPHALT- HOT-CELL TESTS
OAK RIDGE NATIONAL LABORATORY
ORNL-TM-1343 +. 20 PAGES, FIGURES, TABLES, 4 REFERENCES- NOVEMBER 18, 1965, CFSTI, \$1.00 CY, \$0.50 MN

HOT-CELL TESTS ON THE FIXATION OF INTERMEDIATE-RADIOACTIVITY-LEVEL WASTE (5 CURIES/GAL) IN EMULSIFIED ASPHALT CONFIRMED EARLIER SUCCESSFUL NONRADIOACTIVE AND TRACER TESTS OF THE PROCESS. LEACHING, WITH STATIC DEMINERALIZED WATER, REACHED AN APPARENT STEADY-STATE RATE OF ABOUT 2 TIMES 10 TO THE MINUS 4 G PER SQUARE CM PER DAY, WHICH IS ADEQUATE FOR PERMANENT DISPOSAL BY BURIAL IN STEEL DRUMS. RADIOLYTIC-GALS GENERATION FOR FIVE MONTHS, DURING WHICH TIME THE ASPHALT RECEIVED AN INTERNAL DOSE OF ABOUT 1.2 TIMES 10 TO THE 7 RAD, WAS NOT MEASURABLE. THE SUCCESS OF THESE TESTS SUGGESTS THAT THE PROCESS SHOULD BE EXTENDED TO INCLUDE EXPERIMENTS WITH MORE RADIOACTIVE WASTES, INCLUDING TYPES DIFFERENT FROM THE ONE USED HERE.

*WASTE TREATMENT, FIXATION + *WASTE TREATMENT, LIQUID + CESIUM + GROSS BETA + GROSS GAMMA + RADIATION EFFECT + RARE EARTH + RUTHENIUM + STRONTIUM + WASTE TREATMENT, EQUIPMENT

14-C9274 TRIULZI C
TREND OF GROSS BETA RADIOACTIVITY IN PLANKTON SAMPLES COLLECTED IN THE ADRIATIC AND LIGURIAN-TYRRHENIAN SEAS DURING 1961-1964
ISTITUTO LOMBARDO, MILAN + CISE, MILAN
TID-22112 +. 17 PAGES, MEETING HELD ON JUNE 24, 1965- CFSTI, \$1.00 CY, \$0.50 MN

GROSS BETA RADIOACTIVITY WAS MEASURED ON PLANKTON ASH SAMPLES COLLECTED IN THE LIGURIAN-TYRRHENIAN SEA AND UPPER ADRIATIC DURING 1961-1964. THE TREND OF GROSS BETA RADIOACTIVITY DURING THIS PERIOD IS CORRELATED WITH RAINFALL AND RADIOACTIVE FALLOUT IN THE SAME ZONE. VALUES OF GROSS BETA ARE REPORTED, WHICH HAS BEEN MEASURED 15 AND 200 DAYS AFTER THE TOW. RATIO BETWEEN THESE VALUES SUPPLIES A USEFUL INDICATION OF THE DATE OF NUCLEAR EXPLOSIONS RESPONSIBLE FOR SAMPLE CONTAMINATION.

*BIOLOGICAL CONCENTRATION, ALGAE + *BIOLOGICAL CONCENTRATION, AQUATIC ORGANISMS + *SURVEY, RADIATION, ENVIRONMENTAL + FALLOUT + GROSS BETA + OCEAN AND SEA + RAINOUT + SURFACE WATER, NUCLIDE OCCURRENCE

14-C9483 INVESTIGATION OF THE ION ADSORPTION CHARACTERISTICS OF SOILS
INTERNATIONAL ATOMIC ENERGY AGENCY, VIFNNA, AUSTRIA + STATE AGRICULTURAL UNIVERSITY WAGENINGEN, NETHERLANDS
NP-15085 +. 81 PAGES, DECEMBER 1964, DEP. MN.

THIS REPORT COMPRISES A SUMMARY OF INVESTIGATIONS DEALING WITH SEVERAL ASPECTS OF ION-ADSORPTION PHENOMENA OCCURRING IN SOILS AND CLAYS, WITH SPECIAL EMPHASIS ON THE USE OF RADIOACTIVE TRACERS.

*ADSORPTION + *TRACER, RADIOACTIVE + CALCIUM + POTASSIUM + SOIL, NUCLIDE OCCURRENCE + SOIL, PROPERTY

14-U9485 SMITH DB + PARSONS TV + CLOET RL
AN INVESTIGATION USING RADIOACTIVE TRACERS INTO THE SILT MOVEMENT IN AN EBB CHANNEL, FIRTH OF FORTH, 1965
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, WANTAGE, ENGLAND
AERE-R-5080 +. 15 PAGES, 7 FIGURES, NOVEMBER 1965, BIS, \$0.80

INVESTIGATIONS OF THE SILT MOVEMENT FROM THE OXCARS SPOIL GROUND, USING RADIOACTIVE TRACERS (AERE - R 4980), SHOWED THAT THE SPOIL GROUND IS UNSATISFACTORY DUE TO EXTENSIVE UPSTREAM TRANSPORT OF SPOIL. AN INVESTIGATION OF AN ALTERNATIVE SPOIL GROUND IN AN EBB CHANNEL NEAR OXCARS WAS UNDERTAKEN, USING GROUND-GLASS TRACER LABELLED WITH LA-140. THE RESULTS SHOW THAT THE SPOIL WOULD BE WIDELY DISTRIBUTED DOWNSTREAM OF THE DEPOSITION AREA WITHOUT APPROACHING EXISTING HARBORS ON THE ESTUARY. UPSTREAM MOVEMENT OF SPOIL WAS VERY LIMITED DURING THE THREE-DAY INVESTIGATION.

*LANTHANUM + *SEDIMENT + *SURFACE WATER, SEDIMENT + *SURFACE WATER, TRACER + *TRACER, RADIOACTIVE + SURFACE WATER, DISPOSAL MEDIA + UNITED KINGDOM

14-C9486 LANDSTROM O + WENNER CG
NEUTRON-ACTIVATION ANALYSIS OF NATURAL WATER APPLIED TO HYDROGEOLOGY
AKTIEBOLAGET ATOMENERGI, STOCKHOLM, SWEDEN
AE-204 +. 28 PAGES, DECEMBER 1965, DEP. MN.

THE NATURAL CONTENT OF ELEMENTS IN WATER WAS USED TO CHARACTERIZE DIFFERENT GROUNDWATER SUPPLIES AND REVEAL THE PRESENCE OF GROUNDWATER STREAMS. A NEUTRON-ACTIVATION METHOD INCLUDING CHEMICAL-GROUP SEPARATION TECHNIQUES HAS BEEN USED FOR THE DETERMINATION OF TRACE ELEMENTS. ANALYZED WATER SAMPLES FROM THREE DIFFERENT PLACES IN NORTHERN SWEDEN ILLUSTRATE THE APPLICATION TO COMMON AND IMPORTANT HYDROGEOLOGICAL PROBLEMS, SUCH AS THE QUALITY AND CAPACITY OF WATER SUPPLIES, THE ORIGIN AND EXISTENCE OF GROUNDWATER STREAMS, AND GROUNDWATER EXCHANGE WITH RIVERS.

*ACTIVATION PRODUCT + *GEOLOGICAL CONSIDERATION, GEOCHEMICAL + *HYDROLOGICAL CONSIDERATION, GENERAL + ACTIVATION + GEOLOGICAL CONSIDERATION, GENERAL + SWEDEN

14-C9603 THOMPSON RC
SNPO AND SNAP BIOLOGICAL STUDIES. SUMMARY TECHNICAL REPORT
BATTELLE NORTHWEST, PACIFIC NORTHWEST LABORATORY, RICHLAND

CATEGORY 14
RADIONUCLIDE RELEASE AND MOVEMENT IN THE ENVIRONMENT

14-09603 *CONTINUED*

BNWL-182 +. 19 PAGES, 3 TABLES, JANUARY 3, 1966, CFSTI \$1.00, \$0.50 MN

A SHARP DISTINCTION CANNOT BE MADE BETWEEN THOSE PHASES OF OUR INVESTIGATIONS WHICH WERE PRIMARILY CONCERNED WITH SNPO (SPACE NUCLEAR PROPULSION OFFICE) PROBLEMS AND THOSE PHASES CONCERNED WITH SNAP (SYSTEMS FOR NUCLEAR AUXILIARY POWER) PROBLEMS BECAUSE THE OBJECTIVES WERE VERY SIMILAR. THEREFORE, WE ARE NOT SEPARATING THIS REPORT INTO SNPO AND SNAP SECTIONS. HOWEVER, IF SUCH DISTINCTION IS NECESSARY, THE PU-238 FEEDING STUDY IS PRIMARILY RELATED TO SNAP, AND THE STUDIES WITH THE OAK RIDGE-PREPARED SIMULATED FUEL PARTICLES ARE PRIMARILY RELATED TO SNPO. THE LARGE-PARTICLE INHALATION STUDIES AND THE SOLUBILITY STUDIES CLEARLY HAVE APPLICATION TO BOTH SNPO AND SNAP PROBLEMS. EXPERIMENTAL WORK CONSISTED OF SEVERAL SEPARATE INVESTIGATIONS. IN MANY INSTANCES, THESE INVESTIGATIONS ARE STILL CONTINUING, AND FINAL CONCLUSIONS CANNOT BE DRAWN.

*AEROSPACE SAFETY + *BIOMEDICAL + *PARTICLE, RADIOACTIVE +
*SNAP, GENERAL (SYSTEMS FOR NUCLEAR AUX. POWER) + EXPERIMENT, GENERAL + INGESTION + INHALATION + PLUTONIUM

14-C9663 TROTT AF

CONTAMINATION CONTROL AND WASTE DISPOSAL IN THE HIGH LEVEL ISOTOPE OPERATIONS AT ATOMIC ENERGY OF CANADA LIMITED COMMERCIAL PRODUCTS

ATOMIC ENERGY OF CANADA LIMITED

9 PAGES, 7 FIGURES, 5 REFERENCES- 1965- PP. 668-677 OF THE PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM ON WORKING METHODS IN HIGH ACTIVITY HOT LABORATORIES, GRENOBLE, JUNE 15-18, 1965, VOL. 2- ENEA, OECD, PUBLISHERS

TEN YEARS OF EXPERIENCE IN HANDLING MULTIKILOCURIE QUANTITIES OF CO-60 AND OTHER ISOTOPES IN A PLANT NEAR THE CENTRE OF THE CITY OF OTTAWA AND REMOTE FROM RADIOACTIVE-WASTE-DISPOSAL FACILITIES IS REVIEWED. CONTAMINATION CONTROL, INCLUDING VENTILATION DESIGN, CONTINUOUS EFFLUENT-AIR MONITORING AND FILTRATION, CONTINUOUS EFFLUENT-WATER MONITORING, IN-CELL MONITORING AND CONTAMINATION CONTROL, LIQUID AND DRY WASTE PROCESSING AND REMOVAL FROM HOT CELLS, AND CONTAMINATION CONTROL, LIQUID AND DRY WASTE PROCESSING AND REMOVAL FROM HOT CELLS, AND THE REMOVAL, PACKAGING, AND TRANSPORTATION OF WASTE FROM THE PLANT SITE TO BURIAL ARE DESCRIBED.

*CANADA + *CONTAMINATION + *WASTE DISPOSAL, GENERAL + EFFLUENT + ENEA (EUROPEAN NUCLEAR ENERGY AGENCY) + FILTRATION + MONITOR, RADIATION, AIR + TRANSPORTATION AND HANDLING + VENTILATION SYSTEM

14-C9528 UPSON UL

FIXATION OF HIGH-LEVEL RADIOACTIVE WASTES IN PHOSPHATE GLASS--HOT CELL GLASS EXPERIMENT BATTTELLE-NORTHWEST

BNWL-200 + CONF-660208-9 +. 65 PAGES, 28 FIGURES, 12 REFERENCES, 12 TABLES- JANUARY 1966, CFSTI, \$3.00 CY, \$0.75 MN, FROM SYMPOSIUM AND LONG-TERM STORAGE OF HIGHLY RADIOACTIVE WASTES, RICHLAND, WASH.

PHOSPHATE GLASS WAS PRODUCED FROM ACTUAL, HIGHLY RADIOACTIVE FUEL-REPROCESSING WASTE, DEMONSTRATING THE TECHNICAL FEASIBILITY PROCESS, AN AQUEOUS WASTE IS CONVERTED DIRECTLY TO A PHOSPHATE GLASS, WITH NO INTERMEDIATE DRYING OR CALCINATION STEP. THE CONVERSION TO GLASS YIELDS A WASTE-PRODUCT VOLUME OF ABOUT 5 GAL PER TON OF URANIUM PROCESSED, A 15- TO 20-FOLD REDUCTION FROM THAT OF CURRENTLY STORED LIQUID PUREX WASTES. IN THIS DEMONSTRATION, AGED PUREX 1WW WASTE, DEFICIENT IN CE-144 AND ZR-NB-95 WAS 400 CURIES OF GAMMA ACTIVITY PER LITER AND PRODUCING ABOUT 2W OF THERMAL POWER PER LITER.

*WASTE TREATMENT, FIXATION + WASTE MANAGEMENT + WASTE STORAGE + WASTE TREATMENT, EQUIPMENT

14-10074 CARNAHAN CL

A PROCEDURE FOR THE CALCULATION OF NEUTRON ACTIVATION OF AN INFINITE HOMOGENEOUS MEDIUM HAZELTON-NUCLEAR SCIENCE CORPORATION, PALO ALTO, CALIFORNIA

HNS-1229-54 +. 67 PAGES, REFERENCES, SEPTEMBER 15, 1964, CFSTI, \$3.00

A METHOD FOR CALCULATING QUANTITIES OF RADIONUCLIDES INDUCED IN INFINITE, HOMOGENEOUS MEDIA BY NEUTRONS FROM UNDERGROUND NUCLEAR DETONATIONS IS DEVELOPED THEORETICALLY, AND A PROCEDURE FOR PRACTICAL APPLICATION OF THE THEORY IS PRESENTED. RESULTS OF CALCULATIONS ARE GIVEN FOR RADIONUCLIDES, HAVING HALF LIVES GREATER THAN 0.5 YEARS, INDUCED BY NEUTRONS FROM FUSION REACTIONS AND FROM FISSION REACTIONS IN MEDIA HAVING THE COMPOSITIONS OF THE AVERAGE EARTHS CRUST, AVERAGE CARBONATE ROCKS, AND THE TATUM SALT DOME, HATTIESBURG, MISSISSIPPI. SEPARATE CALCULATIONS ARE MADE FOR FUSION NEUTRONS AND FOR FISSION NEUTRONS BECAUSE OF THE GREAT DIFFERENCES IN THE INITIAL NEUTRON ENERGY DISTRIBUTIONS AND IN THE TOTAL NUMBERS OF NEUTRONS PRODUCED PER UNIT ENERGY YIELD, BY THE TWO PROCESSES. A SAMPLE CALCULATION IS INCLUDED.

*ACTIVATION + *ACTIVATION PRODUCT + *GROUND WATER, NUCLIDE OCCURRENCE + *PLOWSHARE PROGRAM + CRITICAL NUCLIDE + GEOLOGICAL CONSIDERATION, GENERAL + NUCLEAR DETONATION

14-10077 GUSTAFSON PF + KASTNER J + LUETZELSCHWAB J

ENVIRONMENTAL RADIATION. MEASUREMENTS OF DOSE RATES ARGONNE NATIONAL LABORATORY

4 PAGES, 2 TABLES, 2 FIGURES, 16 REFERENCES, SCIENCE, 145(3627), PAGES 44-47 (JULY 3, 1964)

THE EXPOSURE DOSE FROM ENVIRONMENTAL SOURCES OF RADIATION WAS DETERMINED BY AN IONIZATION CHAMBER, BY GAMMA-RAY SPECTROMETRY IN THE FIELD, AND BY MEASURING RADIOACTIVITY IN SOIL CORES. THE EXPOSURE DOSE FROM COSMIC RADIATION WAS FOUND TO BE 4.4 PLUS OR MINUS 0.2 MICROROENTGENS/HR, THAT FROM NATURAL RADIOACTIVITY 8.0 PLUS OR MINUS 0.3, AND THE CONTRIBUTION FROM FISSION PRODUCTS VARIED FROM 2.0 TO 7.5 DURING THE INTERVAL IN QUESTION.

CATEGORY 14
RADIONUCLIDE RELEASE AND MOVEMENT IN THE ENVIRONMENT

14-10077 *CONTINUED*

*DOSE CALCULATION, EXTERNAL + *DOSE MEASUREMENT, EXTERNAL + *MONITOR, RADIATION, ENVIRONMENTAL + CESIUM + COBALT + FALLOUT + GROSS ALPHA + MONITOR, RADIATION, BACKGROUND + POTASSIUM + RADON + SOIL, NUCLIDE OCCURRENCE + TEST, WEAPONS (HP ASPECTS) + THORIUM + THORON + URANIUM

14-10080 BECK HL + CONDON WJ + LOWDER WM

SPECTROMETRIC TECHNIQUES FOR MEASURING ENVIRONMENTAL GAMMA RADIATION
NEW YORK OPERATIONS OFFICE

HASL-150 +. 71 PAGES, 22 FIGURES, 6 TABLES, 34 REFERENCES, OCTOBER 1964, CFSTI, \$3.00 CY

PULSE-HEIGHT SPECTRA OBTAINED IN THE FIELD BY USING A LARGE NAI(Tl) CRYSTAL CAN BE ANALYZED BY RELATIVELY SIMPLE METHODS TO DETERMINE ACCURATELY TOTAL ENVIRONMENTAL GAMMA-RAY DOSE RATES, AS WELL AS THE INDIVIDUAL DOSE RATE CONTRIBUTIONS FROM K-40, THE U238 SERIES, THE TH232 SERIES, AND THE PRINCIPAL GAMMA-RAY EMITTING FISSION PRODUCTS. THE CALIBRATION OF A 5 BY 3-IN. DETECTOR IS DESCRIBED IN DETAIL, AND THE APPLICABILITY AND LIMITATIONS OF THE SPECTRAL-ANALYSIS ARE EXAMINED. SEVERAL PROBLEMS ASSOCIATED WITH FIELD MEASUREMENTS ARE DISCUSSED, IN PARTICULAR THE EFFECTS OF RADON MIGRATION FROM THE SOIL, SOIL MOISTURE, AND NATURAL FALLOUT. EVIDENCE IS DOSIMETRIC AND RELATED INFORMATION OBTAINED FROM FIELD SPECTRA ANALYZED BY THESE METHODS.

*CRITICAL NUCLIDE + *FALLOUT + *GAMMA EMITTER + *INSTRUMENTATION CALIBRATION + *SOIL + CESIUM + DIFFUSION + HYDROLOGICAL CONSIDERATION, GENERAL + MONITOR, RADIATION, ENVIRONMENTAL + NIOBIUM + POPULATION EXPOSURE + POTASSIUM + RADON + SOIL, RADIONUCLIDE MOVEMENT THROUGH + THORIUM + URANIUM + ZIRCONIUM

14-10085 INGOLD WC + PUDDLESTON CM

AN EMPIRICAL FORMULA FOR CALCULATING GAMMA-RAY DOSE ATTENUATION IN CONCRETE DUCTS
NAVAL CIVIL ENGINEERING LAB., PORT HUENEME, CALIFORNIA

AC-609049 +. 72 PAGES, NOVEMBER 25, 1964, CFSTI, \$2.00

A SURVEY IS PRESENTED OF THE STATUS OF THE CALCULATION OF GAMMA DOSE-RATE ATTENUATION IN AIR DUCTS THROUGH CONCRETE. A SIMPLE EMPIRICAL FORMULA IS EXHIBITED THAT SHOWS SATISFACTORY AGREEMENT WITH THE RESULTS OF MORE COMPLICATED COMPUTATIONAL TECHNIQUES AND WITH EXPERIMENTAL RESULTS. THIS SIMPLE FORMULA, WHICH MAY BE USED FOR HAND COMPUTATION, REPRESENTS A SAVING IN COMPUTATION TIME 2 SECONDS PER CASE COMPARED TO 400 SECONDS BY IBM-1620.

*COMPARISON, THEORY AND EXPERIENCE + *DOSE CALCULATION, EXTERNAL + CONCRETE + FALLOUT + SHIELDING

14-11091 ELLMER M

SITE SELECTION

2 PAGES, ATOMWIRTSCHAFT, 10(11), PAGES 567-568 (NOVEMBER 1965), IN GERMAN

FOR THE POWER PLANT RWE-BAYERNWERK (KRB), THE MOST FAVORABLE SITE ORIGINALLY SEEMED TO BE ONE NEAR BERTOLDSHEIM. HOWEVER, THE WATER AUTHORITIES REJECTED IT FOR TECHNICAL AND EMOTIONAL-POLITICAL REASONS, ALTHOUGH ATTEMPTS WERE MADE TO DEMONSTRATE THAT DRINKING WATER AND NUCLEAR POWER ARE NOT MUTUALLY EXCLUSIVE. THE ATOMIC PLANT WILL BE BUILT IN GUNDEMMINGEN. A METEOROLOGICAL TOWER 118 M HIGH WILL BE ERECTED. A SMALLER DESIGN OF THE PLANT WAS REQUIRED. WE STUDIED THE COOLING-WATER REMOVAL AND RECYCLE TO FIND THE OPTIMUM COMPROMISE BETWEEN WATER ECONOMY AND ENERGY ECONOMY.

*GERMANY + METEOROLOGY + WATER POLLUTION + WATER, DRINKING

14-11124 JEANMAIRE L + PATTI F + DABURON ML + GROS R + BERTRAND S

TESTS ON THE MEASUREMENT OF I-131 IN MILK USING ANIONIC ION EXCHANGERS

COMMISSARIAT A L ENERGIE ATOMIQUE, FONTENAY-AUX-ROSES, FRANCE

CEA-R-2897 +. 11 PAGES, 4 FIGURES, 1 TABLE, JANUARY 1966, DEP.MN, IN FRENCH

THE MILK PRODUCED BY A COW CONTAMINATED BY A SINGLE INGESTION WAS PASSED OVER A DOWEX-1 RESIN TO FIX THE IODINE IT CONTAINED. THE PERCENTAGE FIXED, ORIGINALLY AROUND 100 PERCENT, FALLS TO 50 PERCENT AFTER 15 DAYS.

*ANALYTICAL TECHNIQUE, MILK + *IODINE + BIOLOGICAL CONCENTRATION, MILK + INGESTION + ION EXCHANGE

14-11130 BURT AK + GIBSON JA

A METHOD FOR CONTINUOUS MEASUREMENT OF TRITIATED WATER IN AIR

ATOMIC ENERGY RESEARCH ESTABLISHMENT, HARWELL

JOURNAL OF NUCLEAR ENERGY 20 (3), PAGES 185-190, 6 FIGURES, 7 REFERENCES, 1966

AN INSTRUMENT HAS BEEN DEVELOPED FOR THE CONTINUOUS MEASUREMENT OF TRITIUM (AS HTO) IN AIR IN THE VICINITY OF A HEAVY-WATER REACTOR. WATER IS CONDENSED CONTINUOUSLY FROM THE AIR AT THE RATE OF 10G/HR, AND THE TRITIUM ACTIVITY IS MEASURED IN A FLOW CELL FILLED WITH ANTHRACENE CRYSTALS. THE METHOD WAS DEVELOPED TO IMPROVE THE SENSITIVITY OF DETECTION FROM 2.5 PC/CU.CM FOR AN ION CHAMBER SYSTEM TO ENABLE THE CHRONIC LEVEL OF 0.4 PC/CU.CM (0.08 MPC FOR AIR) TO BE CONTINUOUSLY MEASURED. THE RANGE OF THE INSTRUMENT, USING A LOGARITHMIC RATEMETER, IS FROM THE BACKGROUND SENSITIVITY OF 0.1 TO 1000 PC/CU.CM (250 MPC). THE INSTRUMENT CAN BE OPERATED IN A HIGH GAMMA-RAY BACKGROUND AND DOES NOT DETECT RADIOACTIVE GASES SUCH AS AR-41. CONTAMINATION OF THE CELL IS RAPIDLY REMOVED FOLLOWING A LARGE RELEASE OF TRITIUM ACTIVITY.

*INSTRUMENTATION, AIR SAMPLING + *MONITOR, RADIATION, AIR + *TRITIUM + DECONTAMINATION + REACTOR, HEAVY WATER

ACCESSION NUMBER 14-10077 TO 14-11130

CATEGORY 14
RADIONUCLIDE RELEASE AND MOVEMENT IN THE ENVIRONMENT

14-11131 BROECKER WS + ROCCO GG + VOLCHOK HL
STRONTIUM-90 FALLOUT - COMPARISON OF RATES OVER OCEAN AND LAND
COLUMBIA UNIVERSITY + TRACERLAB, INC., WALTHAM, MASS. + HEALTH AND SAFETY LABORATORY, N.Y.
2 PAGES, 2 FIGURES, 7 REFERENCES, SCIENCE (152), PAGES 640-641 (APRIL 29, 1966)

MEASUREMENTS OF SR-90 IN WATERS RESIDING ON THE BAHAMA BANKS FOR PERIODS BETWEEN 12 AND 180 DAYS SUGGEST THAT FALLOUT RATES ONTO THESE WATERS ARE SUBSTANTIALLY THE SAME AS THE AVERAGE RATES AT ALL FALLOUT COLLECTION STATIONS BETWEEN 20 AND 30 DEGREES LATITUDE. IF THE AMOUNT OF PRECIPITATION ON THE BAHAMA BANKS IS REASONABLY REPRESENTATIVE OF THE OCEANIC AREAS IN THIS LATITUDE BAND, OUR RESULTS SUPPORT THE CONCLUSION THAT THE AMOUNT OF SR-90 DEPOSITED PER UNIT AREA OF OCEAN SURFACE IS WITHIN A FACTOR OF 2 OF THAT ON LAND.

*FALLOUT + *STRONTIUM + OCEAN AND SEA + SURFACE WATER, NUCLIDE OCCURRENCE

14-11132 OWEN WL + KAWAHARA FK + WILTSHIRE LL
RADIOLOGICAL RECLAMATION PERFORMANCE SUMMARY. VOLUME 1. PERFORMANCE TEST DATA COMPILATION
NAVAL RADIOLOGICAL DEFENSE LABORATORY, SAN FRANCISCO, CALIFORNIA
USNRDL-TR-967 +. 124 PAGES, 36 TABLES, 4 FIGURES, 25 REFERENCES, OCTOBER 13, 1965, CFSTI, \$4.00 FS, \$0.75 MN

THIS VOLUME PRESENTS TABULATED DATA SUMMARIZING THE PERFORMANCE OF LAND-RECLAMATION METHODS AND EQUIPMENT. THE TABLED ENTRIES WERE GATHERED FROM 18 EXPERIMENTS AND FIELD OPERATIONS. THEY INCLUDE THOSE OPERATIONAL AND ENVIRONMENTAL FACTORS KNOWN TO INFLUENCE RECLAMATION EFFECTIVENESS. A SECOND VOLUME WILL BE DEVOTED TO THE EVALUATION AND REORGANIZATION OF THE ABOVE COMPILATION INTO A FORM COMPATIBLE WITH THE PLANNING OF RADIOLOGICAL RECOVERY OPERATIONS.

*CIVIL DEFENSE + *DECONTAMINATION + *FALLOUT + DEPOSITION + PARTICLE SIZE + RADIATION SAFETY AND CONTROL + TCPOGRAPHY

14-11252 HENDERSON RW + LARSON OW + FULTYN RV
RADIATION MEASUREMENTS OF THE EFFLUENT FROM THE PHOEBUS 1A-321 REACTOR
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS
LA-3396-MS +. 62 PAGES, 22 FIGURES, 9 TABLES, 2 REFERENCES, FEBRUARY 1966, CFSTI \$3.00 CY, \$0.75 MN

PRESENTED ARE THE RESULTS OF DOCUMENTATION STUDIES ON THE EFFLUENT FROM THE FULL-POWER TEST OF THE PHOEBUS 1A-321 REACTOR. A DESCRIPTION OF PROCEDURES AND EQUIPMENT IS GIVEN. AN ANALYSIS OF THE ENVIRONMENTAL EFFECTS DUE TO THE PASSAGE AND DEPOSITION OF THE RELEASED MATERIAL IS GIVEN, AS WELL AS DEPOSITION VELOCITIES MEASURED AT VARIOUS LOCATIONS. APPENDIX A GIVES THE RESULTS OF THE STUDY OF SELECTED RESIN-COATED TRAYS BY THE LASL INDUSTRIAL HYGIENE GROUP (H-5).

*AEROSPACE SAFETY + *EFFLUENT + *TEST, PROOF + LOSS OF COOLANT + SAMPLING

14-11309 LESS LN + SWALLOW JS
ESTIMATING THE HAZARD DUE TO RADIOLYTIC PRODUCTS FROM AIR
IMPERIAL COLLEGE, LONDON + CHRISTIE HOSPITAL AND HOLT RADIUM INSTITUTE, MANCHESTER
5 PAGES, NUCLEONICS 22 (9), PAGES 58-65, SEPTEMBER 1964

THE PRINCIPAL PRODUCT OF THE IRRADIATION OF AIR IS OZONE. SINCE IT IS TOXIC IT MAY LIMIT THE OPERATION OF LARGE ISOTOPE SERVICES OR HIGH-INTENSITY ACCELERATORS. ESTIMATES OF OZONE PRODUCTIONS AND VENTILATION REQUIREMENTS ARE MADE.

*CHEMICAL TOXICITY + *OZONE + RADIATION EFFECT

14-11312 DEBORTOLI M + GAGLIONE P + MALVICINI A
ENVIRONMENTAL RADIO-ACTIVITY, ISPRA 1965
EUROPEAN ATOMIC ENERGY COMMUNITY (EURATOM), ISPRA, ITALY
EUR-2965E +. 72 PAGES, 1966, DEP. MN

THIS REPORT SUMMARIZES THE RESULTS OF THE MEASUREMENTS OF ENVIRONMENTAL RADIOACTIVITY PERFORMED BY THE SITE-SURVEY GROUP OF THE PROTECTION SERVICE OF THE EURATOM ISPRA ESTABLISHMENT. THE RESULTS INDICATE THAT THE ENVIRONMENTAL RADIATION EXPOSURE FOR THOSE LIVING IN THE NEIGHBOURHOOD OF THE ESTABLISHMENT WAS DUE, ALMOST EXCLUSIVELY, TO NATURAL SOURCES AND WORLD-WIDE FALLOUT.

*BIOLOGICAL CONCENTRATION, AQUATIC ORGANISMS + *BIOLOGICAL CONCENTRATION, FOOD +
*BIOLOGICAL CONCENTRATION, MILK + *BIOLOGICAL CONCENTRATION, VEGETATION + CESIUM + EURATOM + FALLOUT + ITALY + MONITOR, RADIATION, ENVIRONMENTAL + RAINOUT + SOIL, NUCLIDE OCCURRENCE + STRONTIUM + SURVEY, RADIATION, ENVIRONMENTAL + WASTE DISPOSAL, ATMOSPHERIC + WASTE DISPOSAL, LIQUID

14-11313 DOLPHIN GW + DUNCAN KP + DUNSTER HJ + JACKSON S
MAXIMUM PERMISSIBLE CONCENTRATIONS IN AIR FOR COMPOUNDS OF PU-239
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, HARWELL
AHSBIRPIR-69 +. 13 PAGES, APRIL 1966, BIS, \$0.50

THE DERIVATION OF THE VALUES FOR THE MPS (AIR) AS GIVEN IN ICRP PUB 2 (1959) FOR SOLUBLE AND INSOLUBLE PLUTONIUM IS BRIEFLY REVIEWED FOR THE CASES OF BONE, LIVER, AND LUNGS AS ORGANS OF REFERENCE. IN THE MODEL USED IN ICRP PUB 2 FOR CALCULATING THE MPC FOR INSOLUBLE RADIOACTIVE DUSTS IN THE LUNG IT IS ASSUMED THAT 12-1/2 PERCENT OF THE INHALED RADIOACTIVITY IS

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14-11313 *CONTINUED*

TRANSFERRED TO THE BODY FLUIDS. THIS TRANSFER COULD LEAD TO A BUILDUP OF RADIOACTIVITY IN A BODY ORGAN OTHER THAN THE LUNG. HOWEVER, RECENT DATA FROM DOG EXPERIMENTS AND HUMAN AUTOPSIES SHOW THAT THIS IS NOT THE CASE AND THAT THE LUNG IS THE CRITICAL ORGAN FOLLOWING INHALATION OF PLUTONIUM OXIDE. INHALED NITRATE IS FAIRLY READILY TRANSFERRED TO THE LIVER AND BONE. CONSEQUENTLY, THE MORE RESTRICTIVE MPC (AIR) FOR SOLUBLE PLUTONIUM, MUST BE USED WHEN THIS COMPOUND IS INVOLVED. A LIST OF PLUTONIUM COMPOUNDS IS GIVEN AND DIVIDED INTO THOSE COMPOUNDS BEHAVING LIKE PLUTONIUM NITRATE AND THOSE BEHAVING LIKE PLUTONIUM OXIDE IN THE HUMAN BODY.

*MAXIMUM PERMISSIBLE CONCENTRATION (MPC) + *PLUTONIUM + AIR + DOSE CALCULATION, INTERNAL + INHALATION

14-11214 WASTE BURNING AT CHALK RIVER
2 PAGES, 3 FIGURES, NUCLEAR ENGINEERING 10(115), 472-473, DECEMBER 1965

OPERATING EXPERIENCE AT THE LOW-ACTIVITY WASTE INCINERATOR IS DESCRIBED. THE INCINERATOR AND MONITORING EQUIPMENT ARE DESCRIBED, AND OPERATING DATA ARE GIVEN, ALONG WITH THE COSTS.

*CANADA + *CHALK RIVER + *INCINERATION + WASTE TREATMENT, ECONOMICS + WASTE TREATMENT, SOLID

14-11317 SCHULTZ NB
REMOVAL OF LOW-LEVEL RADIOACTIVE WASTES BY A SANITARY WATER TREATMENT PROCESS
UNION CARBIDE CORPORATION, OAK RIDGE, OAK RIDGE GASEOUS DIFFUSION PLANT
K-1651 +. 13 PAGES, 3 FIGURES, 4 TABLES, 8 REFERENCES, APRIL 12, 1966, CFSTI \$1.00 CY, \$0.50 MN

OUR PRESENT KNOWLEDGE INDICATES THAT CONVENTIONAL POTABLE-WATER-TREATMENT PROCESSES ARE RELATIVELY INEFFICIENT FOR REMOVAL OF RADIOELEMENTS FROM THE LOW-LEVEL WASTES WHICH CAN BE EXPECTED TO BE FOUND IN CONCENTRATIONS (MPC) IN RAW WATER SUPPLIES. THUS, STRICT CONTROL OF WASTE DISCHARGE CONCENTRATIONS MUST BE MAINTAINED TO INSURE THE PURITY OF FUTURE WATER SUPPLIES. ASSUMING THAT THESE RECOMMENDED DISCHARGE LEVELS ARE MAINTAINED, IT IS UNLIKELY THAT ADDITIONAL, SPECIFIC TREATMENT WILL BE NEEDED. RATHER, OUR PRIMARY JOB WILL BE THAT OF CONTINUING EFFECTIVE MONITORING OF THE WATER SUPPLY TO REASSURE OURSELVES THAT POLLUTION-CONTROL MEASURES ARE IN FACT ADEQUATE. ON THE OTHER HAND, UNDER EMERGENCY CONDITIONS, IT IS ANTICIPATED THAT SIGNIFICANT REDUCTION CAN BE MADE IN THE LEVELS OF THESE RADIOACTIVE CONSTITUENTS BY SOME OF THE PRESENT METHODS.

*WASTE TREATMENT, LIQUID + *WATER TREATMENT + GROSS BETA + MAXIMUM PERMISSIBLE CONCENTRATION (MPC) + RADIOCHEMICAL ANALYSIS + STRONTIUM + WATER, DRINKING

14-1132C TAPPAN JT + MOORE WE
PROJECT DRIBBLE-SALMON EVENT ON-SITE HEALTH AND SAFETY REPORT
REYNOLDS ELECTRICAL AND ENGINEERING CO., INC.
VUF-1025 +. 49 PAGES, 11 FIGURES, 10 TABLES, NOVEMBER 1965, CFSTI \$2.00 CY, \$0.50 MN

THE SALMON EVENT WAS DETONATED AT PROJECT DRIBBLE TEST SITE, TATUM SALT DOME, NEAR HATTIESBURG, MISSISSIPPI, ON 22 OCTOBER 1964. RADIATION MEASUREMENTS WERE RECORDED DURING AND AFTER THE DETONATION BY A REMOTE-AREA MONITORING SYSTEM. AFTER THE DETONATION, RADIATION MONITORS EQUIPPED WITH PORTABLE RADIATION-DETECTION INSTRUMENTS SURVEYED THE ROUTE INTO SURFACE GROUND ZERO BEFORE OTHER PLANNED REENTRIES WERE MADE. CONTINUOUS MONITORING WAS PROVIDED WHILE WORKERS WERE IN THE AREA. ONLY BACKGROUND RADIATION MEASUREMENTS WERE OBSERVED FROM ZERO TIME UNTIL COMMUNICATION WITH THE CAVITY HAD BEEN ESTABLISHED DURING POSTSHOT DRILLING OPERATIONS AT A DEPTH GREATER THAN 2600 FT. FIFTY-TWO INDIVIDUALS RECEIVED RADIATION DOSES IN EXCESS OF 100 MILLIREMS DURING THE PROGRAM. THE MAXIMUM ACCUMULATED INDIVIDUAL DOSE WAS 1065 (WELL BELOW THE DOSE LIMITS LISTED IN THE AEC MANUAL, CHAPTER 0524, OF 3 REMS PER QUARTER AND 5 REMS PER YEAR).

*RADIATION PROTECTION, ORGANIZATION + *SURVEY, RADIATION, ENVIRONMENTAL +
*VELA UNIFORM PROGRAM, PROJECT SHOAL + AIR + CHEMICAL TOXICITY + DOSE MEASUREMENT, EXTERNAL + GROSS BETA +
IODINE + PERSONNEL EXPOSURE, RADIATION + WASTE DISPOSAL, LIQUID + WASTE DISPOSAL, SOLID + WATER, GENERAL

14-11350 MARBLE G + BERNIER M + BERTET M + GAUDE G
DOSAGE OF SODIUM AND POTASSIUM IN BIOLOGICAL MEDIA BY NEUTRON ACTIVATION WITHOUT CHEMICAL SEPARATION
CENTRE ETUDES NUCLEAIRE FONTENAY-AUX-ROSES, FRANCE
CEA-R-2837 +. 26 PAGES, 11 FIGURES, 4 TABLES, JULY 1965, DEP. MN, IN FRENCH

A RELATIVELY SIMPLE METHOD FOR DOSING SODIUM AND POTASSIUM IN BIOLOGICAL MEDIA WAS DEVELOPED. NO CHEMICAL SEPARATION IS REQUIRED. THE MEASUREMENT OF THE GAMMA AND BETA ACTIVITIES INDUCED BY ACTIVATION IS CARRIED OUT USING SCINTILLATION DETECTORS CONNECTED TO A MULTICHANNEL AMPLITUDE SELECTOR AND A COUNTING UNIT. THE RESULTS ARE EXCELLENT FOR SODIUM, AND SATISFACTORY FOR POTASSIUM IN BIOLOGICAL EXPERIMENTS.

*ACTIVATION + *TRACER, RADIOACTIVE + BIOLOGICAL CONCENTRATION, GENERAL + POTASSIUM + SODIUM

14-11351 FERRON-TROUSSEAU F
CAESIUM ABSORPTION BY BARLEY - INFLUENCE OF ITS RETENTION BY THE SOIL - COMPETITIVE ACTION OF POTASSIUM
CENTRE ETUDES NUCLEAIRE FONTENAY-AUX-ROSES, FRANCE
CEA-R-2708 +. 60 PAGES, FIGURES, 8 TABLES, MAY 1965, DEP. MN, IN FRENCH

THE ABSORPTION OF CAESIUM BY BARLEY AND THE MINERAL EXCHANGE OF CAESIUM BY THE SOIL WERE STUDIED AS A FUNCTION OF POTASSIUM CONCENTRATION. THE SOIL HAS A PRONOUNCED EFFECT ON THE UPTAKE OF

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14-11351 *CONTINUED*

CESIUM BY BARLEY. FOR EXAMPLE, THE PRONOUNCED SELECTIVITY OF ILLITE FOR CESIUM REDUCES ITS UPTAKE BY BARLEY.

*BIOLOGICAL CONCENTRATION, VEGETATION + *CESIUM + *MINERAL EXCHANGE + BIOLOGICAL CONCENTRATION, FOOD + POTASSIUM

14-11352 LEISTNER L

RESEARCH INTO THE RADIOACTIVE CONTAMINATION OF FOODSTUFFS OF ANIMAL ORIGIN
CENTRE DETUDES NUCLEAIRE FONTENAY-AUX-ROSES, FRANCE
CEA-R-2738 + EUR-2226.F +. 69 PAGES, TABLES, MARCH 1965, DEP. MN, IN FRENCH

THE AUTHOR ASSEMBLES IN A VERY COMPLETE WAY ALL THE AVAILABLE DATA RELATING TO THE TRANSFER OF THE MOST IMPORTANT RADIONUCLIDES FROM THE ENVIRONMENT THROUGH ANIMAL PRODUCTS TO MAN. AS THESE DATA ARE NOT DIRECTLY UTILIZABLE BY THE COUNTRIES OF THE EUROPEAN COMMUNITY, HE PROPOSES TO GO FURTHER INTO THE QUESTION TO BE ABLE TO TAKE INTO ACCOUNT THE CHANGING ECOLOGICAL CONDITIONS.

*BIOLOGICAL CONCENTRATION, ANIMAL + *BIOLOGICAL CONCENTRATION, ANIMAL FEED + *ECOLOGICAL CONSIDERATION + BARIUM + BIOLOGICAL CONCENTRATION, AGRICULTURAL PRODUCE + BIOLOGICAL CONCENTRATION, AQUATIC ORGANISMS + BIOLOGICAL CONCENTRATION, FOOD + BIOLOGICAL CONCENTRATION, MILK + BIOLOGICAL CONCENTRATION, VEGETATION + CALCIUM + CESIUM + IODINE + STRONTIUM

14-11506 COBBIN WC + OWEN WL

DEVELOPMENT AND TEST OF A SOD-REMOVAL PROCEDURE FOR MOIST LAWNS CONTAMINATED BY SIMULATED FALLOUT
U.S. NAVAL RADIOLOGICAL DEFENSE LABORATORY, SAN FRANCISCO
USNRDL-TR-965 + AD-631529 +. 67 PAGES, FIGURES, TABLES, 7 REFERENCES, APRIL 11, 1966, DDC

A SOD-CUTTING MACHINE WAS EVALUATED FOR ITS USEFULNESS IN THE RADIOLOGICAL RECLAMATION OF SMALL LAWN AREAS. FALLOUT WAS APPROXIMATED BY CONTAMINATING LAWN TEST AREAS WITH RADIO-TRACED SAND. NOMINAL PARTICLE SIZE RANGES OF 44-88, 88-177, 177-350, AND 350-700 MICRONS WERE USED. THE SAND WAS DISPERSED AT NOMINAL CONCENTRATIONS OF 25, 50 AND 100 G/SQ. FT. RESPECTIVELY. RECLAMATION EFFECTIVENESS OF SOD CUTTING WAS DEPENDENT UPON MACHINE FACTORS (BLADE DEPTH), SOIL CHARACTERISTICS (MOISTURE CONTENT) AND MASS LOADING. THE LEAST EFFECTIVE RESULTS WERE OBTAINED IN CONFINED LAWNS WITH HIGH MOISTURE CONTENT AND HEAVY ROCK CONCENTRATIONS. THE BEST SOD-CUTTING AND REMOVAL EFFECTIVENESS RESULTS WERE OBTAINED ON MORE ACCESSIBLE LAWNS HAVING LESS MOISTURE CONTENT AND ONLY A LIGHT CONCENTRATION OF ROCKS. PARTICLE SIZE WAS FOUND TO HAVE LITTLE, IF ANY, WITH RESPECT TO EFFORT REQUIRED OR REMOVAL EFFECTIVENESS ACHIEVED.

*RECOVERY PROCESS + CONTAMINATION + FALLOUT + PARTICLE SIZE + PARTICLE SIZE DISTRIBUTION + TRACER, RADIOACTIVE

14-11702 LACHAPPELLE DG

AN ENGINEERING EVALUATION OF A RADIOACTIVE-WASTE INCINERATOR
U. S. ARMY NUCLEAR DEFENSE LABORATORY, EDGEWOOD ARSENAL, MARYLAND
CONF-660904 +. 67 PAGES, 32 FIGURES, TABLES, 4 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

A 50-LB/HR INCINERATOR AND ASSOCIATED GAS-CLEANING EQUIPMENT FOR THE CONCENTRATION OF LOW-LEVEL RADIOACTIVE WASTE WERE EVALUATED BY USE OF NONRADIOACTIVE MATERIAL, AND OPTIMUM OPERATING CONDITIONS FOR THE INCINERATOR AND THE GAS CLEANING EQUIPMENT RESULTED. THESE CONDITIONS WERE USED DURING THE RADIOLOGICAL EVALUATION. TESTS WITH SAWDUST CHARGES CONTAINING UP TO 200 MICROCURIES PER KG OF CHARGE WERE SUCCESSFULLY INCINERATED. ACTIVITY CONCENTRATION OF THE SR-89 DISCHARGED TO ATMOSPHERE WAS ALWAYS BELOW MPC LIMITS. TESTS ARE PRESENTLY BEING CONDUCTED IN WHICH ANIMALS INJECTED INTRAVENOUSLY WITH SR-89 ARE BEING INCINERATED TO DETERMINE IF THIS TYPE CHARGE CAN BE SAFELY HANDLED BY THE FACILITY. THE MAXIMUM AMOUNT OF SR INJECTED CORRESPONDS TO 200 MICROCURIES PER KG OF BODY WEIGHT.

*INCINERATION + *STRONTIUM + *WASTE DISPOSAL, GENERAL + *WASTE TREATMENT, EQUIPMENT + *WASTE TREATMENT, SOLID + AIR CLEANING + FISSION PRODUCT TRANSPORT + WASTE DISPOSAL, SOLID + WASTE HANDLING

14-11703 FIRST MW + ZILLES P + WALKLEY J

DISPOSAL OF LOW LEVEL RADIOACTIVE WASTE IN COMMERCIAL INCINERATORS
HARVARD UNIVERSITY
CONF-660904 +. 12 PAGES, 5 FIGURES, 7 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

THE HARVARD BOILER-INCINERATOR, HANDLING PACKAGED WASTES IN MECHANICAL SYSTEMS, IS A SANITARY WAY OF HANDLING AND BURNING ESPECIALLY TROUBLESOME LABORATORY WASTES EFFICIENTLY AND FAST. THE CYCLONE PRECOLLECTOR IS SUPERFLUOUS WITH GAS OR OIL FUELS AND CAN BE ELIMINATED WITHOUT DECREASING OVERALL COLLECTION EFFICIENCY BY THE ELECTROSTATIC PRECIPITATOR THAT FOLLOWS IT. THE REASONS FOR THE POOR EFFICIENCY OF THE ELECTROSTATIC PRECIPITATOR IN THIS TYPE OF SERVICE REQUIRE ADDITIONAL STUDY.

*INCINERATION + *WASTE DISPOSAL, GENERAL + *WASTE TREATMENT, EQUIPMENT + *WASTE TREATMENT, SOLID + AIR CLEANING + WASTE DISPOSAL, SOLID + WASTE HANDLING

14-11704 MANNESCHMIDT JF

CATEGORY 14
RADIONUCLIDE RELEASE AND MOVEMENT IN THE ENVIRONMENT

14-11704 *CONTINUED*

RECENT ADVANCES IN MONITORING OF RADIOACTIVE GASEOUS WASTES AT ORNL
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE

CONF-660904 +. 27 PAGES, 17 FIGURES, 6 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON,
MASS., SEPTEMBER 13-16, 1966, SOURCE

MANY ACTIVITIES AT THE OAK RIDGE NATIONAL LABORATORY ARE CONCERNED WITH THE CHEMICAL PROCESSING OF RADIOACTIVE MATERIALS. GASEOUS EFFLUENTS FROM THESE OPERATIONS ARE TREATED TO REMOVE DANGEROUS CONTAMINANTS BEFORE RELEASE TO THE ATMOSPHERE. ROUTINE MONITORING OF SUCH EMISSIONS WAS STARTED IN 1966 WHEN MANUALLY OPERATED PARTICULATE MONITORS WERE INSTALLED AT EACH OF THREE PROCESS STACKS. SINCE THAT DATE, COVERAGE HAS BEEN EXTENDED TO SIX STACKS, THE SAMPLE WITHDRAWAL SYSTEM HAS BEEN REBUILT, AND THE DETECTION EQUIPMENT HAS BEEN ADDED TO AND MODERNIZED. THE INTENSIVE MONITORING HAS LEAD TO PROCESS IMPROVEMENTS THAT HAVE REDUCED THE ENVIRONMENTAL RELEASES OF RADIOACTIVITY IN THE GASEOUS WASTE EFFLUENTS BY A FACTOR OF 3 SINCE 1962.

*MONITOR, RADIATION, EMERGENCY + *MONITOR, RADIATION, GAS + *MONITOR, RADIATION, GENERAL PRACTICE +
*MONITOR, RADIATION, SAMPLING + *MONITOR, RADIATION, STACK + MONITOR, RADIATION, AIR +
MONITOR, RADIATION, BACKGROUND + MONITOR, RADIATION, ENVIRONMENTAL + MONITOR, RADIATION, GENERAL

CATEGORY 15
ENVIRONMENTAL SURVEYS, MONITORING AND RADIATION EXPOSURE OF MAN

15-08713 PERRY DR + SHAW KB
RADIATION LEVELS IN AND AROUND NIMROD
RUTHERFORD HIGH ENERGY LABORATORY, CHILTON, DIDCOT BERKS
RPP/R-1 +. 12 PAGES, FIGURES, TABLES, 4 REFERENCES- NOVEMBER 11, 1965

HEALTH PHYSICS INSTRUMENTATION AND TECHNIQUES USED AROUND THE 7 GEV PROTON SYNCHROTRON NIMROD ARE REPORTED. MEASUREMENTS ARE GIVEN OF THE STRAY RADIATION FIELD DURING OPERATIONAL PERIODS AND OF INDUCED ACTIVITY IN THE ACCELERATOR. A REVIEW IS MADE OF PERSONNEL DOSE RECORDS DURING 1964.

*DOSE MEASUREMENT, EXTERNAL + *PERSONNEL EXPOSURE, RADIATION + ACTIVATION PRODUCT + INSTRUMENTATION, RADIATION MONITORING

15-08719 MORGAN KZ
PRESENT STATUS OF RECOMMENDATIONS OF THE INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION, NATIONAL COUNCIL ON RADIATION PROTECTION AND FEDERAL RADIATION COUNCIL
OAK RIDGE NATIONAL LABORATORY
32 PAGES, TABLES, 35 REFERENCES, JUNE 14, 1965, PUBLISHED IN PROGRESS IN NUCLEAR ENERGY SERIES XII, VOL. 2, PERGAMON PRESS, LONDON

THE HISTORICAL BACKGROUNDS OF THE INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION (ICRP), THE NATIONAL COUNCIL ON RADIATION PROTECTION (NCRP) AND THE FEDERAL RADIATION COUNCIL (FRC) ARE DISCUSSED AS WELL AS MANY CURRENT RECOMMENDATIONS MADE BY THESE ORGANIZATIONS AS THEY APPLY TO RADIATION PROTECTION IN MAN. THIS INCLUDES WORKERS IN THE RADIATION INDUSTRY, BUT ALSO THE POPULATION AT LARGE.

*RADIATION PROTECTION, ORGANIZATION + PERSONNEL EXPOSURE, RADIATION + RADIATION IN PERSPECTIVE + RADIATION SAFETY AND CONTROL

15-09274 TRIULZI C
TREND OF GROSS BETA RADIOACTIVITY IN PLANKTON SAMPLES COLLECTED IN THE ADRIATIC AND LIGURIAN-TYRRHENIAN SEAS DURING 1961-1964
ISTITUTO LOMBARDO, MILAN + CISE, MILAN
TID-22112 +. 17 PAGES, MEETING HELD ON JUNE 24, 1965- CFSTI, \$1.00 CY, \$0.50 MN

GROSS BETA RADIOACTIVITY WAS MEASURED ON PLANKTON ASH SAMPLES COLLECTED IN THE LIGURIAN-TYRRHENIAN SEA AND UPPER ADRIATIC DURING 1961-1964. THE TREND OF GROSS BETA RADIOACTIVITY DURING THIS PERIOD IS CORRELATED WITH RAINFALL AND RADIOACTIVE FALLOUT IN THE SAME ZONE. VALUES OF GROSS BETA ARE REPORTED, WHICH HAS BEEN MEASURED 15 AND 200 DAYS AFTER THE TOW. RATIO BETWEEN THESE VALUES SUPPLIES A USEFUL INDICATION OF THE DATE OF NUCLEAR EXPLOSIONS RESPONSIBLE FOR SAMPLE CONTAMINATION.

*BIOLOGICAL CONCENTRATION, ALGAE + *BIOLOGICAL CONCENTRATION, AQUATIC ORGANISMS + *SURVEY, RADIATION, ENVIRONMENTAL + FALLOUT + GROSS BETA + OCEAN AND SEA + RAINOUT + SURFACE WATER, NUCLIDE OCCURRENCE

15-09932 RAMSCAN D + PEABODY CO + PASSANT FH + SPEIGHT RG
RADIOIODINE UPTAKES IN THE THYROID STUDIES OF THE BLOCKING AND SUBSEQUENT RECOVERY OF THE GLAND FOLLOWING THE ADMINISTRATION OF STABLE IODINE
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, WINFRITH
AEEW-R 444 +. 23 PAGES, 8 FIGURES, 6 TABLES, 18 REFERENCES- JULY 1965- UKAEA

SMALL AMOUNTS OF RADIOACTIVE IODINE WERE GIVEN TO NINE VOLUNTEERS, AND THEIR THYROID UPTAKE AND URINARY EXCRETION PATTERNS WERE STUDIED. THE EFFECT OF DOSES OF STABLE IODINE ON THESE PATTERNS WAS INVESTIGATED. MODELS OF THYROID METABOLISM WERE STUDIED AND AMPLIFIED TO GIVE SATISFACTORY EXPLANATIONS OF THE EXPERIMENTAL RESULTS. THE MINIMUM AMOUNT OF STABLE IODINE REQUIRED TO BLOCK THE THYROID COMPLETELY WAS ABOUT 30 MG. THYROID UPTAKE CEASED WITHIN HALF AN HOUR OF THE ADMINISTRATION OF A BLOCKING DOSE. THYROID UPTAKE WAS BACK TO NORMAL ABOUT EIGHT DAYS AFTER A SINGLE BLOCKING DOSE. REPEATED DOSES OF STABLE IODINE MAY BE GIVEN AT INTERVALS IN ORDER TO MAINTAIN EFFECTIVE THYROID BLOCKING. THE REQUIRED DOSES RANGE FROM 35 MG EVERY 12 HR TO 250 MG EVERY 48 HR. THE BEST PROTECTION AGAINST A LONG-TERM EXPOSURE TO RADIOACTIVE IODINE, WHILE ADMINISTERING THE LEAST POSSIBLE TOTAL AMOUNT OF STABLE IODINE, WOULD BE GIVEN BY 35 MG EVERY 12 HR. BLOCKING DOSES SHOULD BE GIVEN AS SOON AS POSSIBLE AFTER ANY KNOWN OR SUSPECTED EXPOSURE TO RADIOACTIVE IODINE.

*BIOMEDICAL + *IODINE + BIOLOGICAL CONCENTRATION, MAN + DOSE

15-09937 MORRIS AC + ROSS DA
THE DESIGN OF A LOW-BACKGROUND WHOLE-BODY COUNTING FACILITY
OAK RIDGE INSTITUTE OF NUCLEAR STUDIES, INC., OAK RIDGE
ORINS-51 +. 49 PAGES, 40 FIGURES, 3 TABLES, JANUARY 1966, CFSTI, \$3.00 CY

IN SEPTEMBER 1964 THE MEDICAL DIVISION, OAK RIDGE INSTITUTE OF NUCLEAR STUDIES (ORINS), BEGAN PRELIMINARY STUDIES AND OPERATIONS WITH A NEWLY COMPLETED LOW-LEVEL WHOLE-BODY COUNTER, THE LATEST IN A SERIES OF WHOLE-BODY COUNTERS BUILT AT ORINS--THE OBJECTIVE BEING TO PROVIDE A SERIES OF INSTRUMENTS THAT WILL ALLOW WHOLE-BODY COUNTING STUDIES OVER A CONTINUOUS RANGE OF ACTIVITIES FROM THE THERAPEUTIC DOSES DOWN TO NATURAL BODY-BACKGROUND LEVELS. THE HIGH-LEVEL AND DIAGNOSTIC-LEVEL COUNTERS WERE EARLIER, ALTHOUGH CERTAIN MODIFICATIONS HAVE BEEN MADE SINCE TO IMPROVE THEIR PERFORMANCE. THE DESIGN OF A LOW-LEVEL COUNTER IS THE SUBJECT OF THIS REPORT.

*COUNTER, WHOLE BODY + *SHIELDING + BIOMEDICAL + DESIGN CRITERIA

CATEGORY 15
ENVIRONMENTAL SURVEYS, MONITORING AND RADIATION EXPOSURE OF MAN

15-C5984 BIG ROCK POINT AUTHORIZED TO USE AIR MASK PROTECTION FACTORS FOR AIRBORNE CONTAMINATION
UNITED STATES ATOMIC ENERGY COMMISSION
3 PAGES, MAY 19, 1966, DOCKET 50-155, ATOMIC ENERGY CLEARING HOUSE, 12(23), PAGES 16-18 (JUNE 6, 1966)

VARIOUS PROTECTION FACTORS FOR AIR-PURIFYING AND AIR-SUPPLYING EQUIPMENT USED WHEN EXPOSED TO
AIRBORNE CONCENTRATIONS IN EXCESS OF 10 CFR 20 ARE AUTHORIZED BY AEC IN RESPONSE TO 1962
RFQFST.

*INHALATION + *PERSONNEL PROTECTIVE DEVICE + BIG ROCK POINT + DOSE CALCULATION, INTERNAL +
REACTOR, BOILING WATER + REGULATION, AEC

15-10074 CARNAHAN CL
A PROCEDURE FOR THE CALCULATION OF NEUTRON ACTIVATION OF AN INFINITE HOMOGENEOUS MEDIUM
HAZELION-NUCLEAR SCIENCE CORPORATION, PALO ALTO, CALIFORNIA
HNS-1229-54 +. 67 PAGES, REFERENCES, SEPTEMBER 15, 1964, CFSTI, \$3.00

A METHOD FOR CALCULATING QUANTITIES OF RADIONUCLIDES INDUCED IN INFINITE, HOMOGENEOUS MEDIA BY
NEUTRONS FROM UNDERGROUND NUCLEAR DETONATIONS IS DEVELOPED THEORETICALLY, AND A PROCEDURE FOR
PRACTICAL APPLICATION OF THE THEORY IS PRESENTED. RESULTS OF CALCULATIONS ARE GIVEN FOR
RADIONUCLIDES, HAVING HALF LIVES GREATER THAN 0.5 YEARS, INDUCED BY NEUTRONS FROM FUSION
REACTIONS AND FROM FISSION REACTIONS IN MEDIA HAVING THE COMPOSITIONS OF THE AVERAGE EARTH'S
CRUST, AVERAGE CARBONATE ROCKS, AND THE TATUM SALT DOME, HATTIESBURG, MISSISSIPPI. SEPARATE
CALCULATIONS ARE MADE FOR FUSION NEUTRONS AND FOR FISSION NEUTRONS BECAUSE OF THE GREAT
DIFFERENCES IN THE INITIAL NEUTRON ENERGY DISTRIBUTIONS AND IN THE TOTAL NUMBERS OF NEUTRONS
PRODUCED PER UNIT ENERGY YIELD, BY THE TWO PROCESSES. A SAMPLE CALCULATION IS INCLUDED.

*ACTIVATION + *ACTIVATION PRODUCT + *GROUND WATER, NUCLIDE OCCURRENCE + *PLOWSHARE PROGRAM +
CRITICAL NUCLIDE + GEOLOGICAL CONSIDERATION, GENERAL + NUCLEAR DETONATION

15-10077 GUSTAFSON PF + KASTNER J + LUETZELSCHWAB J
ENVIRONMENTAL RADIATION. MEASUREMENTS OF DOSE RATES
ARGONNE NATIONAL LABORATORY
4 PAGES, 2 TABLES, 2 FIGURES, 16 REFERENCES, SCIENCE, 145(3627), PAGES 44-47 (JULY 3, 1964)

THE EXPOSURE DOSE FROM ENVIRONMENTAL SOURCES OF RADIATION WAS DETERMINED BY AN IONIZATION
CHAMBER, BY GAMMA-RAY SPECTROMETRY IN THE FIELD, AND BY MEASURING RADIOACTIVITY IN SOIL
CORES. THE EXPOSURE DOSE FROM COSMIC RADIATION WAS FOUND TO BE 4.4 PLUS OR MINUS 0.2
MICROROENTGENS/HR, THAT FROM NATURAL RADIOACTIVITY 8.0 PLUS OR MINUS 0.3, AND THE
CONTRIBUTION FROM FISSION PRODUCTS VARIED FROM 2.0 TO 7.5 DURING THE INTERVAL IN QUESTION.

*DOSE CALCULATION, EXTERNAL + *DOSE MEASUREMENT, EXTERNAL + *MONITOR, RADIATION, ENVIRONMENTAL + CESIUM +
COBALT + FALLOUT + GROSS ALPHA + MONITOR, RADIATION, BACKGROUND + POTASSIUM + RADON +
SOIL, NUCLIDE OCCURRENCE + TEST, WEAPONS (HP ASPECTS) + THORIUM + THORON + URANIUM

15-10078 KOVAR Z
A SIMPLE CALORIMETRIC METHOD OF MEASURING X-RAY DOSES
UCRL-TRANS-1184 + FTD-TT-65-363 +. 5 PAGES, FEBRUARY, 1965, TRANSLATED FROM JADERNA ENERGIE, (10), PAGES
1-5, (1963), JCL, \$1.60 FS, \$0.80 MF

A SIMPLE CALORIMETRIC METHOD IS DESCRIBED OF A DIRECT AND ABSOLUTE MEASUREMENT OF ABSORBED
DOSES AND OF CALIBRATING THE X-RAY BEAMS. THE SUGGESTED METHOD CAN BE CARRIED OUT WITH THE
CONVENTIONAL DEVICES FOUND IN A PHYSICAL LABORATORY AND IS PARTICULARLY SUITABLE FOR
HIGH-POWER AND HIGH-ENERGY X-RAY APPARATUS SUCH AS THOSE USED, FOR EXAMPLE, IN X-RAY THERAPY,
DEFECTOSCOPY, OR RADIATION CHEMISTRY.

*DOSE MEASUREMENT, INTERNAL + *X-RAY + BIOMEDICAL + DOSE + MONITOR, RADIATION, PERSONNEL

15-10080 BECK HL + CONDON WJ + LOWDER WM
SPECTROMETRIC TECHNIQUES FOR MEASURING ENVIRONMENTAL GAMMA RADIATION
NEW YORK OPERATIONS OFFICE
HASL-15C +. 71 PAGES, 22 FIGURES, 6 TABLES, 34 REFERENCES, OCTOBER 1964, CFSTI, \$3.00 CY

PULSE-HEIGHT SPECTRA OBTAINED IN THE FIELD BY USING A LARGE NAI(Tl) CRYSTAL CAN BE ANALYZED BY
RELATIVELY SIMPLE METHODS TO DETERMINE ACCURATELY TOTAL ENVIRONMENTAL GAMMA-RAY DOSE RATES,
AS WELL AS THE INDIVIDUAL DOSE RATE CONTRIBUTIONS FROM K-40, THE U238 SERIES, THE TH232
SERIES, AND THE PRINCIPAL GAMMA-RAY EMITTING FISSION PRODUCTS. THE CALIBRATION OF A 5 BY
3-IN. DETECTOR IS DESCRIBED IN DETAIL, AND THE APPLICABILITY AND LIMITATIONS OF THE
SPECTRAL-ANALYSIS ARE EXAMINED. SEVERAL PROBLEMS ASSOCIATED WITH FIELD MEASUREMENTS ARE
DISCUSSED, IN PARTICULAR THE EFFECTS OF RADON MIGRATION FROM THE SOIL, SOIL MOISTURE, AND
NATURAL FALLOUT. EVIDENCE IS DOSIMETRIC AND RELATED INFORMATION OBTAINED FROM FIELD SPECTRA
ANALYZED BY THESE METHODS.

*CRITICAL NUCLIDE + *FALLOUT + *GAMMA EMITTER + *INSTRUMENTATION CALIBRATION + *SOIL + CESIUM + DIFFUSION +
HYDROLOGICAL CONSIDERATION, GENERAL + MONITOR, RADIATION, ENVIRONMENTAL + NIOBIUM + POPULATION EXPOSURE +
POTASSIUM + RADON + SOIL, RADIONUCLIDE MOVEMENT THROUGH + THORIUM + URANIUM + ZIRCONIUM

15-10083 HAYWOOD FF
SPATIAL DOSE DISTRIBUTION IN AIR-OVER-GROUND GEOMETRY
OAK RIDGE NATIONAL LABORATORY
8 PAGES, 13 FIGURES, 15 REFERENCES, HEALTH PHYSICS, 11(3), PAGES 185-192 (MARCH, 1965)

CATEGORY 15
ENVIRONMENTAL SURVEYS, MONITORING AND RADIATION EXPOSURE OF MAN

15-10083 *CONTINUED*

SPATIAL DISTRIBUTIONS OF GAMMA-RAY EXPOSURE AND NEUTRON DOSE WERE MEASURED BY USE OF A POINT CO-60 SOURCE (800 C) AND THE ORNL HEALTH PHYSICS RESEARCH REACTOR AS A SMALL FISSION SOURCE. THE SOURCES WERE SUPPORTED ON A 1527-FT TOWER, AT THE NEVADA TEST SITE, AT HEIGHTS RANGING FROM 27 TO 1500 FT. FOR A GIVEN SLANT RANGE GREATER THAN ABOUT ONE RELAXATION LENGTH, THERE IS AN INCREASE IN NEUTRON DOSE RATE AT THE INTERFACE BY A FACTOR OF 2.4 AS THE REACTOR IS RAISED FROM 27 TO 1500 FT ABOVE THE GROUND, AND, SIMILARLY, THERE IS AN INCREASE IN GAMMA-RAY EXPOSURE RATE BY A FACTOR OF 2.1. THESE INCREASES APPEAR FIXED FOR SOURCE-DETECTOR SEPARATIONS GREATER THAN ABOUT 400 YARDS. AN EFFECT OF THE PRESENCE OF THE INTERFACE WAS OBSERVED BY COMPARING EXPERIMENTALLY DETERMINED VALUES OF THE EXPOSURE BUILDUP FACTOR FOR CO-60 GAMMA RAYS TO CALCULATED BUILDUP FACTORS IN AN INFINITE MEDIUM. BOUNDARY-CORRECTION FACTORS $K(\text{EXP})$ WERE DETERMINED EXPERIMENTALLY. $K(\text{EXP})$ IS DEFINED AS THE RATIO OF DOSE IN THE FINITE AIR MEDIUM TO DOSE IN THE INFINITE AIR MEDIUM AT THE SAME SLANT RANGE. THE DEPENDENCE OF NEUTRON DOSE RATE ON VARIATION OF DETECTOR HEIGHTS AND ON VARIATION OF SOURCE HEIGHTS IS COMPARED TO THEORETICAL MODELS, WITH SATISFACTORY AGREEMENT.

*DOSE MEASUREMENT, EXTERNAL + COBALT + COMPARISON, THEORY AND EXPERIENCE + NEVADA TEST SITE + SOURCE, NEUTRON + SOURCE, POINT + TEST, WEAPONS (HP ASPECTS)

15-10085 INGOLD WC + PUDDLESTON CM
AN EMPIRICAL FORMULA FOR CALCULATING GAMMA-RAY DOSE ATTENUATION IN CONCRETE DUCTS
NAVAL CIVIL ENGINEERING LAB., PORT HUENEME, CALIFORNIA
AC-609049 +. 72 PAGES, NOVEMBER 25, 1964, CFSTI, \$2.00

A SURVEY IS PRESENTED OF THE STATUS OF THE CALCULATION OF GAMMA DOSE-RATE ATTENUATION IN AIR DUCTS THROUGH CONCRETE. A SIMPLE EMPIRICAL FORMULA IS EXHIBITED THAT SHOWS SATISFACTORY AGREEMENT WITH THE RESULTS OF MORE COMPLICATED COMPUTATIONAL TECHNIQUES AND WITH EXPERIMENTAL RESULTS. THIS SIMPLE FORMULA, WHICH MAY BE USED FOR HAND COMPUTATION, REPRESENTS A SAVING IN COMPUTATION TIME 2 SECONDS PER CASE COMPARED TO 400 SECONDS BY IBM-1620.

*COMPARISON, THEORY AND EXPERIENCE + *DOSE CALCULATION, EXTERNAL + CONCRETE + FALLOUT + SHIELDING

15-10086 ENDRES GW
NEUTRON SPECTRUM MEASUREMENTS AT HANFORD WORK LOCATIONS
HANFORD ATOMIC PRODUCTS OPERATION
HW-SA-3525 + CONF-642-33 +. 31 PAGES, MAY 15, 1964, HEALTH PHYSICS SOCIETY MEETING, CINCINNATI, OHIO, JUNE 15-18, 1964, CFSTI, \$2.00 CY

HANFORD OCCUPATIONAL EXPOSURES TO NEUTRON RADIATION ARE DUE MAINLY FROM TWO TYPES OF NEUTRON SOURCES - PRODUCTION REACTORS AND PLUTONIUM IN CHEMICAL-PROCESSING FACILITIES. A KNOWLEDGE OF THE INCIDENT NEUTRON SPECTRUM IS NECESSARY TO ACCURATELY INTERPRET DATA OBTAINED FROM THE CURRENT NUCLEAR-TRACK-TYPE NEUTRON DOSIMETERS (PERSONNEL).

*DOSIMETRY, GENERAL + *SOURCE, NEUTRON + ACTIVATION + BATTELLE NORTHWEST + DOSE MEASUREMENT, EXTERNAL + HANFORD PRODUCTION REACTOR + MONITOR, RADIATION, PERSONNEL + PLUTONIUM + REACTOR, GAS COOLED + REACTOR, GRAPHITE MODERATED

15-10087 UNRUH CM
THE STATUS OF NEW PERSONNEL NEUTRON DOSIMETER DEVELOPMENT
HANFORD ATOMIC PRODUCTS OPERATION
HW-SA-3526 + CONF-642-34 +. 12 PAGES, MAY 15, 1964, HEALTH PHYSICS SOCIETY MEETING, CINCINNATI, OHIO, JUNE 15-18, 1964, CFSTI, \$1.00

PRESENT PERSONNEL NEUTRON DOSIMETERS ARE BASED PRIMARILY ON NUCLEAR-TRACK COUNTING IN THICK-FILM EMULSIONS FOR FAST-NEUTRON-DOSE EVALUATIONS. THESE METHODS ARE RECOGNIZED AS NOT WHOLLY ADEQUATE. A NEUTRON-DOSIMETER SENSITIVITY TO A FULL-ENERGY SPECTRUM OF FAST AND INTERMEDIATE ENERGY NEUTRONS IS REQUIRED TO PROVIDE PERSONNEL NEUTRON DOSIMETRY COMPARABLE WITH THAT PROVIDED FOR GAMMA RADIATION.

*DOSIMETRY, GENERAL + *FAST NEUTRON + *MONITOR, RADIATION, PERSONNEL + DOSIMETRY, THERMOLUMINESCENCE

15-10091 PEGG TG + SAXBY WN + WALLACE CM
THE AUTOMATIC PROCESSING AND EVALUATION OF FILM BADGE DOSIMETER DATA AT AWRE
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, ALDERMASTON
AWRE-O-93/63 +. 23 PAGES, MARCH, 1964, DEP/MN

THE INTRODUCTION OF A NEW MULTIFILTER FILM BADGE FOR PERSONNEL RADIATION DOSIMETRY, AND THE APPEARANCE OF DETAILED STATUTORY REQUIREMENTS FOR RECORDING PERSONAL RADIATION DOSES, LED TO THE DEVELOPMENT OF A SEMIAUTOMATIC SYSTEM FOR PROCESSING AND RECORDING FILM-BADGE DATA. A SYSTEM USING THE IBM 14C1 COMPUTER TO PRODUCE CERTIFICATES GIVING DETAILS OF RADIATION DOSES RECEIVED BY INDIVIDUALS IS DESCRIBED. THE METHOD OF DATA MEASUREMENT, DOSE EVALUATION, AND THE COMPUTER SERVICES ARE DISCUSSED. BRIEF COMMENTS ON OPERATIONAL EXPERIENCE AND COSTS ARE INCLUDED. FIGURES ILLUSTRATE THE PROCESSING AND RECORDING SYSTEM.

*COMPUTER PROGRAM + *DOSE MEASUREMENT, EXTERNAL + *DOSIMETRY, GENERAL + PERSONNEL EXPOSURE, RADIATION

15-10093 MAERKER RE + MUCKENTHALER FJ
CALCULATION AND MEASUREMENT OF THE FAST-NEUTRON DIFFERENTIAL DOSE ALBEDO FOR CONCRETE
OAK RIDGE NATIONAL LABORATORY
20 PAGES, 3 TABLES, FIGURES, 1965

CATEGORY 15
ENVIRONMENTAL SURVEYS, MONITORING AND RADIATION EXPOSURE OF MAN

15-10093 *CONTINUED*

INTEREST IN OBTAINING FAST-NEUTRON DIFFERENTIAL ALBEDO INFORMATION FOR VARIOUS MATERIALS HAS BEEN GENERATED RECENTLY IN CONNECTION WITH SOLVING MULTIBEND-AIR-DUCT TRANSMISSION PROBLEMS. IT IS CONJECTURED THAT THE AIR-DUCT PROBLEM CAN BE DIVIDED INTO TWO SIMPLER PROBLEMS - FIRST, THAT OF DETERMINING FOR THE WALL MATERIAL THE DISTRIBUTION IN ENERGY AND ANGLE OF THE REFLECTED FAST NEUTRONS AS FUNCTIONS OF ENERGY AND ANGLE OF AN INCIDENT MONODIRECTIONAL NEUTRON BEAM, THE WALL MATERIAL ASSUMED TO BE INFINITELY THICK AND TO HAVE A PLANAR SURFACE. SECOND, THAT OF USING THIS INFORMATION IN A MONTE CARLO OR SOME OTHER DUCT-CONFIGURATION-DEPENDENT CALCULATION IN WHICH THE WALL MATERIAL IS REPLACED BY A SURFACE HAVING THE PREVIOUSLY DETERMINED REFLECTION PROPERTIES.

*CONCRETE + *FAST NEUTRON + DOSE CALCULATION, EXTERNAL + DOSE MEASUREMENT, EXTERNAL +
ORNL (OAK RIDGE NATIONAL LABORATORY)

15-10096 THOMPSON PA + LEWIS SA + CLARK TG + FISH BR + BOYETT RH
A PROGRAM TO CALCULATE RADIATION DOSE RATES NEAR A SPHERICAL SOURCE
OAK RIDGE NATIONAL LABORATORY
ORNL-TM-803 +. 59 PAGES, 9 FIGURES, 9 REFERENCES, 2 TABLES- OCTOBER 1964- CFSTI, \$3.00 CY, \$2.00 MN

A COMPUTER PROGRAM WHICH DETERMINES THE DOSE FROM A SPHERICAL SOURCE AS A FUNCTION OF DEPTH IN TISSUE IS DESCRIBED. BASIC PHYSICAL LAWS ARE USED TO FORMULATE A MODEL FOR THE INTERACTION OF RADIATION WITH MATTER. TRANSITIONS BETWEEN ENERGY LEVELS AND BETWEEN BETA AND GAMMA RAYS ARE THE DISTINGUISHING FEATURES. AT PRESENT, GEOMETRICAL CONSIDERATIONS LIMIT ITS USEFULNESS. HOWEVER, EXPERIMENTAL VALUES SUPPORT THE VALIDITY OF THE MODEL.

*ANALYTICAL MODEL + *COMPUTER PROGRAM + *DOSE CALCULATION, EXTERNAL +
ORNL (OAK RIDGE NATIONAL LABORATORY) + SOURCE, RADIATION

15-10099 AUXIER JA
ICHIBAN- THE DOSIMETRY PROGRAM FOR NUCLEAR BOMB SURVIVORS OF HIROSHIMA AND NAGASAKI - A STATUS REPORT AS OF APRIL 1, 1964
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE
CEX-64.3 +. 21 PAGES, 11 FIGURES, APRIL 1964, CFSTI, \$0.50 CY

IN 1956, THE HEALTH PHYSICS DIVISION OF THE OAK RIDGE NATIONAL LABORATORY ATTEMPTED A METHOD FOR EVALUATING THE RADIATION DOSES RECEIVED BY THE SURVIVORS OF THE NUCLEAR BOMBINGS OF HIROSHIMA AND NAGASAKI, JAPAN. DATA FOR THIS PROJECT WERE OBTAINED IN NUCLEAR WEAPONS TESTS, OPERATION BREN, LABORATORY EXPERIMENTS, PHYSICAL SURVEYS IN JAPAN, AND IN CALCULATIONAL STUDIES. THE APPROACH TO THE PROBLEM WAS AS FUNDAMENTAL AS POSSIBLE, WITH EMPHASIS ON QUANTITATIVE MEASUREMENTS AND CALCULATIONS OF THE ENERGY, ANGULAR, AND SPATIAL DISTRIBUTIONS OF WEAPONS RADIATIONS IN AN AIR-OVER-GROUND SITUATION. SPATIAL DISTRIBUTIONS OF DOSE IN VARIOUS SHIELDS, INCLUDING JAPANESE DWELLINGS, WERE MEASURED. TECHNIQUES WERE DEVELOPED IN JAPAN FOR VERIFYING THE LOCATION OF SURVIVORS AND ACCURATELY DESCRIBING THEIR SHIELDING ENVIRONMENTS. SIMPLE EMPIRICAL EQUATIONS WERE FOR CALCULATING THE SHIELDING FACTORS FOR JAPANESE RESIDENTIAL-TYPE STRUCTURES PROBABLE ERROR, ABOUT PLUS OR MINUS 6 PERCENT.

*DOSIMETRY, GENERAL + *JAPAN + ANALYTICAL TECHNIQUE, CALIBRATION + DOSE MEASUREMENT, EXTERNAL +
EQUATION, GENERAL + FLUX DISTRIBUTION + GROSS GAMMA + LASL (LOS ALAMOS SCIENTIFIC LABORATORY) + MOCKUP +
NEVADA TEST SITE + ORNL (OAK RIDGE NATIONAL LABORATORY) + SOURCE, NEUTRON + TEST, WEAPONS (HP ASPECTS)

15-10195 CALDWELL R
NUCLEAR MATERIALS AND EQUIPMENT CORPORATION. OFFSITE AIR-SURVEILLANCE PROGRAM
NUCLEAR MATERIALS AND EQUIPMENT CORPORATION, APOLLO, PA.
2 PAGES, APRIL 20, 1966, ATOMIC ENERGY CLEARING HOUSE, 12(20), PAGES 32-33 (MAY 16, 1966)

APOLLO PLANT DOES NOT LEND ITSELF READILY TO CONVENTIONAL DIFFUSION MODELS FOR OFFSITE AIR-SAMPLE-DATA ANALYSIS. A SIX-MONTH PROGRAM WILL BE UNDERTAKEN TO ESTABLISH LOCATION AND FREQUENCY OF OFFSITE SAMPLING. AN INTERIM SCHEDULE OF STACK SAMPLING IS PROPOSED.

*SURVEY, RADIATION, ENVIRONMENTAL + MONITOR, RADIATION, STACK + RADIOCHEMICAL PROCESSING

15-10196 GENERAL TESTING COMPANY. OVEREXPOSURE UNREPORTED BECAUSE OF UNRELIABLE READINGS
GENERAL TESTING COMPANY, LISBON, OHIO
1 PAGE, ATOMIC ENERGY CLEARING HOUSE, 12(20), PAGE 35, (MAY 16, 1966)

GARDRAY FILM BADGE SERVICE SHOWED A 3.5-REM EXPOSURE FOR ONE INDIVIDUAL, WHILE THE CONTROL BADGES AND FOUR INDIVIDUALS SHOWED NO EXPOSURE. THIS WAS NOT REPORTED BECAUSE IT WAS THOUGHT IN ERROR. PREVIOUSLY READINGS WERE SHOWN FOR UNUSED BADGES, AND USED-BADGE READINGS WERE IN EXCESS OF DAILY DOSIMETER RECORDS. WE RELOCATED THE BADGE-STORAGE RACK AWAY FROM A GAS HEATER. AFTER THE FEBRUARY INSPECTION, TWO FILM BADGES WERE WORN, BUT THE READINGS ARE NOT IN AGREEMENT.

*OPERATING EXPERIENCE + *PERSONNEL PROTECTIVE DEVICE + FAILURE, INSTRUMENT +
PERSONNEL EXPOSURE, RADIATION + RADIOGRAPHY

15-10475 COATES RL + HORTON NR
RSAC--A RADIOLOGICAL SAFETY ANALYSIS COMPUTER PROGRAM
PHILLIPS PETROLEUM COMPANY, IDAHO
100-17151 +. 208 PAGES, 3 TABLES, 7 REFERENCES, MAY 1966, CFSTI, \$6.00 CY, \$1.25 MN

CATEGORY 15
ENVIRONMENTAL SURVEYS, MONITORING AND RADIATION EXPOSURE OF MAN

15-10475 *CONTINUED*

AN IBM 7040 PROGRAM WHICH COMPUTES THE POTENTIAL RADIOLOGICAL DOSES RESULTING FROM A CONTINUOUS OR INSTANTANEOUS RELEASE OF FISSION PRODUCTS TO THE ATMOSPHERE. DEVELOPED AS PART OF LOFT AND GENERAL NUCLEAR SAFETY PROGRAMS TO PROVIDE A GENERALIZED COMPUTER PROGRAM FOR A COMPLETE PARAMETRIC INVESTIGATION OF RADIOLOGICAL HAZARDS. DOSES CONSIDERED ARE CLOUD GAMMA, DEPOSITION GAMMA, INGESTION, AND INHALATION, AND ARE BASED UPON THE RELEASE OF UP TO 200 ISOTOPES, THE RELATIVE ABUNDANCE OF EACH ISOTOPE BEING DEPENDENT UPON THE OPERATING HISTORY OF THE NUCLEAR REACTOR UNDER CONSIDERATION. INCLUDED ARE THE MATHEMATICAL MODELS, CONVERSION FACTORS, ASSUMPTIONS, FLOW CHARTS, PROGRAM LISTINGS, AND OTHER DATA PERTINENT TO THE OVERALL DEVELOPMENT OF THIS PROGRAM.

*COMPUTER PROGRAM + *DOSE CALCULATION, EXTERNAL + *DOSE CALCULATION, INTERNAL +
*FISSION PRODUCT RELEASE, GENERAL + SUTTON DIFFUSION FORMULA

15-10508 SCHNEIDER MF

ADVANCED SPACEBORNE DOSIMETRY INSTRUMENTATION
KIRTLAND AIR FORCE BASE, NEW MEXICO

AFWL-TDR-64-96 +. 168 PAGES, 80 FIGURES, 12 TABLES, 15 REFERENCES, DECEMBER 1965

PROBLEM - MEASURE THE RADIATION DOSE TO PERSONNEL IN MANNED SPACE FLIGHTS. APPROACH - A BASIC DOSIMETER SYSTEM WAS DEVELOPED CONSISTING OF - TISSUE-EQUIVALENT ION CHAMBER, A LOGARITHMIC ELECTROMETER, MAGNETIC AMPLIFIERS, A DECADE SWITCHING UNIT, AND AN AUTOMATIC CALIBRATION CIRCUIT FOR PULSING THE CHAMBER HIGH VOLTAGE. THE BASIC UNIT WAS ADAPTED FOR A GEMINI DOSIMETER, AIR FORCE SATELLITE DOSIMETER, AND MANNED-SPACE-SYSTEMS PORTABLE SURVEY DOSIMETER. RESULTS-- PERFORMANCE UNDER EXTENSIVE TESTING PROGRAMS AND IN THE GEMINI GT-4 FLIGHT IS PRESENTED.

*DOSE MEASUREMENT, EXTERNAL + *INSTRUMENTATION CALIBRATION + *INSTRUMENTATION, RADIATION MONITORING +
*MONITOR, RADIATION, PERSONNEL + COMPARISON, THEORY AND EXPERIENCE + EQUIPMENT DESIGN + SPACECRAFT +
TEST, INSTRUMENT RESPONSE

15-10513 RUSSELL JA + KNOWLES DJ

DESCRIPTION OF FACILITY RADIATION AND CONTAMINATION ALARM SYSTEMS INSTALLED IN THE HIGH-FLUX ISOTOPE
REACTOR FACILITY, BUILDING 7900
OAK RIDGE NATIONAL LABORATORY

ORNL-TM-1393 +. 21 PAGES, 8 FIGURES, 2 TABLES, DECEMBER 8, 1965, CFSTI \$1.00 CY, \$0.50 MN

PROBLEM - TO MONITOR THE GAMMA-RADIATION LEVEL AND AIR-CONTAMINATION LEVEL IN THE ENTIRE FACILITY. APPROACH - NINE MONITORS CONTINUOUSLY MONITOR FOR GAMMA RADIOACTIVITY. NINE CONSTANT AIR-MONITORS CONTINUOUSLY SAMPLE THE AIR IN THE BUILDING FOR RADIOACTIVE (BETA-GAMMA) PARTICLES. ABNORMAL RADIATION LEVELS OR AIR ACTIVITY PRODUCE THE FOLLOWING ACTIONS - SOUND LOCAL ALARM, SOUND ALARM IN REACTOR-CONTROL ROOM, SOUND THE BUILDING-EVACUATION AIR HORNS, AND ACTIVATE AN ALARM IN THE LABORATORY EMERGENCY CONTROL CENTER.

EQUIPMENT DESIGN + INSTRUMENTATION, RADIATION MONITORING + MONITOR, RADIATION, AIR +
MONITOR, RADIATION, BACKGROUND + MONITOR, RADIATION, ENVIRONMENTAL + SYSTEM DESCRIPTION

15-10563 GULIK AE

INCINERATION OF P32 SOURCE AT DETROIT GRACE CENTRAL HOSPITAL, MAY 22, 1966
GRACE CENTRAL HOSPITAL, DETROIT, MICHIGAN

2 PAGES, MAY 24, 1966, ATOMIC ENERGY CLEARING HOUSE, 12(27), PAGES 28-29 (JULY 4, 1966)

SATURDAY, A JANITRESS AT GRACE CENTRAL HOSPITAL DISCARDED AN APPARENTLY EMPTY SHIPPING CARTON CONTAINING A JUST-RECEIVED 30-MILLICURIE SOURCE OF P-32. THE SOURCE WAS INCINERATED. MONDAY, THE LOSS OF THE SOURCE FROM THE LOCKED CONTAINER WAS DISCOVERED, AND TRACED TO THE INCINERATOR. THREE TINS OF CONTAMINATED ASHES WERE RECOVERED.

*FIRE + *INCIDENT, ACTUAL, NONREACTOR + *RADIOACTIVITY, RELEASE + *SOURCE, RADIATION, LOST +
*TRACER, RADIOACTIVE + FAILURE, ADMINISTRATIVE CONTROL

15-10670 BATES RG

AERORADIOACTIVITY SURVEY AND AREAL GEOLOGY OF PARTS OF OHIO AND INDIANA (ARMS-1)
U. S. GEOLOGICAL SURVEY

CEX-59.4.23 +. 19 PAGES, 5 FIGURES, 12 REFERENCES, JUNE 1964, CFSTI, \$1.00 CY, \$0.50 MN

AN AIRBORNE RADIOACTIVITY SURVEY WAS MADE OF AN AREA OF 11,250 SQUARE MILES IN CENTRAL AND WESTERN OHIO AND EASTERN INDIANA. LITTLE GEOLOGIC INFORMATION WAS OBTAINED FROM THE RADIOACTIVITY DATA. THE INTERLOBATE AREA FORMED BETWEEN THE MIAMI AND SCIOTO GLACIAL LOBES DURING LATE WISCONSIN TIME IS OUTLINED BY A RADIOACTIVITY LOW. TWO EXPOSURES OF OHIO SHALE NORTH OF COLUMBUS, OHIO, ARE OUTLINED BY HIGHS. THE PURPOSE OF THE SURVEY WAS TO DETERMINE THE NATURAL RADIOACTIVITY BACKGROUND OF THE ROCKS AND SOILS. THIS INFORMATION WILL SERVE AS A REFERENCE TO DETERMINE THE AMOUNT AND EXTENT OF ANY POSSIBLE FUTURE INCREASE IN RADIOACTIVITY LEVEL OF THE AREA BY THE NUCLEAR FACILITIES THROUGH NORMAL OPERATIONS OR ACCIDENTS THAT MAY OCCUR. ANOTHER PURPOSE WAS TO DETERMINE THE RELATION BETWEEN THE DISTRIBUTION OF RADIOACTIVITY AND THE AREAL GEOLOGY.

*GEOLOGICAL CONSIDERATION, GENERAL + *SURVEY, RADIATION, AERIAL + INSTRUMENTATION, RADIATION MONITORING +
MONITORING SYSTEM

CATEGORY 15
ENVIRONMENTAL SURVEYS, MONITORING AND RADIATION EXPOSURE OF MAN

15-10812 NICHOLS JP + BROOKSBANK RE + FERGUSON DE
RADIATION EXPOSURES IN FABRICATION U233-THORIUM FUELS
OAK RIDGE NATIONAL LABORATORY
9 PAGES, 1 FIGURE, 1 DRAWING, 1 TABLE, 3 REFERENCES, NUCLEAR APPLICATIONS, APRIL, 1965

THIS REPORT GIVES A DESCRIPTION OF THE TH--U-233 FUEL-FABRICATION PROCESS AT ORNL, ALONG WITH CRITICAL NUCLIDES ENCOUNTERED IN THE PROCESS. EXPOSURES FROM GAMMA RAYS AND SHIELDING ARE INCLUDED IN THIS PAPER.

*MAXIMUM PERMISSIBLE DOSE (MPD) + *TELLURIUM + *URANIUM + *URANIUM DIOXIDE + CALCINATION + COMPACTION + DOSE MEASUREMENT, EXTERNAL + GLOVE BOX + LEAD + MAXIMUM PERMISSIBLE CONCENTRATION (MPC) + CRNL (CAK RIDGE NATIONAL LABORATORY) + THORIUM

15-11041 DIVISION OF REACTOR LICENSING SENDS QUESTIONNAIRE REGARDING RADIOACTIVITY ENVIRONMENTAL MONITORING PROGRAMS
DIVISION OF REACTOR LICENSING, U. S. ATOMIC ENERGY COMMISSION
2 PAGES, ATOMIC ENERGY CLEARING HOUSE, 12(31), PAGES 13-14, (AUGUST 1, 1966)

QUESTIONNAIRE REQUESTS UP-TO-DATE DESCRIPTION OF CURRENT PROGRAM REGARDING OBJECTIVES AND PROCEDURES, INCLUDING (1) SAMPLING OF SOIL, AIR, WATER, AND LIVING ORGANISMS, (2) DIRECT-READING RADIOACTIVITY MONITORS, (3) CORRELATION OF EMISSIONS WITH BIOLOGICAL RESULTS, (4) SPECIAL STUDIES, AND (5) COOPERATION WITH NON-AEC AGENCIES.

*MONITOR, RADIATION, ENVIRONMENTAL + *SURVEY, RADIATION, ENVIRONMENTAL + REGULATION, AEC

15-11091 ELLMER M
SITE SELECTION
2 PAGES, ATOMWIRTSCHAFT, 10(11), PAGES 567-568 (NOVEMBER 1965), IN GERMAN

FOR THE POWER PLANT RWE-BAYERNWERK (KRB), THE MOST FAVORABLE SITE ORIGINALLY SEEMED TO BE ONE NEAR BERTOLDSHEIM. HOWEVER, THE WATER AUTHORITIES REJECTED IT FOR TECHNICAL AND EMOTIONAL-POLITICAL REASONS, ALTHOUGH ATTEMPTS WERE MADE TO DEMONSTRATE THAT DRINKING WATER AND NUCLEAR POWER ARE NOT MUTUALLY EXCLUSIVE. THE ATOMIC PLANT WILL BE BUILT IN GUNDEMMINGEN. A METEOROLOGICAL TOWER 118 M HIGH WILL BE ERECTED. A SMALLER DESIGN OF THE PLANT WAS REQUIRED. WE STUDIED THE COOLING-WATER REMOVAL AND RECYCLE TO FIND THE OPTIMUM COMPROMISE BETWEEN WATER ECONOMY AND ENERGY ECONOMY.

*GERMANY + METEOROLOGY + WATER POLLUTION + WATER, DRINKING

15-11121 VAN HORN WH
SUMMARY REPORT OF OPERATIONAL AND MANAGEMENT ASPECTS OF PERIPHERAL RADIOLOGICAL COUNTERMEASURES, FINAL REPORT
U. S. NAVAL RADIOLOGICAL DEFENSE LABORATORY, SAN FRANCISCO, CALIFORNIA
URS-646-4 + USNRDL-TRC-5 + AD-632211 +. 150 PAGES, 28 FIGURES, 2 TABLES, MARCH, 1966, CFSTI, \$5.00 CY, \$1.00 MN

THE OPERATIONAL CONSTRAINTS AND MANAGEMENT PROBLEMS ASSOCIATED WITH THE PLANNING AND IMPLEMENTATION OF PERIPHERAL RADIOLOGICAL COUNTERMEASURES ARE PRESENTED IN THIS REPORT. THE FOUR COUNTERMEASURES STUDIED (POSTATTACK EVACUATION, APPLIED SHIELDING, DOSE EQUALIZATION - INCLUDING GROUP SHIELDING - AND EXPOSURE SCHEDULING) CAN BE USEFUL TO THE LOCAL CIVIL-DEFENSE ORGANIZATION IN PROVIDING A SIGNIFICANT DEGREE OF CONTROL OVER RADIATION EXPOSURE IN THE EARLY POSTATTACK PERIOD, AND THEIR USE MAY RESULT IN A REDUCTION OF DOSE TO PERSONNEL AND OR A DECREASE IN THE TIME TILL EMERGENCE FROM SHELTER IS POSSIBLE. MOREOVER, THE FLEXIBILITY IN SCHEDULING MADE POSSIBLE BY THE USE OF PERIPHERAL COUNTERMEASURES CAN INCREASE THE SCOPE OF LIFESAVING ACTIVITIES AND PERMIT EARLIER INITIATION OF THE RECOVERY PHASE.

*CIVIL DEFENSE + DOSE + FALLOUT + PERSONNEL EXPOSURE, RADIATION + POPULATION EXPOSURE + SHIELDING

15-11123 RAABE OG + PATTERSON FS
A METHOD OF ANALYSIS OF AIR SAMPLING DATA FOR PARTICULATE ALPHA EMITTERS IN A RADON-THORON DAUGHTER ATMOSPHERE
UNIVERSITY OF ROCHESTER, NEW YORK
UR-658 +. 92 PAGES, FEBRUARY 1, 1965, CFSTI, \$3.00 CY

THE ANALYSIS OF AIR-SAMPLING DATA OF PARTICULATE ALPHA EMITTERS IN A RADON-DAUGHTER AND THORON-DAUGHTER ATMOSPHERE IS GENERALIZED TO ALLOW RAPID AND ACCURATE CALCULATIONS WITH A MINIMUM OF RESTRICTIONS. A RIGOROUS REGRESSION ANALYSIS IS DESCRIBED, GIVING STATISTICAL-ERROR CONFIDENCE LIMITS AND THE SIZE OF INHERENT MATHEMATICAL ERRORS. THE METHOD DESCRIBED FOR THIS ANALYSIS DOES NOT REQUIRE EQUILIBRIUM CONDITIONS FOR THE ALPHA EMITTERS, AVERAGING OF THE ALPHA COUNTS OVER THE PERIOD OF COUNTING, OR LIMITING OF THE MAXIMUM NUMBER OF ALPHA-COUNT OBSERVATIONS THAT MAY BE MADE AND USED IN THE COMPUTATIONS. ALSO DESCRIBED IS A COMPLETE IBM FORTRAN PROGRAM FOR PERFORMING THE ANALYSIS AND PLOTTING THE DECAY RESULTS BY USING THE CALCOMP DIGITAL PLOTTER IN CONJUNCTION WITH AN IBM 7074 COMPUTER.

*AIR + *MATHEMATICAL STUDY + *SAMPLING + ANALYTICAL TECHNIQUE, AIR + COMPUTER PROGRAM + GROSS ALPHA + PARTICLE, RADIOACTIVE + RADON + THORON

15-11125 SANDERS FW
DOSE RATE MEASUREMENTS ON THE KIWI B-4D-202 AND KIWI B-4E-301 REACTORS
LOS ALAMOS SCIENTIFIC LABORATORY, NEW MEXICO

CATEGORY 15
ENVIRONMENTAL SURVEYS, MONITORING AND RADIATION EXPOSURE OF MAN

15-11125 *CONTINUED*
LA-3447-MS +. 21 PAGES, 1 TABLE, 15 FIGURES, 12 REFERENCES, JANUARY, 1966, CFSTI, \$1.00 CY, \$0.50 MN

THE FIELD STUDIES GROUP OF THE HEALTH DIVISION OF THE LOS ALAMOS SCIENTIFIC LABORATORY MEASURED GAMMA-RAY DOSE RATES AT SEVERAL DISTANCES FROM KIWI REACTORS B-4D-202 AND B-4E-301 DURING THE TESTING OF THESE REACTORS AT THE NUCLEAR ROCKET DEVELOPMENT STATION IN NEVADA. MEASUREMENTS PERFORMED WERE SIMILAR TO THOSE MADE ON PREVIOUS KIWI REACTORS. PEAK GAMMA-RAY DOSE RATES OF 31,700 R PER MIN AND 32,200 R PER MIN WERE MEASURED 60 FT FROM B-4D AND B-4E, RESPECTIVELY. THE EIGHT KIWI REACTORS TESTED HAVE YIELDED RATHER UNIFORM GAMMA-RAY DOSE RATES PER MEGAWATT OF REACTOR POWER. THE AVERAGE VALUE IS 35.1 R PER MIN-MW, MEASURED AT 60 FT.

*DOSE MEASUREMENT, EXTERNAL + *KIWI + DOSE + GROSS GAMMA + INSTRUMENTATION, RADIATION MONITORING + NEVADA TEST SITE + REACTOR, SPACE + ROVER PROGRAM

15-11126 SPLICHAL WF
PORTABLE MULTIPURPOSE RADIATION MONITOR
SAVANNAH RIVER LABORATORY, Aiken, SOUTH CAROLINA
DP-593 +. 13 PAGES, 6 FIGURES, 1 REFERENCE, MAY, 1966, CFSTI, \$1.00 CY, \$0.50 MN

A BASIC ELECTRONIC PACKAGE FOR A PORTABLE MULTIPURPOSE RADIATION MONITOR WAS DESIGNED, BUILT, AND FIELD TESTED. TRANSISTORIZED PLUG-IN CIRCUITS POWERED BY RECHARGEABLE NICKEL-CADMIUM BATTERIES, A READOUT METER, AND AN ELECTROMECHANICAL REGISTER ARE CONTAINED IN A 4 X 5 X 6-IN. CASE. NEUTRON, ALPHA, BETA-GAMMA, OR ALPHA-BETA-GAMMA DETECTORS CAN BE INDIVIDUALLY COUPLED TO THE ELECTRONIC PACKAGE. CALIBRATION FOR EACH DETECTOR IS SIMPLE AND STABLE BECAUSE THE PACKAGE IS UNAFFECTED BY TEMPERATURE CHANGES BETWEEN 20 AND 100 DEGREES F. THE MONITOR WEIGHS ABOUT 7 LB, CAN BE CARRIED IN ONE HAND, REQUIRES NO WARMUP PERIOD, AND IS EASY TO OPERATE AND SERVICE.

*INSTRUMENTATION, RADIATION MONITORING + *MONITOR, RADIATION, GENERAL PRACTICE + GROSS ALPHA + GROSS BETA + GROSS GAMMA + INSTRUMENTATION CALIBRATION + INSTRUMENTATION, TESTING + NEUTRON + RADIATION SAFETY AND CONTROL

15-11127 GREENWOOD JA
ESTIMATION OF PARAMETERS IN MULTIVARIATE EXPERIMENTAL DESIGN AND A HYPOTHETICAL APPLICATION TO ESTIMATING FRACTIONAL DOSE-RECOVERY EFFECTS
ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE, BETHESDA, MARYLAND
AFRRI-TN-66-2 + AD-635167 +. 22 PAGES, 4 TABLES, 5 FIGURES, FEBRUARY, 1966, CFSTI, \$1.00 CY, \$0.50 MN

A STATISTICAL TECHNIQUE IS EXPLAINED, DERIVED, AND ILLUSTRATED. ANALYSIS OF VARIANCE, COMPONENTS OF VARIANCE ANALYSIS, AND THE ESTIMATION TECHNIQUE DESCRIBED HEREIN APPLIED TO A PROPERLY DESIGNED EXPERIMENT WILL GO FAR TOWARD EXTRACTING ALL THE RELEVANT INFORMATION FROM A SAMPLE. ESTIMATION FORMULAS FOR THE TERMS OF THE ASSUMED MATHEMATICAL MODEL ARE DERIVED FOR TWO OF THE MOST USED STATISTICAL EXPERIMENTAL DESIGNS, THE FACTORIAL AND THE ORTHOGONAL SQUARES. THE METHOD IS ILLUSTRATED ON A THREE-VARIABLE, HYPOTHETICAL DOSE-RECOVERY EXPERIMENT. THE METHOD GIVES ONE A HANDLE ON MEASURING QUANTITATIVELY THE SEPARATE AND JOINT CONTRIBUTIONS TO THE OBSERVED EFFECT OF VARIABLES OTHERWISE HOPELESSLY CORRELATED AND OVERLAPPING.

*DOSE + *MATHEMATICAL STUDY + STATISTICAL CORRELATION

15-11128 IZAWA M
REVIEW OF THE NEW 1962 ICRP RECOMMENDATIONS
NATIONAL INSTITUTE OF RADIOLOGICAL SCIENCES, CHIBA, JAPAN
UCRL-TRANS-10055 +. 20 PAGES, TRANSLATED FROM NIPPON GENSHEYOKU GAKKAISHI, 7, PAGES 418-22 (1965), JCL, \$1.60 FS, \$0.80 MF

THE NEW RECOMMENDATIONS OF THE INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION ADOPTED IN 1962 ARE REVIEWED. THE BASIC PRINCIPLES ARE THE SAME AS THOSE OF THE 1958 RECOMMENDATIONS, BUT A NUMBER OF AMENDMENTS AND CLARIFICATIONS ARE MADE IN THE NEW PUBLICATION. ADOPTION OF THE NEW RECOMMENDATIONS TO REGULATIONS OF RADIATION PROTECTION IN JAPAN ARE DISCUSSED.

*ICRP (INT. COMM. ON RADIOLOGICAL PROTECTION) + *RADIATION PROTECTION, ORGANIZATION + JAPAN + RADIATION SAFETY AND CONTROL

15-11129 SCHREIBER B
THE OCEANS AND THE PROBLEM OF ARTIFICIAL RADIOACTIVITY
ISTITUTO DI ZOOLOGIA E ANATOMIA COMPARATA, PARMA, ITALY
7 PAGES, SCIENTIA, (100), PAGES 158-164 (1966), IN ITALIAN

THE MILITARY APPLICATION OF THE DISCOVERY OF ATOMIC FISSION AND THE SUCCESSIVE EXPLOITATION OF ATOMIC ENERGY ON AN INDUSTRIAL SCALE HAVE POSED SOME IMPORTANT QUESTIONS REGARDING THE APPEARANCE ON THE EARTH OF PREVIOUSLY NONEXISTENT RADIOACTIVE ISOTOPES OF NATURAL ELEMENTS. THE OCEANS HAVE SUDDENLY BECOME INVOLVED IN THESE PROBLEMS, ON THE ONE HAND, THROUGH THE POLLUTION DUE TO RADIOACTIVE FALLOUT FROM EXPLOSIONS OR TO EXPLOSIONS THEMSELVES MADE TO OCCUR IN THE OCEAN. ON THE OTHER HAND, THE OCEANS ARE INVOLVED BECAUSE INDUSTRIAL RADIOACTIVE WASTES, WHICH MUST AT ALL COSTS BE REMOVED FROM POPULATED AREAS, ARE DISCHARGED INTO THE SEA. FROM THIS HAVE ARISEN PROBLEMS FOR STUDY WHICH, RENDERED NECESSARY TO FILL GAPS PERTAINING TO PROTECTION AGAINST THESE PRODUCTS, HAVE AT THE PRESENT TIME MADE FORESEEN CONTRIBUTIONS TO PHYSICAL AND BIOLOGICAL OCEANOGRAPHY.

*OCEAN AND SEA + BIOLOGICAL CONCENTRATION, AQUATIC ORGANISMS + FALLOUT +

CATEGORY 15
ENVIRONMENTAL SURVEYS, MONITORING AND RADIATION EXPOSURE OF MAN

15-11129 *CONTINUED*
SURFACE WATER, NUCLIDE OCCURRENCE + SURFACE WATER, PROPERTY + WASTE DISPOSAL, OCEAN

15-11130 BURT AK + GIBSON JA
A METHOD FOR CONTINUOUS MEASUREMENT OF TRITIATED WATER IN AIR
ATOMIC ENERGY RESEARCH ESTABLISHMENT, HARWELL
JOURNAL OF NUCLEAR ENERGY 20 (3), PAGES 185-190, 6 FIGURES, 7 REFERENCES, 1966

AN INSTRUMENT HAS BEEN DEVELOPED FOR THE CONTINUOUS MEASUREMENT OF TRITIUM (AS HTO) IN AIR IN THE VICINITY OF A HEAVY-WATER REACTOR. WATER IS CONDENSED CONTINUOUSLY FROM THE AIR AT THE RATE OF 10G/HR, AND THE TRITIUM ACTIVITY IS MEASURED IN A FLOW CELL FILLED WITH ANTHRACENE CRYSTALS. THE METHOD WAS DEVELOPED TO IMPROVE THE SENSITIVITY OF DETECTION FROM 2.5 PC/CU.CM FOR AN ION CHAMBER SYSTEM TO ENABLE THE CHRONIC LEVEL OF 0.4 PC/CU.CM (0.08 MPC FOR AIR) TO BE CONTINUOUSLY MEASURED. THE RANGE OF THE INSTRUMENT, USING A LOGARITHMIC RATEMETER, IS FROM THE BACKGROUND SENSITIVITY OF 0.1 TO 1000 PC/CU.CM (250 MPC). THE INSTRUMENT CAN BE OPERATED IN A HIGH GAMMA-RAY BACKGROUND AND DOES NOT DETECT RADIOACTIVE GASES SUCH AS AR-41. CONTAMINATION OF THE CELL IS RAPIDLY REMOVED FOLLOWING A LARGE RELEASE OF TRITIUM ACTIVITY.

*INSTRUMENTATION, AIR SAMPLING + *MONITOR, RADIATION, AIR + *TRITIUM + DECONTAMINATION + REACTOR, HEAVY WATER

15-11131 BROECKER WS + ROCCO GG + VOLCHOK HL
STRONTIUM-90 FALLOUT - COMPARISON OF RATES OVER OCEAN AND LAND
COLUMBIA UNIVERSITY + TRACERLAB, INC., WALTHAM, MASS. + HEALTH AND SAFETY LABORATORY, N.Y.
2 PAGES, 2 FIGURES, 7 REFERENCES, SCIENCE (152), PAGES 640-641 (APRIL 29, 1966)

MEASUREMENTS OF SR-90 IN WATERS RESIDING ON THE BAHAMA BANKS FOR PERIODS BETWEEN 12 AND 180 DAYS SUGGEST THAT FALLOUT RATES ONTO THESE WATERS ARE SUBSTANTIALLY THE SAME AS THE AVERAGE RATES AT ALL FALLOUT COLLECTION STATIONS BETWEEN 20 AND 30 DEGREES LATITUDE. IF THE AMOUNT OF PRECIPITATION ON THE BAHAMA BANKS IS REASONABLY REPRESENTATIVE OF THE OCEANIC AREAS IN THIS LATITUDE BAND, OUR RESULTS SUPPORT THE CONCLUSION THAT THE AMOUNT OF SR-90 DEPOSITED PER UNIT AREA OF OCEAN SURFACE IS WITHIN A FACTOR OF 2 OF THAT ON LAND.

*FALLOUT + *STRONTIUM + OCEAN AND SEA + SURFACE WATER, NUCLIDE OCCURRENCE

15-11132 OWEN WL + KAWAHARA FK + WILSHIRE LL
RADIOLOGICAL RECLAMATION PERFORMANCE SUMMARY. VOLUME 1. PERFORMANCE TEST DATA COMPILATION
NAVAL RADIOLOGICAL DEFENSE LABORATORY, SAN FRANCISCO, CALIFORNIA
USNRDL-TR-967 +. 124 PAGES, 36 TABLES, 4 FIGURES, 25 REFERENCES, OCTOBER 13, 1965, CFSTI, \$4.00 FS, \$0.75 MN

THIS VOLUME PRESENTS TABULATED DATA SUMMARIZING THE PERFORMANCE OF LAND-RECLAMATION METHODS AND EQUIPMENT. THE TABLED ENTRIES WERE GATHERED FROM 18 EXPERIMENTS AND FIELD OPERATIONS. THEY INCLUDE THOSE OPERATIONAL AND ENVIRONMENTAL FACTORS KNOWN TO INFLUENCE RECLAMATION EFFECTIVENESS. A SECOND VOLUME WILL BE DEVOTED TO THE EVALUATION AND REORGANIZATION OF THE ABOVE COMPILATION INTO A FORM COMPATIBLE WITH THE PLANNING OF RADIOLOGICAL RECOVERY OPERATIONS.

*CIVIL DEFENSE + *DECONTAMINATION + *FALLOUT + DEPOSITION + PARTICLE SIZE + RADIATION SAFETY AND CONTROL + TOPOGRAPHY

15-11165 PELLERIN P + MORONI JP + REMY ML
FIRST RESULTS OF A SYSTEMATIC STUDY OF INTERNAL CONTAMINATIONS DUE TO RADIOACTIVE FALLOUT
CENTRAL SERVICE OF PROTECTION AGAINST IONIZING RADIATION
SCPRI-(S)-107 +. 11 PAGES, 6 FIGURES, 2 TABLES, MARCH 1964, IN FRENCH

SINCE SEPTEMBER 1961, MORE THAN 500 TOTAL-BODY-COUNTER MEASUREMENTS, ASSOCIATED WITH URINARY ANALYSIS, HAVE BEEN DONE BY THE SCPRI. THE COMPARATIVE STUDY OF THESE RESULTS BRINGS OUT SOME FACTS RELATING TO THE INTERNAL CONTAMINATION DUE TO FALLOUT - (1) CS-137 ALONE IS CONSTANTLY FOUND AND THE RATIO BETWEEN ITS URINARY EXCRETION AND THE TOTAL CHARGE IN THE ORGANISM. (2) FISSION PRODUCTS WITH MEAN LIFE (ZR-95 + NB-95, RU-107, ETC.) WERE FOUND TRANSITORILY. (3) THE SR-90 TOTAL BODY BURDEN OF THE HUMAN ORGANISM WAS INDIRECTLY ESTIMATED BY COMPARING THE PERCENTAGE OF CS-137 IN FALLOUT (WHICH IS ESSENTIALLY THE SAME AS THAT OF SR-90) AND THE URINARY EXCRETION OF SR-90.

*BIOLOGICAL CONCENTRATION, MAN + *FALLOUT + ANALYTICAL TECHNIQUE, URINE + CESIUM + COUNTER, WHOLE BODY + DOSE + NIOBIUM + RUTHENIUM + STRONTIUM + ZIRCONIUM

15-11167 TOCHILIN E + GOLDSTEIN N
DOSE RATE AND SPECTRAL MEASUREMENTS FROM PULSED X-RAY GENERATORS
U.S. NAVAL RADIOLOGICAL DEFENSE LABORATORY, SAN FRANCISCO
DASA-17C3 + USNRDL-TR-939 + AD-627567 +. 33 PAGES, 7 FIGURES, 1 TABLE, 15 REFERENCES, DECEMBER 3, 1966, CFSTI \$1.00 CY, \$0.50 MN

TYPICAL X-RAY SPECTRA FROM HIGH INTENSITY, PULSED X-RAY SOURCES WERE DETERMINED BY MEANS OF AN EQUIVALENT-CONSTANT-VOLTAGE ACCELERATOR. THE PHOTON-ENERGY SPECTRUM FOR THE FORWARD X-RAY BEAM WAS MEASURED WITH VARIOUS X-RAY TARGET THICKNESSES AT ACCELERATOR VOLTAGES OF 1.0, 1.5, AND 2.0 MV. X-RAY SPECTRA WERE ALSO OBTAINED FROM A REFLECTION X-RAY TARGET AT ANGLES OF 7 AND 45 DEG WITH RESPECT TO THE X-RAY BEAM AT APPLIED POTENTIALS OF 0.55, 1.0, AND 2.0 MV. THE DOSE-RATE DEPENDENCE OF THERMOLUMINESCENT LIF, SILVER-ACTIVATED PHOSPHATE GLASS, AND

CATEGORY 15
ENVIRONMENTAL SURVEYS, MONITORING AND RADIATION EXPOSURE OF MAN

15-11167 *CONTINUED*

DOSIMETRY FILM WAS INVESTIGATED OVER A RANGE OF DOSE RATES EXTENDING FROM 10 TO THE 4TH TO 10 TO THE 11TH RAD/SEC WITH THREE SEPARATE FLASH X-RAY SYSTEMS.

*DOSE + *DOSIMETRY, GENERAL + *X-RAY + ACCELERATOR + DOSIMETRY, PHOTOGRAPHIC + DOSIMETRY, THERMOLUMINESCENCE

15-11254 BRAMSON PE + ENDRES GW
PULSED REACTOR TESTS OF DOSIMETERS
BATTELLE NORTHWEST, PACIFIC NORTHWEST LABORATORY, RICHLAND
BNWL-SA-27 +. 11 PAGES, JUNE 7, 1965, CFSTI, \$1.00 CY, \$0.50 MN

HANFORD CRITICALITY DOSIMETERS, PERSONAL BETA-GAMMA FILM BADGE DOSIMETERS AND SEVERAL TYPES OF SILICON DIODES WERE EXPOSED AT THE SANDIA PULSED-REACTOR FACILITY. THE NEUTRON DOSAGES WERE 40 TO 2700 RADS. THE RADIATION MONITORING INSTRUMENTS USED AT HANFORD WERE EXPOSED TO A 0.1 MICROSECOND PULSE OF 600 KW X-RAYS.

*DOSE MEASUREMENT, EXTERNAL + *MONITOR, RADIATION, PERSONNEL + MONITOR, RADIATION, ENVIRONMENTAL + NEUTRON

15-11309 LESS LN + SWALLOW JS
ESTIMATING THE HAZARD DUE TO RADIOLYTIC PRODUCTS FROM AIR
IMPERIAL COLLEGE, LONDON + CHRISTIE HOSPITAL AND HOLT RADIUM INSTITUTE, MANCHESTER
5 PAGES, NUCLEONICS 22 (9), PAGES 58-65, SEPTEMBER 1964

THE PRINCIPAL PRODUCT OF THE IRRADIATION OF AIR IS OZONE. SINCE IT IS TOXIC IT MAY LIMIT THE OPERATION OF LARGE ISOTOPE SERVICES OR HIGH-INTENSITY ACCELERATORS. ESTIMATES OF OZONE PRODUCTIONS AND VENTILATION REQUIREMENTS ARE MADE.

*CHEMICAL TOXICITY + *OZONE + RADIATION EFFECT

15-11311 MILBURN GS
TAGGING STUDIES TO DETERMINE THE OFFSHORE-INSHORE EXCHANGE OF GROUND FISH OFF OREGON AND WASHINGTON, JUNE 1961 - FEBRUARY 1966
OREGON FISH COMMISSION, ASTORIA
RL0-1731-5 +. 35 PAGES, FEBRUARY 1966, CFSTI, \$2.00 CY, \$0.50 MN

A COOPERATIVE STUDY WAS STARTED IN JUNE 1961 BY THE ATOMIC ENERGY COMMISSION, BUREAU OF COMMERCIAL FISHERIES, AND THE OREGON FISH COMMISSION TO DETERMINE THE OFFSHORE-INSHORE MOVEMENTS OF DOVER SOLE AND SABLEFISH. FROM JUNE 1961 TO MAY 1964, 9013 DOVER SOLE AND 4657 SABLEFISH WERE TAGGED AND RELEASED AT APPROXIMATELY 25-FATHOM INTERVALS FROM 50 TO 450 FATHOM IN A 35-MILE-LONG AREA SOUTHWEST OF THE COLUMBIA RIVER.

*ECOLOGICAL CONSIDERATION + OCEAN AND SEA + WASTE DISPOSAL, OCEAN

15-11312 DEBORTOLI M + GAGLIONE P + MALVICINI A
ENVIRONMENTAL RADIO-ACTIVITY, ISPRA 1965
EUROPEAN ATOMIC ENERGY COMMUNITY (EURATOM), ISPRA, ITALY
EUR-2965E +. 72 PAGES, 1966, DEP. MN

THIS REPORT SUMMARIZES THE RESULTS OF THE MEASUREMENTS OF ENVIRONMENTAL RADIOACTIVITY PERFORMED BY THE SITE-SURVEY GROUP OF THE PROTECTION SERVICE OF THE EURATOM ISPRA ESTABLISHMENT. THE RESULTS INDICATE THAT THE ENVIRONMENTAL RADIATION EXPOSURE FOR THOSE LIVING IN THE NEIGHBOURHOOD OF THE ESTABLISHMENT WAS DUE, ALMOST EXCLUSIVELY, TO NATURAL SOURCES AND WORLD-WIDE FALLOUT.

*BIOLOGICAL CONCENTRATION, AQUATIC ORGANISMS + *BIOLOGICAL CONCENTRATION, FOOD + *BIOLOGICAL CONCENTRATION, MILK + *BIOLOGICAL CONCENTRATION, VEGETATION + CESIUM + EURATOM + FALLOUT + ITALY + MONITOR, RADIATION, ENVIRONMENTAL + RAINOUT + SOIL, NUCLIDE OCCURRENCE + STRONTIUM + SURVEY, RADIATION, ENVIRONMENTAL + WASTE DISPOSAL, ATMOSPHERIC + WASTE DISPOSAL, LIQUID

15-11314 WASTE BURNING AT CHALK RIVER
2 PAGES, 3 FIGURES, NUCLEAR ENGINEERING 10(115), 472-473, DECEMBER 1965

OPERATING EXPERIENCE AT THE LOW-ACTIVITY WASTE INCINERATOR IS DESCRIBED. THE INCINERATOR AND MONITORING EQUIPMENT ARE DESCRIBED, AND OPERATING DATA ARE GIVEN, ALONG WITH THE COSTS.

*CANADA + *CHALK RIVER + *INCINERATION + WASTE TREATMENT, ECONOMICS + WASTE TREATMENT, SOLID

15-11318 SEABORN GB
A DETECTOR FOR ALPHA RADIOACTIVITY IN FLOWING WATER
UNION CARBIDE CORPORATION, OAK RIDGE, OAK RIDGE GASEOUS DIFFUSION PLANT
K-1656 +. 19 PAGES, 8 FIGURES, APRIL 19, 1966, CFSTI \$1.00 CY, \$0.50 MN

A DETECTOR WAS DEVELOPED FOR CONTINUOUSLY MONITORING THE ALPHA RADIOACTIVITY IN FLOWING WATER. THE INSTRUMENT IS CAPABLE OF DETECTING ALPHA LEVELS DOWN TO 1 PERCENT OF THE MAXIMUM PERMISSIBLE CONCENTRATION ALLOWED FOR HUMAN CONSUMPTION. THE REQUIRED MAINTENANCE IS MINIMAL, AND IT IS SUITABLE FOR LOCATION IN A REMOTE AREA. THE DESIGN AND TEST RESULTS ARE DESCRIBED.

CATEGORY 15
ENVIRONMENTAL SURVEYS, MONITORING AND RADIATION EXPOSURE OF MAN

15-11318 *CONTINUED*
*INSTRUMENTATION, RADIATION MONITORING + *MONITOR, RADIATION, LIQUID + GROSS ALPHA + WATER POLLUTION

15-1132C TAPPAN JT + MOORE WE
PROJECT DRIBBLE-SALMON EVENT ON-SITE HEALTH AND SAFETY REPORT
REYNOLDS ELECTRICAL AND ENGINEERING CO., INC.
VUF-1025 +. 49 PAGES, 11 FIGURES, 10 TABLES, NOVEMBER 1965, CFSTI \$2.00 CY, \$0.50 MN

THE SALMON EVENT WAS DETONATED AT PROJECT DRIBBLE TEST SITE, TATUM SALT DOME, NEAR HATTIESBURG, MISSISSIPPI, ON 22 OCTOBER 1964. RADIATION MEASUREMENTS WERE RECORDED DURING AND AFTER THE DETONATION BY A REMOTE-AREA MONITORING SYSTEM. AFTER THE DETONATION, RADIATION MONITORS EQUIPPED WITH PORTABLE RADIATION-DETECTION INSTRUMENTS SURVEYED THE ROUTE INTO SURFACE GROUND ZERO BEFORE OTHER PLANNED REENTRIES WERE MADE. CONTINUOUS MONITORING WAS PROVIDED WHILE WORKERS WERE IN THE AREA. ONLY BACKGROUND RADIATION MEASUREMENTS WERE OBSERVED FROM ZERO TIME UNTIL COMMUNICATION WITH THE CAVITY HAD BEEN ESTABLISHED DURING POSTSHOT DRILLING OPERATIONS AT A DEPTH GREATER THAN 2600 FT. FIFTY-TWO INDIVIDUALS RECEIVED RADIATION DOSES IN EXCESS OF 100 MILLIREMS DURING THE PROGRAM. THE MAXIMUM ACCUMULATED INDIVIDUAL DOSE WAS 1065 (WELL BELOW THE DOSAGE LIMITS LISTED IN THE AEC MANUAL, CHAPTER 0524, OF 3 REMS PER QUARTER AND 5 REMS PER YEAR).

*RADIATION PROTECTION, ORGANIZATION + *SURVEY, RADIATION, ENVIRONMENTAL +
*VELA UNIFORM PROGRAM, PROJECT SHOAL + AIR + CHEMICAL TOXICITY + DOSE MEASUREMENT, EXTERNAL + GROSS BETA +
IODINE + PERSONNEL EXPOSURE, RADIATION + WASTE DISPOSAL, LIQUID + WASTE DISPOSAL, SOLID + WATER, GENERAL

15-11348 FITOUSSI L + LEBOUTEUX P + BRICARD P + MOREAU A
RADIOPROTECTION PROBLEMS RESULTING FROM THE PRESENCE OF EXPERIMENTAL DEVICES AROUND AN ATOMIC REACTOR
CENTRE ETUDES NUCLEAIRES DE SACLAY
CEA-R-2799 +. 15 PAGES, 1 TABLE, APRIL 1965, DEP. MN, IN FRENCH

THE SETTING UP OF EXPERIMENTAL DEVICES AROUND A REACTOR PRODUCES DANGERS OF IRRADIATION AND RADIOACTIVE CONTAMINATION, WHICH CAN BECOME VERY GREAT IN THE CASE OF AN ACCIDENT, ESPECIALLY IF THE IN-PILE PORTION CONTAINS FISSIONABLE MATTER. THIS MAY RESULT IN IRRADIATION OF PERSONNEL, PROHIBITION OF ACCESS TO THE EXPERIMENTAL ZONES UNTIL THE SOURCES OF IRRADIATION AND CONTAMINATION HAVE BEEN ELIMINATED, AND A PROLONGED STOPPAGE OF THE REACTOR. THE PLANS FOR AN IN-PILE EXPERIMENT SHOULD TAKE INTO ACCOUNT RADIO-PROTECTION FACTORS. THE AUTHORS SUMMARIZE THE PHYSICAL AND TECHNICAL DATA REQUIRED BY RADIO-PROTECTION SPECIALISTS AND GIVE THE RULES AND GENERAL ADVICE CONCERNING RADIO-PROTECTION WHICH SHOULD BE USEFUL DURING THE PLANNING OF AN IN-PILE EXPERIMENT.

*IN PILE EXPERIMENT + *RADIATION SAFETY AND CONTROL + PERSONNEL EXPOSURE, RADIATION +
RADIATION PROTECTION, ORGANIZATION

15-11349 RODIER J + CHASSANY J + GUILLERMIN P
HEALTH PHYSICS DURING WORK ON THE G.2 AND G.3 REACTOR EXCHANGES
COMMISSARIAT A L'ENERGIE ATOMIQUE
CCA R 2070 +. 35 PAGES, 10 FIGURES, TABLES, DECEMBER 1965, DEP. MN, IN FRENCH

DURING THIS WORK AND ITS PREPARATION, WHICH TOOK PLACE FIRST AT G.2 AND THEN AT G.3 OVER A PERIOD OF 11 MONTHS, 15,000 RESULTS WERE OBTAINED. THEIR ANALYSIS, TOGETHER WITH A CONSIDERATION OF THE ORGANIZATION ON THE SITE AND OF THE CONCLUSIONS DRAWN FROM THE EXPERIMENT, SHOWS THE VARIOUS FACTORS THAT DETERMINE THE IMPORTANCE OF THE RADIOACTIVE DANGERS.

*RADIATION PROTECTION, ORGANIZATION + FRANCE + RADIATION IN PERSPECTIVE + RADIATION SAFETY AND CONTROL +
VENTILATION SYSTEM

15-11352 LEISTNER L
RESEARCH INTO THE RADIOACTIVE CONTAMINATION OF FOODSTUFFS OF ANIMAL ORIGIN
CENTRE ETUDES NUCLEAIRES FONTENAY-AUX-ROSES, FRANCE
CEA-R-2738 + EUR-2226.F +. 69 PAGES, TABLES, MARCH 1965, DEP. MN, IN FRENCH

THE AUTHOR ASSEMBLES IN A VERY COMPLETE WAY ALL THE AVAILABLE DATA RELATING TO THE TRANSFER OF THE MOST IMPORTANT RADIONUCLIDES FROM THE ENVIRONMENT THROUGH ANIMAL PRODUCTS TO MAN. AS THESE DATA ARE NOT DIRECTLY UTILIZABLE BY THE COUNTRIES OF THE EUROPEAN COMMUNITY, HE PROPOSES TO GO FURTHER INTO THE QUESTION TO BE ABLE TO TAKE INTO ACCOUNT THE CHANGING ECOLOGICAL CONDITIONS.

*BIOLOGICAL CONCENTRATION, ANIMAL + *BIOLOGICAL CONCENTRATION, ANIMAL FEED + *ECOLOGICAL CONSIDERATION +
BARIUM + BIOLOGICAL CONCENTRATION, AGRICULTURAL PRODUCE + BIOLOGICAL CONCENTRATION, AQUATIC ORGANISMS +
BIOLOGICAL CONCENTRATION, FOOD + BIOLOGICAL CONCENTRATION, MILK + BIOLOGICAL CONCENTRATION, VEGETATION +
CALCIUM + CESIUM + IODINE + STRONTIUM

15-11506 COBBIN WC + OWEN WL
DEVELOPMENT AND TEST OF A SOD-REMOVAL PROCEDURE FOR MOIST LAWNS CONTAMINATED BY SIMULATED FALLOUT
U.S. NAVAL RADIOLOGICAL DEFENSE LABORATORY, SAN FRANCISCO
USNRDL-TR-965 + AD-631529 +. 67 PAGES, FIGURES, TABLES, 7 REFERENCES, APRIL 11, 1966, DDC

A SOD-CUTTING MACHINE WAS EVALUATED FOR ITS USEFULNESS IN THE RADIOLOGICAL RECLAMATION OF SMALL LAWN AREAS. FALLOUT WAS APPROXIMATED BY CONTAMINATING LAWN TEST AREAS WITH RADIO-TRACED SAND. NOMINAL PARTICLE SIZE RANGES OF 44-88, 88-177, 177-350, AND 350-700

CATEGORY 15
ENVIRONMENTAL SURVEYS, MONITORING AND RADIATION EXPOSURE OF MAN

15-11506 *CONTINUED*

MICRONS WERE USED. THE SAND WAS DISPERSED AT NOMINAL CONCENTRATIONS OF 25, 50 AND 100 G/SQ. FT, RESPECTIVELY. RECLAMATION EFFECTIVENESS OF SOD CUTTING WAS DEPENDENT UPON MACHINE FACTORS (BLADE DEPTH), SOIL CHARACTERISTICS (MOISTURE CONTENT) AND MASS LOADING. THE LEAST EFFECTIVE RESULTS WERE OBTAINED IN CONFINED LAWNS WITH HIGH MOISTURE CONTENT AND HEAVY ROCK CONCENTRATIONS. THE BEST SOD-CUTTING AND REMOVAL EFFECTIVENESS RESULTS WERE OBTAINED ON MORE ACCESSIBLE LAWNS HAVING LESS MOISTURE CONTENT AND ONLY A LIGHT CONCENTRATION OF ROCKS. PARTICLE SIZE WAS FOUND TO HAVE LITTLE, IF ANY, WITH RESPECT TO EFFORT REQUIRED OR REMOVAL EFFECTIVENESS ACHIEVED.

*RECOVERY PROCESS + CONTAMINATION + FALLOUT + PARTICLE SIZE + PARTICLE SIZE DISTRIBUTION + TRACER, RADIOACTIVE

15-11704 MANNESCHMIDT JF

RECENT ADVANCES IN MONITORING OF RADIOACTIVE GASEOUS WASTES AT ORNL

OAK RIDGE NATIONAL LABORATORY, OAK RIDGE

CONF-660904 +. 27 PAGES, 17 FIGURES, 6 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

MANY ACTIVITIES AT THE OAK RIDGE NATIONAL LABORATORY ARE CONCERNED WITH THE CHEMICAL PROCESSING OF RADIOACTIVE MATERIALS. GASEOUS EFFLUENTS FROM THESE OPERATIONS ARE TREATED TO REMOVE DANGEROUS CONTAMINANTS BEFORE RELEASE TO THE ATMOSPHERE. ROUTINE MONITORING OF SUCH EMISSIONS WAS STARTED IN 1966 WHEN MANUALLY OPERATED PARTICULATE MONITORS WERE INSTALLED AT EACH OF THREE PROCESS STACKS. SINCE THAT DATE, COVERAGE HAS BEEN EXTENDED TO SIX STACKS, THE SAMPLE WITHDRAWAL SYSTEM HAS BEEN REBUILT, AND THE DETECTION EQUIPMENT HAS BEEN ADDED TO AND MODERNIZED. THE INTENSIVE MONITORING HAS LEAD TO PROCESS IMPROVEMENTS THAT HAVE REDUCED THE ENVIRONMENTAL RELEASES OF RADIOACTIVITY IN THE GASEOUS WASTE EFFLUENTS BY A FACTOR OF 3 SINCE 1962.

*MONITOR, RADIATION, EMERGENCY + *MONITOR, RADIATION, GAS + *MONITOR, RADIATION, GENERAL PRACTICE +
*MONITOR, RADIATION, SAMPLING + *MONITOR, RADIATION, STACK + MONITOR, RADIATION, AIR +
MONITOR, RADIATION, BACKGROUND + MONITOR, RADIATION, ENVIRONMENTAL + MONITOR, RADIATION, GENERAL

15-11714 SMITH DG + REIST PC + SILVERMAN L

INCREASED DETECTION SENSITIVITY FOR KRYPTON-85

HARVARD UNIVERSITY

CONF-660904 +. 14 PAGES, 6 FIGURES, 1 TABLE, 4 REFERENCES, PRESENTED AT 9TH AEC AIR CLEANING CONFERENCE, BOSTON, MASS., SEPTEMBER 13-16, 1966, SOURCE

INCREASING THE FIELD DETECTION SENSITIVITY FOR KR-85 TO A LEVEL OF 3(MINUS 8TH) MICROCURIE/CC BY USING A 2.8-LITER IONIZATION CHAMBER AND VIBRATING-REED-ELECTROMETER DETECTION SYSTEM, PLUS AN ADSORPTION-DESORPTION KR-85 CONCENTRATING SYSTEM, WAS INVESTIGATED. THE KR-85 IN THE SAMPLE STREAM WAS CONCENTRATED BY ADSORBING IT ON AN ACTIVATED CARBON BED AT -78.5 C AND DESORBING IT INTO THE IONIZATION CHAMBER AT 20 C. A CONCENTRATION FACTOR WAS DEFINED AND OBSERVED TO BE INDEPENDENT OF THE INLET CONCENTRATION OF KR-85.

*ANALYTICAL TECHNIQUE, AIR + *ANALYTICAL TECHNIQUE, GAS + *INSTRUMENTATION CALIBRATION + *KRYPTON +
*NOBLE GAS + AIR CLEANING + RADIOACTIVITY, RELEASE + RADIOISOTOPE

CATEGORY 16
METEOROLOGICAL CONSIDERATIONS

16-09611 GRAHAM ER
STRONTIUM-90, CESIUM-137, AND RADIOACTIVE RARE EARTHS IN ENVIRONMENTAL RAIN AND AIR AT LOS ALAMOS, NEW MEXICO
LOS ALAMOS SCIENTIFIC LABORATORY, NEW MEXICO
LAHS-2878 +. 17 PAGES, 2 FIGURES, 8 TABLES, 3 REFERENCES, JULY 1964, CFSTI, \$0.50 CY

A STUDY WAS MADE OF THE STRONTIUM-90, CESIUM-137, AND THE RADIOACTIVE RARE EARTHS IN RAIN AND AIR AT LOS ALAMOS, NEW MEXICO. SAMPLES WERE COLLECTED CONTINUOUSLY FROM JANUARY 1958 THROUGH JUNE 1963. THE RESULTS SHOWED THE ACTIVITY OF THE STRONTIUM-90 TO BE THE HIGHEST DURING THE SUMMER OF 1958- THE ACTIVITY THEN DECREASED SLOWLY REACHING THE LOWEST LEVEL DURING SEPTEMBER OF 1961. STARTING IN OCTOBER OF 1961, THE ACTIVITY STARTED TO RISE, HOWEVER, NEVER REACHING THE LEVEL OF 1958. THE ENVIRONMENTAL CONCENTRATION OF CESIUM-137 AND RARE-EARTH RADIOACTIVITY WERE SIMILAR TO THOSE FOR STRONTIUM-90.

*AIR + *CESIUM + *PRECIPITATION + *RARE EARTH + *SAMPLING + *STRONTIUM + RAINOUT

16-09613 WESS WM
THE EFFECTS OF HIGH ALTITUDE EXPLOSIONS
GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.
NASA-TN-D-2402 +. 32 PAGES, 17 FIGURES, 44 REFERENCES, SEPTEMBER 1964, CFSTI, \$1.00 CY

HIGH-ALTITUDE NUCLEAR EXPLOSIONS HAVE HELPED CONSIDERABLY IN OUR UNDERSTANDING OF THE NATURAL RADIATION BELTS. THE ARGUS ARTIFICIAL RADIATION BELT MADE IN 1958 GAVE INFORMATION ON THE STABILITY OF PARTICLE ORBITS. THE STARFISH ARTIFICIAL BELT GAVE QUANTITATIVE INFORMATION ON ELECTRON LIFETIMES NOT AVAILABLE ANY OTHER PLACE. BELOW L EQUAL 1.7, THE ELECTRONS HAVE A LONG LIFE AND APPARENTLY ARE LOST ONLY BY COULOMB SCATTERING ON THE ATMOSPHERE. ABOVE L EQUAL 1.7, THE LIFETIME SHORTENS ABRUPTLY AND SOME NON-ATMOSPHERIC PROCESS DOMINATES. SYNCHROTRON RADIATION AND AURORA WERE ALSO OBSERVED AFTER STARFISH. THERE ARE SOME INTERESTING QUESTIONS LEFT ABOUT HOW THE STARFISH ELECTRONS GOT WHERE THEY DID AND WHY THEY HAVE THE SPECTRA OBSERVED.

*NUCLEAR EXPLOSION DEBRIS + *RADIATION EFFECT + SOURCE, NEUTRON

16-09614 HEDMAN FA
CALCULATION OF FREE-FALL VELOCITY OF SPHERICAL PARTICLES AT VARIOUS ALTITUDES
NATIONAL MILITARY COMMAND SYSTEM SUPPORT CENTER
AD-463352 +. 19 PAGES, 2 TABLES, 16 REFERENCES, MARCH 1965

A GENERAL EQUATION USING REYNOLD NUMBER RELATIONSHIPS IS DERIVED FOR THE FREE-FALL VELOCITY OF SPHERICAL PARTICLES (OR DROPLETS) OF ANY DENSITY FOR ALL ALTITUDES OF INTEREST IN NUCLEAR-FALLOUT CALCULATIONS. IT IS A MODIFIED STOKES EQUATION. TABLES OF THE VALUES OF STOKES CONSTANT AND MAXIMUM APPLICABLE DIAMETER OF UNIT-DENSITY PARTICLES ARE PRESENTED FOR ALTITUDES TO 105,000 FEET. DATA, APPLICABLE ONLY TO LARGE PARTICLES, ARE INCLUDED FOR USE WITH NEWTON EQUATION. EMPIRICAL EQUATIONS OF THESE PARAMETER VALUES AS FUNCTIONS OF ALTITUDE ON INTEGRATION, GIVE TOTAL DESCENT TIME.

*ANALYTICAL MODEL + *DEPOSITION + *EQUATION, GENERAL + *FALLOUT + *PARTICLE SIZE + *PARTICLE, RADIOACTIVE

16-09616 IORDANOV D
DIFFUSION FROM A POINT SOURCE IN A SURFACE AIR LAYER WITH UNSTABLE STRATIFICATION
BULGARIAN ACADEMY OF SCIENCE, SOFIA
ORNL-TR-905 +. 5 PAGES, 11 REFERENCES, 1965- TRANSLATED FROM DOKLADY BOLGARSKOI AKAD. NAUK 18(2)-109-112 (1965), CFSTI \$1.00 CY, \$0.50 MN

A THEORY OF DIFFUSION FROM CONTINUOUS POINT AND LINE SOURCES LOCATED AT VARIOUS HEIGHTS IN THE SURFACE, OR CONSTANT STRESS LAYER OF THE ATMOSPHERE (ROUGHLY, THE LOWEST 10 TO 100 METERS ABOVE GROUND), IS DESCRIBED. THE THEORY IS BASED ON THE MONIN AND OBUKHOV TWO-LAYER MODEL OF THE SURFACE LAYER, FOR THE CASE OF UNSTABLE THERMAL STRATIFICATION. GENERAL RESULTS INVOLVE SUMS OF BESSEL FUNCTIONS. SOME SPECIAL, LIMITING CASES ARE DISCUSSED. THESE RESULTS ARE PRIMARILY OF THEORETICAL INTEREST. NO GRAPHICAL OR TABULAR SUMMARIES ARE INCLUDED.

ATMOSPHERIC DIFFUSION + BOUNDARY LAYER + LAPSE RATE, UNSTABLE + SOURCE, CONTINUOUS + SOURCE, ELEVATED + SOURCE, LINE + SOURCE, POINT

16-09617 LIGDA MG
THE LASER IN METEOROLOGY
6 PAGES, 5 FIGURES, DISCOVERY 26(7), PAGES 30-35, 50 (JULY 1965)

A NEW AND NOVEL INSTRUMENT, BASED ON THE GIANT-PULSE RUBY LASER, HAS RECENTLY BEEN DEVELOPED FOR WEATHER OBSERVATION. ITS USE FOR PROBING CLOUDS AND STUDYING AEROSOLS IN THE ATMOSPHERE IS NOW REVEALING NEW INFORMATION ABOUT THE ATMOSPHERE, ITS STRUCTURE, FINE-SCALE MOTION, AND THE MODIFICATION OF IT BY MAN. THE LIDAR (LIGHT DETECTION AND RANGING INSTRUMENT) IS BASED ON THE PRINCIPLE OF RADAR FOR DETECTING AND RANGING ATMOSPHERIC TARGETS BY THE RADIATION THAT THEY REFLECT - THEIR BACKSCATTER. A NUMBER OF THESE INSTRUMENTS HAS ALREADY BEEN BUILT IN THE LABORATORIES OF STANFORD RESEARCH INSTITUTE.

*INSTRUMENTATION, METEOROLOGICAL + AEROSOL + AIR POLLUTION + ATMOSPHERIC STABILITY + SCATTERING (SKYSHINE) + WIND PROFILE

16-09620 DATA ON ENVIRONMENTAL RADIOACTIVITY COLLECTED IN ITALY, JULY-DECEMBER 1963

ACCESSION NUMBER 16-09611 TO 16-09620

CATEGORY 16
METEOROLOGICAL CONSIDERATIONS

16-C9620 *CONTINUED*
COMITATO NAZIONALE PER L ENERGIA NUCLEARE, ROME
BIO/04/64 +. 204 PAGES, FIGURES, TABLES, APRIL 1964, DEP MN

THIS DOCUMENT CONTAINS GRAPHS, MAPS, AND TABLES ON THE ENVIRONMENTAL RADIOACTIVITY COLLECTED IN ITALY FROM JULY TO DECEMBER 1963. THE DOCUMENT IS DIVIDED INTO SECTION REPORTS FROM NATIONAL NETWORKS, LOCAL NETWORKS, AND ISOLATED AND VARIOUS STATIONS. A LIST IS INCLUDED OF RECENTLY PUBLISHED ITALIAN PAPERS ON DATA ON ENVIRONMENTAL RADIOACTIVITY.

*ENVIRONMENTAL CONDITION + *ITALY + *RADIOISOTOPE + AIR + CESIUM + GROSS BETA + SAMPLING + STRONTIUM

16-10195 CALDWELL R
NUCLEAR MATERIALS AND EQUIPMENT CORPORATION. OFFSITE AIR-SURVEILLANCE PROGRAM
NUCLEAR MATERIALS AND EQUIPMENT CORPORATION, APOLLO, PA.
2 PAGES, APRIL 20, 1966, ATOMIC ENERGY CLEARING HOUSE, 12(20), PAGES 32-33 (MAY 16, 1966)

APOLLO PLANT DOES NOT LEND ITSELF READILY TO CONVENTIONAL DIFFUSION MODELS FOR OFFSITE AIR-SAMPLE-DATA ANALYSIS. A SIX-MONTH PROGRAM WILL BE UNDERTAKEN TO ESTABLISH LOCATION AND FREQUENCY OF OFFSITE SAMPLING. AN INTERIM SCHEDULE OF STACK SAMPLING IS PROPOSED.

*SURVEY, RADIATION, ENVIRONMENTAL + MONITOR, RADIATION, STACK + RADIOCHEMICAL PROCESSING

16-10644 HERING WS + BORDEN TR
OZONESONDE OBSERVATIONS OVER NORTH AMERICA. VOLUME 3
AIR FORCE CAMBRIDGE RESEARCH LABORATORIES, BEDFORD
AFCL-64-30 (III) +. 270 PAGES, 1 TABLE, AUGUST 1965, CFSTI

SYSTEMATIC OBSERVATIONS OF THE VERTICAL OZONE DISTRIBUTION HAVE BEEN OBTAINED SINCE JANUARY 1963 FROM A NETWORK OF STATIONS IN NORTH AMERICA. OBSERVATIONS FOR THE FIRST EIGHT MONTHS OF THE PROGRAM (JANUARY THROUGH AUGUST 1963) WERE PUBLISHED IN OZONESONDE OBSERVATIONS OVER NORTH AMERICA, AFCL-64-30(1) AND (2). VOLUME 3 CONTAINS THE OBSERVATIONS OBTAINED DURING THE ONE-YEAR PERIOD SEPTEMBER 1963 THROUGH AUGUST 1964. THIS REPORT ALSO CONTAINS A SPECIAL SERIES OF OZONESONDE ASCENTS MADE AT LA PAZ, BOLIVIA (16.5 DEGREES S, 68.0 DEGREES W) UNDER THE DIRECTION OF L. ALDAS, OF THE UNIVERSITY OF NEW MEXICO. IT BECAME EVIDENT DURING THE COURSE OF THE PROGRAM THAT THE CHEMILUMINESCENT SENSORS USED IN THE FIELD FROM ABOUT SEPTEMBER 1963 TO MAY 1964 WERE SUBJECT TO A LOSS IN SENSITIVITY DURING ASCENT. BEGINNING WITH OBSERVATIONS IN SEPTEMBER 1963, DATA WERE EXTRACTED FROM THE ORIGINAL FLIGHT RECORDS AT ONE-MINUTE INTERVALS IN LIEU OF THE HALF-MINUTE INTERVALS USED PREVIOUSLY. OZONAGRAMS FOR THE PERIOD SEPTEMBER 1963 THROUGH AUGUST 1964 ARE PRESENTED.

*ENVIRONMENTAL CONDITION + *METEOROLOGY + *OZONE + ATMOSPHERIC CHEMISTRY + INSTRUMENTATION, METEOROLOGICAL

16-10645 FINAL REPORT OF WEATHER AND SURFACE RADIATION PREDICTION ACTIVITIES FOR THE SALMON EVENT - PROJECT DRIBBLE
U. S. WEATHER BUREAU
VUF-1020 +. 38 PAGES, 9 FIGURES, 2 TABLES, DECEMBER 1965, CFSTI, \$2.00 CY

THE WEATHER BUREAU PROVIDED WEATHER PLANNING AND PREDICTION FOR THE RADIOLOGICAL SAFETY PROGRAM OF THE SALMON EVENT, PROJECT DRIBBLE. OBSERVATIONS OF WINDS AND WEATHER CONDITIONS AT THE SITE BEGAN 20 MONTHS PRIOR TO THE EVENT. WIND AND TEMPERATURE SOUNDINGS AND WEATHER AND RADIOACTIVITY FORECASTING FACILITIES WERE ADDED DURING THE DETONATION AND POST-EVENT DRILLING PHASES. THE WINDS DURING THE 4 WEEKS FOLLOWING THE READY DATE WERE SUFFICIENTLY ABNORMAL IN DIRECTION AND SPEED THAT THE PLANNED FIRING CRITERIA WERE NOT MET, RESULTING IN DELAYS AND CHANGES IN CRITERIA TO ACCEPT A WIDER RANGE OF CONDITIONS.

*ENVIRONMENTAL CONDITION + *METEOROLOGY + *NUCLEAR DETONATION + *RADIOLOGICAL ASSISTANCE +
*SITE CLIMATOLOGY + INSTRUMENTATION, METEOROLOGICAL

16-10646 STONE WA
METEOROLOGICAL INSTRUMENTATION OF THE HANFORD AREA
HANFORD ATOMIC PRODUCTS OPERATION, RICHLAND
HW-62455 +. 21 PAGES, 14 FIGURES, 1 TABLE, MARCH 1964, CFSTI, \$0.50 CY

THIS REPORT LISTS THE METEOROLOGICAL INSTRUMENTS IN USE IN THE HANFORD AREA AND GIVES A BRIEF EXPLANATION OF HOW THEY WORK. IT ALSO INCLUDES INSTALLATION DATES, MAINTENANCE INFORMATION, AND SOME DISCUSSION OF SPECIAL PROBLEMS. TYPES OF INSTRUMENTS INCLUDE - THE BENDIX-FRIEZ AEROVANE WIND-SPEED AND DIRECTION TRANSMITTER, FOXBORO HUMIDITY SENSING CELL, FRIEZ MODEL MICROBAROGRAPH, BENDIX-FRIEZ AUTOMATIC RAIN GAGE, THE EPLLY 10- JUNCTION PYRHELIOMETER, AND A CROUSE-HINDS TYPE DCE-16 CEILING PROJECTOR.

*HANFORD SITE + *INSTRUMENTATION, METEOROLOGICAL + *MAINTENANCE AND REPAIR + ENVIRONMENTAL CONDITION + MEASUREMENT, TEMPERATURE + METEOROLOGY + PRECIPITATION + SITE CLIMATOLOGY + WIND STATISTICS

16-10648 AEBY JW + KENNEDY WR
BETA-GAMMA RADIOACTIVITY IN ENVIRONMENTAL AIR AT LOS ALAMOS, NEW MEXICO, FOR 1963
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS
LAMS-3071 +. 22 PAGES, 3 FIGURES, 1 TABLE, JUNE 1964, CFSTI, \$0.50 CY

THIS REPORT IS A CONTINUATION OF WORK REPORTED IN THE LOS ALAMOS SECTION OF - RADIOACTIVE FALLOUT DATA COLLECTED FROM ELEVEN ATOMIC ENERGY INSTALLATIONS FOR 1958-(LAMS-2329), 1960,

CATEGORY 16
METEOROLOGICAL CONSIDERATIONS

16-10648 *CONTINUED*

1961, AND 1963. THE BETA ACTIVITIES WERE NOT IDENTIFIED. HOWEVER, SINCE THE MEASUREMENTS WERE MADE IN THE SAME MANNER, THE VALUES ARE RELATIVE TO ONE ANOTHER. DAILY SAMPLES WERE COLLECTED THROUGHOUT 1963. THE FIRST HALF OF 1963 SHOWED RESULTS CONSISTENTLY HIGHER THAN THE FIRST HALF OF 1962. THE LAST HALF OF 1963 SHOWED A CONTINUOUS DECLINE IN ACTIVITIES.

*ENVIRONMENTAL CONDITION + *FALLOUT + *GAMMA + *LASL (LOS ALAMOS SCIENTIFIC LABORATORY) +
*MONITOR, RADIATION, AIR

16-1C650 SCHUMCHYK MJ + MCNEILLY JH + HAMPTON WC + SACCENTI JC + MURSCHEL I + JACOBSON J
MEASUREMENTS OF GAMMA RADIATION AND GAMMA SPECTRA VERSUS HEIGHT ABOVE A FALLOUT FIELD SIMULATED WITH CO-60
US NUCLEAR DEFENSE LABORATORY, EDGEWOOD ARSENAL
NDL-TR-70 + AD-474-963 +. 156 PAGES, FIGURES, TABLES, 22 REFERENCES, DOD

THIS EXPERIMENT DETERMINED THE FREE-FIELD DOSE RATES, GAMMA RADIATION BUILDUP FACTORS, AND AIR-TO-GROUND DOSE-RATE CORRELATION FACTORS AT VARIOUS HEIGHTS ABOVE A FALLOUT FIELD SIMULATED BY A CO-60 SOURCE EXPOSED AT SEVERAL SOURCE-TO-DETECTOR DISTANCES. ANALYSIS OF SPECTRAL DATA OBTAINED ABOVE A CO-60 POINT SOURCE FOR SOURCE-TO-DETECTOR DISTANCES DISCUSSED IN THIS REPORT INDICATED THAT (A) SCATTERED GAMMA RADIATION WAS OBSERVED AT ALL ANGLES, (B) ENERGY OF THE SCATTER PEAKS VARIED FROM 50 KEV TO 70 KEV, (C) A COLLIMATED DETECTOR SAW NO DIRECT RADIATION COMPONENT THERE WERE NO HIGH-ENERGY GAMMA PHOTO PEAKS IN THE SPECTRAL DATA.

*DOSE CALCULATION, EXTERNAL + *DOSE MEASUREMENT, EXTERNAL + *FALLOUT + *GAMMA + COBALT +
INSTRUMENTATION, METEOROLOGICAL + SOURCE, GROUND LEVEL + SOURCE, POINT

16-1C651 KAYNOR GS

RADIOACTIVE COPPER AS AN ATMOSPHERIC TRACER
BROOKHAVEN NATIONAL LABORATORY, UPTON

CONF-641 207-2 +. 34 PAGES, 20 FIGURES, 4 REFERENCES, DECEMBER 1964, TO BE PRESENTED AT THE 1964 WINTER MEETING OF THE AMERICAN SOCIETY OF AGRICULTURAL ENGINEERS, DECEMBER 8-11, NEW ORLEANS, LOUISIANA, CFSTI

TECHNIQUES AND INSTRUMENTS HAVE BEEN DEVELOPED FOR USING RADIOACTIVE COPPER AS A TRACER IN STUDIES OF DIFFUSION AND DISPERSION THROUGH THE ATMOSPHERE AND OF DEPOSITION ON THE GROUND AND VEGETATION. THE COPPER, IN THE FORM OF SPHERICAL PARTICLES, 2 TO 12 MICRONS IN DIAMETER, OR IN A SOLUBLE COMPOUND, IS ACTIVATED BY EXPOSURE TO A SLOW NEUTRON FLUX TO PRODUCE CU-64. AFTER THREE YEARS OF ACTUAL FIELD EXPERIMENTATION, THIS TRACE SYSTEM HAS PROVED SATISFACTORY FOR ITS DESIGNED PURPOSE AND IS CONSIDERED WELL-ADAPTED FOR ANY APPLICATION WHERE MEASUREMENTS ARE DESIRED ON VEGETATIVE AND SOIL SURFACES AS WELL AS AIR.

*ATMOSPHERIC DIFFUSION + *COPPER + *TRACER, RADIOACTIVE + BNL (BROOKHAVEN NATIONAL LABORATORY) +
DISPERSION + INSTRUMENTATION, METEOROLOGICAL

16-1C652 ATMOSPHERIC RADIOACTIVITY AND FALLOUT RESEARCH DIVISION OF BIOLOGY AND MEDICINE
DIVISION OF TECHNICAL INFORMATION, USAEC
TID-12616 (REV. 2) +. 127 PAGES, 5 FIGURES, DECEMBER 1964, CFSTI, \$1.50 CY

THIS BOOKLET ON ATMOSPHERIC RADIOACTIVITY AND FALLOUT RESEARCH IS A SECOND REVISION OF ONE IN A SERIES OF SUCH PUBLICATIONS TO DESCRIBE THE RESEARCH SUPPORTED BY THE DIVISION OF BIOLOGY AND MEDICINE, U. S. ATOMIC ENERGY COMMISSION. ITS PURPOSE IS TO ACQUAINT INTERESTED SCIENTISTS WITH THE OBJECTIVES, NEEDS, AND CONTENT OF THE PROGRAM. INDIVIDUAL DESCRIPTIVE SUMMARIES OF RESEARCH UNDER EACH CONTRACT ARE INCLUDED, MOSTLY BASED ON INFORMATION PROVIDED BY THE PRINCIPAL INVESTIGATOR OF EACH PROJECT. RESULTS OF THE INVESTIGATIONS ARE NOT INCLUDED HERE, BUT A SELECTION OF SCIENTIFIC PAPERS AND REPORTS ARE LISTED.

*AEROSOL + *AIRBORNE RELEASE + *ATMOSPHERIC DIFFUSION EXPERIMENT + *FALLOUT + *PRECIPITATION +
*RADIOACTIVITY, RELEASE + *SAMPLING, HIGH ALTITUDE

16-1C653 MISKEL JA + BONNER NA

DISTRIBUTION OF THE RADIOACTIVITY FROM A NUCLEAR CRATERING EXPERIMENT. PROJECT DANNY BOY
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA

WL-1817 +. 23 PAGES, 4 FIGURES, 4 TABLES, 6 REFERENCES, SEPTEMBER 1964, CFSTI, \$2.00 CY

THE PRINCIPAL OBJECTIVE OF THE RADIOCHEMISTRY PROGRAM ON DANNY BOY WAS TO MEASURE THE AMOUNT AND DISTRIBUTION OF VENTED RADIONUCLIDES. THE TWO METHODS USED - CLOSE-IN FALLOUT COLLECTION AND AIRCRAFT SAMPLING - GIVE COMPLEMENTARY INFORMATION. A FEW TENTHS OF A PERCENT OF THE NONVOLATILE FISSION PRODUCTS AND 10 TO 20 PERCENT OF THE MORE VOLATILE SPECIES WERE VENTED. A LARGE FRACTION OF THE NONVOLATILE PRODUCTS FELL OUT WITHIN 10 MILES, WHEREAS THE MAJOR PORTION OF THE VOLATILE PRODUCTS DID NOT.

*DEPOSITION + *EXCAVATION, NUCLEAR + CESIUM + CONCENTRATION, GROUND LEVEL + CONCENTRATION, ISOPLETH +
SAMPLING, HIGH ALTITUDE

16-10657 VAUGHN HR + MATEJKA DQ

PROJECT SAND FINAL PROGRAM REPORT. VOLUME III. DYNAMIC ANALYSIS OF THE SAND SAMPLER FLIGHT
SANTIA CORPORATION, ALBUQUERQUE

SC-RR-65-286 +. 71 PAGES, 24 FIGURES, 5 REFERENCES, SEPTEMBER 1965, CFSTI, \$3.00 CY, \$0.75 MN.

THE SAND (SAMPLER FOR AEROSPACE NUCLEAR DEBRIS) WAS DEVELOPED TO COLLECT SAMPLES OF NUCLEAR DEBRIS IN THE 100 TO 225 KILOFEET ALTITUDE RANGE. THE SAND SAMPLER CONSISTS OF A RUCKEL-BUSSED SAMPLER PAYLOAD THAT IS RETARDED IN DESCENT BY A LARGE (50 FEET) CONSTRUCTED

CATEGORY 16
METEOROLOGICAL CONSIDERATIONS

16-10657 *CONTINUED*

DIAMETER) PARACHUTE. IMMEDIATELY AFTER THE PARACHUTE HAS OPENED NEAR APOGEE, SAMPLING VANES ARE EXTENDED FROM THE PAYLOAD, AND THE ENTIRE PAYLOAD IS SPUN AT FIVE REVOLUTIONS PER SECOND BY HYDROGEN PEROXIDE JETS LOCATED IN THE VANE TIPS. THE SAMPLING MATERIAL, LOCATED IN THE VANES EXTRACTS THE NUCLEAR PARTICLES FROM THE AIR THAT FLOWS THROUGH THE VANES. THIS REPORT PRESENTS DYNAMIC ANALYSIS OF THE APPARENT DYNAMIC INSTABILITY AND CONSEQUENT STRUCTURAL FAILURE OF THE SAMPLER PAYLOAD. IT WILL BE SHOWN THAT THE FAILURE WAS CAUSED BY A STRUCTURAL OVERLOAD THAT RESULTED FROM RESONANCE COUPLING BETWEEN THE PAYLOAD MOTION AND THE FIRST BENDING MODE OF THE SAMPLING VANES. FURTHER, THE RESONANCE OCCURRED AS A RESULT OF AN UNFORTUNATE CHOICE OF SPIN RATE, WHICH WOULD HAVE BEEN PRACTICALLY IMPOSSIBLE TO PREDICT PRIOR TO THE FLIGHT TEST.

*INSTRUMENTATION, METEOROLOGICAL + *NUCLEAR EXPLOSION DEBRIS + *SAMPLING, HIGH ALTITUDE + METEOROLOGY

16-10659 JACKSON BS

BIBLIOGRAPHY OF ATMOSPHERIC OZONE TO 40 KM- ITS CONCENTRATION, DISTRIBUTION, METHODS OF DETECTION, AND RELATIONSHIP WITH OTHER METEOROLOGICAL PHENOMENA
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS
LA-3328-MS +. 36 PAGES, JULY 1965, CFSTI, \$2.00 CY, \$0.50 MN

THE PERIOD COVERED IN THIS LITERATURE SEARCH ON ATMOSPHERIC OZONE IS 1960 THROUGH MARCH 1965. THIS BIBLIOGRAPHY INCLUDES REFERENCES TO JOURNALS, BOOKS, AND REPORTS. THE REFERENCES ARE ARRANGED ALPHABETICALLY BY AUTHOR AND ALPHABETICALLY BY TITLE. EACH REFERENCE INCLUDES A NOTATION IDENTIFYING WHERE IT IS ABSTRACTED.

*ATMOSPHERIC CHEMISTRY + *BIBLIOGRAPHY + *OZONE + *STRATOSPHERE + METEOROLOGY

16-10660 ENGELMANN RJ

MIDAS COMPUTATION OF WATERDROP EVAPORATION
BATTTEL-NORTHWEST, RICHLAND
BNWL-74 +. 39 PAGES, 8 FIGURES, 1 TABLE, 14 REFERENCES, JULY 1965, CFSTI, \$2.00 CY, \$0.50 MN.

ALTHOUGH THE THEORY AND FORMULAE FOR CALCULATING THE EVAPORATION OF FALLING WATERDROPS HAVE BEEN AVAILABLE FOR MANY YEARS, ONLY A FEW CALCULATIONS HAVE BEEN MADE FOR SPECIFIC TEMPERATURE AND HUMIDITY REGIMES. SEVERAL PROBLEM AREAS REQUIRING EVAPORATION ESTIMATES FROM METEOROLOGISTS INCLUDE - CHANGES IN RAINDROP SIZE DISTRIBUTIONS BETWEEN THE CLOUD AND THE MEASURING SITE AT GROUND LEVEL, EXTENT OF COOLING OF HEATED WATER BETWEEN A SPRINKLER AND VEGETATION OR POND, AND EXTENT OF EVAPORATION OF CARRIER DROPLETS FOR INSECTICIDES AND PESTICIDES BEFORE THEY REACH THEIR TARGETS. THE MIDAS PROGRAM (MODIFIED INTEGRAL DIGITAL ANALOG SIMULATOR) PROVIDES A METHOD FOR OBTAINING DIGITAL SOLUTIONS ON AN IBM 7090 COMPUTER FOR SYSTEMS OF ORDINARY DIFFERENTIAL EQUATIONS. PROGRAMMING TECHNIQUES ARE VERY SIMILAR TO ANALOG PROGRAMMING. THE SIMPLICITY OF MIDAS AND SIMILAR PROGRAMS CURRENTLY BEING DEVELOPED ENABLE SCIENTISTS TO QUICKLY LEARN TO DO THEIR OWN PROGRAMMING AND DEAL DIRECTLY WITH THE COMPUTER--INDEPENDENTLY OF FORTRAN AND THIRD PERSONS.

*COMPUTER PROGRAM, METEOROLOGICAL + *EVAPORATION + *WATER, GENERAL + HUMIDITY + METEOROLOGY

16-10661 DOURY A + CAPUT C

DAILY MEASUREMENTS OF THE LONG LIVED ATMOSPHERIC RADIOACTIVITY PRESENT ON THE MAIN FRENCH NUCLEAR SITES IN 1963
COMMISSARIAT A L ENERGIE ATOMIQUE, FRANCE, CENTRE D ETUDES NUCLEAIRES, SACLAY
CEA-R-2627 +. 45 PAGES, JANUARY 1965, CEA, DEP. MN.

THIS REPORT FOLLOWS ON TO THE CEA REPORT 2397 AND IS DESIGNED PRIMARILY TO PROVIDE A DETAILED AND CONVENIENT RECAPITULATION OF THE MAIN MEASUREMENT RESULTS OBTAINED DURING THE CONTINUOUS SUPERVISION OF FRENCH NUCLEAR SITES. THE RESULTS PUBLISHED CORRESPOND TO THE RADIO-ACTIVE CONSTITUENT OF THE ATMOSPHERE WHICH SHOULD BE THE MOST AFFECTED BY ANY WASTE COMING FROM AN INSTALLATION (FISSION PRODUCTS). UP TO THE PRESENT, ONLY TEST EXPLOSIONS CAN REASONABLY BE HELD RESPONSIBLE FOR ATMOSPHERE POLLUTION, WHOSE LEVEL NEVERTHELESS REMAINS VERY LOW WITH RESPECT TO PERMISSIBLE NORMS. ALL GRAPHS AND CHART MATERIAL - NOT MUCH TEXT.

*NUCLEAR EXPLOSION DEBRIS + *TEST, WEAPONS (HP ASPECTS) + *TROPOSPHERE + PRECIPITATION

16-10662 CARBON-14 MEASUREMENTS IN THE ATMOSPHERE

U.S. ATOMIC ENERGY COMMISSION, NEW YORK, HEALTH AND SAFETY LAB
HASL-166 +. 73 PAGES, JANUARY 1966, CFSTI, \$2.50 CY, \$0.75 MN

CONTAINS A COMPILATION OF DATA FORWARDED TO THE HEALTH AND SAFETY LABORATORY THROUGH THE WEATHER BUREAU, ENVIRONMENTAL SCIENCES SERVICES ADMINISTRATION. MOST OF THE DATA PERTAINS TO AIRCRAFT OBSERVATIONS, BUT A FEW DEAL WITH BALLOON-BORNE SAMPLING AND GROUND-LEVEL COLLECTIONS. THE REPORT WAS EXPANDED TO INCLUDE THE DEFENSE ATOMIC SUPPORT AGENCY STAR DUST PROGRAM AND SOME EARLIER DATA FROM A UNITED KINGDOM PROGRAM.

*ATMOSPHERIC CHEMISTRY + *CARBON + *MEASUREMENT, GENERAL + METEOROLOGY + SAMPLING, HIGH ALTITUDE

16-10663 CROCKER GR + OCONNOR JD + FREILING EC

PHYSICAL AND RADIOCHEMICAL PROPERTIES OF FALLOUT PARTICLES
U. S. NAVAL RADIOLOGICAL DEFENSE LABORATORY, SAN FRANCISCO
USNRDL-TR-899 +. 20 PAGES, 4 FIGURES, 2 TABLES, 11 REFERENCES, JUNE 1965, CFSTI \$1.00 CY, \$0.50 MN.

CATEGORY 16
METEOROLOGICAL CONSIDERATIONS

16-10663 *CONTINUED*

A SURVEY HAS BEEN MADE OF THE LITERATURE ON THE CHARACTERISTICS OF FALLOUT PARTICLES. AN ATTEMPT IS MADE TO SUMMARIZE IN CONCISE FORM THE RANGES OF PHYSICAL AND RADIOCHEMICAL PROPERTIES OF PARTICLES OF THE DEBRIS PRODUCED BY DEVICES DETONATED UNDER VARIOUS CONDITIONS. THE PHYSICAL AND RADIOCHEMICAL PROPERTIES OF FALLOUT PARTICLES FROM NUCLEAR WEAPONS DO NOT FALL INTO NARROWLY DEFINED RANGES. DETONATIONS AT ALTITUDES SUFFICIENT TO PREVENT INCORPORATION OF SOIL INTO THE FIREBALL TEND TO PRODUCE SMALL, SPHERICAL, HIGHLY ACTIVE PARTICLES, WITH THE ACTIVITY DISTRIBUTED THROUGHOUT. IF SOIL AND OTHER ON-SITE MATERIAL IS INCORPORATED INTO THE FIREBALL, ONE OBSERVES INCREASED FREQUENCY OF PARTICLES WITH LOWER SPECIFIC ACTIVITY, IRREGULAR SHAPE, LARGER SIZE, EVIDENCE OF PARTIAL MELTING AND AGGLOMERATION, AND ACTIVITY CONCENTRATED ON THE SURFACE OF THE PARTICLE. THE LEACHING ACTION OF VARIOUS SOLVENTS ON FALLOUT PARTICLES DEPENDS UPON THE NATURE OF THE PARTICLES THEMSELVES AS WELL AS THAT OF THE SOLVENT.

*FALLOUT + *PROPERTY, PHYSICAL + *RADIOCHEMICAL ANALYSIS

16-10664 RENOUX A
STUDY OF RADIOACTIVE IONS IN THE ATMOSPHERE
CENTRE D ETUDES NUCLEAIRES, FONTENAY-AUX-ROSES
CEA-R-2771 +. 86 PAGES, 31 FIGURES, TABLES, MARCH 1965, CEA

A COMPARATIVE STUDY IS MADE OF ACTIVE DEPOSITS OF RADON AND THORON IN SUSPENSION IN THE ATMOSPHERE BY MEANS OF ALPHA RADIATION COUNTING, USING ZELENY TUBES, SCATTERING EQUIPMENT, FILTER PAPERS, OR MEMBRANES. IT HAS BEEN POSSIBLE TO SHOW THE EXISTENCE OF SMALL AND LARGE IONS WHICH ARE NEGATIVE AND POSITIVE, AS WELL AS OF NEUTRAL RADIOACTIVE NUCLEI. THEIR PROPERTIES ARE STUDIED. A THEORETICAL INTERPRETATION OF THE RESULTS IS PRESENTED. THE AVERAGE CONTENT OF RADON (USING THE RA A CONCENTRATION) AND OF TH B IN THE AIR HAS BEEN DETERMINED. THE RADIOACTIVE EQUILIBRIUM BETWEEN RADON AND ITS DAUGHTER PRODUCTS IN ATMOSPHERIC AIR ARE EXAMINED. THE TECHNIQUES DEVELOPED FOR ACTIVE RADON AND THORON DEPOSITS ARE APPLIED TO THE STUDY OF ARTIFICIAL RADIOACTIVITY, THE ANALYSES BEING CARRIED OUT BY MEANS OF GAMMA SPECTROMETRY.

*ATMOSPHERIC CHEMISTRY + *RADON + *THORON + MEASUREMENT, GENERAL + METEOROLOGY + TROPOSPHERE

16-10665 AEBY JW + KENNEDY WR
BETA-GAMMA RADIOACTIVITY IN ENVIRONMENTAL AIR AT LOS ALAMOS, NEW MEXICO, FOR 1964
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS
LA-3245-MS +. 24 PAGES, 3 FIGURES, 1 TABLE, APRIL 1965, CFSTI, \$2.00 CY

THE REPORT IS A CONTINUATION OF WORK REPORTED IN THE LOS ALAMOS SECTION OF RADIOACTIVE FALLOUT DATA COLLECTED FROM ELEVEN ATOMIC ENERGY INSTALLATIONS FOR 1958, LAMS-2397 (NOV., DEC. OF 1958 AND ALL OF 1959), LAMS-2499 (FOR 1960), LAMS-2702 (FOR 1961), LAMS-2870 (FOR 1962), AND LAMS-3071 (FOR 1963). THE BETA ACTIVITIES WERE NOT IDENTIFIED. HOWEVER, SINCE THE MEASUREMENTS WERE MADE IN THE SAME MANNER, THE VALUES ARE RELATIVE TO ONE ANOTHER. THE MONTHLY AVERAGE-PER-DAY GRAPHS SHOW, IN GENERAL, LOWER TRENDS THROUGHOUT THIS YEAR THAN LAST. FALLOUT FROM THE CHINESE DETONATION, ARRIVING LATE IN OCTOBER, SENT THE AVERAGES FOR THAT MONTH SLIGHTLY HIGHER THAN WOULD HAVE NORMALLY BEEN EXPECTED.

*FALLOUT + *GAMMA + *LASL (LOS ALAMOS SCIENTIFIC LABORATORY) + *NUCLEAR EXPLOSION DEBRIS + FILTER + PRECIPITATION + SAMPLING

16-10668 KUCK GA
TIME BEHAVIOR OF CHARGED PARTICLES INJECTED BY 1962 HIGH ALTITUDE RUSSIAN NUCLEAR TESTS
AIR FORCE INSTITUTE OF TECHNOLOGY, OHIO
AC-603599 +. 88 PAGES, 28 FIGURES, 9 TABLES, AUGUST 1964, CFSTI, \$4.00 CY

THE TIME BEHAVIOR OF THE CONCENTRATION OF CHARGED PARTICLES INJECTED BY THE HIGH-ALTITUDE RUSSIAN NUCLEAR TEST SERIES (1962) WAS FOLLOWED BY THE INSTRUMENTS ON AIR FORCE SATELLITE 1962 BY THE AIR FORCE CAMBRIDGE RESEARCH LABORATORIES. TWO WIDE-ANGLE RADIATION DETECTORS WERE ABLE TO FOLLOW THE TIME DECAY OF THE CHARGED PARTICLES FOR 45 DAYS AFTER THE EXPLOSIONS. THE DATA FOR THIS TIME PERIOD WAS ANALYZED AND PRESENTED AS PITCH-ANGLE DISTRIBUTIONS AND MAXIMUM COUNTING RATES OF THE DETECTORS IN THE L-SHELL REGIONS OF SPACE 1.70-2.00 AT DIFFERENT MAGNETIC LATITUDES. THE DECAY RATE OF THE INJECTED CHARGED PARTICLES IN THESE L SHELLS WAS CONSISTENT WITH AN EXPONENTIAL DECAY HAVING A HALF-LIFE OF 9 TO 18 DAYS.

*NUCLEAR EXPLOSION DEBRIS + *PARTICLE, RADIOACTIVE + *SAMPLING, HIGH ALTITUDE + *UNION OF SOVIET SOCIALIST REPUBLICS + DATA PROCESSING + INSTRUMENTATION, METEOROLOGICAL

16-10669 HANFORD RADIOLOGICAL SCIENCES RESEARCH AND DEVELOPMENT ANNUAL REPORT FOR 1964
BATTELLE-NORTHWEST, RICHLAND
BNWL-36 +. 344 PAGES, FIGURES, TABLES, REFERENCES, JANUARY 1965, CFSTI, \$8.71 CY, \$2.50 MN

THIS DOCUMENT IS THE ANNUAL REPORT OF THE ATMOSPHERIC PHYSICS GROUP OF BATTELLE-NORTHWEST. TOPICS COVERED INCLUDE - A MODEL OF DIFFUSION AND TRANSPORT FOR A CONTINUOUS RELEASE IN A STABLE ATMOSPHERE, MEASUREMENTS OF DISPERSION FROM A CONTINUOUS ELEVATED POINT SOURCE, ATMOSPHERIC TURBULENCE MEASUREMENTS, AREA DOSAGE RELATIONSHIPS DOWNWIND OF A POINT SOURCE, PRECIPITATION SCAVENGING STUDIES, A SAMPLER FOR RECORDING THE CONCENTRATION AT AIRBORNE ZINC SULFIDE ON A REAL TIME SCALE, AND IMPROVEMENTS IN MICROMETEOROLOGICAL INSTRUMENTATION.

*ATMOSPHERIC STABILITY + *BATTELLE NORTHWEST + *DISPERSION + *INSTRUMENTATION, METEOROLOGICAL + *METEOROLOGY + *PRECIPITATION + *SAMPLING, HIGH ALTITUDE + *SOURCE, CONTINUOUS + *SOURCE, ELEVATED + *SOURCE, POINT

CATEGORY 16
METEOROLOGICAL CONSIDERATIONS

16-10671 PROJECT HANDCAR. WEATHER AND RADIOLOGICAL SURVEILLANCE
WEATHER AND SURFACE RADIATION PREDICTION + U. S. PUBLIC HEALTH SERVICE + REYNOLDS ELECTRICAL AND
ENGINEERING CO., INC.
PNE-807F +. 56 PAGES, FIGURES, TABLES, NOVEMBER 1965, CFSTI, \$3.00 CY, \$C.5C MN

PROPER EVALUATION AND MINIMIZATION OF THE POTENTIAL RADIATION HAZARD ASSOCIATED WITH THE
POSSIBLE VENTING OF RADIOACTIVE MATERIALS FROM THE HANDCAR UNDERGROUND NUCLEAR DETONATION
REQUIRED THE USE OF METEOROLOGICAL FACILITIES FOR MEASURING AND PREDICTING ATMOSPHERIC
CONDITIONS. RADIATION MEASUREMENTS AT AND AFTER THE DETONATION INDICATED THAT THE ACTIVITY
LEVELS REMAINED AT NORMAL BACKGROUND THROUGHOUT THE ENTIRE SAMPLING ARRAY. IT IS CONCLUDED
THAT A RELEASE OF RADIOACTIVITY, IF IT OCCURRED, WAS EXTREMELY SMALL AND BELOW DETECTABLE
LIMITS.

*ENVIRONMENTAL CONDITION + *METEOROLOGY + *NUCLEAR DETONATION + *SITE CLIMATOLOGY +
DOSE MEASUREMENT, EXTERNAL + SAMPLING, HIGH ALTITUDE

16-10672 VOLCHOK HL
HEALTH AND SAFETY LABORATORY. THE HASL SURFACE AIR SAMPLING PROGRAM SUMMARY REPORT FOR 1963
NEW YORK OPERATIONS OFFICE, USAEC
HASL-156 +. 68 PAGES, 12 FIGURES, 4 TABLES, JANUARY 1965, CFSTI, \$1.75 CY

THIS REPORT COVERS THE FIRST YEAR OF OPERATION OF THE SURFACE AIR SAMPLING PROGRAM AT THE
HEALTH AND SAFETY LABORATORY. THE DATA DEVELOPED IN 1963 AND A DESCRIPTION OF THE SAMPLING
SITES, SAMPLING EQUIPMENT, AND METHODS ARE PRESENTED. DURING 1963, OVER 1,700 AIR-FILTER
SAMPLES AND 400 SAMPLES OF PRECIPITATION WERE ASSAYED FOR GROSS-GAMMA CONCENTRATION, FISSION
AND NEUTRON ACTIVATION PRODUCTS. THE RESULTS INDICATE THAT IN NORTHERN HEMISPHERIC SURFACE
AIR IN 1963, THE WELL-DOCUMENTED SPRING PEAK OCCURRED AND THAT IN GENERAL THE AIR WAS WELL
MIXED WITH RESPECT TO FISSION PRODUCTS. THROUGH MOST OF THE YEAR, THE AIR OF THE SOUTHERN
HEMISPHERE WAS NOT AS THOROUGHLY MIXED. THE TRENDS OF VARIOUS RADIONUCLIDE CONCENTRATIONS
AND RADIONUCLIDE RATIOS SUGGEST THAT A SUBSTANTIAL PORTION OF THE NUCLEAR DEBRIS DETECTED AT
GROUND LEVEL IN THE SOUTHERN HEMISPHERE CAME ACROSS THE EQUATOR FROM THE TROPOSPHERE OF THE
NORTHERN HEMISPHERE.

*AIR + *SAMPLING + FILTER + GROSS GAMMA + NEUTRON + PRECIPITATION + TROPOSPHERE

16-10674 DE VRIES TW
FALLOUT RADIATION ENERGY DISTRIBUTION AS A FUNCTION OF ALTITUDE
GENERAL DYNAMICS, FORT WORTH
AD-602492 + FZK-187 + N64-27864 +. 209 PAGES, 17 FIGURES, 22 TABLES, 5 REFERENCES, JULY 15, 1964, CFSTI
\$6.00

THE GAMMA-RAY SPECTRA IN THE AIR ABOVE A PLANE CONTAINING FALLOUT FISSION PRODUCTS WERE
CALCULATED AS A FUNCTION OF TIME AND ALTITUDE. SIMILAR CALCULATIONS WERE MADE BY USING THE
SPECTRA OF COBALT-60 AND CESIUM-137 AS SOURCE TERMS. AN EXPERIMENT WAS DESIGNED TO MEASURE
THE SPECTRA CALCULATED FOR COBALT-60, UTILIZING 11 COBALT-60 SOURCES AND A VERY SENSITIVE NaI
GAMMA-RAY SPECTROMETER. THE RESULTS OF THE CALCULATIONS INDICATE THAT THE RELATIVE SPECTRA
ARE CONSTANT ABOVE 800 FT FOR TIMES AFTER FISSION GREATER THAN ONE DAY AND, FURTHERMORE, THAT
THE VARIATION OF THE DOSE RATE WITH ALTITUDE IS CONSTANT FOR THIS TIME INTERVAL.

*DOSE CALCULATION, EXTERNAL + *FALLOUT + *SURVEY, RADIATION, AERIAL + CESIUM + COBALT + GAMMA

16-10675 BARRY PJ
THE WIND PROFILE
CHALK RIVER NUCLEAR LABORATORIES, CHALK RIVER
AECL-2574 +. 12 PAGES, 2 FIGURES, 1 TABLE, 14 REFERENCES, JUNE 1966, PRESENTED AT NATIONAL METEOROLOGY
CONGRESS ROYAL METEOROLOGICAL SOCIETY, SHERBROOKE, QUEBEC, JUNE 8-10, 1966, AECL, \$0.50 CY

THE MAIN INTEREST IN THE WIND PROFILE IS BASED ON THE POSSIBILITY THAT IT MAY BE USED TO
ESTIMATE THE SHEARING STRESS AT THE SURFACE. THIS PAPER REVIEWS SEVERAL SUGGESTED
RELATIONSHIPS BETWEEN SURFACE STRESS AND WIND PROFILES FOR BOTH ADIABATIC AND DIABATIC
CONDITIONS. A COMPARISON HAS BEEN MADE BETWEEN THE SHEARING STRESS ESTIMATED BY USE OF
THEORETICAL EQUATIONS AND THE RESULTS FOUND IN THE FEW AVAILABLE EXPERIMENTS. PROTAGONISTS
OF SOME OF THE THEORIES HAVE MADE SWEEPING CLAIMS FOR THE ACCURACY OBTAINABLE WHEN ESTIMATING
THE STRESS. THESE CLAIMS ARE CAREFULLY EXAMINED AND IT IS CONCLUDED THAT THERE IS AT PRESENT
NO WAY OF RELIABLY MEASURING SURFACE STRESS FROM A WIND PROFILE.

*WIND PROFILE + CANADA + METEOROLOGY + TURBULENCE, SHEAR (WIND)

16-10676 BARRY PJ
FREQUENCY OF OCCURRENCES OF MAXIMUM POLLUTION LEVELS FROM SINGLE STACKS
CHALK RIVER NUCLEAR LABORATORIES, CHALK RIVER
AECL-2575 +. 6 PAGES, 9 FIGURES, 3 TABLES, 5 REFERENCES, JUNE 1966, AECL, \$0.50 CY

ARGON-41 IS DISCHARGED CONTINUOUSLY FROM THE CRNL STACK AT AN ALMOST CONSTANT RATE. THE
CONCENTRATION AT GROUND LEVEL WAS MEASURED CONTINUOUSLY AT FOUR SAMPLING STATIONS AT VARIOUS
DISTANCES AROUND THE STACK. THE MAGNITUDE OF EXTREME POLLUTION LEVELS OCCURRING IN THE
VICINITY, AND ALSO THE FREQUENCY WITH WHICH EXTREME LEVELS OF DIFFERENT MAGNITUDES OCCUR,
WERE ESTIMATED FROM THE RESULTS. THE OCCURRENCE OF EXTREME POLLUTION LEVELS IS RELATED TO
SUCH VARIABLES AS ATMOSPHERIC STABILITY AND WIND TURBULENCE.

*ARGON + *ATMOSPHERIC POLLUTION + *CHALK RIVER + *NOBLE GAS + *STACK + ATMOSPHERIC STABILITY + METEOROLOGY

CATEGORY 16
METEOROLOGICAL CONSIDERATIONS

16-10677 KRASNOPEVTSEV YV
TRANSPORT OF RADIOACTIVE AEROSOLS IN THE TROPOSPHERE FROM THE NORTHERN TO THE SOUTHERN HEMISPHERE
AD-617948 + FTD-TT-65-342 +. 10 PAGES, 1 FIGURE, 3 TABLES, METEOROLOGIYA I GIDROLOGIYA 4, PP. 3-8 (1964),
CFSTI, \$1.00 CY

IN THIS ARTICLE, AN ATTEMPT WAS MADE TO EVALUATE THE RATE OF TRANSITION THROUGH THE EQUATORIAL ZONE OF RADIOACTIVE AEROSOLS FORMED AS A RESULT OF NUCLEAR EXPLOSIONS IN THE NORTHERN HEMISPHERE. IT IS POSSIBLE TO CONCLUDE THAT THE TIME OF THE TRANSITION OF THE RADIOACTIVE AEROSOLS ACROSS THE EQUATORIAL ZONE AMOUNTS TO ABOUT THREE TO THREE-AND-ONE-HALF MONTHS. IN THIS CASE, ALL THE POINTS OF OBSERVATION WERE ALREADY ON THE 180TH MERIDIAN.

*AEROSOL + *FISSION PRODUCT TRANSPORT + *TROPOSPHERE + *UNION OF SOVIET SOCIALIST REPUBLICS +
NUCLEAR EXPLOSION DEBRIS

16-10678 HUFF FA + BRADLEY WE
STUDY OF RAINOUT OF RADIOACTIVITY IN ILLINOIS
U. S. ATOMIC ENERGY COMMISSION, DIVISION OF BIOLOGY AND MEDICINE, WASHINGTON
COO-1199-R +. 20 PAGES, 5 FIGURES, 2 REFERENCES, OCTOBER 1965, CFSTI, \$2.00 CY, \$0.50 MN

SURFACE-AIR AND PRECIPITATION SAMPLES WERE COLLECTED DURING 14 RAINS AND ANALYZED FOR GROSS BETA RADIOACTIVITY. PRELIMINARY INSPECTION INDICATES RELATIVELY WEAK CORRELATION BETWEEN RADIOACTIVITY CONCENTRATIONS IN SURFACE AIR AND PRECIPITATION. AN EXCEPTION OCCURRED ON MAY 26 WHEN HIGH AIR AND WATER CONCENTRATIONS OCCURRED CLOSE TOGETHER IN THE SECOND AND THIRD SHOWERS. NO CONSISTENT INCREASE IN RADIOACTIVITY CONCENTRATIONS HAS BEEN FOUND IMMEDIATELY PRECEDING THE ONSET OF RAINSTORMS TO CORRESPOND WITH THE INITIALLY HIGH CONCENTRATIONS OF RAINWATER RADIOACTIVITY USUALLY FOUND AT THE LEADING EDGE OF STORMS. AIRBORNE MEASUREMENTS OF PRECIPITATION RADIOACTIVITY DURING ONE STORM INDICATED AN INCREASE IN GROSS BETA ACTIVITY BETWEEN FLIGHT ALTITUDE AND THE SURFACE. THE INCREASE IN CONCENTRATION IS MORE THAN CAN BE ACCOUNTED FOR BY EVAPORATION. FURTHER ANALYSIS OF THE DATA IN CONJUNCTION WITH ASSOCIATED METEOROLOGICAL CONDITIONS MUST BE MADE BEFORE FIRM CONCLUSIONS CAN BE ESTABLISHED.

*PARTICLE, RADIOACTIVE + *RAINCUT + INSTRUMENTATION, METEOROLOGICAL + SAMPLING + SAMPLING, HIGH ALTITUDE +
SURVEY, RADIATION, AERIAL

16-10679 FREILIN EC + KAY MA
RADIOISOTOPE FRACTIONATION IN AIR-BURST DEBRIS
U. S. NAVAL RADIOLOGICAL DEFENSE LABORATORY, SAN FRANCISCO
USNRDL-TR-933 +. 21 PAGES, 1 FIGURE, 5 TABLES, 8 REFERENCES, SEPTEMBER 1965, CFSTI, \$1.00 CY, \$0.50 MN

RADIOCHEMICAL DATA FROM FRACTIONATED SAMPLES FROM 15 AIRBURSTS PROVIDED A SOURCE OF EQUIVALENT-FISSION VALUES FOR 24 RADIOISOTOPES. THE AIRBURSTS RANGED IN YIELD BY A FACTOR OF OVER 300. THE EQUIVALENT-FISSION VALUES WERE CONVERTED TO RATIOS BASED ON ZR95, AND THESE RATIOS WERE CORRELATED LOGARITHMICALLY. THE CORRELATION SLOPES WERE RELATIVELY INSENSITIVE TO YIELD, AND THEIR VALUES PERMITTED THE PLACEMENT OF THE RADIOISOTOPES ON A SCALE OF VOLATILITY. SEVERAL GROUPS OF RADIOISOTOPES DID NOT FRACTIONATE FROM EACH OTHER. THE ISOTOPES CS137 AND BA140 HAD ESSENTIALLY THE SAME SLOPES FOR AIR BURSTS AS FOR HIGH-YIELD SURFACE BURSTS, BUT MO99 AND NP239 BEHAVED MORE VOLATILITY INFERRED FROM FRACTIONATION BEHAVIOR CORRELATED WELL WITH THAT BASED ON THERMODYNAMIC CALCULATIONS.

*AIRBORNE RELEASE + *AIRBURST + *FALLOUT + *NUCLEAR EXPLOSION DEBRIS + *PARTICLE SIZE DISTRIBUTION +
BARIUM + CESIUM + MOLYBDENUM + NEPTUNIUM + ZIRCONIUM

16-10680 WALKER ER
METEOROLOGICAL ASPECTS OF SAMPLING OF AIRBORNE ARTIFICIAL RADIOACTIVITY OVER CANADA
SUFFIELD EXPERIMENTAL STATION, CANADA
CONF-64C6C6-9 +. 22 PAGES, 16 FIGURES, JULY 1964, PRESENTED AT THE 45TH ANNUAL MEETING OF THE PACIFIC DIVISION, AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, VANCOUVER, JUNE 23, 1964, SOURCE

THE PAPER PRESENTED FAIRLY WELL ALL THE CANADIAN SAMPLING TO DATE (1964). DURING PERIODS OF CURRENT NUCLEAR TESTS THE PATTERNS IN THE CHARTS WERE AFFECTED BY CURRENT EVENTS. IN UNDISTURBED PERIODS, WHEN MATERIAL WAS FLD FROM THE STRATOSPHERE, THE ACTIVITY WAS ARRANGED IN CHARACTERISTIC PATTERNS WITH A MAXIMUM OF CONCENTRATIONS ON THE CANADIAN PRAIRIES. THE MAIN FEATURES OF THESE PATTERNS CAN BE EXPLAINED IF THE DOWNWARD-MOTION MECHANISM MENTIONED IS CONSIDERED THE IMPORTANT TRANSFER AGENT. THE CANADIAN DATA SUGGESTS THAT DRY DEPOSIT IS NORMALLY ONLY A SMALL FRACTION OF DEPOSIT IN PRECIPITATION.

*AIRBORNE RELEASE + *CANADA + *METEOROLOGY + *SAMPLING + PRECIPITATION + STRATOSPHERE

16-10681 BRADBURY HG
ATMOSPHERIC DIFFUSION STUDIES AT THE NAFI SITE
AIR FORCE WEAPONS LABORATORY, KIRTLAND, NEW MEXICO
AFWL-TR-64-156 +. 104 PAGES, 39 FIGURES, 15 TABLES, 24 REFERENCES, JUNE 1965, CFSTI

FOUR ATMOSPHERIC DIFFUSION EXPERIMENTS WERE CONDUCTED IN THE NUCLEAR AEROSPACE RESEARCH FACILITY AREA AT GENERAL DYNAMICS/FORT WORTH TO STUDY THE DISPERSAL AND DILUTION FACTORS OF THE ATMOSPHERE AS THEY PERTAIN TO THE RELEASE OF AIRBORNE RADIOACTIVITY IN THE NAFI AREA. FLUORESCENT DYE WAS RELEASED TO THE ATMOSPHERE FROM A POINT NEAR THE REACTOR OPERATIONS BUILDING AND SAMPLED DOWNWIND TO MEASURE DEPLETION FACTORS UNDER VARYING METEOROLOGICAL CONDITIONS. THE TESTS WERE PERFORMED WITH AIR-TEMPERATURE GRADIENTS RANGING FROM SLIGHTLY UNSTABLE TO MILDLY STABLE (INVERSION) SITUATIONS. THE SAMPLING DATA OBTAINED WERE APPLIED IN THE EVALUATION OF THE PARAMETERS ASSOCIATED WITH THE STATISTICAL DIFFUSION EQUATION. ALTHOUGH THE FOUR TESTS WERE TOO FEW TO PROVIDE SUBSTANTIAL STATISTICAL DATA, THE RESULTS

CATEGORY 16
METEOROLOGICAL CONSIDERATIONS

16-10681 *CONTINUED*

SHOW THAT UNDER THE POOREST DIFFUSION CONDITIONS EXPERIENCED, THE EFFLUENT DEPLETION FACTORS RANGES FROM APPROXIMATELY 10 TO THE MINUS 4 TO 10 TO THE MINUS 6 BETWEEN 88 AND 704 M FROM THE RELEASE POINT. THESE FACTORS ARE CONSIDERABLY LESS THAN THOSE ACTUALLY BEING APPLIED UNDER NUCLEAR SAFETY CONSIDERATIONS WITHIN THE NARF REACTOR OPERATIONS AREA.

*DIFFUSION + *DILUTION + *CISPERION + METECROLOGY + SAMPLING + TRACER, FLUORESCENT

16-10682 FEELY HW + FRIEND JP + KREY PW + RUSSELL BA
FLIGHT DATA AND RESULTS OF RADIOCHEMICAL ANALYSES OF FILTER SAMPLES COLLECTED DURING 1961 AND 1962
ISOTOPES, INC., WESTWOOD, NEW JERSEY
HASL-15 +. 219 PAGES, TABLES, JANUARY 1965, CFSTI, \$3.00 CY

THIS IS THE FIRST OF A SERIES OF REPORTS OF FLIGHT DATA AND RESULTS OF RADIOCHEMICAL ANALYSES OF STRATOSPHERIC AND TROPOSPHERIC AIR-FILTER SAMPLES COLLECTED DURING PROJECT STAR DUST. THE REPORT CONTAINS DATA FOR SAMPLES COLLECTED DURING JUNE 1961 TO DECEMBER 1962, THE FIRST YEAR-AND-A-HALF OF THE PROJECT. PROJECT STAR DUST WAS DESIGNED TO PROVIDE INFORMATION NEEDED TO EVALUATE THE INFLUENCE EXERTED BY THE UPPER ATMOSPHERE UPON GASEOUS AND PARTICULATE MATTER INTRODUCED INTO IT. THE WORK IS LEADING TO THE DEVELOPMENT OF A MODEL OF ATMOSPHERIC TRANSPORT PROCESSES THAT WILL DESCRIBE MIXING AND TRANSFER OF TRACE MATERIALS IN THE STRATOSPHERE AND UPPER ATMOSPHERE. THIS WILL PERMIT THE DETERMINATION OF LONG-RANGE RADIOACTIVE FALLOUT DISTRIBUTIONS AND BIOLOGICAL DOSES TO BE EXPECTED FROM ALL KINDS OF RELEASES OF RADIOACTIVITY IN THE ATMOSPHERE. A CLOSELY RELATED ASPECT OF THE PROJECT INVOLVES THE DETERMINATION OF THE DISTRIBUTION IN THE STRATOSPHERE OF RADIOACTIVE DEBRIS PRODUCED BY NUCLEAR WEAPONS TESTS CONDUCTED PRIOR TO AND DURING THE PERIOD OF THE PROJECT, AND THE INFLUENCE OF STRATOSPHERE-TROPOSPHERE EXCHANGE PROCESSES ON THAT DEBRIS.

*FILTER + *RADIOCHEMICAL ANALYSIS + *SAMPLING, HIGH ALTITUDE + *STRATOSPHERE + *TROPOSPHERE + ATMOSPHERIC DIFFUSION EXPERIMENT + BARIUM + CERIUM + MOLYBDENUM + STRONTIUM + ZIRCONIUM

16-10684 ENGELMANN RJ
THE PHYSICS OF PRECIPITATION SCAVENGING
BATTELLE-NORTHWEST, RICHLAND
BNWL-SA-400 + CONF-651122-1 +. 10 PAGES, TO BE PRESENTED AT THE AMERICAN ASSOCIATION OF PHYSICS TEACHERS, RICHLAND, WASHINGTON, NOVEMBER 13, 1965, CFSTI

DETERMINING THE COLLISION PROCESS IS A NONLINEAR EQUATION INVOLVING SEVERAL FORCE FIELDS AND THE RATHER UNCERTAIN VELOCITY FIELD OF THE AIR FLOWING PAST THE FALLING DROPLET OR FLAKE. NUMERICAL SOLUTIONS OF THIS EQUATION HAVE BEEN MADE ONLY FOR UNCHARGED PARTICLES OF RATHER SMALL SIZE BEING OVERTAKEN BY SPHERICAL RAINDROPS. MUCH EXPERIMENTAL WORK HAS FOLLOWED THIS ATTACK OF (1) MEASURING THE COLLECTION OF EACH SIZE OF DROP ON EACH SIZE OF PARTICLE, (2) SEPARATELY MEASURING THE SIZES OF DROPS THAT FALL IN A RAIN, AND THEN (3) IN INTEGRATING THE RESULTS TO OBTAIN THE WASHOUT COEFFICIENT.

*ATMOSPHERIC POLLUTION + *PRECIPITATION + *SAMPLING + METEOROLOGY + WASHOUT

16-10765 FENDLER H + KNOERZER G
RADIATION PROTECTION FOR POWER STATIONS AND SURROUNDINGS
AEG ALLGEMEINE ELEKTRICITÄTS-GESELLSCHAFT, FRANKFURT, GERMANY + KERNKRAFTWERK RWE-BAYERNWERK GMBH, GUNDREMMINGEN, GERMANY
5 PAGES, 3 FIGURES, 3 TABLES, REFERENCES, NOVEMBER 1965. TRANSLATED FROM ATOMWIRTSCHAFT 10 (11)- 627-631 (NOVEMBER 1965)

FOR GERMAN POWER PLANTS, THE TEMPERATURE, HUMIDITY, AND WIND DIRECTION IN THE AIR LAYERS NEAR THE GROUND ARE MEASURED AT A 118-M-HIGH MAST AT THE PLANT. MEASUREMENTS WERE MADE FROM FALL OF 1963 TO EARLY 1965 AT HEIGHTS OF 2, 10, 40, 80, AND 118 M. AFTER THE PLANT STARTUP, THE WIND DIRECTION AND VELOCITY ARE CONTINUOUSLY MEASURED AND RECORDED BOTH AT THE WEATHER MAST AND ABOVE THE REACTOR BUILDING. THE METEOROLOGICAL OPINION (WHICH TAKES IN THE GENERAL CLIMATOLOGICAL RELATIONSHIPS OF THE PLANT SITE) WAS USED TO ESTABLISH THE MAXIMUM PERMISSIBLE QUANTITIES OF ACTIVITY ABOVE THE 110-M CHIMNEY DURING PLANT OPERATION.

*GERMANY + *MEASUREMENT, GENERAL + *METEOROLOGY + *SITE CLIMATOLOGY + HUMIDITY + STACK + WIND PROFILE

16-10766 PETERSEN AM
WASHOUT OF PARTICULATE MATTER IN LONG-TERM CLOUDS PRODUCED BY NUCLEAR EXPLOSIONS
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
UCRL-14700 +. 22 PAGES, 5 FIGURES, 2 TABLES, 33 REFERENCES, MARCH 1966, CFSTI, \$2.00 CY, \$0.50 MN

THE THEORY OF RAIN-SCAVENGING OF AIRBORNE PARTICLES IS EXTENDED TO THE MORE GENERAL CASE OF MOVING, POLYDISPERSE POPULATIONS. VALUES FOR A MULTIDIMENSIONAL WASHOUT COEFFICIENT AS A FUNCTION OF PARTICLE RADIUS AND RAIN INTENSITY ARE GIVEN. BY USING EXPRESSIONS FOR THE CONCENTRATION WITHIN AN INSTANTANEOUS POINT-SOURCE CLOUD WITH A SPECTRUM OF PARTICLE SIZES, FORMULAE ARE DERIVED WHICH GIVE THE RATE OF DEPOSITION AND INTEGRATED DEPOSITION OF RADIOACTIVITY OR PARTICLES FROM A LONG-TERM NUCLEAR-DEVICE CLOUD AT ANY POINT DOWNWIND. BY EMPLOYING RECENT EMPIRICAL DATA FOR THE DISTRIBUTION OF RADIOACTIVITY WITH PARTICLE SIZE WITHIN THE CLOUD FROM THE SEDAN EVENT, THE EQUATIONS ARE USED TO CALCULATE THE MAXIMUM INTEGRATED DEPOSITION OF RADIOACTIVITY THAT MIGHT BE SCAVENGED FROM LONG-TERM CLOUDS PRODUCED BY A NUCLEAR DEVICE USED FOR EXCAVATION. THE MAXIMUM PERCENTAGE OF THE RADIOACTIVITY OF THE CLOUD DEPOSITED WITHIN THE FIRST METER IS PRESENTED NOMOGRAPHICALLY, WITH VARIOUS WIND SPEEDS IN MILES PER HOUR AND RAIN INTENSITIES IN MILLIMETERS PER HOUR.

*AIRBORNE RELEASE + *DEPOSITION + *EXCAVATION, NUCLEAR + *NUCLEAR EXPLOSION DEBRIS +

CATEGORY 16
METEOROLOGICAL CONSIDERATIONS

16-10766 *CONTINUED*

*PARTICLE, RADIOACTIVE + *WASHOUT + EQUATION, GENERAL + METEOROLOGY + PARTICLE SIZE DISTRIBUTION

16-10769 LAVRENCHIK VM

GLOBAL FALLOUT PRODUCTS OF NUCLEAR EXPLOSIONS

AEC-TR-6666 +. 192 PAGES, 68 FIGURES, 17 TABLES, 173 REFERENCES, TRANSLATION OF GLOBAL NOE VYPADENIE PRODUKTOV YADERNYKH VZRYVOV, ATOMIZDAT, MOSCOW, 1965, CFSTI, \$5.00 CY, \$1.00 MN.

THIS WORK WAS TRANSLATED FROM RUSSIAN. THE TRANSLATION CONSISTS OF SEVEN CHAPTERS. IN CHAPTER I, WITHOUT A DETAILED SURVEY OF THE PHYSICS OF FISSION, THE BASIC QUANTITATIVE RELATIONSHIPS OF THE FORMATION OF THE PRODUCTS OF NUCLEAR EXPLOSIONS ARE CONSIDERED. CHAPTER II IS DEVOTED TO THE PROCESS OF THE FORMATION OF RADIOACTIVE AEROSOLS. THE CONNECTION BETWEEN THE RATE OF COOLING OF THE FIREBALL AND THE YIELD OF THE BURST IS ESTABLISHED. IN CHAPTER III, A SURVEY IS GIVEN OF THE BASIC METHODS OF COLLECTING AND ANALYZING SAMPLES OF THE PRODUCTS OF NUCLEAR BURSTS IN THE ATMOSPHERE. IN CHAPTERS IV AND V, THE BEHAVIOR OF RADIOACTIVE AEROSOLS IN SPACE (IN THE ATMOSPHERE) AND IN TIME IS DESCRIBED. IN CHAPTER VI, DATA ARE COLLECTED ON FORECASTING RADIOACTIVE FALLOUT FROM THE TROPOSPHERE AND THE STRATOSPHERE. IN CHAPTER VII, WE GIVE A BRIEF SURVEY OF CONTEMPORARY CONCEPTS OF THE HARMFUL BIOLOGICAL EFFECTS OF THE RADIOACTIVITY ON MAN.

*AEROSOL, RADIOACTIVE + *FALLOUT + *NUCLEAR EXPLOSION DEBRIS + *SAMPLING + *STRATOSPHERE + *TROPOSPHERE + *UNION OF SOVIET SOCIALIST REPUBLICS + AEROSOL PRODUCTION + PRECIPITATION

16-10786 SPURR G

CORRESPONDENCE, THE BENT-OVER PLUME OF HOT GAS

CENTRAL ELECTRICITY RESEARCH LABORATORIES

1 PAGE, ROYAL METEOROLOGICAL SOCIETY QUARTERLY JOURNAL 83- 269 (1957)

IN THIS CORRESPONDENCE, THE AUTHOR DEVELOPS A CUBIC EQUATION FOR FINDING Z-SUB-1, FROM WHICH THE CEILING HEIGHT OF THE PLUME CAN BE FOUND USING THE PRIESTLY FORMULA, (EG. 12) IN QUARTERLY JOURNAL OF THE ROYAL METEOROLOGICAL SOCIETY 82, P. 165, 1956.

*BUOYANT RISE + HEIGHT OF RISE

16-10787 SCHMIDT FH

ON THE RISE OF HOT PLUMES IN THE ATMOSPHERE

ROYAL NETHERLANDS METEOROLOGICAL INSTITUTE

24 PAGES, 7 FIGURES, 7 TABLES, 19 REFERENCES, INTERNATIONAL JOURNAL OF AIR AND WATER POLLUTION 9(4)-175-198 (APRIL 1965)

A THEORY FOR THE RISE OF A HOT PLUME IN A STABLE ATMOSPHERE HAS BEEN DEVELOPED AND APPEARS POSSIBLE TO COMPUTE THE MINIMUM PLUME RISE. THE RESULTS OF THE COMPUTATIONS HAVE BEEN COMPARED WITH AVAILABLE PLUME RISE OBSERVATIONS. THEORETICAL AND EXPERIMENTAL VALUES ARE IN SATISFACTORY AGREEMENT.

*BUOYANT RISE + ATMOSPHERIC STABILITY + COMPARISON, THEORY AND EXPERIENCE + HEIGHT OF RISE + SOURCE, ELEVATED + STACK

16-10811 WILSON IJ

A.E.A. WORK FOR THE CONCORD

UNITED KINGDOM ATOMIC ENERGY AUTHORITY, ALDERMASTON

8 PAGES, 6 FIGURES, ATOM, (108), PAGES 211-218 (OCTOBER, 1965)

PASSENGERS AND CREW OF THE FUTURE, FLYING AT ABOUT 65,000 FT OR ABOVE 93 PERCENT OF THE ATMOSPHERE, WILL ENCOUNTER HIGHER DOSE RATES DUE TO COSMIC RADIATION. THIS RADIATION COMES FROM TWO SOURCES - THE NORMAL, STEADY, LOW-INTENSITY FLUX OF HIGH- AND VERY-HIGH-ENERGY PARTICLES WHICH ORIGINATE OUTSIDE OUR SOLAR SYSTEM, AND FREQUENT, SHORT-LIVED, VARIABLE, HIGH-INTENSITY FLUX OF MODERATE- AND HIGH-ENERGY PARTICLES RELEASED FROM THE SUN BY SOLAR FLARES. THE AVERAGE ENERGY OF THESE PARTICLES IS MEASURED IN THOUSANDS OF MILLIONS OF ELECTRON VOLTS. BECAUSE OF THE WAY IN WHICH PRIMARY GALACTIC PARTICLES INTERACT WITH THE TOP OF THE ATMOSPHERE, IT IS NOT POSSIBLE TO OBTAIN CONCORD CRUISE ALTITUDE DOSE-RATES BY SIMPLY SCALING UP THE VALUES MEASURED IN JET AIRLINES.

AEROSPACE SAFETY + COSMIC RADIATION

16-10813 SMITH FB

THE ROLE OF WIND SHEAR IN HORIZONTAL DIFFUSION OF AMBIENT PARTICLES

METEOROLOGICAL OFFICE, BRACKNELL, BERKSHIRE

12 PAGES, 5 FIGURES, REFERENCES, QUARTERLY JOURNAL OF THE ROYAL METEOROLOGICAL SOCIETY, 91(389), PAGES 318-329 (JULY, 1965)

A CHANGE IN THE WIND VECTOR WITH HEIGHT CAN HAVE A VERY MARKED EFFECT ON THE DIFFUSION OF TRACERS. CORRSIN (1953), SAFFMAN (1962), AND HOGSTROM (1964) SHOWED THAT AT LARGE DISTANCES FROM THE SOURCE OF A TRACER, THE HORIZONTAL SPREAD OF THE CLOUD VARIES WITH TIME t LIKE t TO THE $3/2$ POWER, PROVIDED THAT THE VELOCITY SHEAR IS MAINTAINED OVER A SUFFICIENT DEPTH OF THE ATMOSPHERE. THEIR RESULT IS EXTENDED IN TWO WAYS, FIRST TO ALL VALUES OF t , AND SECOND BY TAKING INTO ACCOUNT THE CORRELATION BETWEEN HORIZONTAL AND VERTICAL EDDY VELOCITIES. THE MOST SIGNIFICANT RESULT OF THE LATTER EFFECT IS TO REDUCE THE DISPLACEMENT OF THE PLUME AT ANY LEVEL IN THE DIRECTION OF THE SHEAR. AT SMALL TIMES OF TRAVEL, IT IS SHOWN THAT THE RELATIVE SPREAD IS ACTUALLY LESS IN THE PRESENCE OF SHEAR THAN PREDICTED BY THE CONVENTIONAL

CATEGORY 16
METEOROLOGICAL CONSIDERATIONS

16-10813 *CONTINUED*
TAYLOR METHOD.

ATMOSPHERIC DIFFUSION + ATMOSPHERIC DIFFUSION COEFFICIENT + TURBULENCE, SHEAR (WIND) +
TURBULENCE, STATISTICS

16-10814 HARDIN J + GOLD S + KAHN B + STRAUB CP
MEASUREMENT OF RADIOACTIVE FALLOUT ON AIRBORNE PARTICLES
ROBERT A. TAFT SANITARY ENGINEERING CENTER, CINCINNATI, OHIO
12 PAGES, 5 TABLES, 5 FIGURES, 14 REFERENCES, HEALTH PHYSICS, 10, PAGES 563-575 (FEBRUARY, 1964)

RADIOACTIVE FALLOUT IN AIR WAS MEASURED AT CINCINNATI, OHIO, BY ANALYSIS OF FILTER SAMPLES COLLECTED WITH HIGH-VOLUME AIR SAMPLERS. FALLOUT FROM THE USSR NUCLEAR TESTS DURING THE FALL OF 1961 WAS FIRST DETECTED ON SEPTEMBER 15. RADIOACTIVITY LEVELS WERE MEASURED DAILY FOR THE NEXT 6 MONTHS. RADIONUCLIDES WERE IDENTIFIED AND MEASURED RADIOCHEMICALLY AND BY GAMMA SPECTRAL ANALYSIS. THE RELATIVE CONCENTRATIONS OF THE MAJOR FISSION PRODUCTS WERE COMPARABLE TO COMPUTED VALUES BASED ON FISSION YIELD AND RADIOACTIVE DECAY.

*AIR + *FALLOUT + *MONITOR, RADIATION, AIR + FILTER, FIBERGLASS + SAMPLING

16-10817 WHITEHEAD HC + FETH JH
CHEMICAL COMPOSITION OF RAIN, DRY FALLOUT, AND BULK PRECIPITATION AT MENLO PARK, CALIFORNIA, 1957-1959
U. S. GEOLOGICAL SURVEY, MENLO PARK, CALIFORNIA
14 PAGES, 3 TABLES, 5 FIGURES, 18 REFERENCES, JOURNAL OF GEOPHYSICAL RESEARCH 69(16), PAGES 3319-3333 (AUGUST 15, 1964)

WINTER PRECIPITATION IS DEFINED AS RAIN, DRY FALLOUT, AND BULK PRECIPITATION - THE LAST BEING A MIXTURE OF THE OTHER TWO. THE DIVISION OF WINTER PRECIPITATION INTO PHASES IS BASED ON COLLECTION PROCEDURES. EACH PHASE SHOWS DISTINCTIVE CHARACTERISTICS OF CHEMICAL COMPOSITION. RAIN DISPLAYS THE STRONG INFLUENCE OF THE NEARBY PACIFIC OCEAN AND SAN FRANCISCO BAY. DRY FALLOUT, COLLECTED BETWEEN RAINS, SHOWS STRONG EFFECTS FROM LOCALLY DERIVED MATERIALS IN THE ATMOSPHERE. BULK PRECIPITATION SHOWS, IN CHEMICAL COMPOSITION, THE EXPECTED BLENDING OF THE TWO ENVIRONMENTAL INFLUENCES AND IS ABOUT 4 TO NEARLY 10 TIMES HIGHER IN MINERAL CONCENTRATION THAN RAINWATER IS. BULK PRECIPITATION IS CONSIDERED THE GEOCHEMICALLY SIGNIFICANT PHASE THAT SHOULD BE USED IN STUDIES RELATING CONTRIBUTIONS OF ATMOSPHERIC SALTS TO SURFACE- AND GROUNDWATER SUPPLIES, TO WEATHERING, AND TO THE NOURISHMENT OF GROWING PLANTS.

*ATMOSPHERIC CHEMISTRY + *FALLOUT + *RAINOUT + SAMPLING

16-10818 VAN HULSTEYN DB
THE ATMOSPHERIC PRESSURE WAVE GENERATED BY A NUCLEAR EXPLOSION - PART 1 AND PART 2
UNIVERSITY OF MICHIGAN, RADIATION LABORATORY, ANN ARBOR
22 PAGES, 5 FIGURES, 23 REFERENCES, JOURNAL OF GEOPHYSICAL RESEARCH, 70(2), PAGES 257-278 (JANUARY 15, 1965)

THE PROBLEM OF DESCRIBING THE PRESSURE WAVE DETECTED BY AN OBSERVER ON THE GROUND A FEW THOUSAND KILOMETERS FROM A LOW-ALTITUDE NUCLEAR EXPLOSION IS FORMULATED. TO AVOID NUMERICAL COMPLICATIONS, THE ATMOSPHERE IS ASSUMED TO HAVE AN ISOTHERMAL TEMPERATURE DISTRIBUTION. WITH THIS SIMPLIFICATION A GREENS FUNCTION FOR THE PROBLEM IS DEVELOPED AS AN EXPANSION IN LEGENDRE POLYNOMIALS. THIS REPRESENTATION YIELDS A TIME-DEPENDENT PRESSURE FUNCTION WHICH SATISFIES THE CONDITION OF CAUSALITY BUT WHICH CONVERGES FAR TOO SLOWLY TO BE USEFUL. AN ALTERNATIVE SCHEME, WHICH IS ENTIRELY EQUIVALENT, MAKES USE OF A WATSON TRANSFORMATION AND REQUIRES THE DETERMINATION OF THE SET OF REGGE POLES. THE BEHAVIOR OF THE COMPLETE GREENS FUNCTION IS THEN SHOWN TO BE DOMINATED BY THE SO-CALLED GRAVITY WAVE MODE, AND THE FORM OF THIS APPROXIMATE SOLUTION IS DEVELOPED.

*TEST, WEAPONS (HP ASPECTS) + *TROPOSPHERE + EQUATION, GENERAL + EXPLOSION + PRESSURE, EXTERNAL

16-10967 SINGER IA
WIND GUST SPECTRA
BROOKHAVEN NATIONAL LABORATORY
BNL-7328 +. 17 PAGES, 12 FIGURES, 1 TABLE, 12 REFERENCES, ANNALS NEW YORK ACADEMY OF SCIENCES, 116(1), PAGES 116-134 (1964)

THE MAJOR POINTS OF THIS PAPER ARE - (1) INTENSITY OF TURBULENCE IS CONSTANT WITH HEIGHT. (2) LOCAL ISOTROPY EXISTS AT WAVE LENGTHS SHORTER THAN ABOUT 100 M. (3) HORIZONTAL ISOTROPY CONTINUOUS UP TO WAVE LENGTHS OF ABOUT 500 M. (4) CROSS SPECTRA ARE ESSENTIALLY ZERO IN RANGE OF INTEREST. (5) CROSS-CORRELATION COEFFICIENT OF SIMILAR WIND COMPONENT IS A FUNCTION OF RATIO OF HEIGHTS. THE RESULTS ARE ONLY APPLICABLE BETWEEN 75 AND 300 FT OVER FAIRLY SMOOTH TERRAIN.

*TURBULENCE, SHEAR (WIND) + *WIND PROFILE + *WIND STATISTICS

16-10968 SAYERS J
THE ELECTRON DENSITY DISTRIBUTION IN THE TOPSIDE IONOSPHERE. II. EFFECTS OF THE NUCLEAR EXPLOSION OVER JOHNSTON ISLAND AND THE IONIZATION PRODUCED BY CORPUSCULAR RADIATION AT HIGH MAGNETIC LATITUDES
6 PAGES, 5 FIGURES, 1 REFERENCE, PROCEEDINGS OF THE ROYAL SOCIETY, SERIES A, 281(1387), PAGES 459-464, (OCTOBER 10, 1964)

CORPUSCULAR RADIATION SEEMS TO BE A MAJOR SOURCE OF IONIZATION IN THE TOPSIDE IONOSPHERE IN

16-10968 *CONTINUED*

REGIONS INTERSECTED BY HIGH MAGNETIC SHELLS. THE INTENSITY OF THIS IONIZATION CAN IN FACT BE USED AS AN INDICATOR OF THE INCIDENCE OF CHARGED PARTICLES ON THE IONOSPHERE, AND A VERY CLOSE CORRELATION IS OBSERVED WITH THE K-SUB-P INDEX. THE RECOMBINATION TIME CANNOT BE DETERMINED FROM THE OBSERVATIONS SO FAR RECORDED, BUT BOTH THE STARFISH DATA AND THE S.C. DATA INDICATE THAT THE TOPSIDE IONOSPHERE CAN RECOVER COMPLETELY FROM MAJOR DISTURBANCES IN A PERIOD OF 24 HR.

*ICNOSPHERE + *NUCLEAR DETONATION + *PARTICLE SIZE DISTRIBUTION

16-10971 ZIER M

RELATIVE HUMIDITY AND LONG LIVED RADIOACTIVITY IN THE LAYER OF AIR NEAR THE GROUND
2 PAGES, 2 FIGURES, ZEITSCHRIFT FUR METEOROLOGIE, 18(3/4), PAGES 161-162 (1965), IN GERMAN

THIS IS A DISCUSSION AND A TENTATIVE INTERPRETATION OF AN INVERSE CORRELATION BETWEEN LONG-LIVED RADIOACTIVITY AND THE RELATIVE HUMIDITY WITHIN THE SURFACE LAYER OF THE ATMOSPHERE.

*HUMIDITY + RADIOACTIVITY, RELEASE + TROPOSPHERE

16-10972 WOODS JD

THE EFFECT OF ELECTRIC CHARGES UPON COLLISIONS BETWEEN EQUAL-SIZE WATER DROPS IN AIR
IMPERIAL COLLEGE, LONDON
3 PAGES, 2 FIGURES, 4 REFERENCES, QUARTERLY J. OF THE ROYAL METEOROLOGICAL SOCIETY, 91(389), PAGES 353-355 (JULY, 1965)

STREAK PHOTOGRAPHS OF COLLISIONS BETWEEN EQUAL-SIZE DROPS CARRYING ELECTRIC CHARGES OF OPPOSITE SIGN SHOW A MARKED ATTRACTION IMMEDIATELY BEFORE COALESCENCE OCCURS. FOR DROPS OF RADIUS R LESS THAN 40 MICRONS, THE COALESCENCE RATE INCREASES LINEARLY WITH DROP CHARGE ONCE A THRESHOLD VALUE OF ABOUT 0.00005 ESU HAS BEEN REACHED. BELOW THIS THRESHOLD THERE IS NO EFFECT. FOR DROPS OF R EQUAL TO OR MORE THAN 40 MICRONS, WHICH COALESCE SPONTANEOUSLY BY WAKE ATTRACTION, EVEN WHEN UNCHARGED, THE COALESCENCE RATE INCREASES LINEARLY WITH DROP CHARGE. CHARGES OF THE SAME SIGN INHIBIT COALESCENCE ENTIRELY FOR DROPS OF R LESS THAN 40 MICRONS, AND REDUCE THE COALESCENCE RATE BY A FACTOR OF FIVE FOR DROPS OF RADIUS R EQUAL TO 40 MICRONS.

*COALESCENCE + *RAINOUT + DROPLET

16-10973 WAKNKE OF

GROUND DEPOSITION OF MICROSPHERES RELEASED FROM 50 KILOMETERS
SANDIA CORPORATION
SC-TM-65-398 +. 28 PAGES, JANUARY, 1966, CFSTI, \$2.00 CY, \$0.50 MN

THE SURFACE-DEPOSIT DENSITIES WHICH RESULT FROM A DISTRIBUTION OF MICROSPHERES BEING RELEASED AT AN ALTITUDE OF 50 KILOMETERS AND DISPERSED BY GRAVITATION, WIND, AND DIFFUSION WERE CALCULATED AND ARE PRESENTED IN THIS REPORT FOR EIGHT WIND CONDITIONS. THE RESULTS PROVE TO BE USEFUL AS A ROUGH GUIDE TO THE SENSITIVITY OF DEPOSIT DENSITIES TO PARTICLE-SIZE DISTRIBUTION PARAMETERS, SOURCE ALTITUDE, VERTICAL WIND SHEAR, AND LATERAL DISPERSION RATES AS WELL AS AN AID IN INVESTIGATING THE MERITS OF ANY REFINEMENTS TO THE TRC MODEL.

*AIRBORNE RELEASE + *COMPUTER PROGRAM, METEOROLOGICAL + *DEPOSITION + AEROSOL +
PARTICLE SIZE DISTRIBUTION + SURFACE CONTAMINATION

16-11113 LIPPMANN M

STRATOSPHERIC MONITORING PROGRAM SEMI-ANNUAL PROGRESS REPORT, SEPTEMBER 1963 - FEBRUARY 1964
DEL ELECTRONICS CORPORATION
NYO-2363-1 +. 70 PAGES, REFERENCES, JUNE 10, 1964, CFSTI, \$6.60 FS, \$2.30 MF

THE DESIGN AND DEVELOPMENT OF THE MODEL-2 HIGH-VOLUME ELECTROSTATIC PRECIPITATOR AEROSOL SAMPLER FOR THE UPPER STRATOSPHERE IS WELL ADVANCED. IN THIS DESIGN, THE SAMPLES WILL BE COLLECTED IN A PARALLEL ARRAY OF 37 SINGLE-STAGE PRECIPITATOR TUBES, EACH 2-1/8 IN. IN I.D. AND 2 FT LONG. THE AMBIENT FLOWRATE WILL BE 50 CFM PER TUBE, OR 1850 CFM FOR THE ENTIRE SAMPLER, PROVIDING A SAMPLE VOLUME OF 500 STANDARD CUBIC FEET WHEN OPERATED AT THE UPPER ALTITUDE DESIGN LIMIT OF 150,000 FT, FOR 3 HR. AIR WILL BE MOVED THROUGH THE SAMPLER BY A NOMINAL 2000-CFM VANE-AXIAL FAN OF SPECIAL DESIGN

*INSTRUMENTATION, AIR SAMPLING + *INSTRUMENTATION, METEOROLOGICAL + *MONITOR, RADIATION, AIR +
*STRATOSPHERE

16-11114 KENNEDY WR + AEBY JW

BETA-GAMMA RADIOACTIVITY IN ENVIRONMENTAL AIR AT LOS ALAMOS, NEW MEXICO, FOR 1965
LOS ALAMOS SCIENTIFIC LABORATORY, NEW MEXICO
LA-3516 +. 22 PAGES, 1 TABLE, 3 FIGURES, JANUARY, 1966, CFSTI, \$2.00 CY, \$0.50 MN

AS PART OF THE ENVIRONMENTAL RADIATION MONITORING PROGRAM AT LOS ALAMOS, MEASUREMENTS OF AIRBORNE RADIOACTIVE PARTICLES AND RADIOACTIVITY IN PRECIPITATION ARE MADE PERIODICALLY. DAILY SAMPLES WERE COLLECTED THROUGHOUT 1965. THE DECLINE IN RADIOACTIVITY THAT STARTED IN THE LAST HALF OF 1963 CONTINUED THROUGHOUT 1965. NO FALLOUT WHICH COULD BE ATTRIBUTED TO ATMOSPHERIC TESTING COULD BE DETECTED.

*FALLOUT + *LASL (LOS ALAMOS SCIENTIFIC LABORATORY) + *MONITOR, RADIATION, ENVIRONMENTAL + RAINOUT +

CATEGORY 16
METEOROLOGICAL CONSIDERATIONS

16-11114 *CONTINUED*
SAMPLING

16-11115 KEGELMANN G
CONCENTRATION OF RADIOACTIVE SUBSTANCES IN ATMOSPHERIC PRECIPITATION
UNIVERSITAT HEIDELBERG, GERMANY
BMWF-FB-K-65-05 +. 67 PAGES, 22 FIGURES, DECEMBER 1965, SOURCE, IN GERMAN

DISCONTINUOUS AND CONTINUOUS MEASUREMENTS OF FISSION PRODUCTS AND OF RADIUM B AND C IN PRECIPITATION ARE REPORTED. THE DEPENDENCE ON PRECIPITATION INTENSITY OF THE SPECIFIC RADIOACTIVITY OF PRECIPITATIONS HAS BEEN CONSIDERED. IT CAN BE APPROXIMATED BY A HYPERBOLIC RELATION VALID FOR THE INTEGRAL AND THE DIFFERENTIAL BEHAVIOR AS WELL. A MARKED DEPENDENCE ON METEOROLOGICAL PARAMETERS HAS BEEN FOUND SUCH AS TYPE OF PRECIPITATION, KIND OF CLOUDS, CEILING HEIGHT, AND ALSO ON PHYSICO-CHEMICAL PARAMETERS, E.G., SOLUBILITY. THE DEPENDENCE ON INTENSITY IS STRONGER WITH FISSION PRODUCTS THAN IT IS WITH RADIUM B AND C. A MODEL FOR THE ATTACHMENT OF ACTIVITY TO PRECIPITATION ELEMENTS IS SUGGESTED. IT CAN EXPLAIN THE OBSERVATIONS REASONABLY.

*RAINOUT + GERMANY + MEASUREMENT, GENERAL + METEOROLOGY + PRECIPITATION

16-11116 DAY WC + ROHERER RF
CLOUD DEVELOPMENT STUDIES. PROJECT PRE-SCHOONER II
U.S. ARMY ENGINEER NUCLEAR CRATERING GROUP, LIVERMORE + LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
PNE-511 +. 34 PAGES, 22 FIGURES, 4 TABLES, 6 REFERENCES, JUNE, 1966, CFSTI, \$1.50 CY

THIS REPORT PRESENTS THE CLOUD-DEVELOPMENT DATA FOR THE PRE-SCHOONER II HIGH-EXPLOSIVE CRATERING EVENT CONDUCTED IN A RHYOLITE MEDIUM IN SOUTHWESTERN IDAHO. EARLY BASE-SURGE RADIUS DIMENSIONS ARE GIVEN AS A FUNCTION OF TIME IN SEVERAL DIRECTIONS AND ARE RELATED TO BASE-SURGE CLOUD DIMENSIONS FROM PAST CRATERING EXPERIMENTS IN ALLUVIUM AND BASALT. MEASUREMENTS OF BASE-SURGE HEIGHT, MAIN CLOUD RADIUS, AND MAIN CLOUD HEIGHT ARE ALSO GIVEN. TWO NEW METHODS OF CLOUD DELINEATION ARE DESCRIBED - A LASER-RADAR TECHNIQUE, AND A FLUORESCENT-PARTICLE TRACER TECHNIQUE.

*ATMOSPHERIC STABILITY + *FALLCUT + *METEOROLOGY + *NUCLEAR EXPLOSION DEBRIS +
ATMOSPHERIC DIFFUSION EXPERIMENT + TRACER, FLUORESCENT

16-11115 EDWARDS MA
TABULATION OF DATA ON ANNOUNCED NUCLEAR DETONATIONS BY ALL NATIONS THROUGH 1965
LAWRENCE RADIATION LABORATORY, LIVERMORE
UCRL-14786 +. 25 PAGES, MARCH 17, 1966, CFSTI, \$2.00 CY, \$0.50 MN

THE DATA INCLUDED IN THIS REPORT WERE COMPILED FOR THE INFORMATION INTEGRATION GROUP OF THE LRL BIO-MEDICAL DIVISION. THE TABULATION IS PUBLISHED HERE BECAUSE OF ITS POSSIBLE USEFULNESS TO OTHER RESEARCH WORKERS. THE TABULATION IS ORGANIZED BY GEOGRAPHICAL LOCATION OF THE DETONATION, WITH THE EXCEPTION OF THE NUCLEAR VELA UNIFORM SEISMIC SERIES. THIS SERIES, DUE TO ITS UNIQUE CHARACTER, IS LISTED SEPARATELY.

*NUCLEAR DETONATION + EXPLOSION + FRANCE + UNION OF SOVIET SOCIALIST REPUBLICS + UNITED KINGDOM

16-11120 KATZ EJ
ATMOSPHERIC DIFFUSION OF SETTLING PARTICLES WITH SLOWISH RESPONSE
THE HEBREW UNIVERSITY OF JERUSALEM, ISRAEL
8 PAGES, 4 FIGURES, 2 TABLES, 10 REFERENCES, JOURNAL OF ATMOSPHERIC SCIENCES, 23(2), PAGES 159-166 (MARCH 1966)

REPORT PRESENTS A STUDY OF THE SETTLING OF HEAVY PARTICLES IN A TURBULENT MEDIUM QUANTITATIVELY APPLIED TO THE LOWER ATMOSPHERE. THE RESPONSE TIME OF SETTLING PARTICLES TO CHANGES IN THE VELOCITY OF THEIR SURROUNDINGS IS ESTIMATED FOR A WIDE RANGE OF PARTICLE SIZES, AND THIS TIME IS THEN COMPARED TO THE PERIOD DURING WHICH SUCH CHANGES MAY BE EXPECTED TO OCCUR DURING SETTLING. THE REDUCTION IN DIFFUSION DUE TO INSUFFICIENT RESPONSE TIME IS PREDICTED. IF THE TIME OF FALLOUT IS SUFFICIENTLY LARGE COMPARED WITH THE RESPONSE TIME OF THE PARTICLE, NO SIGNIFICANT REDUCTION IS EFFECTED, AS HAD BEEN PREVIOUSLY SUGGESTED. AN ATTEMPT IS INCLUDED TO NUMERICALLY PREDICT THE DIFFUSION OF SETTLING PARTICLES.

*ATMOSPHERIC DIFFUSION EXPERIMENT + FALLOUT + PARTICLE SIZE

CATEGORY 17
OPERATIONAL SAFETY AND EXPERIENCE

17-G848G LARSON C + LACY PS + NIRSCHL R
PATHFINDER ATOMIC POWER PLANT. PATHFINDER BOILER CORE. SLAB EXPERIMENT TEST 301
ALLIS-CHALMERS MFG. CO., BETHESDA
ACNP-64601 +. 29 PAGES, 1G FIGURES, 9 TABLES, 5 REFERENCES, SEPTEMBER 1964, CFSTI, \$2.00 CY

TEST 301 CHECKED VALIDITY OF NUCLEAR DESIGN MODEL. SOURCE AND DETECTORS AT BOTTOM OF CORE AND RODS AT TOP OF CORE FLATTENED MULTIPLICATION DATA, WHICH DROPPED SHARPLY AT CRITICALITY. TWO ADDITIONAL ELEMENTS WERE NEEDED, REPRESENTING A REACTIVITY LOSS OF 1.3 PERCENT. CHANGING FROM TWO TO FOUR GROUPS AND TO A MORE EXACT REPRESENTATION OF FUEL AND EQUIPMENT EXPLAINED THE DIFFERENCE.

*COMPARISON, THEORY AND EXPERIENCE + *REACTOR STARTUP TESTING + CRITICALITY EXPERIMENT + FUEL ELEMENT + PATHFINDER + REACTOR, BOILING WATER + REACTOR, SUPERHEAT + REACTOR, SUPERHEAT

17-C9311 HILL TM
RIVERTON, WYOMING. ADMINISTRATIVE CONTROL PREVENTS HIGH RADIATION EXPOSURE DURING ORE-CRUSHING
FEDERAL-RADOROCK-GAS HILLS PARTNERS
2 PAGES, MARCH 16, 1966, ATOMIC ENERGY CLEARING HOUSE, 12(14), PAGES 15-16 (APRIL 4, 1966)

SINCE EARLY 1965, HIGH-CLAY ORES ARE PROCESSED DURING DRY SEASONS. DRYING OPERATIONS (DURING WET SEASONS) CAUSES SEVERE DUSTING. LARGE VENT FANS ARE KEPT RUNNING DURING MAINTENANCE. NO ONE HAS EXCEEDED MPC SINCE THESE MEASURES STARTED.

*ADMINISTRATIVE CONTROLS AND PRACTICES + CONTAMINATION + MILLING

17-09312 MILLER WA
CONAM INSPECTION, INC., OVEREXPOSURE, JANUARY 25, 1966
CONAM INSPECTION, INC.
2 PAGES, JANUARY 25, 1966, ATOMIC ENERGY CLEARING HOUSE, 12(14), PAGES 17-18 (APRIL 4, 1966)

AN EMPLOYEE RECEIVED 3.83 REMS IN ONE QUARTER. THIS WAS NOT REPORTED TO THE AEC EARLIER BECAUSE HE HAD BEEN THOUGHT TO BE WORKING ONLY ON THE X-RAY MACHINE. THE DOSE-REPORTING SYSTEM WAS THEN CHANGED TO PINPOINT HOW MUCH RECEIVED FROM X-RAY AND HOW MUCH FROM GAMMA RADIATION FROM ISOTOPES.

*PERSONNEL EXPOSURE, RADIATION + FAILURE, ADMINISTRATIVE CONTROL + X-RAY

17-G9313 JANNEY CD
DEGOESBRIAND MEMORIAL HOSPITAL, BURLINGTON, VT., OVEREXPOSURE, MARCH 8, 1966
DEGOESBRIAND MEMORIAL HOSPITAL, BURLINGTON, VT.
1 PAGE, MARCH 8, 1966, ATOMIC ENERGY CLEARING HOUSE, 12(14), PAGE 18 (APRIL 4, 1966)

THE FILM BADGE OF A STUDENT X-RAY TECHNICIAN READ 4.5 REMS, A SMALL FRACTION FROM LICENSED MATERIAL. HIS DUTIES WERE NORMAL, AND THE OVEREXPOSURE WAS THE RESULT OF EITHER A PRANK OR AN ACCIDENTAL X-RAY EXPOSURE.

*PERSONNEL EXPOSURE, RADIATION + FAILURE, ADMINISTRATIVE CONTROL + X-RAY

17-09416 ZIEMANN DL
MODIFICATION OF PNPFC CONTROL ROD CABLES DUE TO EXCESSIVE ROD DROPS
PIQUA NUCLEAR POWER FACILITY
PNPF-69-66 +. 4 PAGES, MARCH 22, 1966, DOCKET NO. 115-2, PDR

MANY CASES OF SHORTING-TO-GROUND HAVE OCCURRED DUE TO COOLANT CARBURIZATION AND MECHANICAL DAMAGE. VARIOUS MODIFICATIONS WILL BE MADE RATHER THAN CHANGE TO A COMPLETELY SEALED SYSTEM.

*FAILURE, COMPONENT + *PIQUA + *REACTOR, ORGANIC COOLED + *SCRAM, FALSE + MODIFICATION, SYSTEM OR EQUIPMENT

17-09417 WEISMAN J + BARTNOFF S
THE SAXTON CHEMICAL SHIM EXPERIMENT
WESTINGHOUSE ELECTRIC CORPORATION, PITTSBURGH
WCAP-3269-24 +. 87 PAGES, 11 FIGURES, 10 TABLES, JULY 1965, DOCKET NO. 50-146: CFSTI, \$3.00 CY, \$0.75 MN

SPECIAL FUEL ELEMENTS WERE INSERTED AND LATER EXAMINED TO SHOW NO BORON ACCUMULATION DURING 4521 MWD/TON U IN CHEMICAL-SHIM OPERATION, MOST OF WHICH WAS AT 23.5 MW, WITH 16 PERCENT OF CORE SURFACE IN NUCLEATE BOILING. UNACCOUNTABLE REACTIVITY VARIED LESS THAN 0.2 PERCENT AT ALL TIMES. COOLANT PH WAS VARIED AND SHOWED NO REACTIVITY CHANGE AT ZERO POWER, ABOUT + 0.16 DELTA RHO/DELTA PH (HIGH BORON, WHETHER OR NOT BOILING), AND ABOUT + C.13 (LOW BORON, NO BOILING). LITHIUM HYDROXIDE AND POTASSIUM HYDROXIDE WERE USED TO ADJUST PH.

*CHEMICAL SHIM + *NUCLEATE BOILING + *OPERATIONS REPORTS, ANALYSIS + *SAXTON + COOLANT CHEMISTRY + REACTIVITY EFFECT, ANOMALOUS + REACTOR, PRESSURIZED WATER + SURFACE FILM DEPOSIT

17-C9435 O BOYLE MJ
YANKEE CORE EVALUATION PROGRAM QUARTERLY PROGRESS REPORT FOR THE PERIOD ENDING DECEMBER 31, 1965
WESTINGHOUSE ELECTRIC CORPORATION, ATOMIC POWER DIVISION
WCAP-6079 +. 80 PAGES, JANUARY 1966, DOCKET NO. 50-29, PDR, CFSTI \$3.00 CY \$0.75 MN

CATEGORY 17
OPERATIONAL SAFETY AND EXPERIENCE

17-09439 *CONTINUED*

A CORE I HIGH-BURNUP ASSEMBLY (46,000 MWD/METRIC TON U, PEAK) WAS EXAMINED (AFTER CORE IV IRRADIATION). THE FUEL ASSEMBLY LENGTHENED 0.118 IN. (ABOUT 0.1 PERCENT). CORE I AND II ASSEMBLIES HAD MINOR CRUD AT UPPER TIPS OF FUEL RODS. THIS ASSEMBLY HAD CRUD DEPOSITS 27 IN. DOWN FROM TOP OF FUEL IN IRREGULAR PATTERNS. CRUD DID NOT DEPOSIT ON SURFACE NEXT TO CONTROL-ROD CHANNELS. GRITTY DEPOSITS, A SLIPPED FERRULE, AND A STRANGE OBJECT WERE FOUND. SPECIFIC ACTIVITY OF CRUD IMPLIED A 125-DAY RESIDENCE TIME. LAST 127 DAYS OF CORE IV WERE AT 60 PERCENT POWER, HIGH PH. CRUD WAS 4 MILS THICK - A SCALY, LOOSELY ADHERING DEPOSIT. CLADDING WAS CUT FOR BURST-PRESSURE TESTS.

*FUEL ELEMENT + *IRRADIATION TESTING + *SURFACE FILM DEPOSIT + COOLANT CHEMISTRY + FUEL BURNUP + REACTOR, PRESSURIZED WATER + YANKEE

17-C9594 GARRETT AW + SEYFRIT KV + SIMS WH + SPENCER WC + TABOR WL + WHITT KW + ZIEMANN DL
PIQUA NUCLEAR POWER FACILITY MONTHLY OPERATING REPORT NO 28, AUGUST 1965
PIQUA NUCLEAR POWER CO.
CCO-652-18 +. 16 PAGES, 1 FIGURE, AUGUST 1965, PDR

THE REACTOR WAS SHUT DOWN THROUGHOUT THE MONTH TO REPAIR CONTROL-ROD LEADS, TO REPLACE INVESSEL FILTERS, AND OTHER WORK. TWENTY-ONE FAILURES IN THE MAGNETIC-JACK CONTROL-ROD DRIVES ARE REPORTED, MOSTLY SHORTED WIRES AND DEFECTIVE LEADS. IN-VESSEL FILTERS MEASURED UP TO 3.3 RODS/HR DUE TO ACTIVATION AT TIPS. TECHNICAL SPECIFICATIONS WERE REVISED TO PERMIT REMOVAL OF THE NEUTRON WINDOW, ALLOWING A METAL LINER TO BE PLACED INSIDE THE LEAKING FUEL-STORAGE POOL.

*COOLANT CHEMISTRY + *FAILURE, SCRAM MECHANISM + FILTER, GLASS + FUEL STORAGE + OPERATIONS REPORTS, GENERAL + PIQUA + REACTOR, ORGANIC COOLED

17-C9602 MANN S + YOUNGBLOOD EL
DECONTAMINATION OF THE ORNL MOLTEN-SALT FLUORIDE-VOLATILITY PILOT PLANT AFTER PROCESSING IRRADIATED ZIRCONIUM-URANIUM ALLOY FUEL
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TENNESSEE
ORNL-3891 +. 35 PAGES, 13 TABLES, 2 FIGURES, 14 REFERENCES, FEBRUARY 1966- CFSTI, \$2.00 CY, \$0.50 MN

THE MOLTEN-SALT FLUORIDE-VOLATILITY PROCESS FOR RECOVERING URANIUM FROM IRRADIATED ZIRCONIUM-OR ZIRCALOY-2-CLAD FUEL ELEMENTS WAS DEMONSTRATED SUCCESSFULLY IN THE ORNL MOLTEN-SALT FLUORIDE-VOLATILITY PILOT PLANT. THIS REPORT DESCRIBES DECONTAMINATION METHODS THAT HAVE BEEN USED TWICE, FOLLOWING TWO PERIODS OF HOT OPERATION, TO REDUCE RADIATION LEVELS IN EXCESS OF 2000 R/HR TO VALUES SUFFICIENTLY LOW TO PERMIT EXTENSIVE DIRECT MAINTENANCE AND EQUIPMENT MODIFICATION. RADIATION DOSAGE TO INDIVIDUALS WHO DID THE MECHANICAL WORK IN NO CASE EXCEEDED THE QUARTERLY 1.3-R ALLOWANCE. FINAL BACKGROUNDS WERE LESS THAN 100 MR/HR IN THE MAJORITY OF CELL LOCATIONS, WITH MAXIMUM READINGS OF 500 MR/HR ADJACENT TO SOME PARTS OF THE PROCESS EQUIPMENT. THE DECONTAMINATION SEQUENCE WAS BASED ON LABORATORY DEVELOPMENT WORK. IT INCLUDES FLUSHING WITH A MOLTEN SALT, FOLLOWED BY TREATMENT WITH THREE TYPES OF AQUEOUS SOLUTIONS FOR REMOVING SALT FILM, METAL SCALE, AND DEPOSITED RADIATION EMITTERS. THE RESPECTIVE COMPOSITIONS WERE - AMMONIUM OXALATE (0.3 TO 0.35 M), ALUMINUM NITRATE (0.1 M), OR AL (NO-3)3-HNO-3 (0.1-0.01 M), SODIUM HYDROXIDE-HYDROGEN PEROXIDE-SODIUM TARTRATE (ABOUT 5-1-1 WT PERCENT). THIS PROCEDURE IS SUITABLE FOR RADIATION LEVELS AT LEAST AS HIGH AS THOSE ENCOUNTERED IN THE TWO RADIOACTIVE OPERATING PERIODS CITED.

*FUEL ELEMENT + *MOLTEN FUEL + *RADIOCHEMICAL PROCESSING + CLAD + DECONTAMINATION + SALT + URANIUM + ZIRCALOY + ZIRCONIUM

17-C9650 A REVIEW OF FAST BREEDER REACTORS AND OF HIGH TEMPERATURE REACTORS (DRAGON PROJECT)
15 PAGES, 10 FIGURES, 5 TABLES, 19 REFERENCES, NUCLEAR ENGINEERING 11 (122)- 527-542 (JULY 1966)

REVIEW OF TWO CONFERENCES OF THE BRITISH NUCLEAR ENERGY SOCIETY ON FAST BREEDER REACTORS, HIGH-TEMPERATURE REACTORS, AND THE DRAGON PROJECT. PRESENTS BASIC TRENDS AND IDEAS OF THE MANY PAPERS RELATING OPERATING EXPERIENCE, NEW DESIGN, AND FUTURE (ECONOMIC) PROJECTIONS.

*DESIGN STUDY + *OPERATING EXPERIENCE + REACTOR, BREEDER + REACTOR, GAS COOLED

17-09788 PRESSURIZED WATER REACTOR (PWR) PROJECT. TECHNICAL PROGRESS REPORT, OCTOBER 22, 1965-JANUARY 21, 1966
BETTS ATOMIC POWER LABORATORY, PITTSBURGH, PENNSYLVANIA
WAPC-MRP-115 +. 105 PAGES, 13 FIGURES, 21 TABLES, JANUARY 21, 1966, CFSTI, \$4.00 CY, \$0.75 MN

REMAINS OF A THIN SHEET OF FIBROUS GASKET MATERIAL WERE FOUND ON THE OUTLET FLANGE OF THE SAFETY-INJECTION BOOSTER PUMP, AS WELL AS RUST AND SCALE IN THE CARBON-STEEL SUCTION LINE. A PH GREATER THAN 10.2 ARRESTED INCREASING CORE-PRESSURE DROP, BUT INCREASE BEGAN WHEN PH LOWERED. CONTROL-ROD CALIBRATIONS DURING XENON TRANSIENTS SHOWED A DOUBLE HUMP BECAUSE OF FLUX SHIFTS IN THE CORE. POTASSIUM PENTABORATE WAS INJECTED DURING MAINTENANCE. CRITICAL ROD POSITION BEFORE AND AFTER AGREED WITHIN XENON AND PRESSURE REACTIVITY EFFECTS, HOWEVER DIFFERENTIAL WORTH WAS ALMOST HALF AFTER BORON REMOVAL. FUEL ELEMENT AND POISON-PLATE IRRADIATION-TEST RESULTS REPORTED.

*CONTROL ROD CALIBRATION + *SHIPPINGPORT + *SURFACE FILM DEPOSIT + IN PILE LOOP + IRRADIATION TESTING + POISON, SOLUBLE + REACTIVITY EFFECT + REACTOR, PRESSURIZED WATER + XENON

17-C9578 ORR WL + STERNBERG HI + DERAMAIX P + CHASTAIN RH + BINDLER L + IMPINK AJ

CATEGORY 17
OPERATIONAL SAFETY AND EXPERIENCE

17-09978 *CONTINUED*
SAXTON PLUTONIUM PROGRAM. NUCLEAR DESIGN OF THE SAXTON PARTIAL PLUTONIUM CORE
WESTINGHOUSE ELECTRIC CORPORATION, PITTSBURGH, ATOMIC POWER DIV.
WCAP-3385-51 +. 350 PAGES (APPROX.), 108 FIGURES, 70 TABLES, DECEMBER 1965, CFSTI \$7.00 CY, \$1.75 MN.

REPORTS PARAMETER STUDIES ON PERFORMANCE IN SAXTON SPECIFIC-DESIGN CALCULATION TO SET
ENRICHMENT AND PERFORMANCE, AND CRITICALITY EXPERIMENTS TO CONFIRM DESIGN. PLUTONIUM
ELEMENTS ARE EXPECTED TO REACH 13,600 MWD/METRIC TON (AV), WITHIN A LINEAR POWER LIMIT OF 16
KW/FT. NINE UO₂-PUO₂ ELEMENTS WERE SURROUNDED BY 12 UO₂ ELEMENTS. INITIAL STUDIES SHOWED A
2.6 PERCENT DELTA K/K DISCREPANCY BETWEEN CALCULATION AND HANFORD EXPERIMENTS. ANALYSIS ALSO
UNDERESTIMATED ROD WORTH IN PLUTONIUM REGIONS. MORE-SEVERE LOCAL POWER PEAKING NEAR WATER
SLOTS OCCURRED IN PLUTONIUM REGIONS.

*COMPARISON, THEORY AND EXPERIENCE + *CRITICALITY EXPERIMENT + *FUEL ELEMENT + *HOT SPOT +
*PLUTONIUM OXIDE + *REACTIVITY EFFECT + *SAXTON + *URANIUM DIOXIDE

17-C9982 RANDALL JD
MOVABLE-BRIDGE LOCKING MECHANISM FAILURE AT TEXAS A AND M UNIVERSITY
TEXAS A AND M UNIVERSITY
2 PAGES, MAY 16, 1966, DOCKET 50-128, ATOMIC ENERGY CLEARING HOUSE, 12(23), PAGES 19-20 (JUNE 6, 1966)

THE REACTOR WAS MOVED UNDER CONTROLLED CONDITIONS, ALTHOUGH THE SUPERVISOR HAD FORGOTTEN TO
UNLOCK THE BRIDGE. THIS DEMONSTRATED THAT THE FRICTION-TYPE LOCKING MECHANISM WAS NOT A
POSITIVE LOCK, BECAUSE THE RUBBER BRAKING MATERIAL HAD BECOME HARD AND SLICK WITH AGE. THE
FRICTION-BRAKE CONCEPT IS BEING REPLACED WITH A PADLOCKED ROD PLACED THROUGH ONE OF MANY
HOLES DRILLED IN THE DRIVE WHEEL.

*FAILURE, DESIGN ERROR + *FUEL HANDLING + REACTOR, POOL TYPE

17-09984 BIG ROCK POINT AUTHORIZED TO USE AIR MASK PROTECTION FACTORS FOR AIRBORNE CONTAMINATION
UNITED STATES ATOMIC ENERGY COMMISSION
3 PAGES, MAY 19, 1966, DOCKET 50-155, ATOMIC ENERGY CLEARING HOUSE, 12(23), PAGES 16-18 (JUNE 6, 1966)

VARIOUS PROTECTION FACTORS FOR AIR-PURIFYING AND AIR-SUPPLYING EQUIPMENT USED WHEN EXPOSED TO
AIRBORNE CONCENTRATIONS IN EXCESS OF 10 CFR 20 ARE AUTHORIZED BY AEC IN RESPONSE TO 1962
REQUEST.

*INHALATION + *PERSONNEL PROTECTIVE DEVICE + BIG ROCK POINT + DOSE CALCULATION, INTERNAL +
REACTOR, BOILING WATER + REGULATION, AEC

17-10044 HOYT HK + ASCHERL RJ + COX BT
DRESDEN AND GARIGLIANO TURBINE MAINTENANCE EXPERIENCE
COMMONWEALTH EDISON COMPANY + GENERAL ELECTRIC COMPANY, SAN JOSE + GENERAL ELECTRIC COMPANY, CHICAGO
15 PAGES, 8 FIGURES, APRIL 1966, PP. 18-33 OF OPERATING AND MAINTENANCE EXPERIENCE WITH BWR POWER PLANTS,
PRESENTED AT THE AMERICAN POWER CONFERENCE 28TH ANNUAL MEETING, APRIL 26-28, 1966, CHICAGO, ILLINOIS,
APC, \$0.25 CY

CORROSION/EROSION PROBLEMS. FIRST INSPECTION REQUIRED PLASTIC FACE SHIELD BECAUSE OF HIGH
BETA FIELDS. ON LOAD DUMP, THE GARIGLIANO TURBINE WOULD OVERSPEED AND TRIP BECAUSE OF
FLASHING OF WATER ON SHIELDS AND PIPING.

*HEAT SINK + *MAINTENANCE AND REPAIR + CORROSION + DRESDEN I + GROSS BETA + ITALY + REACTOR, BOILING WATER

17-10045 HOYT HK + ASCHERL RJ + COX BT
GARIGLIANO (SENN) NUCLEAR POWER STATION OPERATING EXPERIENCE
COMMONWEALTH EDISON COMPANY + GENERAL ELECTRIC COMPANY, SAN JOSE + GENERAL ELECTRIC COMPANY, CHICAGO
6 PAGES, 1 TABLE, APRIL 1966, PP. 12-17 OF OPERATING AND MAINTENANCE EXPERIENCE WITH BWR POWER PLANTS,
PRESENTED AT THE AMERICAN POWER CONFERENCE 28TH ANNUAL MEETING, APRIL 26-28, 1966, CHICAGO, ILLINOIS

DURING FIRST YEAR, CORE-PRESSURE DROP INCREASED FROM 3.5 PSI TO 7 PSI. UNDERWATER TV REVEALED
CRUD DEPOSITS ON THE BOTTOM GRID, REMOVED FASTER BY BRUSHES THAN ULTRASONIC. THE HIGH COPPER
CONTENT INDICATED THE MONEL FEEDWATER HEATERS AND STEAM-GENERATOR TUBES.

*CRUD + *PRESSURE DROP + ITALY + REACTOR, BOILING WATER

17-10046 HOYT HK + ASCHERL RJ + COX BT
DRESDEN NUCLEAR POWER STATION OPERATING EXPERIENCE
COMMONWEALTH EDISON CO. + GENERAL ELECTRIC CO., SAN JOSE + GENERAL ELECTRIC COMPANY, CHICAGO
12 PAGES, APRIL 1966, PP. 1-11 OF OPERATING AND MAINTENANCE EXPERIENCE WITH BWR POWER PLANTS, PRESENTED AT
THE AMERICAN POWER CONFERENCE 28TH ANNUAL MEETING, APRIL 26-28, 1966, CHICAGO, ILLINOIS

FUEL-CYCLE 3 CONTAINED ENOUGH LEAKERS SO THAT STACK-DISCHARGE LIMITS FORCED BASELOAD OPERATION
AT 70 PERCENT POWER. (1) CONDENSATE-PUMP STUFFING BOX SPLIT, LEAKING WATER. CONDENSATE
STORAGE WATER MAINTAINED WATER IN DRUM. (2) LIGHTNING ARRESTER FAILED, TRIPPED GENERATOR AND
2 CIRCULATING PUMPS. FLOW REDUCTION OVERCAME PRESSURE INCREASE, WHICH NORMALLY CAUSES A HIGH
FLUX SCRAM. (3) TORNADO CAUSED FAILURE OF ALL 5 TRANSMISSION LINES. EMERGENCY DIESEL LOADED
PROPERLY. (4) FAILURE OF A 10-CENT CARBON RESISTOR IN A LOGIC MODULE CAUSED THE FIRST
IN-CORE FLUX-MONITORING SCRAM.

*EMERGENCY POWER, ELECTRIC + *FAILURE, PIPE + DRESDEN I + FAILURE, INSTRUMENT + INSTRUMENTATION, IN CORE +

CATEGORY 17
OPERATIONAL SAFETY AND EXPERIENCE

17-10046 *CONTINUED*
OPERATING EXPERIENCE + REACTOR, BOILING WATER

17-10048 POCOCK FJ + LUX JA + SEIBEL RV
CONTROL OF IRON PICK-UP IN CYCLES UTILIZING CARBON STEEL FEEDWATER HEATERS
THE BABCOCK AND WILCOX COMPANY, OHIO
30 PAGES, 8 FIGURES, 9 TABLES, APRIL 1966, PRESENTED AT THE AMERICAN POWER CONFERENCE 28TH ANNUAL MEETING,
APRIL 26-28, 1966, CHICAGO, ILLINOIS, APC, \$0.25 CY

CONVENTIONAL STATION, STEEL-TUBED FEEDWATER HEATERS MAINTAINED AT PH ABOVE 9.3 MINIMIZED IRON
IN WATER. RESULTS OF VARIABLE PH TESTS AT 3 STATIONS. 100-FT-LONG SAMPLE LINE REDUCED IRON
CONTENT OF SAMPLE WATER TO ZERO. PH CONTROLLED BY AMMONIA INJECTION.

*CORROSION + *HEAT EXCHANGER + COOLANT CHEMISTRY + STEEL, STAINLESS

17-10049 PRESTEL JA + EDLUND MC
INDIAN POINT UNIT NO. 1 CORE A PERFORMANCE SUMMARY APRIL 1966
CONSOLIDATED EDISON CO., NEW YORK + BABCOCK AND WILCOX CO., LYNCHBURG
TP-285 +. 17 PAGES, 3 FIGURES, 3 TABLES, 9 REFERENCES, APRIL 1966, PRESENTED AT THE AMERICAN POWER
CONFERENCE 28TH ANNUAL MEETING, APRIL 26-28, CHICAGO, ILLINOIS, APC, \$0.25 CY

BRIEF SUMMARY OF CORE A HISTORY. ZERO-POWER TESTS INDICATED LIFETIME OF 450 PLUS/MINUS 65
DAYS, MID-LIFE TESTS 420 PLUS/MINUS 40 DAYS. FULL-POWER LIFE WAS 385 DAYS, 442 WITH
STRECHOUT. 18 POWER-RANGE DETECTORS LOCATED OUTSIDE VESSEL FOLLOWED ROD ASYMMETRIC AND XENON
TRANSIENT WELL. NON-UNIFORM BORON BURNUP WAS A MAXIMUM AT THE INTERPHASE BETWEEN FIXED SHIM
AND ITS TIP, AND RESULTANT STRESS FRACTURED RODS.

CONTROL ROD + FUEL BURNUP + INDIAN POINT I + OPERATING EXPERIENCE + REACTOR, PRESSURIZED WATER +
XENON OSCILLATION

17-10050 COCHRAN JD + MONSON HO + OWENS JE
OPERATING EXPERIENCE WITH LARGE SODIUM COOLED REACTOR PLANTS
CONSUMERS PUBLIC POWER, HALLAM + ARGONNE NATIONAL LABORATORY, ARGONNE + ATOMICS INTERNATIONAL, CANOGA PARK
48 PAGES, 17 FIGURES, 7 TABLES, 11 REFERENCES, APRIL 1966, PRESENTED AT THE AMERICAN POWER CONFERENCE 28TH
ANNUAL MEETING, APRIL 26-28, 1966, CHICAGO, ILLINOIS, APC, \$0.25 CY

FERMI STEAM GENERATORS FAILED TWICE, ONCE DUE TO STRESS CORROSION CRACKING INITIATED BY A
CLEANING-SOLUTION RESIDUE, ONCE DURING CLEAN-UP OPERATION DUE TO VIBRATION. THE SODIUM-WATER
REACTION WAS HANDLED BY THE PRESSURE-RELIEF SYSTEM. HALLAM SECONDARY EXPANSION TANK FAILED
BECAUSE A HALIDE-COATED WELDING ROD WAS USED FOR FIELD INSTALLATION OF AN INTERNAL BAFFLE.

*CORROSION + *STRESS + FERMI + HALLAM + OPERATING EXPERIENCE + REACTOR, BREEDER + REACTOR, FAST +
REACTOR, GRAPHITE MODERATED + REACTOR, LIQUID METAL COOLED

17-10051 WEST JM + FRAGOSO JH
BONUS OPERATING EXPERIENCE
COMBUSTION ENGINEERING, INC., WINDSOR + PUERTO RICO WATER RESOURCES AUTHORITY, RINCON
12 PAGES, 6 FIGURES, 4 TABLES, 1 REFERENCE, APRIL 1966, PRESENTED AT THE AMERICAN POWER CONFERENCE 28TH
ANNUAL MEETING, APRIL 26-28, 1966, CHICAGO, ILLINOIS, APC, \$0.25 CY

BRIEF REVIEW PRIMARILY OF CONVENTIONAL EQUIPMENT. BORON HAS REACHED HOTWELL, APPARENTLY AS
VENTING THE BORON TANK CAUSES FOAMING AND CARRYOVER. LEAKAGE OF PENTABORATE OUT VALVE STEMS
CONTINUES. THREE TIMES THE EMERGENCY CORESPRAY SYSTEM HAS INADVERTANTLY BEEN ACTUATED DURING
A SHUTDOWN. ONCE ENOUGH WATER WAS ADMITTED TO FILL VESSEL AND FLOOD SUPERHEATER WITH IMPURE
WATER. TURBINE OPERATED AGAINST LOAD LIMIT TO AVOID LOAD SWINGS AND TRANSIENTS IN
STEAM-FLOW/POWER. MAJOR ALTERATIONS HAVE BEEN NECESSARY IN FEEDWATER AND STEAM-FLOW CONTROL
VALVES TO OBTAIN SMOOTHER OPERATION, BECAUSE OF EXTREME SENSITIVITY OF CLAD TEMP. TO
STEAM-FLOW/POWER RATIO AT LOW POWER. CONTROL ROD DRIVE SEALS AND BUSHING DETERIORATE TOO
RAPIDLY.

*CORE SPRAY + *OPERATING EXPERIENCE + *SAFETY INJECTION + *VALVE + FAILURE, GENERAL + REACTOR, SUPERHEAT

17-10052 BEATTY DC + FARBERMAN GH
ACCUMULATED EXPERIENCE WITH NUCLEAR POWER PLANTS
WESTINGHOUSE ELECTRIC COMPANY, PITTSBURGH
22 PAGES, 4 FIGURES, 5 TABLES, APRIL 1966, PRESENTED AT THE AMERICAN POWER CONFERENCE 28TH ANNUAL MEETING,
APRIL 26-28, 1966, CHICAGO, ILLINOIS, APC, \$0.25 CY

GENERAL DISCUSSION OF FUEL-CYCLE LENGTH, OUTAGES, AND USE FACTORS. WHEN THE NOVEMBER 9, 1965
BLACKOUT OCCURRED, YANKEE ROWE WAS IN STARTUP TESTS FOR CORE V. ON 3-HOUR NOTICE, HEATUP WAS
BEGUN, AND IN 12 HOURS YANKEE WAS SYNCHRONIZED TO THE LINE. WITH INCREASED OPERATION
EXPERIENCE AND REPETITIVE CORES, THE SAME STARTUP TESTS CAN BE BETTER PROGRAMMED. CORE-V
PHYSICS TESTS TOOK 20 HOURS.

*OPERATING EXPERIENCE + LOSS OF POWER + POWER UPGRATING + REACTOR, PRESSURIZED WATER + TEST, PHYSICS +
YANKEE

17-10053 REES DR + HUGGINS RA

CATEGORY 17
OPERATIONAL SAFETY AND EXPERIENCE

17-10053 *CONTINUED*

THE OYSTER CREEK NUCLEAR STATION- DESIGN CONCEPT, CONSTRUCTION, AND TRAINING PROGRAM
JERSEY CENTRAL POWER AND LIGHT COMPANY, MORRISTOWN + GENERAL ELECTRIC COMPANY, SAN JOSE
12 PAGES, 6 FIGURES, APRIL 1966, PRESENTED AT THE AMERICAN POWER CONFERENCE 28TH ANNUAL MEETING, APRIL
26-28, 1966, CHICAGO, ILLINOIS, APC, \$0.25 CY

ALTHOUGH RATED FOR 540 MWE GROSS, TURBINE AND REACTOR HAVE CAPABILITY FOR 640. SPECIAL
FACILITY FOR DILUTING CONDENSER WATER DISCHARGE. CRITICAL PATH SCHEDULING AND PARTIALLY
CONCURRENT CONSTRUCTION HAS HELD SCHEDULE. WELLS ARE NECESSARY TO KEEP WATER TABLE LOW FOR
BELOW-GRADE CONSTRUCTION. EXTENSIVE TRAINING OF CREW DISCUSSED.

*CONTAINMENT CONSTRUCTION + *STAFFING, TRAINING, QUALIFICATION + OYSTER CREEK + REACTOR, BOILING WATER

17-10054 LONG NA

RECENT OPERATING EXPERIENCES WITH STAINLESS STEEL CONDENSER TUBES
WALLINGFORD STEEL COMPANY, WALLINGFORD

22 PAGES, APRIL 1966, PRESENTED AT THE AMERICAN POWER CONFERENCE 28TH ANNUAL MEETING, APRIL 26-28, 1966,
CHICAGO, ILLINOIS, APC, \$0.25 CY

REVIEW OF STEAM-ELECTRIC PLANT EXPERIENCE WITH 304 AND 316 SS TUBING INSTEAD OF COPPER BASED
ALLOYS. OF 176 CONDENSERS, 155 HAVE HAD NO DIFFICULTIES, 4 HAVE HAD MANGANESE DEPOSITS, 9
HAVE HAD MINOR PROBLEMS, AND 8 HAVE HAD SIGNIFICANT TUBE FAILURE. IN GENERAL PITTING OCCURS
UNDERNEATH SURFACE FILM DEPOSITS (SLIME, CARBONATE, MANGANESE) WHICH HOLD CHLORINE. A PROPER
SCHEDULE OF CLEANING AND CIRCULATION DURING OUTAGES GIVES GENERALLY EFFECTIVE CONTROL.

*CHLORINE + *CORROSION + *FAILURE, PIPE + *HEAT SINK + COOLANT CHEMISTRY + OPERATING EXPERIENCE +
SURFACE FILM DEPOSIT

17-10192 JOHNSON RU

HARVARD UNIVERSITY. TWO CURIES OF KR-85 LOST BECAUSE OF THEFT
HARVARD UNIVERSITY, CAMBRIDGE, MASS.

1 PAGE, DECEMBER 29, 1965, ATOMIC ENERGY CLEARING HOUSE, 12(20), PAGE 36, (MAY 16, 1966)

TWO CURIES OF KR-85 WAS HELD IN VIALS BY 5 POUNDS OF MERCURY, IN A HOOD. ON NOVEMBER 29,
1965, THE MERCURY WAS FOUND MISSING. THE RELEASE WAS ESTIMATED AS 500 TIMES THE MPC. A
SERIES OF MERCURY THEFTS HAD OCCURRED OVER SEVERAL MONTHS. WHILE THE DOOR WAS LOCKED, 15 TO
20 KEYS WERE IN EXISTENCE.

*FISSION GAS RELEASE + *INCIDENT, ACTUAL, HUMAN ERROR + TRACER, RADIOACTIVE

17-10193 HALL WF

WESTERN NEW YORK NUCLEAR RESEARCH CENTER. N-16 TO BE USED FOR POWER-LEVEL CHANNEL
WESTERN NEW YORK NUCLEAR RESEARCH CENTER, INC.

2 PAGES, MAY 3, 1966, DOCKET 50-57, ATOMIC ENERGY CLEARING HOUSE, 12(20), PAGES 30-31 (MAY 16, 1966)

SINCE DECEMBER 1964 AN N-16 SYSTEM HAS BEEN INSTALLED IN THE CORE-COOLANT-OUTLET LINE. THE
SYSTEM IS HIGHLY RELIABLE BETWEEN 100 KW AND 2 MW, HAS A 7-SEC RESPONSE TIME, AND IS
INSENSITIVE TO CHANGING XENON-INDUCED FLUX PATTERNS. FLOW AND TEMPERATURE DIFFERENCES ARE
ACCEPTABLE MEASURES OF REACTOR POWER, WHEN THE POOL REACHES TEMPERATURE EQUILIBRIUM 45 MIN
AFTER STARTUP. ON APPROACHING FULL POWER, THE N-16 SIGNAL IS SWITCHED ONTO THE
STARTUP-CHANNEL LOG-COUNTING-RATE RECORDER.

*INSTRUMENTATION, PROCESS + *NITROGEN + *OPERATING EXPERIENCE + *REACTOR POWER + *REACTOR, POOL TYPE +
REACTOR, PULSED

17-10194 HALL WF

WESTERN NEW YORK RESEARCH CENTER REACTOR. THERMOCOUPLES GAVE FALSE POWER INDICATION
WESTERN NEW YORK NUCLEAR RESEARCH CENTER, INC.

2 PAGES, MAY 3, 1966, DOCKET 50-57, ATOMIC ENERGY CLEARING HOUSE, 12(20), PAGES 30-31 (MAY 16, 1966)

DURING TESTING OF AN N-16 POWER-RANGE CHANNEL, VERY PRECISE INSTRUMENTS WITH RESISTANCE BULBS
SHOWED THAT THE THERMOCOUPLE TEMPERATURE-DIFFERENTIAL SYSTEM WAS UNDERESTIMATING THERMAL
POWER BY 14.7 PERCENT. RESISTANCE BULBS WERE USED AFTER THAT.

*FAILURE, DESIGN ERROR + *INCIDENT, ACTUAL, EQUIPMENT + *INSTRUMENTATION, TEMPERATURE + *REACTOR POWER +
REACTOR, POOL TYPE + REACTOR, PULSED

17-10196 GENERAL TESTING COMPANY. OVEREXPOSURE UNREPORTED BECAUSE OF UNRELIABLE READINGS

GENERAL TESTING COMPANY, LISBON, OHIO

1 PAGE, ATOMIC ENERGY CLEARING HOUSE, 12(20), PAGE 35, (MAY 16, 1966)

GARDRAY FILM BADGE SERVICE SHOWED A 3.5-REM EXPOSURE FOR ONE INDIVIDUAL, WHILE THE CONTROL
BADGES AND FOUR INDIVIDUALS SHOWED NO EXPOSURE. THIS WAS NOT REPORTED BECAUSE IT WAS THOUGHT
IN ERROR. PREVIOUSLY READINGS WERE SHOWN FOR UNUSED BADGES, AND USED-BADGE READINGS WERE IN
EXCESS OF DAILY DOSIMETER RECORDS. WE RELOCATED THE BADGE-STORAGE RACK AWAY FROM A GAS
HEATER. AFTER THE FEBRUARY INSPECTION, TWO FILM BADGES WERE WORN, BUT THE READINGS ARE NOT
IN AGREEMENT.

*OPERATING EXPERIENCE + *PERSONNEL PROTECTIVE DEVICE + FAILURE, INSTRUMENT +
PERSONNEL EXPOSURE, RADIATION + RADIOGRAPHY

CATEGORY 17
OPERATIONAL SAFETY AND EXPERIENCE

17-10197 ADVISORY COMMITTEE ON REACTOR SAFEGUARDS REVIEW OF BONUS
1 PAGE, ATOMIC ENERGY CLEARING HOUSE, 12(22), PAGE 30 (MAY 30, 1966)

ACRS APPROVES TRANSFER OF BONUS OPERATING CONTRACT TO PUERTO RICO WATER RESOURCES AUTHORITY, AND RECOMMENDS A REVIEW OF UNSOLVED OPERATING PROBLEMS, FOR EXAMPLE, FAILED FUEL, CRACKED SUPERHEATER PIPING INSIDE VESSEL, CONTROL ROD DRIVE AND INSTRUMENT DEFECTS.

*ACRS (ADVISORY COMMITTEE ON REACTOR SAFEGUARDS) + *OPERATING EXPERIENCE +
BONUS (BOILING NUCLEAR SUPERHEAT PROJECT) + REACTOR, SUPERHEAT

17-10198 SCHENDEL KR
OVEREXPOSURE AT WESTINGHOUSE, WALTZ MILL, PA.
WESTINGHOUSE ELECTRIC CORP., PITTSBURGH, PA.
3 PAGES, APRIL 28, 1966, ATOMIC ENERGY CLEARING HOUSE, 12(22), PAGES 23-25 (MAY 30, 1966)

ONE EMPLOYEE RECEIVED A QUARTERLY 99-REM (MOSTLY BETA) DOSE TO THE LEFT HAND WHILE ANALYZING IRRADIATED FUEL, BECAUSE RADIATION READINGS WERE CUSTOMARILY TAKEN AT 9 IN., AND THIS BATCH HAD CONSIDERABLY HIGHER CONTACT BETA DOSE RATES THAN BEFORE. ANOTHER EMPLOYEE RECEIVED A 28- AND 18-REM (MOSTLY BETA) QUARTERLY DOSE, FOR THE SAME REASON, WHILE PREPARING THE SAMPLES.

*GROSS BETA + *PERSONNEL EXPOSURE, RADIATION + FISSION PRODUCT ACTIVITY, GROSS +
INCIDENT, ACTUAL, HUMAN ERROR + RADIOCHEMICAL PROCESSING

17-10195 CRONIN DF
BACKFLOW OF UF6 FROM HOOD, CAUSED BY ROOM DOOR ADMITTING AIR. UNITED NUCLEAR CORPORATION
UNITED NUCLEAR CORPORATION, NEW HAVEN, CONN.
3 PAGES, APRIL 21, 1966, ATOMIC ENERGY CLEARING HOUSE, 12(22), PAGES 21-23 (MAY 30, 1966)

A PUZZLING RANDOM SOURCE OF AIR CONTAMINATION MAY HAVE BEEN BACKFLOW FROM A LEAKING CONNECTION. AN OPERATOR HAD INSTALLED A FILLED UF6 CYLINDER IN A HOOD, NOTICED A LEAK IN THE CONNECTION AND WAS TIGHTENING IT, WHEN ANOTHER PERSON OPENED THE ROOM DOOR. A BACKFLOW OF AIR FROM THE HOOD BROUGHT A BRIEF UNPLEASANT ODOR TO THE OPERATOR. URINE SPECIMENS INDICATED SOME UPTAKE. MODIFICATIONS ARE BEING MADE.

*AIRBORNE RELEASE + *GLOVE BOX + MODIFICATION, SYSTEM OR EQUIPMENT + URANIUM

17-10200 TRITIUM CONTAMINATION AT THEODORE R. SCHWALM, INC.
DIVISION OF STATE AND LICENSEE RELATIONS, USAEC
2 PAGES, APRIL 14, 1966, ATOMIC ENERGY CLEARING HOUSE, 12(22), PAGES 20-21 (MAY 30, 1966)

AEC INSPECTION REVEALED THAT EMPLOYEES LEAVING TRITIUM PAINTING AREAS HAD 59,000 DIS/MIN OF REMOVABLE TRITIUM ON THEIR HANDS AND STREET SHOES. EMPLOYEES HAD MONITORED THEMSELVES WITH AN ULTRAVIOLET LIGHT (USED FOR LUMINOUS PAINT) INEFFECTIVE AGAINST TRITIUM. IN ADDITION, CONTAMINATED CLOTHES ARE REUSED WITHOUT WASHING, INADEQUATE CHANGE ROOMS EXIST, AND CONTAMINATED DIAL HOLDERS ARE PASSED INTO UNRESTRICTED AREAS. AEC INDICATES THAT OTHER PAINTERS WITH CAREFUL HOUSEKEEPING CAN OPERATE WITHIN THEIR LIMITS.

*CONTAMINATION + *FAILURE, ADMINISTRATIVE CONTROL + *TRITIUM

17-10201 AIRBORNE CONTAMINATION AT NUCLEAR MATERIALS AND EQUIPMENT CORPORATION, APOLLO, PA.
NUCLEAR MATERIALS AND EQUIPMENT CORPORATION
1 PAGE, MAY 5, 1966, ATOMIC ENERGY CLEARING HOUSE, 12(22), PAGE 18 (MAY 30, 1966)

EIGHT OPERATORS RECEIVED EXPOSURES MORE THAN 40 MPC (AIR) EQUIVALENT HOURS IN LESS THAN SEVEN DAYS RECENTLY. WHEN THE FUEL-WAFER AREA WAS CONVERTED FROM DEPLETED URANIUM TO ENRICHED URANIUM, SEVERAL PROCESS VENTILATION INADEQUACIES WERE DISCOVERED. IN ADDITION, WORKERS WERE REINDOCTRINATED.

*AIRBORNE RELEASE + *MILLING + URANIUM

17-10202 IRIRARTE M
FURTHER INFORMATION ON BONUS ACTIVITY RELEASES FOLLOWING SCRAMS
PUERTO RICO WATER RESOURCES AUTHORITY
4 PAGES, MAY 4, 1966, DOCKET 115-4, ATOMIC ENERGY CLEARING HOUSE, 12(21), PAGES 6-9 (MAY 23, 1966)

INFORMATION ON FIVE SCRAMS BETWEEN MARCH 10 FILING AND MAY 4 INDICATE THAT THE PROBLEM CONTINUES BUT THAT PROCEDURAL AND EQUIPMENT MODIFICATIONS REDUCE RELEASE. CHANGE OF PRESSURE AND TEMPERATURE ALLOWS LEAKS THROUGH VARIOUS VALVES, RESULTING IN THE WEARING OF FACEMASKS FOR SEVERAL HOURS. VENTILATION IS BEING IMPROVED AND KNOWN VALVES DETERMINED QUICKER.

*FISSION GAS RELEASE + *OPERATING EXPERIENCE + *VALVE + BONUS (BOILING NUCLEAR SUPERHEAT PROJECT) +
REACTOR, SUPERHEAT

17-10278 KNAPP WG
METHOD FOR NEUTRON-FLUX STUDIES IN AN OPERATING POWER REACTOR USING BARE AND CADMIUM-COVERED RADIOACTIVANTS
ARGONNE NATIONAL LABORATORY
ANL-7C11 +. 26 PAGES, 17 FIGURES, REFERENCES, MARCH 1965, CFSTI \$2.00 CY

CATEGORY 17
OPERATIONAL SAFETY AND EXPERIENCE

17-10278 *CONTINUED*

SMALL PNEUMATIC TRANSFER LOOPS WERE INSERTED INTO EBWR TO MAKE FLUX-PLUT IRRADIATIONS AT POWER, USING RADIOACTIVANTS ARRANGED IN BEAD-CHAIN FASHION (SIMILAR TO ORDINARY KEY CHAINS). THIS MINIMIZED THE SHUTDOWN TIME FOR FLUX PLOTTING AND ENABLED MORE EXTENSIVE PHYSICS DATA-TAKING. IN-CORE TUBING WAS 3/16-INCH INCONEL, AND A SPARE 3-INCH INSTRUMENTATION NOZZLE ALLOWED SIX LOOPS AT A TIME. REPORT DESCRIBES EQUIPMENT USED AND GIVES SUGGESTIONS FOR IMPROVEMENT.

*FLUX DISTRIBUTION + *IN CORE MEASUREMENT + EBWR (EXPERIMENTAL BOILING WATER REACTOR) + OPERATING EXPERIENCE + REACTOR, BOILING WATER

17-10335 BARON S
ENGINEERING FOR COMMUNITY ACCEPTANCE - THE ARCHITECT-ENGINEER ROLE
BURNS AND ROE, INC.

13 PAGES, 1 FIGURE, PRESENTED AT THE AMERICAN POWER CONFERENCE 28TH ANNUAL MEETING, APRIL 26-28, 1966, CHICAGO, APC

COMMENTS ON AEC DESIGN CRITERIA AND TURNKEY CONTRACTS. SUGGESTS TIGHT CONTRACT PRICE LEAVES LITTLE LEEWAY FOR AEC - REQUIRED MODIFICATIONS, TURNKEY CONTRACT A-E CANNOT SERVE AS SUBCONTRACTOR AND STILL ENGINEER PLANT FOR COMMUNITY ACCEPTANCE. LITTLE OR NO STANDBY CAPACITY AVAILABLE FOR MAJOR COMPONENT FAILURE, CHEAPER BUT LESS RELIABLE EQUIPMENT INEVITABLE. CONCENTRATION ON ACCIDENT ANALYSES, CONTAINMENT, AND SAFETY SYSTEMS REDUCE EFFORT ON MAINTAINABILITY AND LOCAL RADIATION CONTROL. SUGGESTS ELIMINATION OF FIXED-PRICE CONTRACTS TO ALLOW CONTINUED ENGINEERING RATHER THAN TOO-EARLY STANDARDIZATION, TO MEET ECONOMIC CHALLENGE.

*DESIGN CRITERIA + *SAFETY PRINCIPLES AND PHILOSOPHY + RADIATION, PUBLIC EDUCATION/ACCEPTANCE

17-10343 CHASSANY JP + GUILLERMIN P + DELMAR J
RADIOACTIVITY MEASUREMENTS INSIDE THE PRESSURE VESSEL OF THE REACTOR G3 AFTER 4 YEARS OPERATION
COMMISSARIAT A L ENERGIE ATOMIQUE
CEA-R 2785 +. 8 PAGES, 4 FIGURES, APRIL 1965, DEP MN

EARLIER ENTRY INTO G2 AND G3 OCCURRED DURING STARTUP PHASE OF INTERMITTENT OPERATION. THIS ENTRY WAS MADE DURING MODIFICATION OF HEAT EXCHANGERS TO INSPECT AND ESTABLISH REQUIREMENTS SHOULD SUCH ENTRY BE NECESSARY. AT THE END OF THE PIPING COMING INTO THE VESSEL, THE DOSE RATE REACHED 75 MR/HR AND 100 MR/HR NEAR THE DEFLECTOR. ON THE OTHER SIDE OF THIS DEFLECTOR IT WAS STILL 100 MR/HR AND THEN INCREASED RAPIDLY TO OVER 1 R/HR AT 1 M FROM THE STARTING-UP CHAMBERS. ON THE SIDES, THE FLUX TENDED TO DECREASE (80 MR/HR) AND WAS 2 R/HR AT A HEIGHT OF 3 M. THIS DOSE RATE COULD CERTAINLY HAVE BEEN DECREASED BY DISCHARGING THE PERIPHERAL ZONE OF THE REACTOR. CONSEQUENTLY IT SHOULD BE POSSIBLE TO INTRUDE INTO THE VESSEL IF NECESSARY, ON CONDITION THAT GREAT CARE IS TAKEN TO AVOID CONTAMINATION AND THAT THE TOTAL DOSE IS FOLLOWED AS PRECISELY AS POSSIBLE DURING THE OPERATIONS.

*CONTAINMENT, PRESSURE VESSEL + *INCIDENT, ACTUAL, RECOVERY FROM + *SURVEY, RADIATION, GENERAL + FRANCE + REACTOR, GAS COOLED + SHIELDING

17-10344 HORSMAN JC
THE DEVELOPMENT OF STEAM-WATER REACTOR LOOPS AT CHALK RIVER
ATOMIC ENERGY OF CANADA, LTD., CHALK RIVER
AECL-2415 + CONF-660521-1 +. 17 PAGES, 15 FIGURES, 1 TABLE, APRIL 1966, AECL \$0.75 CY

A SMALL PRESSURIZED-WATER LOOP IN NRX, X-4, WAS MODIFIED IN 1960 TO PROVIDE FOR COOLING WITH SUPERHEATED STEAM, AND IN 1962 FOR BOILING WATER AND FOG COOLANT. SEVERAL PROBLEMS IN STEAM GENERATION, CONTROL STABILITY, DEGASSING, OUT-LEAKAGE, AND PUMPING WERE OVERCOME. EXPERIENCE WITH X-4 PROVIDED A BASIS FOR THE DESIGN OF A LARGE STEAM-WATER LOOP, U-1, THAT WAS ADDED TO THE NRX REACTOR IN 1964. THIS SYSTEM HANDLES FROM 1 TO 4 MW OF NUCLEAR HEAT, DEPENDING ON THE COOLING MODE. THESE TWO LOOPS ARE NOW FULLY OPERATIONAL, BEING USED TO DETERMINE THE CRITICAL HEAT FLUX, AND, IN MOST RESPECTS, MEET THE REQUIREMENTS. U-1 HAS EXCELLENT CONTROL STABILITY OVER A RANGE OF CONDITIONS. IT IS DIFFICULT TO DEGAS TO LOW CONCENTRATIONS, AND PERSISTENT LEAKAGE FROM SMALL VALVES IS ALSO A CONTINUING PROBLEM. IMPROVEMENTS ARE NEEDED IN DESIGN AND IN COMPONENT RELIABILITY TO REDUCE COMPLEXITY, MAINTENANCE, AND CAPITAL COSTS.

*CANADA + *DESIGN CRITERIA + *HEAT TRANSFER + *IN PILE LOOP + *OPERATING EXPERIENCE + REACTOR, RESEARCH

17-10345 SIMON RH
DESIGN, CONSTRUCTION, AND INITIAL OPERATION OF GENERAL ATOMIC IN-PILE LOOP
GENERAL ATOMIC DIVISION, GENERAL DYNAMICS CORP.
GA-5938 +. 53 FIGURES, 15 TABLES, FEBRUARY 15, 1965, CFSTI \$4.00 CY

REVIEWS DESIGN, ETC., AND ACCIDENT EVALUATION OF A 600-KW TEST LOOP FOR PEACH BOTTOM FUEL ELEMENTS.

*COATED PARTICLE + *FUEL ELEMENT + *FUEL INTEGRITY + *GETR (GENERAL ELECTRIC TEST REACTOR) + *IN PILE LOOP + *OPERATING EXPERIENCE + REACTOR, GAS COOLED + REACTOR, TEST

17-10517 RICE RE
EXPERIMENTS WITH PERIPHERAL SUPERHEATER CORE PSW-I. BORAX-V
ARGONNE NATIONAL LABORATORY, ARGONNE
ANL-6962 +. 287 PAGES, 147 FIGURES, 43 TABLES, 18 REFERENCES, JULY 1965, CFSTI, \$6.00 CY, \$1.50 MN

CATEGORY 17
OPERATIONAL SAFETY AND EXPERIENCE

17-10517 *CONTINUED*

THE FUEL ELEMENTS WERE REPAIRED AND THE CORE MODIFIED FOR PSH-1 OPERATION FROM APRIL THROUGH AUGUST 1964. EARLY TERMINATION LIMITED TESTS TO THE USUAL PHYSICS TESTS PLUS SPECIAL SUPERHEAT TESTS, TRANSFER-FUNCTION MEASUREMENTS, POWER SPLIT, DEFECTIVE-ELEMENT TESTS --ALL WITH LOW POWER (NATURAL CIRCULATION). REPORT INCLUDES SIGNIFICANT RESULTS AND DISCUSSION OF THE MAJOR TESTS.

*HEAT TRANSFER, NATURAL CONVECTION + *OPERATIONS REPORTS, ANALYSIS + *TEST, PHYSICS + *TEST, SYSTEM OPERABILITY + BORAX, ALL (BOILING REACTOR EXPERIMENTS, NRTS) + COOLANT CHEMISTRY + FAILURE, FUEL ELEMENT + REACTOR, SUPERHEAT + TRANSFER FUNCTION

17-10561 VAUGH HA

TRITIUM EXPOSURE AT U. S. RADIUM CORPORATION, JUNE 2, 1966
U. S. RADIUM CORPORATION

1 PAGE, JUNE 2, 1966, ATOMIC ENERGY CLEARING HOUSE, 12(27), PAGE 29 (JULY 4, 1966)

AN INDIVIDUAL BIOASSAY AVERAGED 30 MICROCURIES OF TRITIUM PER LITER FOR 7 DAYS, DUE TO TWO CONTINGENCIES NOT FORESEEN (IMPROPER HANDLING OF LEAKING TRITIUM-FILLED GLASS TUBES, AND BEING TOO CLOSE TO A LEAKING GAS-FILLING PORT).

*INCIDENT, ACTUAL, NONREACTOR + *PERSONNEL EXPOSURE, RADIATION + *TRITIUM + FAILURE, ADMINISTRATIVE CONTROL

17-10562 MECKSTROTH GR

IRIDIUM-192 INCINERATION AT TULANE SCHOOL OF MEDICINE, MAY 25, 1966
TULANE UNIVERSITY SCHOOL OF MEDICINE, NEW ORLEANS, LA.

1 PAGE, ATOMIC ENERGY CLEARING HOUSE, 12(27), PAGE 29 (JULY 4, 1966)

IRIDIUM-192 SEEDS WERE IMPLANTED IN DOGS KEPT IN MARKED CAGES. A DOG DIED AND WAS INCINERATED WITHOUT NOTIFYING PROPER AUTHORITIES. ONE OF THE 16 STAINLESS-STEEL-SHEATHED IRIDIUM SEEDS SURVIVED THE FIRE. THE ASHES REAC 120 MR/HR AT CONTACT. 9.2 MILLICURIES OF IRIDIUM WAS INVOLVED.

*FIRE + *INCIDENT, ACTUAL, NONREACTOR + *RADIOACTIVITY, RELEASE + *SOURCE, RADIATION, LOST + FAILURE, ADMINISTRATIVE CONTROL

17-10563 GULIK AE

INCINERATION OF P32 SOURCE AT DETROIT GRACE CENTRAL HOSPITAL, MAY 22, 1966
GRACE CENTRAL HOSPITAL, DETROIT, MICHIGAN

2 PAGES, MAY 24, 1966, ATOMIC ENERGY CLEARING HOUSE, 12(27), PAGES 28-29 (JULY 4, 1966)

SATURDAY, A JANITRESS AT GRACE CENTRAL HOSPITAL DISCARDED AN APPARENTLY EMPTY SHIPPING CARTON CONTAINING A JUST-RECEIVED 30-MILLICURIE SOURCE OF P-32. THE SOURCE WAS INCINERATED. MONDAY, THE LOSS OF THE SOURCE FROM THE LOCKED CONTAINER WAS DISCOVERED, AND TRACED TO THE INCINERATOR. THREE TINS OF CONTAMINATED ASHES WERE RECOVERED.

*FIRE + *INCIDENT, ACTUAL, NONREACTOR + *RADIOACTIVITY, RELEASE + *SOURCE, RADIATION, LOST + *TRACER, RADIOACTIVE + FAILURE, ADMINISTRATIVE CONTROL

17-10564 FREDERICKSON RL

IODINE 131 RELEASE AT ABBOTT LABORATORIES, MAY 31, 1966
ABBOTT LABORATORIES

1 PAGE, MAY 31, 1966, ATOMIC ENERGY CLEARING HOUSE, 12(27), PAGE 28, (JULY 4, 1966)

A 48-HR AIR SAMPLE TAKEN FROM INSIDE A HOT-CELL EXHAUST DUCT OVERWHELMED THE GEIGER-TUBE COUNTING SYSTEM, GIVING FALSELY LOW READINGS. THE NEXT DAY, GAMMA SCINTILLATION INDICATED THAT THE SAMPLE WAS 3580 TIMES THE MPC. LATER ANALYSIS SHOWED THE AVERAGE AIR CONCENTRATION WAS 38,800 TIMES MPC, AND OUTDOOR SAMPLING DURING THE RELEASE SHOWED ONLY 0.69 MPC. NO UNUSUAL BUILDING CONCENTRATIONS NOR EXPOSURE OF PERSONS OUTSIDE RESULTED. A BUBBLE OF IODINE IS BELIEVED TO HAVE PASSED OUT OF THE VESSEL REACTING A TELLURIUM TARGET. VARIOUS CHANGES TO SYSTEMS AND PROCEDURES ARE BEING STUDIED.

*FAILURE, INSTRUMENT + *FISSION PRODUCT RELEASE, GENERAL + *HOT CELL + *INCIDENT, ACTUAL, NONREACTOR + *IODINE + MODIFICATION, SYSTEM OR EQUIPMENT + TRACER, RADIOACTIVE

17-10565 SMITH CB

UCLA REQUESTS RE-EVALUATION OF REQUEST TO ALLOW VISITORS OPERATE REACTOR DURING OPEN HOUSE
UNIVERSITY OF CALIFORNIA, LOS ANGELES, CALIFORNIA

2 PAGES, JUNE 13, 1966, DOCKET 50-142, ATOMIC ENERGY CLEARING HOUSE, 12(27), PAGES 23-24, (JULY 4, 1966)

UCLA REQUESTS THAT AEC ALLOW VISITORS TO PUSH REACTOR CONTROL BUTTONS UNDER CLOSE SUPERVISION TO ADJUST POWER LEVEL AND TO INCREASE POWER TO THE (LOWERED) SCRAM LEVEL. UCLA BELIEVES THAT SUCH CAREFULLY CONTROLLED DEMONSTRATIONS OF REACTOR SAFETY MAY LESSEN PUBLIC MISUNDERSTANDING AND FEAR. UCLA INVITES AEC REPRESENTATIVE TO PRESENT BRIEF TV DISCUSSION DURING DEMONSTRATION.

*RADIATION, PUBLIC EDUCATION/ACCEPTANCE + REACTOR, RESEARCH

17-10566 WITHERS WT

CATEGORY 17
OPERATIONAL SAFETY AND EXPERIENCE

17-10566 *CONTINUED*

RCD DRIVE VENTED AT BONUS TO RELIEVE RADIOLYTIC GASES, JUNE 15, 1966
PUERTO RICO WATER RESOURCES AUTHORITY

3 PAGES, JUNE 15, 1966, DOCKET 115-4, ATOMIC ENERGY CLEARING HOUSE, 12(27), PAGES 21-23, (JULY 4, 1966)

SEVENTY-SEVEN PERCENT HYDROGEN AND 17 PERCENT OXYGEN WERE FOUND IN RACK-HOUSING 9. THREE DAYS AT FULL POWER IS ENOUGH FOR THE MIXTURE TO PRODUCE A HYDROGEN-OXYGEN REACTION. VENTS WERE INSTALLED TO THE MAIN STEAM LINE WITH ORIFICES. TESTS SHOWED THAT A BROKEN VENT LINE WOULD NOT SIGNIFICANTLY AFFECT THE ROD-DROP TIME. SAFETY ANALYSIS DESCRIBED.

*CONTROL ROD DRIVE + *MODIFICATION, SYSTEM OR EQUIPMENT + *RADIOLYTIC GAS +
BONUS (BOILING NUCLEAR SUPERHEAT PROJECT) + EXPLOSION + OPERATING EXPERIENCE + REACTOR, SUPERHEAT

17-10567 POWER REACTOR DEVELOPMENT COMPANY REQUESTS TECH. SPEC. CHANGE FOR POWER COEFFICIENT
POWER REACTOR DEVELOPMENT COMPANY

1 PAGE, JUNE 24, 1966, DOCKET 50-16, ATOMIC ENERGY CLEARING HOUSE, 12(27), PAGE 21 (JULY 4, 1966)

PRESENT POWER-COEFFICIENT MEASUREMENTS HAVE A PLUS OR MINUS UNCERTAINTY OF 25 PERCENT BECAUSE OF INACCURACIES IN HEAT BALANCE AT LOW POWER. THE LOWER LIMIT IS MINUS 0.15 CENT/MW, LESS THAN THE SAFEGUARDS-REPORT VALUE OF 0.2. THE SAFETY ANALYSIS WAS REDONE IN SUPPORT OF REQUESTING A CHANGE TO THE LOWER COEFFICIENT.

*OPERATING LIMITS/TECHNICAL SPECIFICATIONS + *POWER COEFFICIENT + FERMI + REACTOR, BREEDER + TEST, PHYSICS

17-10568 HAUETER RL

CONTROL ROD WITHDRAWAL AT BIG ROCK POINT WITHOUT ACTUATION BY CONTROLS, JANUARY 1966

CONSUMERS POWER COMPANY

3 PAGES, JUNE 22, 1966, DOCKET 50-155, ATOMIC ENERGY CLEARING HOUSE, 12(27), PAGES 16-18, (JULY 4, 1966)

ON TWO OCCASIONS HYDRAULICALLY DRIVEN CONTROL RODS WITHDREW DOWNWARDS AFTER A SCRAM AND SUBSEQUENT REACTOR DEPRESSURIZATION TO ABOUT 60 PSIG, WHEN INDIVIDUAL DRIVES WERE VALVED OFF FROM THE ROD-DRIVE SUPPLY PUMP. INTERNAL DRIVE LEAKAGE WOULD THEN PRESSURIZE THE CLOSED SCRAM DUMP TANK ABOVE THE LOWERED REACTOR PRESSURE ENOUGH TO OPEN THE ROD-DRIVE LOCKING COLLET. VALVING OUT THE INDIVIDUAL DRIVE WOULD REMOVE ROD-INSERTION PRESSURE, ALLOWING THE ROD TO DRIFT OUT OF THE CORE. MODIFICATION WAS TO VENT THE SCRAM DUMP TANK TO THE REACTOR SYSTEM DURING A SCRAM, WITH CHECK VALVES TO PREVENT BACKFLOW OF REACTOR WATER.

*CONTROL ROD DRIVE + *FAILURE, EQUIPMENT + *INCIDENT, ACTUAL, EQUIPMENT +
ACCIDENT, CONTROL ROD WITHDRAWAL + BIG ROCK POINT + MODIFICATION, SYSTEM OR EQUIPMENT +
REACTOR, BOILING WATER

17-10602 RAFFETY SJ + THOMAS JT

EXPERIMENTAL DETERMINATION OF SAFE HANDLING PROCEDURES FOR HIGH FLUX ISOTOPE REACTOR FUEL ELEMENTS OUTSIDE THE REACTOR

OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TENNESSEE

ORNL-TM-1488 +. 22 PAGES, 13 FIGURES, 2 TABLES, JULY 1966, CFSTI, \$1.00 CY, \$0.50 MN

CRITICALITY EXPERIMENTS WERE PERFORMED TO DETERMINE POISONING REQUIREMENTS DURING UNDERWATER STORAGE AND HANDLING. ELEMENT WAS 1.15 DOLLARS SHUTDOWN IN WATER. REACTIVITY OF VARIOUS SOLID REFLECTORS AND CF VOIDS IN TARGET REGION EXPERIMENTALLY DETERMINED, ALSO WORTH OF VARIOUS POISONS ADDED. INTERACTION BETWEEN ADJACENT ELEMENTS MEASURED.

*CRITICALITY EXPERIMENT + *FUEL HANDLING + *FUEL STORAGE + HFIR (HIGH FLUX ISOTOPE REACTOR) +
REACTOR, FLUX TRAP + SHUTDOWN MARGIN

17-10603 KEGLEY TM

EVALUATION OF ALUMINUM FUEL ELEMENT CORROSION SAMPLE FROM PAKISTAN RESEARCH REACTOR

OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TENNESSEE

ORNL-TM-1507 +. 10 PAGES, 3 FIGURES, 3 TABLES, JUNE 1966, CFSTI, \$1.00 CY, \$0.50 MN

A THREE-LAYER CORROSION-PRODUCT FILM WAS ANALYZED AFTER AN EARLY 1966 MISOPERATION. WHILE THE MATERIAL WAS ANALYZED, THE EXACT CAUSE OF THE RATHER EXTREME CORROSION CANNOT BE DETERMINED DUE TO LACK OF DETAILS ON THE MISOPERATION (PH, TEMP., TIME, FLOWRATE, ETC.). CHLORINE WAS PRESENT.

*CLAD + *CORROSION + INCIDENT, ACTUAL, GENERAL + PAKISTAN + REACTOR, RESEARCH

17-10604 PRESSURIZED WATER REACTOR PROJECT, JANUARY 22, 1966 TO APRIL 22, 1966

BETTIS ATOMIC POWER LABORATORY, PITTSBURGH, PENNSYLVANIA

WAPD-MRP-116 +. 91 PAGES, FIGURES, TABLES, APRIL, 1966, CFSTI \$4.00 CY, \$0.75 MN

VARIOUS FUEL-DEVELOPMENT AND OPERATIONS-ANALYSIS PROGRAMS DISCUSSED. A XENON TILT WAS INTRODUCED AND DAMPING FACTOR FOUND TO BE -0.052 PER HOUR (WITH OVERSHOOTS). MAXIMUM DEVIATION AFTER ROD RETURNED TO NORMAL WAS ABOUT TWICE EQUILIBRIUM VALUE. COPE PRESSURE DROP INCREASE AT PH 9.9 WAS STOPPED AT PH 10.2. CRUD-DEPOSITION MODEL INCORPORATED INTO POWER-CAPABILITY CALCULATIONS. FAILURE OF FEED ISOLATION VALVE CAUSED BY HYDRAULIC POWER DEPRESSURIZATION THROUGH CONTROL VALVE, CURED BY DELAYING CLOSURE SIGNAL 8 SEC TO ALLOW HYDRAULIC PRESSURE TO BUILD UP FIRST. A SINGLE ROD DROP AT 75 PERCENT POWER CAUSED PRESSURIZER LEVEL DROP OF 80 INCHES TO 10 INCHES, WHILE A FULL SCRAM GIVES HALF THE DROP AND STOPS AT 40 INCHES.

CATEGORY 17
OPERATIONAL SAFETY AND EXPERIENCE

17-10604 *CONTINUED*

*OPERATING EXPERIENCE + *OPERATIONS REPORTS, ANALYSIS + COOLANT CHEMISTRY + FAILURE, EQUIPMENT + PRESSURIZER + REACTOR, PRESSURIZED WATER + SCRAM, FALSE + SHIPPINGPORT + SURFACE FILM DEPOSIT + XENON OSCILLATION

17-10605 ARNOLD JL

IRRADIATION PERFORMANCE OF PIQUA CORE I FUEL ELEMENTS
ATOMICS INTERNATIONAL, CANOGA PARK

NAA-SR-11712 +. 42 PAGES, 13 FIGURES, 2 TABLES, 3 REFERENCES, MAY 1966, CFSTI, \$2.00 CY, \$0.50 MN

TWO ELEMENTS WERE SECTIONED (INCLUDING ONE THAT HAD RUN HOT). GENERAL CONDITION, INCLUDING NICKEL DIFFUSION BARRIER, OK. PEAK BURNUP, 2550 MWD / METRIC TON U. THIN SURFACE FILM FOUND, TIGHTLY ADHERENT BUT WITH A VERY ROUGH SURFACE. COKE HAD JAMMED THE INNER PROCESS TUBE DRAIN VALVE CLOSED, SO THE TUBE WAS STILL FILLED WITH REACTOR COOLANT. ABOUT 5 PERCENT OF THE TUBE CONTENTS CONSISTED OF COKE PARTICLES.

*EXAMINATION + *FUEL ELEMENT + *IRRADIATION TESTING + PIQUA + REACTIVITY EFFECT, ANOMALOUS + REACTOR, ORGANIC COOLED + SURFACE FILM DEPOSIT

17-10606 KRAMER WC + MCCUAIG FO + BEATTY RA + BEAN CH + NOLAND RA

FABRICATION OF SPIKED-CORE FUEL ELEMENTS FOR THE EXPERIMENTAL BOILING WATER REACTOR
ARGONNE NATIONAL LABORATORY

ANL-6283 +. 63 PAGES, 39 FIGURES, 35 TABLES, NOVEMBER 1965, CFSTI \$3.00 CY, \$0.50 MN

IN THE 1962 MODIFICATION OF EBWR FOR 100 MWT, 28 OF THE ORIGINAL SLIGHTLY ENRICHED, METAL-FUEL ELEMENTS WERE REPLACED WITH 35 ELEMENTS CONTAINING HIGHLY ENRICHED CERAMIC FUEL. 32 CONTAINED A SOLID-SOLUTION CERAMIC FUEL COMPOSED OF 9.01 WITHOUT UO₂ (93 E PERCENT U235), 9.07 PERCENT CAO, AND 81.92 PERCENT ZRO₂ IN THE FORM OF CYLINDRICAL PELLETS. THREE CONTAINED A CERMET FUEL COMPOSED OF A DISPERSION OF 11.83 PERCENT U3O8 IN A MATRIX OF X-8001 ALUMINUM. ALL THE FUEL WAS JACKETED IN ZIRCALOY-2 TUBING, EXCEPT FOR THE RODS COMPRISING ONE CERMET FUEL ELEMENT, WHICH HAD A-288 ALUMINUM JACKETS. COMMERCIAL PROCUREMENT AND OR ANL FABRICATION OF ZIRCALOY-2, 304 STAINLESS STEEL AND ALUMINUM HARDWARE FOR FUEL-ELEMENT COMPONENTS ARE DISCUSSED. METHODS ARE REVIEWED COVERING FUEL-POD FABRICATION, FUEL-ELEMENT ASSEMBLY AND EVALUATION PROCEDURES.

*FABRICATION + *FUEL ELEMENT + EBWR (EXPERIMENTAL BOILING WATER REACTOR) + REACTOR, BOILING WATER

17-10607 TAYLOR EG

SAXTON PLUTONIUM PROGRAM - CRITICAL EXPERIMENTS FOR THE SAXTON PARTIAL PLUTONIUM CORE

WESTINGHOUSE ELECTRIC CORPORATION, ATOMIC POWER DIVISION, PITTSBURGH, PENNSYLVANIA

WCAP-3385-54 + EURAEC-1493 +. 300 PAGES (APPROXIMATELY), 14 FIGURES, 2 TABLES, 2 REFERENCES, DECEMBER 1965, CFSTI \$7.00 CY, \$1.50 MN.

UNRODDED SLAB GEOMETRIES WERE TAKEN CRITICAL BY ADJUSTING MODERATOR HEIGHT. VARIOUS BUCKLING, POWER DISTRIBUTION, ETC., MEASUREMENTS MADE TO VERIFY CALCULATIONAL TECHNIQUES IN UO₂, FPO₂, AND CORES CONTAINING BOTH UO₂ FUEL RODS AND UO₂-PUO₂ FUEL RODS. REPORT CLAIMS CLOSE AGREEMENT BETWEEN PREDICTED AND MEASURED NUCLEAR CHARACTERISTICS, NOTES THAT WATER-SLOT POWER PEAKING IS IMPORTANT IN THERMAL REACTORS.

*CRITICALITY EXPERIMENT + *PLUTONIUM + POWER DISTRIBUTION + REACTOR, PRESSURIZED WATER + SAXTON

17-10608 SOULIS RE + ENGLISH WF + KIMURA LA + WILCOX TP + TITUS GW

ARMY GAS COOLED REACTOR SYSTEMS PROGRAM, ML-1-II FUEL ELEMENT DESIGN REPORT

AEROJET-GENERAL NUCLEONICS, SAN RAMON, CALIFORNIA

AGN-TM-415 +. 223 PAGES, 25 FIGURES, 37 TABLES, JANUARY 1966, CFSTI, \$6.00 CY, \$1.25 MN

INCLUDES DESCRIPTION, NEUTRONIC-THERMAL-MECHANICAL DESIGN, STRESS, VIBRATION-FATIGUE AND THERMAL ANALYSIS. MATERIAL, MECHANICAL FLUID FLOW, AND IN-CORE TESTS. COMPREHENSIVE

*DESIGN STUDY + *FUEL ELEMENT + ML 1 (MOBILE LOW POWER PLANT NO. 1) + REACTOR, GAS COOLED

17-10616 WALKER VA + GRABER MJ + GIBSON GW

ATR FUEL MATERIALS DEVELOPMENT IRRADIATION RESULTS. PART II

PHILLIPS PETROLEUM COMPANY, IDAHO FALLS, IDAHO

IDO-17157 +. 97 PAGES, 69 FIGURES, 25 TABLES, 18 REFERENCES, JUNE 1966, CFSTI \$4.00 CY

DESCRIBES ETR#PAEC 59 LOOP USED, PREPARATION OF SAMPLES, AND RESULTS OF PROOF TEST OF VARIOUS ATR AND HFIR FUEL PLATES AT APPROXIMATE REACTOR CONDITIONS. BOTH U3O8 AND UAL3, WITH AND WITHOUT BORON CARBIDE, WERE CLAD WITH 6061-O ALUMINUM AND IRRADIATED WITH WEIGHT PERCENT OF FUEL VARYING. CORROSION RATES AGREED WITH PREDICTIONS. POSTIRRADIATION ANNEAL SHOWED BREAKAWAY SWELLING, BEGINNING AT 750 F FOR U3O8 AND 800 F FOR UAL3.

*ATR (ADVANCED TEST REACTOR - NRIS) + *FUEL ELEMENT + *HFIR (HIGH FLUX ISOTOPE REACTOR) + *IRRADIATION TESTING + CORROSION + REACTOR, TEST

17-10712 RANDEN KG + GOLLIHER KG

STARTUP AND OPERATION OF THE ONE-MEGAWATT SHIELD TEST AND IRRADIATION REACTOR

ATOMICS INTERNATIONAL, CANOGA PARK, CALIFORNIA

CATEGORY 17
OPERATIONAL SAFETY AND EXPERIENCE

17-10712 *CONTINUED*
NAA-SR-11175 +. 40 PAGES, 27 FIGURES, 3 TABLES, MARCH 25, 1966, CFSTI, \$2.00 CY

COMPLETELY NEW CORE AND HEAT-REMOVAL SYSTEM CONVERTED THIS 50-KW FACILITY TO 1 MW. BRIEF DESCRIPTION OF 1-MW STARTUP TESTS AND FIRST 6 MONTHS OPERATION GIVEN. UNIQUE FEATURES - CALIBRATION OF FISSION PLATE, DIFFERENTIAL ROD EXPANSION CORRECTION TO ISOTHERMAL TEMPERATURE COEFFICIENT, AND WATER-FILLED CENTRAL VOID MEASUREMENTS. NITROGEN-16 JET DIFFUSERS ARE SLIGHTLY UPTILTED, SO TCO HIGH A FLOW RATE AIDS RISE TO SURFACE. AIR THIMBLE USED FOR SOME SAMPLES, SO GAMMA-HEATING TEMPERATURES OF WATER AND LEAD MEASURED.

*POWER UPGRATING + *REACTOR STARTUP EXPERIENCE, INITIAL + HEAT GENERATION, INTERNAL + REACTOR, RESEARCH + TEMPERATURE COEFFICIENT

17-10713 BROOKHAVEN NATIONAL LABORATORY - ANNUAL REPORT - JULY 1, 1965
BROOKHAVEN NATIONAL LABORATORY, UPTON, LONG ISLAND, NEW YORK
BNL-929 +. 229 PAGES, FIGURES, TABLES, JULY 1, 1965, CFSTI, \$6.00 CY, \$1.25 MN

OPERATIONAL EXPERIENCE AT THE MEDICAL RESEARCH REACTOR - CONSIDERABLE FOULING OF THE SECONDARY WATER SIDE OF THE HEAT EXCHANGERS INCREASED THE OPERATING TEMPERATURES OF THE REACTOR WATER. PERMANENT TAPS WERE INSTALLED TO FACILITATE CHEMICAL CLEANING. A CITRIC ACID SOLUTION GAVE EXCELLENT RESULTS. A PROTOTYPE BORATED STAINLESS STEEL CONTROL ROD INSTALLED ON AUGUST 17, 1964, PROVED SATISFACTORY. INSPECTION REVEALED NO ABNORMALITIES AFTER SIX MONTHS OF USE. ANOTHER ROD INSTALLED ON MARCH 30, 1965. DURING THE WINTER MONTHS, CONDENSATE IN THE COMPRESSED-AIR SUPPLY CAUSED FREEZING OF AIR-OPERATED COMPONENTS OF THE INLET AIR INCIDENT DAMPER. THE ORIGINAL WATER-CHILL UNITS WERE REPLACED BY REFRIGERATION DRYERS ON BOTH REACTOR AIR COMPRESSORS. THE ROUTINE ANNUAL ANNEALING OF THE CORE GRAPHITE WAS COMPLETED ON APRIL 6, 1965. SEVERAL CONTROL-ROD MAGNET FAILURES OCCURRED BECAUSE OF WATER LEAKAGE INTO THE CANS DUE TO CONTAINER FATIGUE.

*CONTAINMENT PENETRATION, CLOSURE OF + *FAILURE, COMPONENT + BNL(BROOKHAVEN NATIONAL LABORATORY) + OPERATING EXPERIENCE + REACTOR, RESEARCH

17-10746 KIGER EO
OPERATIONAL SUMMARY OF THE HEAVY WATER COMPONENTS TEST REACTOR - OCTOBER 1961 - DECEMBER 1964
SAVANNAH RIVER LABORATORY, AIKEN, SOUTH CAROLINA
DP-591 +. 74 PAGES, 27 FIGURES, 6 TABLES, 9 REFERENCES, APRIL 1966, CFSTI, \$3.00 CY, \$0.75 MN

AN EXCELLENT SHORT SUMMARY OF THE LIFE HISTORY OF THIS TEST REACTOR, WITH MAJOR SYSTEMS BRIEFLY DESCRIBED AND PROBLEMS AND SOLUTIONS DISCUSSED. FAILURES DISCUSSED INCLUDED UNUSUAL PRESSURE-TUBE WEARING THROUGH BY COMPONENT VIBRATION, FAILURE OF CONTROL-ROD GUIDE TUBES DETECTED BY SHORTER ROD-DROP TIMES, INTERNAL-STRUCTURE BOLTS FAILED BY INSTALLATION OVERSTRESS PLUS THERMAL STRESS, ETC. D2O LEAKAGE FROM STEAM GENERATOR TUBE-TO-SHEET JOINTS CONTRIBUTED AT LEAST HALF THE NEARLY 16 LB OF LEAKAGE PER DAY. FAILED FUEL ELEMENTS WERE LOCATED BY STOPPING ALL FLOW THROUGH ASSEMBLIES AND ALLOWING THEM TO HEAT UP, THEN SAMPLING A SMALL FLOW FROM EACH ELEMENT.

*FAILURE, EQUIPMENT + *OPERATING EXPERIENCE + *OPERATIONS REPORTS, ANALYSIS + HWCTR (HEAVY WATER COMPONENT TEST REACTOR) + INSTRUMENTATION, DETECTION FAILED FUEL ELEMENT + REACTOR, HEAVY WATER + REACTOR, PRESSURIZED WATER

17-10799 TAYLOR EG
SAXTON PLUTONIUM PROGRAM - CRITICAL EXPERIMENTS FOR THE SAXTON PARTIAL PLUTONIUM CORE. APPENDIX D WESTINGHOUSE ELECTRIC CORPORATION, ATOMIC POWER DIVISION, PITTSBURGH, PENNSYLVANIA
WCAP-3385-54 + EURAEC 1493 +. 56 PAGES, 29 FIGURES, 19 TABLES, 4 REFERENCES, DECEMBER 1965, CFSTI \$7.00 CY, \$1.50 MN.

THIS REPORT DESCRIBES A METHOD FOR DIRECT MEASUREMENT OF FUEL-ROD FISSION POWER THROUGH THE USE OF HEATING RATES. THESE MEASUREMENTS, WHEN USED IN CONJUNCTION WITH SUBSEQUENT MEASUREMENTS OF FISSION-PRODUCT GAMMA DECAY, PROVIDE USEFUL DATA FOR THE INTERPRETATION OF POWER SHARING IN LOW-POWER CRITICALITY EXPERIMENTS. A DIRECT RELATIONSHIP IS PROVIDED TO RELATE CONVENTIONAL MEASUREMENTS OF GAMMA ACTIVITY FOR FUELS HAVING DIFFERENT FISSION ELEMENTS TO THE POWER SHARING OF THE FUELS. THE PARTICULAR EXPERIMENTS PERFORMED RELATED POWER SHARING IN A MULTIZONED CORE HAVING BOTH PLUTONIUM AND URANIUM FUELS. RESULTS FROM MEASUREMENTS AT THE WESTINGHOUSE REACTOR EVALUATION CENTER SHOW THAT A TIME-DEPENDENT CORRECTION IS NECESSARY BECAUSE OF DIFFERENCES IN THE FISSION-PRODUCT DECAY CHARACTERISTICS OF THE FUELS. THIS CORRECTION REACHES A MAXIMUM VALUE OF 30 PERCENT ABOUT 4 HR AFTER SHUTDOWN.

*CRITICALITY EXPERIMENT + *HIGH TEMPERATURE + *POWER DISTRIBUTION + PLUTONIUM + URANIUM DIOXIDE

17-10832 ABLITT JF
CONTRIBUTION OF SYSTEMATIC INCIDENT EVALUATION TO THE ACHIEVEMENT OF REACTOR SAFETY
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, HEALTH AND SAFETY BRANCH
14 PAGES, 6 FIGURES, 5 TABLES, 10 REFERENCES, NUCLEAR SAFETY, 7(3), PAGES 279-292 (SPRING, 1966), GPO, \$0.55

THE UKAEA PROCEDURE FOR COLLECTING FAULT DATA FROM OPERATING SITES AND THEN RECORDING, ANALYZING, AND DISSEMINATING THE DATA IS DESCRIBED. THIS PROCEDURE IS A MEANS FOR EXTRACTING THE MAXIMUM PRACTICAL VALUE FROM THE SAFETY ASPECTS OF EXPERIENCE IN REACTOR DESIGN AND OPERATION. FAULTS ARE CLASSIFIED INTO FOUR CATEGORIES - PLANT TYPE, COMPONENT TYPE, FAULT IMPORTANCE, AND FAULT TYPE. THESE CATEGORIES AND THE DEGREE OF DETAIL INVOLVED IN EACH ARE ILLUSTRATED BY EXTRACTS FROM THE UKAEA FAULT CODE. THUS FAR, SOME 600 DATA ITEMS HAVE BEEN

CATEGORY 17
OPERATIONAL SAFETY AND EXPERIENCE

17-10833 *CONTINUED*

COLLECTED FROM 25 REACTORS IN A SIX-MONTH PERIOD. SIX PERCENT OF EVENTS REPORTED ADVERSELY AFFECTED THE SAFETY STATUS OF A REACTOR. THE FAULT DATA ARE APPLIED TO A NUMERICAL EVALUATION OF RELIABILITY, AND SEVERAL TYPICAL FAULTS DESCRIBED.

*INCIDENT COMPILATION + *OPERATING EXPERIENCE + *RELIABILITY, COMPONENT + FAILURE, COMPONENT + FAILURE, OPERATOR ERROR + REACTOR, GAS COOLED + UNITED KINGDOM

17-10834 MEEM JL

RADIATION SAFETY AT THE UNIVERSITY OF VIRGINIA
UNIVERSITY OF VIRGINIA

5 PAGES, 1 FIGURE, NUCLEAR SAFETY, 7(3), PAGES 292-296, (SPRING, 1966), GPO, \$0.55

THE ORGANIZATION FOR RADIATION SAFETY IS DESCRIBED AS APPLIED TO THE NUCLEAR REACTOR, THE PARTICLE ACCELERATORS, AND THE TWO LARGE COBALT SOURCES AT THE UNIVERSITY OF VIRGINIA HOSPITAL AND AT BLANDY EXPERIMENTAL FARM. RADIATION SAFETY IS ADMINISTERED BY A RADIATION SAFETY COMMITTEE AND A REACTOR SAFETY COMMITTEE UNDER LICENSE WITH THE ATOMIC ENERGY COMMISSION. SELF-REGULATION UNDER RATHER BROAD LIMITS HAS BEEN ESTABLISHED.

*ADMINISTRATIVE CONTROLS AND PRACTICES + *RADIATION SAFETY AND CONTROL + ACCELERATOR + REACTOR, RESEARCH

17-10835 CRAMER EN

PRODUCTION AND UTILIZATION FACILITY OPERATOR LICENSING
OAK RIDGE NATIONAL LABORATORY

5 PAGES, 1 FIGURE, 1 TABLE, 13 REFERENCES, NUCLEAR SAFETY, 7(3), PAGES 297-301, (SPRING, 1966), GPO, \$0.55

THIS REVIEW DISCUSSES CURRENT PRACTICES IN THE LICENSING OF REACTOR OPERATORS AND SENIOR REACTOR OPERATORS AND PRESENTS IN TABULAR FORM BY REACTOR TYPE THE NUMBER OF OPERATOR LICENSES GRANTED TO DATE, THUS INDICATING THE GENERAL TRENDS OF OPERATOR REPLACEMENT FOR EXISTING LOW-POWER REACTORS AND OF NEW OPERATORS FOR NEW POWER-REACTOR STARTUPS. A LICENSING GUIDE HAS BEEN PUBLISHED BY THE AEC FOR USE BY PROSPECTIVE REACTOR OPERATORS. THE FIRST EXAMINATIONS AT LICENSED FUEL-REPROCESSING PLANTS HAVE BEEN GIVEN.

*STAFFING, TRAINING, QUALIFICATION + RADIOCHEMICAL PROCESSING + REACTOR, GENERAL

17-10836 WAGONER CC + NABOW SE

CVTR OPERATING EXPERIENCE

CAROLINAS-VIRGINIA NUCLEAR POWER ASSOCIATES, INC.

8 PAGES, 4 FIGURES, 24 REFERENCES, NUCLEAR SAFETY, 7(3), PAGES 375-383, (SPRING, 1966) GPO, \$0.55

PERTINENT BACKGROUND INFORMATION AND RELATED PROBLEMS ENCOUNTERED IN THE CHECKOUT AND OPERATION OF THE PLANT ARE PRESENTED. THE REACTOR IS A 65-MW (TH) PROTOTYPE FOR A 200-MW UNIT TO PROVIDE DATA AND OPERATING EXPERIENCE WITH THE PRESSURE-TUBE DESIGN AND LOW-ENRICHMENT FUEL AND TO PROVIDE A BASIS FOR FUTURE DESIGN OF A RELATED CONCEPT ON A LARGER SCALE. PROBLEMS INCLUDED LEAVING DESICCANT IN PRESSURIZER, HALIDE RELEASE FROM HEADER-CAVITY THERMAL INSULATION, U-TUBE CHROME-PLATED NUTS GALLED, DUST AND FOAM-GLASS GALLED CONTROL-ROD DRIVES, VIBRATING TUBES IN SIX HEAT EXCHANGERS. DRIFTING OF CONTROL RODS WAS CAUSED BY CONTROL-ROD DRIVE AMPLIFIERS, AND SOLID-STATE DEVICES REPLACED TUBES.

*OPERATING EXPERIENCE + *REACTOR STARTUP EXPERIENCE, INITIAL + CONTROL ROD DRIVE + CORROSION + CVTR (CAROLINAS VIRGINIA TUBE REACTOR) + FAILURE, FATIGUE + REACTOR, HEAVY WATER + REACTOR, PRESSURE TUBE + REACTOR, PRESSURIZED WATER + SCRAM, FALSE + TEST, SYSTEM OPERABILITY + VIBRATION

17-10858 LUMB RF

REACTOR MODIFICATION, MAY 1, 1965 TO APRIL 30, 1966

WESTERN NEW YORK NUCLEAR RESEARCH CENTER, INC.

2 PAGES, JULY 21, 1966, DOCKET 5C-57, PDR

CHANGES NOT CONSIDERED NECESSARY FOR DIVISION OF REACTOR LICENSING APPROVAL INCLUDE - CHANGE THE ROD-NOT-SEATED CIRCUIT FROM 6 V DC TO 24 V AC TO ELIMINATE BATTERY PROBLEMS, REWIRE ROD-POSITION SWITCH SEQUENCE.

*MODIFICATION, SYSTEM OR EQUIPMENT + REACTOR, PULSED + REACTOR, RESEARCH

17-10860 MINNICK LE

YANKEE OPERATION REPORT NO. 66, FOR THE MONTH OF JUNE, 1966

YANKEE ATOMIC ELECTRIC COMPANY

11 PAGES, 2 FIGURES, JULY 22, 1966, DOCKET 50-29, PDR

REPORTS IN THIS SERIES WILL BE INDEXED AS PERTINENT ITEMS ARE REPORTED. SIXTY-DAY CONTAINMENT LEAK RATE AVERAGED 0.011 PERCENT PER DAY, AND EXTRAPOLATED TO 0.11 PERCENT PER DAY AT TEST PRESSURES. A PH.D. CANDIDATE TESTED A PORTABLE GAMMA SPECTROMETER IN ENVIRONMENTAL WATERS. NITROGEN BOTTLE INSTALLED FOR ALTERNATE AIR PRESSURE FOR VALVES IN STEAM-DRIVEN EMERGENCY BOILER FEED PUMP. PRIOR TO BORON REMOVAL, IN-CORE INSTRUMENTS EVALUATED FZ EQUAL 2.2, FH EQUAL 1.9, AND MINIMUM DNBR 3.28. FOLLOWING DILUTION, I-131 CONTENT DOUBLED. TRITIUM AVERAGED 2.4 MICROCURIES PER MILLILITER IN PC, AND SOME 435 MC GROSS BETA-GAMMA AND SOME 180 C TRITIUM DISCHARGED FROM WASTE-DISPOSAL SYSTEM.

*OPERATIONS REPORTS, GENERAL + CONTAINMENT LEAKAGE + HOT SPOT + POISON, SOLUBLE + REACTOR, PRESSURIZED WATER + TRITIUM + YANKEE

CATEGORY 17
OPERATIONAL SAFETY AND EXPERIENCE

17-10863 SMITH EH
ETR OPERATIONS BRANCH PROGRESS REPORT FOR CYCLE NO. 99 FEBRUARY 27 - APRIL 7, 1966
PHILLIPS PETROLEUM COMPANY, IDAHO
ID0-17184 +. 25 PAGES, JUNE 15, 1966, DTIC

REPORTS IN THIS SERIES WILL BE INDEXED AS PERTINENT ITEMS ARE REPORTED. SIX AND A HALF HOURS OF POWER REDUCTION RESULTED FROM ERRATIC REACTOR INSTRUMENTATION, PROBABLY DUE TO AN ERRATIC POWER SUPPLY. COMPARISON OF POWER DISTRIBUTION AND CRITICAL ROD POSITION BETWEEN ETR AND ETRC WITH AND WITHOUT EQUILIBRIUM XENON SHOWED (1) ETR GAINS 0.4 PERCENT REACTIVITY WHEN LOOPS HEATED UP, (2) POWER DENSITIES CHANGE BETWEEN PLUS 22 PERCENT AND MINUS 16 PERCENT BETWEEN INITIAL AND EQUILIBRIUM XENON OPERATION, (3) XENON EQUIL. IS 3.4 PERCENT, (4) ETRC IS APPROXIMATELY 1.1 PERCENT MORE REACTIVE THAN ETR.

*IN PILE LOOP + *POWER DISTRIBUTION + *REACTIVITY EFFECT + *XENON + ETR (ENGINEERING TEST REACTOR) + REACTOR, TEST

17-10864 STROLE WP
MTR PROGRESS REPORT, CYCLE NO. 242, APRIL 25, 1966-MAY 16, 1966
PHILLIPS PETROLEUM COMPANY, IDAHO
ID0-17189 +. 39 PAGES, JUNE 10, 1966, DTIC

DURING OPERATION AT 1 PERCENT POWER TO INSERT FLUX SUPPRESSORS NEAR AN EXPERIMENT, REGULATING-ROD FLUCTUATIONS OCCURRED 3 TIMES, AND RODS DROPPED THE LAST FLUCTUATION. ON THE SUBSEQUENT POWER INCREASE, NEUTRON NOISE BECAME MORE PRONOUNCED, AND THE REACTOR WAS SHUT DOWN. DEBRIS WAS FOUND IN 3 ELEMENTS, APPARENTLY FROM AN O-RING LOST DURING THE PREVIOUS FUEL LOADING. A SHIM ROD (PREVIOUSLY USED IN ROD-DROP TESTING) WAS REMOVED AND PROVED TO BE DISCOLORED.

*FLOW BLOCKAGE + MTR (MATERIAL TESTING REACTOR) + NOISE + REACTOR, TEST

17-10866 DOLLE L
PROBLEMS ARISING FROM THE USE OF HEAVY WATER IN NUCLEAR REACTORS
AECL-2408 +. 34 PAGES, 12 FIGURES, 29 REFERENCES, MARCH 1966, TRANSLATED FROM INDUSTRIES ATOMIQUES 9(7-8) 57-69 (1965), AECL, DEP. MN

DISCUSSES EFFECTS OF IONIZING RAYS AND OF INTERACTION WITH CONTAINING WALLS. EL-3 EXPERIENCE IS FREQUENTLY QUOTED IN SECTIONS ON RADIOACTIVATION, CONSERVATION, RADIO-DECOMPOSITION, AND CHEMICAL CONTAMINATION AND PURIFICATION. LITHIUM-6 SULPHATE WAS TESTED AS A SOLUBLE POISON IN EL-3, WITH LITHIUM RECOVERED FROM THE DEMINERALIZER. LITHIUM IS CONSIDERED THE BEST CHOICE AMONG THE 5 POISONS (INCLUDING H₂O) CONSIDERED, DESPITE THE TEMPORARY TRITIUM INCREASE (FACTOR OF 5) AND DESPITE THE TRITON REACTION WITH OXYGEN TO PRODUCE F-18. A STILL IS USED TO RECLAIM DEGRADED WATER AT EL-3. EL-3 INFRARED ANALYSIS WITH INTERFERENCE FILTER WILL DETECT 10-100 PPM D₂O IN H₂O SECONDARY COOLANT. DISSOLVED HYDROGEN, IN ABSENCE OF OXYGEN, SUPPRESSES EVALUATION OF RADIOLYTIC GASES.

*OPERATING EXPERIENCE + *POISON, SOLUBLE + ACTIVATION PRODUCT + COOLANT CHEMISTRY + FRANCE + RADIOLYTIC GAS + REACTOR, HEAVY WATER

17-10983 MONAHAN JM + HALPINE PA
PM-2A REACTOR VESSEL TEST - PHASE I
WESTINGHOUSE ELECTRIC CORP., BETTIS ATOMIC POWER LABORATORY, PITTSBURGH
WAPD-TM-604 +. 87 PAGES, 47 FIGURES, 4 TABLES, 14 REFERENCES, JULY 1966, CFSTI, \$3.00 CY, \$0.75 MN.

THIS PROGRAM IS TO OBTAIN DIRECT CONFIRMATION OF PRESSURE-VESSEL BRITTLE-FRACTURE-PREVENTION CRITERIA BY TESTING A FULL-SIZE IRRADIATED REACTOR VESSEL. PHASE I OBTAINED NONDESTRUCTIVE TEST DATA TO ALLOW PREDICTION OF BRITTLE-FRACTURE FAILURE UNDER THE CONTROLLED CONDITIONS OF THE PRESSURE-TEMPERATURE TESTING TO BE CONDUCTED AS PHASE II. DIMENSIONAL, ULTRASONIC, AND LIQUID-PENETRANT EXAMINATIONS WERE MADE TO PROVIDE DATA FOR A DETAILED STRESS ANALYSIS. STUDY OF THE MN-54 RESIDUAL ACTIVITY REVEALED THE MAXIMUM INTEGRATED FAST NEUTRON FLUX SEEN BY THE VESSEL AS 1.4×10^{10} TO THE 19.

*BRITTLE FRACTURE + *CONTAINMENT, PRESSURE VESSEL + *TEST, DESTRUCTIVE + COMPARISON, THEORY AND EXPERIENCE + PM 2A (PORTABLE MEDIUM NUCLEAR POWER PLANT) + REACTOR, ARMY + REACTOR, PRESSURIZED WATER

17-10984 MURRI EL + KEELEY GS
UNDERWATER REPAIRS INSIDE IRRADIATED REACTOR VESSEL, BIG ROCK POINT NUCLEAR PLANT
PHILLIPS PETROLEUM COMPANY, IDAHO FALLS, IDAHO + CONSUMERS POWER COMPANY, JACKSON, MICHIGAN
CONF-642-13 +. 17 PAGES, 2 TABLES, 4 FIGURES, 2 REFERENCES, SEPTEMBER 1, 1964, PRESENTED AT HEALTH PHYSICS SOCIETY NINTH ANNUAL MEETING, CINCINNATI, OHIO, JUNE 15-18, 1964, SOURCE

DIVERS WERE ABLE TO ASSIST IN THE ALIGNMENT OF THE CORE-SUPPORT PLATE LOCATED ABOUT 6 FT BELOW THE BOTTOM OF THE CORE. TECHNIQUES AND EQUIPMENT LIMITED DOSE TO ABOUT 120 MR (8 DIVES) IN THE 50-MR/HR FIELDS. FILM BADGES READ A FACTOR OF 2 LOWER THAN DOSIMETERS BECAUSE OF THE ISOTROPIC EXPOSURE UNDER WATER.

*CONTAINMENT, PRESSURE VESSEL + *MAINTENANCE AND REPAIR + BIG ROCK POINT + OPERATING EXPERIENCE + REACTOR, BOILING WATER + SHIELDING

17-10986 HYDROGEN EXPLOSION AT REACTOR FACILITY

CATEGORY 17
OPERATIONAL SAFETY AND EXPERIENCE

17-10986 *CONTINUED*
DIVISION OF OPERATIONAL SAFETY, U. S. ATOMIC ENERGY COMMISSION
SERIOUS ACCIDENTS NO. 270 +. 4 PAGES, 5 FIGURES, JULY 15, 1966, DPI

AN EXPLOSION RESULTED FROM TEMPORARY STORAGE OF A FUEL-TRANSFER COFFIN IN AN AIRLOCK WITH THE EMERGENCY BATTERIES ACCIDENTALLY LEFT ON FULL CHARGE. THE HYDROGEN-AIR EXPLOSION OCCURRED WHEN THE DOOR WAS OPENED, PROBABLY FROM A SWITCH OR RELAY SPARK. THE PRESSURE (45 TO 70 PSI) BLEW THE ONE-TON AIRLOCK DOOR OFF ITS HINGES AND GENERATED MISSILES INSIDE THE CONTAINMENT.

*EXPLOSION + *HYDROGEN + CONTAINMENT, MISSILE GENERATION AND PROTECTION +
EBR I AND II (EXPERIMENTAL BREEDER REACTORS) + FUEL HANDLING MACHINE + REACTOR, BREEDER + REACTOR, FAST + REACTOR, LIQUID METAL COOLED

17-10987 FIRE DURING GLOVEBOX CLEANUP LEADS TO \$23,000 DAMAGE VIA CONTAMINATION SPREAD
DIVISION OF OPERATIONAL SAFETY, U. S. ATOMIC ENERGY COMMISSION
SERIOUS ACCIDENTS NO. 269 +. 2 PAGES, 1 FIGURE, JULY 8, 1966, DPI

PAINT WAS BEING STRIPPED FROM A GLOVE-BOX LINE, USING BOTH A NONFLAMMABLE AND A FLAMMABLE (50 PERCENT ACETONE) PAINT REMOVER CALLED COCOON. WHILE THE WORK PERMIT REQUIRED AN INERT ATMOSPHERE, AND PERSONS INVOLVED KNEW THAT A MUFFLE FURNACE WAS IN THE SAME GLOVE-BOX LINE, THE GUILLOTINE DOOR SEPARATING THE PAINT STRIPPING AND THE FURNACE WAS LEFT SLIGHTLY AJAR. AFTER REMOVING STRIPPED PAINT AND RECOCONING THE BOX, THE FIRE STARTED WHILE THE AIRLOCK DOOR WAS OPENED, AND CONTAMINATION SPREAD TO THE NEXT FLOOR THROUGH DUCTWORK BEING MODIFIED.

*CONTAMINATION + *FIRE + *GLOVE BOX + FAILURE, ADMINISTRATIVE CONTROL + INCIDENT, ACTUAL, NONREACTOR

17-10988 FUEL ELEMENT RUPTURE TEST FACILITY INCIDENT AT THE PLUTONIUM RECYCLE TEST REACTOR
U. S. ATOMIC ENERGY COMMISSION, DIVISION OF OPERATIONAL SAFETY
ROE-66-1 +. 3 PAGES, AUGUST 5, 1966, OPERATING EXPERIENCES, REACTOR SAFETY BULLETIN, DPI

ON SEPTEMBER 29, 1965, A UO2-PUO2 FUEL ELEMENT WITH AN INTENTIONAL DEFECT, IRRADIATED IN A TEST LOOP, CAUSED THE FAILURE OF A PRESSURE TUBE. THE RESULTANT PRESSURE DECREASE CAUSED 700 G OF MOLTEN FUEL TO BE EJECTED FROM THE FUEL ROD THROUGH THE FAILED TUBE. ALTHOUGH THE MOLTEN FUEL WAS STOPPED BY THE SURROUNDING SHROUD TUBE, SOME FUEL AND FISSION PRODUCT WAS SPREAD BY THE DRY GAS AND THE CONTAINMENT VENTILATION SYSTEM. THE HYPOTHESIZED COURSE OF THE INCIDENT WAS AS FOLLOWS - WATER OXIDIZED THE FUEL TO UO2.1, THERMAL CONDUCTIVITY WAS LOWERED, INCREASING THE VOLUME OF MOLTEN FUEL AND THE INTERNAL PRESSURE, WHICH SPLIT THE CLADDING. THE SWOLLEN FUEL INTERFERED WITH THE COOLING OF THE PRESSURE TUBE, WHICH THEN FAILED UNDER PRESSURE.

*CENTERLINE MELTING + *FAILURE, CLADDING + *INCIDENT, ACTUAL, GENERAL + *OXIDATION + FAILURE, PIPE + IN PILE LOOP + PRTR (PLUTONIUM RECYCLE TEST REACTOR) + REACTOR, AEC OWNED + REACTOR, HEAVY WATER + REACTOR, PRESSURE TUBE + URANIUM DIOXIDE

17-10989 MALFUNCTION OF EQUIPMENT INVOLVING SHUTDOWN RODS IN THE PROCESS DEVELOPMENT PILE (PDP)
DIVISION OF OPERATIONAL SAFETY, U. S. ATOMIC ENERGY COMMISSION
ROE-66-2 +. 2 PAGES, AUGUST 5, 1966, OPERATING EXPERIENCES, REACTOR SAFETY BULLETIN, DPI

ON TWO OCCASIONS, PDP DRUM-AND-CABLE-TYPE CONTROL-ROD-DRIVE MOTORS WERE NOT SHUT OFF WHEN THE RODS REACHED THEIR TRAVEL LIMIT, BECAUSE OF MECHANICAL INTERFERENCE. IN ONE CASE, THE CABLES BROKE. IN THE OTHER, THE DRUMS UNWOUND COMPLETELY AND REWOUND IN THE WRONG DIRECTION. IN BOTH CASES, MISALIGNMENT OR MECHANICAL INTERFERENCE RESULTED.

*CONTROL ROD, SHIM SAFETY + *FAILURE, COMPONENT + CRITICAL ASSEMBLY FACILITY + FAILURE, DESIGN ERROR + INSTRUMENTATION, SWITCH + REACTOR, AEC OWNED + SAVANNAH RIVER PLANT

17-10990 SMOKE DETECTORS CONTAINING RADIOACTIVE SOURCES
U. S. ATOMIC ENERGY COMMISSION, DIVISION OF OPERATIONAL SAFETY
HEALTH AND SAFETY INFO. NO. 239, 2 PAGES, JUNE 28, 1966, DPI

REVIEWS DESIGN AND HANDLING PROBLEMS. RADIATION MAY BE AS HIGH AS 800 MR/HR (CONTACT) FROM AN RA-226 (40 MICROGRAMS) DETECTOR, WHILE THE AM-241 IS LESS THAN 1 MR/HR (CONTACT). IN CASE OF FIRE OR DAMAGE, THEY ARE A SOURCE OF CONTAMINATION. LEAK TEST SHOULD BE MADE AT INTERVALS LESS THAN THREE YEARS.

*FIRE + *INSTRUMENTATION, PROCESS + *SOURCE, RADIATION

17-10991 FILTER UNIT INSPECTION AND TESTING SERVICE, FISCAL YEAR 1967
U. S. ATOMIC ENERGY COMMISSION, DIVISION OF OPERATIONAL SAFETY
HEALTH AND SAFETY INFO. NO. 240, 4 PAGES, JULY 1, 1966, DPI

PROVIDES INFORMATION AND CHARGES FOR TESTING HIGH-EFFICIENCY FILTERS AT OAK RIDGE AND HANFORD.

*FILTER, HIGH EFFICIENCY + *TEST, FILTER

17-10992 ACCELERATOR RADIATION MONITORING AND HEALTH PHYSICS COURSE
U. S. ATOMIC ENERGY COMMISSION, DIVISION OF OPERATIONAL SAFETY
HEALTH AND SAFETY INFO. NO. 241, 1 PAGE, JULY 20, 1966, DPI

CATEGORY 17
OPERATIONAL SAFETY AND EXPERIENCE

17-10992 *CONTINUED*

AT LAWRENCE RADIATION LABORATORY, A ONE-MONTH COURSE WILL BEGIN IN JANUARY 1967, WITH EQUAL TIME ON CLASSROOM WORK AND ACTUAL MONITORING OF THE ACCELERATORS.

*ACCELERATOR + *HEALTH PHYSICS TRAINING

17-10995 MOLTEN-SALT REACTOR PROGRAM. SEMIANNUAL PROGRESS REPORT FOR PERIOD ENDING FEBRUARY 28, 1966
OAK RIDGE NATIONAL LABORATORY
ORNL-3936 +. 216 PAGES, FIGURES, REFERENCES, JUNE, 1966, CFSTI, \$6.00 CY, \$1.25 MN

REPORTS IN THIS SERIES WILL BE INDEXED AS PERTINENT ITEMS APPEAR. SECTIONS TREAT MSRE OPERATIONS AND COMPONENT DEVELOPMENT, GENERAL MATERIALS AND FUEL-SALT WORK, AND LARGE REACTOR DESIGN.

*OPERATING EXPERIENCE + COOLANT CHEMISTRY + MATERIAL + MSRE (MOLTEN SALT REACTOR EXPERIMENT) + REACTOR, MOLTEN SALT

17-11004 HBWR QUARTERLY PROGRESS REPORT, JANUARY TO MARCH 1966
INSTITUTE FOR ATOMENERGI OECD HALDEN REACTOR PROJECT
HPR-67 +. 113 PAGES, 20 FIGURES, 7 TABLES, MAY, 1966, DEP. MN

AN OUT-OF-PILE BURNOUT DETECTOR TEST PROGRAM WAS RUN ACCORDING TO SIX SCHEMES. TWO (INSULATION-RESISTANCE AND ELEMENT-EXTENSOMETER) SHOWED PROMISE OF PROTECTING THE ENTIRE TUBE AND WILL BE TESTED IN PILE, LATE IN 1966.

*BURNOUT HEAT FLUX + *INSTRUMENTATION, IN CORE + NORWAY + REACTOR, BOILING WATER + REACTOR, HEAVY WATER

17-11005 HBWR QUARTERLY PROGRESS REPORT, JULY TO SEPTEMBER 1964
INSTITUTE FOR ATOMENERGI OECD HALDEN REACTOR PROJECT
HPR-57 +. 137 PAGES, 26 FIGURES, 9 TABLES, DECEMBER 1964, DEP MN

MEASUREMENT OF THE LEVEL OF THE LIQUID MODERATOR IS NO LONGER MADE WITH AN ELECTRIC DEPSTICK, BUT A MODIFIED HELIUM BUBBLER SYSTEM. EXPLOSION TESTS WERE RUN ON CONTROL THIMBLES OUT OF REACTOR TO DETERMINE SAFE LIMITS OF RADIOLYTIC GAS. GAS ACCUMULATIONS IN THE REACTOR ARE MEASURED BY THERMOCOUPLES ON THE THIMBLE. WHEN LIMITS ARE APPROACHED, THE REACTOR PRESSURE IS REDUCED TO EXPEL THE GAS. INPILE BURNOUT DETECTORS (SPECIAL PELLETS HAVING A CLUD-MEET VOID TO INCREASE HEAT FLUX NEAR THERMOCOUPLE) WERE TESTED BY RAISING REACTOR POWER PAST THE NORMAL LIMIT. TEMPERATURE TRACES AT STEADY POWER SHOWED A RISE TO FILM BOILING TEMPERATURE, THEN A DROP TO NORMAL TEMPERATURE.

*BURNOUT HEAT FLUX + *CONTROL ROD DRIVE + *EXPLOSION + *INSTRUMENTATION, IN CORE + *INSTRUMENTATION, LIQUID LEVEL DETECTION + *RADIOLYTIC GAS + NORWAY + REACTOR, BOILING WATER + REACTOR, HEAVY WATER

17-11036 BUYP LP
REACTIVITY LOSS AT GENERAL ELECTRIC NUCLEAR TEST REACTOR
GENERAL ELECTRIC COMPANY, VALLECITOS ATOMIC LABORATORY
1 PAGE, JULY 19, 1966, DOCKET 50-73, ATOMIC ENERGY CLEARING HOUSE, 12(33), PAGE 13 (AUGUST 15, 1966)

ON APRIL 13 AND JULY 6, 1966, WATER WAS SPILLED ONTO THE GRAPHITE REFLECTOR, CAUSING REACTIVITY LOSSES OF 0.8 AND 0.4 DOLLAR RESPECTIVELY. DRYING TECHNIQUES REPLACE ABOUT 15 CENTS PER MONTH. ONE OCCURRENCE WAS DUE TO AN INADEQUATE OVERFLOW, AND ONE DUE TO OPERATOR FAILING TO STOP THE FILLING OF THE REACTOR TANK.

*GRAPHITE + *REACTIVITY EFFECT, ANOMALOUS + FAILURE, DESIGN ERROR + FAILURE, OPERATOR ERROR + REACTOR, RESEARCH

17-11037 MCEWEN LH
EVSER ROD LATCH MECHANISM FAILURE
GENERAL ELECTRIC COMPANY, PLEASANTON, CALIFORNIA
2 PAGES, AUGUST 9, 1966, DOCKET 50-183, ATOMIC ENERGY CLEARING HOUSE, 12(34), PAGES 20-21, (AUGUST 22, 1966)

SLIGHT MISALIGNMENT AND ACCUMULATED DIRT AND OIL COMBINED TO PREVENT ROD NO. 11 MECHANICAL LATCH FROM ENGAGING ON ITS QUARTERLY TEST.

*INCIDENT, ACTUAL, NONNUCLEAR + CONTROL ROD, SHIM SAFETY + REACTOR, BOILING WATER + REACTOR, SUPERHEAT + VESR (VALLECITOS EXP. SUPERHEAT REACTOR-ESADA)

17-11038 HANETER R
BIG ROCK POINT RELEASES RADIOACTIVITY WHEN TURBINE CASING DIAPHRAGM BLOWS
CONSUMERS POWER COMPANY
1 PAGE, AUGUST 9, 1966, DOCKET 50-155, ATOMIC ENERGY CLEARING HOUSE, 12(34), PAGE 20 (AUGUST 22, 1966)

ON AUGUST 8, 1966, LIGHTNING TRIPPED THE MAIN TRANSMISSION LINE, CAUSING A HIGH-PRESSURE SCRAM. THE TURBINE DID NOT TRIP AND CARRIED STATION POWER FOR OVER A MINUTE, WHEN THE TURBINE WAS MANUALLY TRIPPED TO MAINTAIN REACTOR PRESSURE. ON THE TRIP, A COMPLETE LOSS OF POWER RESULTED, AND THE MAIN BYPASS VALVE OPENED WHILE THE MAIN ISOLATION VALVE WAS CLOSING.

CATEGORY 17
OPERATIONAL SAFETY AND EXPERIENCE

17-11038 *CONTINUED*

SUFFICIENT HIGH-PRESSURE STEAM WAS ADMITTED TO THE CONDENSER TO BURST THE RUPTURE DIAPHRAGM. APPARENTLY NO RADIOACTIVITY WAS RELEASED LOCALLY. THE VALVE OPERATED AS DESIGNED TO OPEN ON LOSS OF POWER.

*INCIDENT, ACTUAL, EQUIPMENT + BIG ROCK POINT + LOSS OF POWER + PRESSURE, INTERNAL + REACTOR, BOILING WATER + SAFE FAILURE CRITERION

17-11039 TEMPORARY AUTHORIZATION TO OPERATE INDIAN POINT WITH PUMP FLOW TECHNICAL SPECIFICATIONS REQUIREMENT DELETED

U. S. ATOMIC ENERGY COMMISSION

1 PAGE, JULY 27, 1966, DOCKET 50-8, ATOMIC ENERGY CLEARING HOUSE, 12(32), PAGE 11 (AUGUST 8, 1966)

TEMPORARY FULL-POWER AUTHORIZATION WITH A LOWER-THAN-TECHNICAL-SPECIFICATION VALUE ON PRIMARY COOLANT FLOW PER PUMP GRANTED TO DETERMINE ACCURATELY FULL-FLOW VALUE.

*OPERATING LIMITS/TECHNICAL SPECIFICATIONS + FLOW, HIGH SPEED + INDIAN POINT I + PUMP + REACTOR, PRESSURIZED WATER

17-11040 FERMI POWER COEFFICIENT ANALYSIS

POWER REACTOR DEVELOPMENT COMPANY

2 PAGES, JULY 22, 1966, ATOMIC ENERGY CLEARING HOUSE, 12(32), PAGES 12-13 (AUGUST 8, 1966)

REVIEW OF DATA SHOWS THAT POWER COEFFICIENT IS LINEAR WITH POWER, AND TRANSFER-FUNCTION MEASUREMENTS SHOW REACTOR STRONGLY STABLE. PRINCIPLE CHANGES WERE - MORE-NEGATIVE CORE SODIUM EXPANSION EFFECT AND LESS-NEGATIVE CORE RADIAL EXPANSION EFFECT. NO CAUSE FOR CONCERN EXISTS, AS PREVIOUS SAFETY ANALYSIS USED POWER COEFFICIENTS AS LOW AS MINUS 0.15 CENT PER MEGAWATT, AND PRESENT COEFFICIENT IS MINUS 0.18.

*COMPARISON, THEORY AND EXPERIENCE + *POWER COEFFICIENT + FERMI + REACTOR, FAST BREEDER + REACTOR, LIQUID METAL COOLED

17-11041 DIVISION OF REACTOR LICENSING SENDS QUESTIONNAIRE REGARDING RADIOACTIVITY ENVIRONMENTAL MONITORING PROGRAMS

DIVISION OF REACTOR LICENSING, U. S. ATOMIC ENERGY COMMISSION

2 PAGES, ATOMIC ENERGY CLEARING HOUSE, 12(31), PAGES 13-14, (AUGUST 1, 1966)

QUESTIONNAIRE REQUESTS UP-TO-DATE DESCRIPTION OF CURRENT PROGRAM REGARDING OBJECTIVES AND PROCEDURES, INCLUDING (1) SAMPLING OF SOIL, AIR, WATER, AND LIVING ORGANISMS, (2) DIRECT-READING RADIOACTIVITY MONITORS, (3) CORRELATION OF EMISSIONS WITH BIOLOGICAL RESULTS, (4) SPECIAL STUDIES, AND (5) COOPERATION WITH NON-AEC AGENCIES.

*MONITOR, RADIATION, ENVIRONMENTAL + *SURVEY, RADIATION, ENVIRONMENTAL + REGULATION, AEC

17-11042 CREUTZ E

SERVO SYSTEM CAUSES REACTOR TRANSIENT WHEN RECORDER INFORMATION MISINTERPRETED AT TRIGA

GENERAL ATOMIC, SAN DIEGO, CALIFORNIA

2 PAGES, JULY 22, 1966, DOCKET 50-227, ATOMIC ENERGY CLEARING HOUSE, 12(31), PAGES 15-16, (AUGUST 1, 1966)

AFTER FUEL MOVEMENTS, THE SIGNAL LEAD TO THE LINEAR POWER CHANNEL WAS NOT RECONNECTED. DURING THE STARTUP, BLUE INK FROM THE LINEAR CHANNEL MINGLED WITH RED INK FROM THE LOG-N CHANNEL, CAUSING THE LOG N TO START DRAWING A TRACE RESEMBLING THE LINEAR CHANNEL RESPONSE. THE OPERATOR SWITCHED TO SERVO WITH THE REACTOR NEARLY CRITICAL, AND THE TRANSIENT RESULTED BECAUSE THE SERVO WAS FED A ZERO SIGNAL FROM THE LINEAR CHANNEL. THE EXCESS REACTIVITY ADDED WAS LESS THAN 1.1 DOLLARS, THE MINIMUM PERIOD LESS THAN 0.23 SEC, AND THE EXCURSION LESS THAN 1.3 MW-SEC. IN ADDITION, A BYPASS WAS FOUND, RENDERING THE AUXILIARY SCRAM CHANNEL INEFFECTIVE. APPARENTLY THE ONE HIGH-RANGE SCRAM CHANNEL WAS EFFECTIVE AND SCRAMMED.

*ACCIDENT, CONTROL ROD WITHDRAWAL + *INCIDENT, ACTUAL, HUMAN ERROR + *INSTRUMENTATION, REGULATING + *REGULATING SYSTEM + FAILURE, ADMINISTRATIVE CONTROL + FAILURE, DESIGN ERROR + OPERATING LIMITS/TECHNICAL SPECIFICATIONS + REACTOR, RESEARCH + TRIGA (TRAINING REACTOR, ISOTOPES, G.A.)

17-11043 MCEWEN LH

EVSR CONTROL BLADES TO USE ZIRCALOY INSTEAD OF STAINLESS STEEL

GENERAL ELECTRIC COMPANY, SAN JOSE, CALIFORNIA

1 PAGE, JULY 12, 1966, DOCKET 50-183, ATOMIC ENERGY CLEARING HOUSE, 12(31), PAGE 17, (AUGUST 1, 1966)

CHANGES INCLUDE DIFFERENT DESIGN AND USE OF ZIRCALOY INSTEAD OF STAINLESS STEEL IN THE FOUR GRAY CONTROL RODS LOCATED IN THE CENTER OF THE CORE.

*CONTROL ROD, SHIM SAFETY + REACTOR, SUPERHEAT + VESR (VALLECITOS EXP. SUPERHEAT REACTOR-ESADA) + ZIRCALOY

17-11044 COE RJ

YANKEE REPLY TO DIVISION OF REACTOR LICENSING LETTER ON REACTOR VESSEL NOT

YANKEE ATOMIC ELECTRIC COMPANY

2 PAGES, JULY 18, 1966, DOCKET 50-129, ATOMIC ENERGY CLEARING HOUSE, 12(31), PAGES 18-19, (AUGUST 1, 1966)

MAXIMUM NOT SHIFT IS PREDICTED TO BE 305 F. PROCEDURES REQUIRE 100 F ABOVE NOT. MEASUREMENTS

CATEGORY 17
OPERATIONAL SAFETY AND EXPERIENCE

17-11044 *CONTINUED*

BY NRL ON SEVEN CHARPY IMPACT SPECIMENS EXPOSED TO TWICE EXPECTED DOSE INDICATE ABOUT 40 F CONSERVATISM IN CURVE FROM WHICH ABOVE LIMITS WERE SET.

*BRITTLE FRACTURE + *NDT DATA (NIL DUCTILITY TRANSITION) + CONTAINMENT, PRESSURE VESSEL + REACTOR, PRESSURIZED WATER + YANKEE

17-11045 PUECHL KH

EXPOSURES AT NUCLEAR MATERIALS AND EQUIPMENT CORP., JUNE 24, 1966

NUCLEAR MATERIALS AND EQUIPMENT CORPORATION, APOLLO, PA.

1 PAGE, JUNE 24 AND JULY 8, 1966, ATOMIC ENERGY CLEARING HOUSE, 12(31), PAGE 21 (AUGUST 1, 1966)

TWO EMPLOYEES (PLUTONIUM LABORATORY) WERE EXPOSED TO AIRBORNE PLUTONIUM NITRATE SLIGHTLY ABOVE 40 MPC HOURS IN TWO DAYS BECAUSE OF LEAKAGE PAST O-RINGS IN A GLOVE PORT. A HOT-CELL TECHNICIAN RECEIVED 3.74 REMS OF GAMMA DURING THE SECOND QUARTER, ACCORDING TO FILM BADGES. THERE IS A 2-TO-3 WEEK DELAY IN GETTING FILM-BADGE RESULTS, AND THERE WAS A SIGNIFICANTLY LOWER DOSE RECORDED ON SELF-READING DOSIMETERS. COMPANY IS NOW CONSIDERING THERMOLUMINESCENT DOSIMETRY FOR FASTER DOSE EVALUATION.

*AIRBORNE RELEASE + *PERSONNEL EXPOSURE, RADIATION + FAILURE, ADMINISTRATIVE CONTROL + FILM, GENERAL + INCIDENT, ACTUAL, NONREACTOR + PLUTONIUM

17-11046 ANDERSON AN

CORE B LOWER FLOWS REQUIRE TECHNICAL SPECIFICATION CHANGE AT INDIAN POINT UNIT 1

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

2 PAGES, JULY 14, 1966, DOCKET 50-3, ATOMIC ENERGY CLEARING HOUSE, 12(31), PAGES 14-15, (AUGUST 1, 1966)

PRELIMINARY HEAT BALANCES INDICATE THE PRIMARY-COOLANT FLOW IS ABOUT 2.5 PERCENT BELOW DESIGN VALUE, ALTHOUGH THERE DOES NOT APPEAR TO BE HIGHER PRESSURE DROP ACROSS THE CORE. SINCE SPECIFICATIONS REQUIRE 18,500 GPM FLOW PER PUMP, REACTOR WILL BE LIMITED TO 7 (OF 8) PUMPS RUNNING TO PRODUCE REQUIRED FLOW PER PUMP WITH LOWER CORE DELTA-P. THIS IS DONE FOR LITERAL COMPLIANCE WITH SPECIFICATIONS, ALTHOUGH THERE IS NO REASON TO BE SURE THAT THEY WOULD NOT BE IN COMPLIANCE WITH ALL PUMPS RUNNING.

*OPERATING LIMITS/TECHNICAL SPECIFICATIONS + FLOW, HIGH SPEED + INDIAN POINT I + PUMP + REACTOR, PRESSURIZED WATER

17-11047 WOLTER EE

FUEL ROD BOWING AT ELK RIVER

RURAL COOPERATIVE POWER ASSOCIATION, ELK RIVER, MINN.

1 PAGE, JUNE 28, 1966, DOCKET 115-1, ATOMIC ENERGY CLEARING HOUSE, 12(29), PAGE 42, (JULY 18, 1966)

TWENTY-THREE OF THE 100 CORE-1 ELEMENTS SHOWED MINOR BOWING, AND 23 SHOWED BOWING GREATER THAN 100 MILS. THE FUEL TUBES ARE 450 MILS IN DIAMETER, WITH 300-MIL SPACING. THE GREATEST DISPLACEMENT DUE TO BOWING WAS 150 MILS. ALL 26 WERE REPLACED.

ELK RIVER + FAILURE, FUEL ELEMENT + REACTOR, BOILING WATER

17-11048 MILLER PH

FUEL CLADDING DISTORTION AT FLAIR-TRIGA

GENERAL ATOMIC

1 PAGE, DOCKET 50-163, JUNE 23, 1966, ATOMIC ENERGY CLEARING HOUSE, 12(28), PAGE 18, (JULY 11, 1966)

AFTER 426 PULSES AT LEVELS THAT GAVE MAXIMUM MEASURED FUEL TEMPERATURE OF 680 C, TWO OF THE HIGHLY LOADED TEST ELEMENTS HAD DEVELOPED SMALL LOCALIZED CLADDING EXPANSIONS. MAXIMUM MEASURED INTERNAL PRESSURE WAS 35 PSIA. LOCALIZED FUEL EXPANSION HAD OCCURRED DUE TO OVERHEATING. THESE TESTS HAVE BEEN DEFERRED UNTIL CAUSE OF THE EXPANSION IS MORE FULLY DETERMINED.

*FUEL ELEMENT + *THERMAL MECHANICAL EFFECT + CLAD + REACTOR, PULSED + TRIGA (TRAINING REACTOR, ISOTOPES, G.A.)

17-11049 WOLTER EE

ELK RIVER CONTROL ROD DAMAGE AND VESSEL INSPECTION

RURAL COOPERATIVE POWER ASSOCIATION, ELK RIVER, MINN.

2 PAGES, JUNE 22, 1966, DOCKET 115-1, ATOMIC ENERGY CLEARING HOUSE, 12(28), PAGES 18-19, (JULY 11, 1966)

THE APRIL 1966 INSPECTION SHOWED CRACKS AT SHIM-ROD RIVETS AND CRACKS IN REGULATING ROD MATERIAL, ALL OF BORON-STAINLESS-STEEL CONSTRUCTION. BORON CARBIDE RODS ARE REPLACING SOME RODS. DYE-PENETRANT INSPECTION OF THE REACTOR VESSEL SHOWED SHALLOW CRACKS JUST BELOW HEAD FLANGE IN MARTENSITIC WELDING. CRACKS SHOULD NOT PRESENT A PROBLEM. STRESSED U-BEND CORROSION SPECIMENS IN THE EVAPORATORS SHOWED CRACKING AFTER 22 MONTHS. ULTRASONIC TESTS OF TEN WELDS SHOWED NO DEFECTS.

*CONTROL ROD, SHIM SAFETY + *DAMAGE + CONTAINMENT, PRESSURE VESSEL + ELK RIVER + EXAMINATION + REACTOR, BOILING WATER

17-11051 ANDERSON AN

CATEGORY 17
OPERATIONAL SAFETY AND EXPERIENCE

17-11051 *CONTINUED*

EVALUATION OF STEAM GENERATOR TUBING FAILURES, INDIAN POINT UNIT 1
CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

2 PAGES, DOCKET 50-3, JUNE 20, 1966, ATOMIC ENERGY CLEARING HOUSE, 12(28), PAGES 16-17, (JULY 11, 1966)

EIGHT TUBE LEAKS HAVE OCCURRED SO FAR IN BOILERS 11 AND 14, WITH NO LEAKS IN 12 OR 13. FIVE LEAKS WERE LOCATED IN THE U-BENDS (INSPECTION SHOWED SAGGED TUBE SUPPORTS IN BOILER 14 AT THE U-BEND), AND ALL LEAKS OCCURRED DURING A PLANT HEATUP. THE LARGEST LEAK (EQUIVALENT TO A 3/4-IN. HOLE) CAUSED PRESSURIZER LEVEL TO DROP 105 IN. IN 6 MIN WITH NORMAL MAKEUP. THE INVESTIGATION CONTINUES.

*FAILURE, PIPE + *HEAT EXCHANGER + INDIAN POINT I + REACTOR, PRESSURIZED WATER + SUPPORT STRUCTURE + THERMAL MECHANICAL EFFECT

17-11052 ROLSTON BF

LOSS OF COOLANT AT MANHATTAN COLLEGE REACTOR, MAY 19, 1966
MANHATTAN COLLEGE, BRONX, N. Y.

1 PAGE, MAY 31, 1966, DOCKET 50-199, ATOMIC ENERGY CLEARING HOUSE, 12(26), PAGE 39 (JUNE 27, 1966)

IN THE EVENING, A PIPE ON THE DISCHARGE SIDE OF THE OPERATING POOL DEMINERALIZER BROKE, AND THE POOL WAS DRAINED INTO THE BASEMENT. NEXT MORNING, THIS WAS DISCOVERED. NO AREA-MONITOR READINGS ABOVE BACKGROUND WERE SEEN. CENTRAL FUEL ELEMENT WAS ALL RIGHT - LESS THAN 1 MR/HR AT CONTACT. THIRTY-SIX HUNDRED GALLONS OF POOL WATER HAD DRAINED INTO THE GROUND THROUGH AN UNSEALED CRACK IN THE FLOOR. A LOW-WATER-LEVEL PUMP CUTOFF SWITCH WAS ADDED, AND THE CRACK WAS SEALED.

*INCIDENT, ACTUAL, GENERAL + *LOSS OF COOLANT + FAILURE, DESIGN ERROR + FAILURE, PIPE + REACTOR, POOL TYPE

17-11057 EVALUATION OF DAMAGE, SAN ONOFRE STEAM GENERATOR

WESTINGHOUSE ELECTRIC CORP., HEAT TRANSFER DIV., LESTER, PA. + BECHTEL CORPORATION, VERNON, CALIFORNIA
113 PAGES, 32 FIGURES, DOCKET NO. 50-206, APRIL, 1966, PDR

THE GENERATOR WAS DROPPED 1 FT DURING THE LIFT AFTER IT WAS INSIDE CONTAINMENT. THE GENERATOR WITHSTOOD THE HYDRAULIC TEST, BUT 32 INCONEL TUBES WERE DEFORMED AS SEVERAL TUBE-SUPPORT SHEETS WERE CRUSHED. REPORT CONTAINS VARIOUS STRESS ANALYSIS ON TUBES AND SUPPORTS, DESCRIBES PROGRAM OF TUBE PLUGGING AND INSPECTION, AND CONCLUDES THAT DAMAGE CAN BE REPAIRED WITHOUT CHANGING PLANT CHARACTERISTICS.

*DAMAGE + *HEAT EXCHANGER + REACTOR, PRESSURIZED WATER + SAN ONOFRE + STRESS ANALYSIS

17-11058 NAHAVANDI AN + VON HOLLEN RF

PRESSURE EFFECTS ON SPACE-DEPENDENT DYNAMICS IN BOILING SYSTEMS
WESTINGHOUSE ELECTRIC CORPORATION, PITTSBURGH, PA., ATOMIC POWER DIVISION

CONF-650,413 +. 18 PAGES, 5 FIGURES, 5 REFERENCES, APRIL 1965, PAGES 566-583 OF NEUTRON DYNAMICS AND CONTROL, PROCEEDINGS OF THE SYMPOSIUM ON NUCLEAR ENGINEERING, UNIVERSITY OF ARIZONA, TUCSON, APRIL 5-7, 1965, CFSTI \$4.50 CY, \$2.50 MN

EARLIER WORK WAS DONE ON CONSTANT-PRESSURE REACTOR. THIS ARTICLE REPORTS WORK DONE WHEN IT WAS REALIZED THAT LOSS OF LOAD WOULD CAUSE TURBINE-SPEED REGULATOR TO OVERCOME THE CONSTANT-DEMAND SIGNAL. EARLIER WORK AND THIS WORK WERE CHECKED AGAINST LOAD RAMP AT FULL POWER. MODEL WAS ALSO APPLIED TO DYNAMIC ANALYSIS OF A 400-MW (TH) VERTICAL STEAM GENERATOR.

*HEAT TRANSFER, BOILING + HEAT EXCHANGER + LOSS OF LOAD + REACTOR, BOILING WATER

17-11059 MILEY GH + KURSTEDT HA + BECK GP

FEEDBACK EFFECTS DURING SHORT-INTERVAL SERIES PULSING
UNIVERSITY OF ILLINOIS

CONF-650,413 +. 17 PAGES, 7 FIGURES, 2 TABLES, 14 REFERENCES, APRIL 1965, PAGES 420-436 OF NEUTRON DYNAMICS AND CONTROL, PROCEEDINGS OF THE SYMPOSIUM ON NUCLEAR ENGINEERING AT THE UNIVERSITY OF ARIZONA, TUCSON, APRIL 5-7, 1965, CFSTI \$4.50 CY, \$2.50 MN

THE EFFECTS OF INITIAL PULSE AMPLITUDE, TIME BETWEEN PULSES, AND TIME AFTER PEAK FOR ROD DROP WERE INVESTIGATED FOR 0.5 TO 3 PULSES PER MINUTE. A CALCULATIONAL MODEL FOR TIME-DEPENDENT TEMPERATURE WAS FOUND. CALCULATIONS SHOW THAT THE WATER-TEMPERATURE COEFFICIENT IS POSITIVE.

*TEMPERATURE COEFFICIENT + REACTOR TRANSIENT + REACTOR, PULSED + REACTOR, RESEARCH + TRIGA (TRAINING REACTOR, ISOTOPES, G.A.)

17-11060 HORNYIK K + WYMAN ME

STUDY OF THE DYNAMICS OF A TRIGA TYPE REACTOR
UNIVERSITY OF ILLINOIS

CONF-650 413 +. 15 PAGES, 14 FIGURES, 10 REFERENCES, PP. 457-572 OF NEUTRON DYNAMICS AND CONTROL, APRIL 7, 1966, CFSTI \$4.50 CY, \$2.50 MN

COOLANT FLOW AND TEMPERATURE ANALYSES MADE FROM STEADY-STATE POWER UP TO 1 MW AND PULSES UP TO 2 DOLLARS. A SIMPLE HEAT-TRANSFER MODEL WAS DEVELOPED THAT WAS IN GOOD AGREEMENT AFTER LESS THAN 1-DOLLAR PULSES. HEAT DENSITY AND TEMPERATURE IS CONCENTRATED IN OUTER LAYERS OF FUEL ELEMENT DURING A PULSE AND AFFECTS BOTH REACTIVITY AND HEAT TRANSFER.

*ANALYTICAL MODEL + HEAT TRANSFER ANALYSIS + REACTOR TRANSIENT + REACTOR, PULSED + REACTOR, RESEARCH +

CATEGORY 17
OPERATIONAL SAFETY AND EXPERIENCE

17-1106G *CONTINUED*
TRIGA (TRAINING REACTOR, ISOTOPES, G.A.)

17-11081 COFFER CO + DEE JB + SHOPTHUGH JP + WEST GB
CHARACTERISTICS OF LARGE REACTIVITY INSERTIONS IN A HIGH-PERFORMANCE TRIGA URANIUM-ZIRCONIUM HYDRIDE CORE
GENERAL ATOMIC DIVISION OF GENERAL DYNAMICS
CONF-650 413 +. 21 PAGES, 16 FIGURES, 2 TABLES, 5 REFERENCES, PP. 398-419 OF NEUTRON DYNAMICS AND
CONTROL, APRIL 7, 1966, CFSTI \$4.50 CY, \$2.50 MN

MORE THAN 400 PULSES BETWEEN 4.0 AND 4.6 DOLLARS INDICATE THAT THE STAINLESS-STEEL-CLAD (304
SS) FUEL CAN WITHSTAND SUCH SERVICE. PEAK POWER, TEMPERATURE, ETC., IN A BURST COMPARE
FAVORABLY WITH FUCHS-NORDHEIM-SCALLETAR MODEL USING VARIABLE HEAT CAPACITY. AT THE HIGHEST
POWER (6480 MW, 44.5 MW-SEC FILM BOILING OCCURED, AS INDICATED BY SMALL PATCHES OF BLUE,
OXIDIZED CLAD. EXPERIMENTS SHOWED THAT 3-4 DOLLAR PULSING RAISED FUEL TEMPERATURE 100 C WHEN
REACTOR OPERATED AT 800 KW. BECAUSE GAS PRESSURES ARE LOWER THAN PREDICTED AND VARY LINEARLY
WITH DOLLARS, AUTHORS BELIEVE THAT INTERNAL PRESSURE IS DUE TO AIR HEATING RATHER THAN
HYDROGEN DISSOCIATION.

*FUCHS MODEL + *FUEL ELEMENT + *REACTOR TRANSIENT + COMPARISON, THEORY AND EXPERIENCE +
PRESSURE, INTERNAL + REACTOR, PULSED + REACTOR, RESEARCH + TRIGA (TRAINING REACTOR, ISOTOPES, G.A.)

17-11082 LONG RL
OPERATING CHARACTERISTICS OF THE WSMR FAST BURST REACTOR
ARMY MISSILE TEST AND EVALUATION DIRECTORATE
CONF-650 413 +. 12 PAGES, 6 FIGURES, 2 TABLES, 3 REFERENCES, PP. 386-397 OF NEUTRON DYNAMICS AND CONTROL,
APRIL 7, 1966, CFSTI \$4.50 CY, \$2.50 MN

BRIEFLY DESCRIBES REACTOR. THE REACTOR (SIMILAR TO THE HPRR AT ORNL) HAS BURST YIELD LIMITED
BY THERMAL SHOCK CAPABILITY, UNLIKE HPRR TEMPERATURE LIMITATIONS. SCATTER IN CURVES OF TOTAL
FISSIONS VS PERIOD LED TO FINDING THAT THERMAL SHOCKS WERE PREVENTING SAFETY-BLOCK RELEASE,
SINCE THE SWITCH ACTUATORS WERE BEING DISPLACED. CORE-ASSEMBLY BOLTS WERE BEING STRETCHED
DURING EACH BURST.

*THERMAL MECHANICAL EFFECT + CCRE COMPONENTS, MISCELLANEOUS + REACTOR, ARMY + REACTOR, FAST BURST

17-11083 DICKERMAN CE + ROBINSON LE
TREAT EXPERIMENTS TO PROVIDE DATA FOR FAST REACTOR SAFETY KINETICS CALCULATIONS
ARGONNF NATIONAL LABORATORY
CONF-650 413 +. 14 PAGES, 10 FIGURES, 18 REFERENCES, PP. 371-385 OF NEUTRON DYNAMICS AND CONTROL, APRIL
7, 1966, CFSTI \$4.50 CY, \$2.50 MN

TREAT EXPERIMENT ON EBR-II-TYPE UO₂ FUEL ENABLED THE INCLUSION OF VARIATIONS IN POWER AND
COOLANT FLOW IN HYPOTHETICAL ACCIDENT MODELS. SUCH VARIATIONS MAY REDUCE REACTIVITY
INSERTION RATES TENFOLD FROM SINGLE-PIN-FAILURE DATA. URANIUM SULPHIDE WAS MECHANICALLY
SUPERIOR TO UO₂. SIGNIFICANTLY DIFFERENT FAILURE MODES WITH DIFFERENT FAILURE THRESHOLDS
WERE FOUND FOR UO₂ IN FAST-REACTOR-FUEL SIZE.

*FUEL ELEMENT + *REACTOR TRANSIENT + EBR I AND II (EXPERIMENTAL BREEDER REACTORS) +
REACTOR, GRAPHITE MODERATED + REACTOR, TEST + TREAT (TRANSIENT TEST REACTOR FACILITY) + URANIUM DIOXIDE +
URANIUM SULFIDE

17-11084 RAJAGOPAN V + SWEN GE
MEASUREMENT OF LOCAL KINETIC PARAMETERS IN THE SAXTON REACTOR
WESTINGHOUSE ELECTRIC CORPORATION, PITTSBURGH
CONF-650 413 +. 10 PAGES, 6 FIGURES, 2 TABLES, 3 REFERENCES, PP. 299-311 OF NEUTRON DYNAMICS AND CONTROL,
APRIL 7, 1966, CFSTI \$4.50 CY, \$2.50 MN

A ROTATING REACTIVITY OSCILLATOR AND MINIATURE IN-CORE ION CHAMBERS YIELDED POWER AND
CROSS-POWER SPECTRAL ANALYSES. THE DETECTOR LOCATION WAS VARIED AXIALLY. MEASUREMENTS
SHOWED THAT THE LOCAL PROMPT POWER COEFFICIENT DECREASES TOWARD THE CORE CENTER (OR AS HEAT
FLUX INCREASES) AND COMPARES WELL WITH CALCULATIONS.

*OSCILLATOR, REACTIVITY + *POWER COEFFICIENT + REACTOR, PRESSURIZED WATER + SAXTON + TRANSFER FUNCTION

17-11085 PLUTA PR
COUPLED-CORE KINETIC BEHAVIOR
GENERAL ELECTRIC COMPANY, ATOMIC POWER EQUIPMENT DEPT., SAN JOSE
CONF-650 413 +. 21 PAGES, 17 FIGURES, 1 TABLE, 16 REFERENCES, PP. 544-565 OF NEUTRON DYNAMICS AND
CONTROL, APRIL 7, 1966, CFSTI \$4.50 CY, \$2.50 MN

POWER TRANSIENTS AND TRANSFER FUNCTIONS WITHOUT FEEDBACK ARE SHOWN. THE MODEL PROPOSED BY
AVERY WAS USED. WITH CENTRAL SUPERHEAT ZONES, TWO CORES WERE USED, ONE HAVING A FAST
SPECTRUM, AND ONE THERMAL.

*COUPLED CORES + REACTOR TRANSIENT + REACTOR, SUPERHEAT + TRANSFER FUNCTION

17-11090 CAMERON IR + DRAGESSET A + FREEMANTLE RG
STUDIES WITH PLUTONIUM-FUELLED CORES IN THE ZERO-ENERGY, HIGH-TEMPERATURE NUCLEAR REACTOR ZENITH

CATEGORY 17
OPERATIONAL SAFETY AND EXPERIENCE

17-11090 *CONTINUED*
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, WINFRITH + OECD HIGH TEMPERATURE REACTOR PROJECT (DRAGON),
WINFRITH + IBM(U.K.) LTD., LONDON
26 PAGES, 11 FIGURES, 6 TABLES, 38 REFERENCES, JOURNAL OF NUCLEAR ENERGY PARTS A/B, 20(4), PAGES 285-311
(1966)

A SERIES OF EXPERIMENTS CARRIED OUT THE AIM OF TESTING CURRENT THEORETICAL METHODS FOR
CALCULATING EXCESS REACTIVITY, TEMPERATURE COEFFICIENTS, DIFFERENTIAL SPECTRUM, AND
REACTION-RATE DISTRIBUTIONS. TWO CORES OF WIDELY DIFFERENT FISSILE/MODERATOR ATOM RATIOS
WERE LOADED TO OBTAIN SIGNIFICANTLY VARIED SPECTRUM CONDITIONS. THE GENERAL AGREEMENT IS
COMPARABLE WITH THAT FOUND FOR THE U-235 CORES PREVIOUSLY INVESTIGATED.

*COMPARISON, THEORY AND EXPERIENCE + *CRITICALITY EXPERIMENT + *PLUTONIUM + REACTIVITY, EXCESS +
REACTOR, GAS COOLED + REACTOR, GRAPHITE MODERATED + TEMPERATURE COEFFICIENT + UNITED KINGDOM

17-11174 SANDERS JP
APPROPRIATE VALUES FOR THE THERMAL CONDUCTIVITY OF UO₂ FOR USE IN THE DESIGN OF THE BONUS SUPERHEATERS
OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TENNESSEE
ORNL-TM-1450 +. 11 PAGES, 1 FIGURE, 6 REFERENCES, APRIL 22, 1966, CFSTI \$1.00 CY, \$0.50 MN

A LITERATURE SURVEY WAS MADE, AND A THERMAL CONDUCTIVITY OF 1.0 - 1.2 BTU/HR-FT-DEG F WAS
CHOSEN. VARIOUS REPORTS INCLUDED GAS-GAP EFFECT. THERMAL CYCLING AND IRRADIATION HISTORY
AFFECT CHOICE ALSO.

BONUS (BOILING NUCLEAR SUPERHEAT PROJECT) + HEAT CONDUCTION + REACTOR, BOILING WATER + REACTOR, SUPERHEAT +
URANIUM DIOXIDE

17-11238 NUCLEAR TECHNOLOGY BRANCHES QUARTERLY REPORT, OCTOBER 1-DECEMBER 31, 1965
PHILLIPS PETROLEUM COMPANY, IDAHO FALLS
IDC-17151 +. 49 PAGES, 40 FIGURES, 4 TABLES, 23 REFERENCES, JUNE 1966, CFSTI \$3.00 CY, \$0.50 MN

FOR THE ATRC, CRITICALITY EXPERIMENTS SHOW FLUX PEAKING BETWEEN FUEL PLATES ONLY AT THE TWO
END PLATES, THAT IS, NEXT TO THE ALUMINUM OR BERYLLIUM. A 500 F PRESSURIZED WATER LOOP WAS
INSTALLED. FUEL-ELEMENT-TEMPERATURE DISTRIBUTIONS WERE OBTAINED SO STRESS CALCULATIONS COULD
BE MADE. SOME LOCATIONS ARE ABOVE THE YIELD STRESS FOR 6061-T6 ALLOY. AS TO THE MTR,
BERYLLIUM LATTICE PIECE LB16 FAILED DURING HANDLING, AFTER 2 TO 5 TIMES 10¹⁹ TO THE 21
INTEGRATED NEUTRON FLUX ABOVE 1 MEV. VARIOUS FRACTURE TESTS WERE RUN.

*BERYLLIUM + *FLUX DISTRIBUTION + *STRESS ANALYSIS + ATR (ADVANCED TEST REACTOR - NRTS) + FUEL ELEMENT +
MTR (MATERIAL TESTING REACTOR) + RADIATION DAMAGE + REACTOR, TEST + THERMAL MECHANICAL EFFECT

17-11246 SCHMIDT ER
ELK RIVER REACTOR CONTROL ROD PERFORMANCE
NUCLEAR UTILITY SERVICES, WASHINGTON, D.C.
NUS-TM-ENG-138 +. 14 PAGES, 5 FIGURES, DOCKET NO. 115-1, JULY 11, 1966, PDR

SUMMARY OF PERFORMANCE OF 2 PERCENT BORON-STEEL ALLOY. (1) GROSS CRACKING OF THE REGULATING
ROD, BECAUSE IT IS DEPLETED 5-6 TIMES MORE THAN THE OTHER RODS. A B4C ROD WILL REPLACE THIS.
(2) ONE SPOT-WELD HAD A PARTIAL CIRCUMFERENTIAL CRACK. NOT SERIOUS, BECAUSE OVER 60 PERCENT
OF THE EBWR SPOT WELDS HAD CRACKED. (3) TWO RODS HAD CRACKS AT THE JOINT BETWEEN ZIRCALOY
AND THE BORON-STAINLESS STEEL. (4) GUSSETS AT THE TIPS OF THE ROD HAD CRACKS BECAUSE OF LOW
DUCTIBILITY OR WELD SHRINKAGE OR HANDLING. REPAIRS DESCRIBED.

*BORON + *CONTROL ROD, SHIM SAFETY + *EMBRITTEMENT + *STEEL, STAINLESS + DAMAGE + ELK RIVER +
MAINTENANCE AND REPAIR + REACTOR, BOILING WATER

17-11248 BUSBOOM HJ + BOYLE RF + HARLING G + HAZEL VE
POST-IRRADIATION EXAMINATION OF EVESR MARK III SUPERHEAT FUEL (0.008-INCH CLADDING FAILURE)
GENERAL ELECTRIC COMPANY, PLEASANTON, CALIFORNIA
GEAP-5135 +. 35 PAGES, MARCH 1966, CFSTI, \$2.00 CY, \$0.50 MN

SHORTLY AFTER INCREASING POWER FROM 15 TO 17 MW(TH) (APPARENTLY FOR THE FIRST TIME), AN 8-MIL
INCOLOY-CLAD SUPERHEAT ROD FAILED. THE REACTOR WAS OPERATED FOR TWO MONTHS TO GAIN
RELEASE-RATE INFORMATION. A 5-IN.-LONG CRACK WAS FOUND, AND GRAIN GROWTH SHOWED CLAD HAD
BEEN ABOVE 1900 F. URANIUM DIOXIDE UNDER THE CRACK WAS UO₂.42, AND HAD SWELLED. THE FAILURE
WAS CAUSED BY HIGH-TEMPERATURE MECHANICAL STRESS WITHOUT CORROSION, OXIDATION, OR HIGH
INTERNAL PRESSURE.

*FAILURE, FUEL ELEMENT + CLAD + INCONEL + REACTOR, SUPERHEAT + STOICHIOMETRY +
VESR (VALLECITOS EXP. SUPERHEAT REACTOR-ESDA)

17-11258 FASSBENDER J + KRAMER H + MEISTER G
RESULTS OF STARTUP TESTING EXPERIMENTS ON FRJ-2 REACTOR
KERNFORSCHUNGSANLAGE, JUELICH, WEST GERMANY
JUL-236-RE +. 213 PAGES, JULY 1965, DEP. MN, IN GERMAN

TESTS RAN FROM NOVEMBER 1962 TO DECEMBER 1963. TYPICAL TEMPERATURE COEFFICIENT, REACTIVITY
WORTH OF CONTROL ROD, XENON AND SAMARIUM REACTIVITY EFFECTS ARE REPORTED.

DIDO (UK) + GERMANY + REACTOR STARTUP TESTING + REACTOR, HEAVY WATER + REACTOR, HIGH FLUX + REACTOR, TEST

CATEGORY 17
OPERATIONAL SAFETY AND EXPERIENCE

17-11259 STOLLER SM
SOME CONSIDERATIONS ON THE ROLE OF ADVANCED CONVERTER REACTORS
S. M. STOLLER ASSOCIATES, NEW YORK
4 PAGES, JUNE 20, 1966, ANS TRANS., PAGE 213, PRESENTED AT THE TWELFTH ANNUAL MEETING OF THE AMERICAN NUCLEAR SOCIETY IN DENVER, COLORADO, JUNE 20, 1966

MARKETING WILL BE DIFFICULT BECAUSE OF THE SQUEEZE BETWEEN BREEDERS AND IMPROVEMENTS IN WATER REACTORS. THE HTGR HAS SURVIVED AND MAY BE A BRIDGE TO THE GAS-COOLED BREEDER. THE POTENTIAL FOR BEING CHEAPER ON PAPER MAY NOT BE ENOUGH. SAVINGS ARE NOT LARGE FOR EVEN SECOND-GENERATION DEVICES AND DEPEND ON SUCCESSFUL R AND D FOR DIFFICULT PROGRAMS, WITH LITTLE FABRICATION EXPERIENCE. THERE ARE PERHAPS 30 UTILITIES BUYING REACTORS, AND NONE WILL WANT MUCH RISK.

*ECONOMICS + REACTOR, BREEDER + REACTOR, POWER

17-11276 DUFFIELD RB
DEVELOPMENT OF THE HIGH-TEMPERATURE GAS-COOLED REACTOR AND THE PEACH BOTTOM HIGH-TEMPERATURE GAS COOLED REACTOR PROTOTYPE
GENERAL ATOMIC
GA-7143 +. 30 PAGES, 14 FIGURES, 4 TABLES, MAY 12, 1966, DOCKET NO. 50-171, PAPER PRESENTED AT THE BRITISH NUCLEAR ENERGY SOCIETY SYMPOSIUM ON HIGH-TEMPERATURE REACTORS AND THE DRAGON PROJECT, AND WILL BE PUBLISHED IN THE JOURNAL OF THE BRITISH NUCLEAR ENERGY SOCIETY.

THE 40-MW(E) PEACH BOTTOM POWER STATION IS DESCRIBED. RESULTS OF LOW-POWER NUCLEAR MEASUREMENTS ARE PRESENTED. SIGNIFICANT CONCLUSIONS OF THE RESEARCH AND DEVELOPEMENT PROGRAM ARE - (1) COATED PARTICLES OF U AND TH ARE VERY PROMISING AS HIGH-TEMPERATURE FUELS BECAUSE OF FISSION-PRODUCT RETENTION. (2) LEAK-TIGHT SYSTEMS CAN BE MADE FOR HELIUM AT HIGH TEMPERATURES AND PRESSURES. (3) MANY CHARACTERISTICS, SUCH AS FUEL LOADING, POWER DISTRIBUTIONS, AND CONTROL ROD WORTHS, MAY BE CALCULATED WITH GOOD PRECISION. TWO TIME-CONSUMING PROBLEMS ENCOUNTERED WERE - (1) THE FUEL-TRANSFER MACHINE HAD TO BE MODIFIED TO OPERATE PROPERLY. (2) STRESS CORROSION WAS OBSERVED IN THE AUSTENITIC SUPERHEATER TUBES OF THE STEAM GENERATOR, WHICH MUST BE REPLACED.

*REACTOR DESCRIPTION + *REACTOR STARTUP TESTING + COATED PARTICLE + CORROSION + FISSION PRODUCT RETENTION + HELIUM + LEAK RATE + PEACH BOTTOM + REACTOR, GAS COOLED + REACTOR, GRAPHITE MODERATED + STRESS

17-11287 KOBAYASHI Y + KOBAYASHI H + AKAISHI J + IJIMA T
BIBLIOGRAPHY ON ACCIDENTS IN NUCLEAR FACILITIES
JAPAN ATOMIC ENERGY RESEARCH INSTITUTE, TOKYO
JAERI-4034 +. 36 PAGES, MAY 1965, DEP. MN

THE BIBLIOGRAPHY CONTAINS 120 ABSTRACTS FROM NUCLEAR SCIENCE ABSTRACTS, 1948 TO 1964, DEALING WITH PERSONAL EXPOSURES TO RADIATION OR RADIATION ACCIDENTS IN NUCLEAR FACILITIES. THE ABSTRACTS ARE ARRANGED IN THE NSA NUMERICAL ORDER. THE SUBJECT INDEX IS DIVIDED INTO EMERGENCY PLANNING AND ACCIDENTS, EACH GROUP BEING FURTHER DIVIDED INTO SMALLER CLASSES.

*BIBLIOGRAPHY + INCIDENT, ACTUAL, GENERAL + PERSONNEL EXPOSURE, RADIATION

17-11364 QUAD-CITIES STATION, UNIT 1 - PLANT DESIGN ANALYSIS, VOLUME 1
COMMONWEALTH EDISON COMPANY, CHICAGO
1 PAGE, DOCKET NO. 50-254, PAGE III-4-4, MAY 31, 1966 PDR

DURING THE EQUIVALENT OF 10 FULL-POWER YEARS OF OPERATION OF GE BOILING-WATER REACTOR, A STEADY-STATE THERMAL OVER-POWER CONDITION IN THE RANGE OF 105 TO 110 PERCENT OF RATED REACTOR POWER OCCURRED ONLY ONCE.

*INCIDENT, ACTUAL, GENERAL + *REACTOR POWER + REACTOR, BOILING WATER

17-11413 SKARPELOS JM
CHEMISTRY OF ESADE-VBWR NUCLEAR SUPERHEAT LOOP
GENERAL ELECTRIC COMPANY, SAN JOSE, CALIFORNIA
GEAP-4813 +. 38 PAGES, FEBRUARY 1964, CFSTI, \$2.00 CY, \$0.50 MN

THE CHEMISTRY PROGRAM ASSOCIATED WITH THE ESADE-VBWR NUCLEAR SUPERHEAT LOOP WAS CARRIED ON WITH THE PRIMARY PURPOSE OF DETECTING THE FAILURE OF FUEL CLADDING AND MEASURING THE FISSION-PRODUCT RELEASE RATE. TO ACCOMPLISH THIS OBJECTIVE, NOBLE-GAS FISSION PRODUCTS AND RADIOIODINES WERE MONITORED IN THE LOOP INLET AND OUTLET STEAM. RADIOCHEMISTRY MEASUREMENTS MADE DURING IRRADIATION GAVE NO INDICATION OF DEFECTIVE FUEL. RESULTS AFTER SIPPING THE FUEL BUNDLE AT THE COMPLETION OF THE IRRADIATION INDICATED THAT A FUEL ELEMENT MIGHT HAVE BEEN DEFECTIVE. HOWEVER, THE SIGNAL WAS SUFFICIENTLY WEAK THAT IF A DEFECT WERE PRESENT IT WAS VERY SMALL. PROBLEMS ASSOCIATED WITH STEAM SAMPLING DID NOT DETRACT FROM THE MAJOR OBJECTIVE, WHICH WAS TO DETERMINE OPERATING LIMITS FOR SUPERHEAT FUEL ELEMENTS OF INTEREST.

*CHEMICAL REACTION + *FAILURE, FUEL ELEMENT + *VBWR (VALLECITOS BOILING WATER REACTOR) + REACTOR, BOILING WATER + REACTOR, SUPERHEAT

17-11422 SMITH EH
PHILLIPS PETROLEUM COMPANY, ETR OPERATIONS PROGRESS REPORT, CYCLE NO. 81, MAY 22, 1966 - JULY 4, 1966
PHILLIPS PETROLEUM, IDAHO
ID0-17201 +. 36 PAGES, 2 FIGURES, AUGUST 5, 1966, DTIC

ACCESSION NUMBER 17-11259 TO 17-11422

CATEGORY 17
OPERATIONAL SAFETY AND EXPERIENCE

17-11422 *CONTINUED*

THIS REPORT IS ONE OF A SERIES OF SUCH REPORTS ON THE FOLLOWING SUBJECTS - PLANT OPERATIONS, OPERATING SUMMARY, IRRADIATION PROGRAM, AND REACTOR IRRADIATION SUMMARY.

*OPERATIONS REPORTS, GENERAL + ETR (ENGINEERING TEST REACTOR) + REACTOR, TEST

17-11427 EXPERIMENTAL BERYLLIUM OXIDE REACTOR PROGRAM. QUARTERLY PROGRESS REPORT FOR THE PERIOD ENDING MARCH 31, 1966
GENERAL ATOMIC
GA-7130 +. 26 PAGES, 2 FIGURES, MARCH 1966, CFSTI \$2.00 CY, \$0.50 MN

INSPECTION AFTER THE LIFE-CYCLE TEST OF THE PROTOTYPE CONTROL-ROD-DRIVE MECHANISM SHOWED SLIGHT POLISHING OF THE GEAR TEETH AND SOME DETERIORATION OF THE MOTOR BEARINGS. TO ENSURE BETTER PERFORMANCE AT ZERO-POWER TEMPERATURE CONDITIONS, A LESS VISCOUS LUBRICANT WAS SELECTED. MANIPULATIONS WITH THE FUEL-HANDLING MACHINE REVEALED INTERFERENCE BETWEEN THE GRAPPLING HEAD AND CORE ELEMENTS ADJACENT TO THE ELEMENT BEING HANDLED. MINOR PEWORKING THE HEAD CORRECTED THE CONDITION. DURING THE VALVE TESTS, 50 GAL OF LUBRICATING WAS DISCHARGED INTO THE MAIN LOOP VIA A DAMAGED OIL SEAL ON THE MAIN HELIUM CIRCULATOR.

*OPERATING EXPERIENCE + EBOR (EXPERIMENTAL BERYLLIUM OXIDE REACTOR) + FAILURE, EQUIPMENT + FUEL HANDLING MACHINE + REACTOR, BEO MODERATED + REACTOR, GAS COOLED + TEST, CONTROL ROD DRIVE

CATEGORY 18
SAFETY ANALYSIS AND DESIGN REPORTS

18-C8716 CORNELL DC
SAFE-PCRS. A COMPUTER PROGRAM FOR THE STRESS ANALYSIS OF COMPOSITE BODIES OF REVOLUTION. INPUT INSTRUCTIONS
GENERAL ATOMIC
GA-6588 +. 40 PAGES, FIGURES, TABLES, 2 REFERENCES- AUGUST 1, 1965- CFSTI, \$2.00 CY, \$0.75 MN.

A COMPUTER PROGRAM FOR THE STRESS ANALYSIS OF COMPOSITE BODIES OF REVOLUTION. INPUT INSTRUCTIONS.

*COMPUTER PROGRAM + *STRESS ANALYSIS + DESIGN STUDY + PROPERTY, PHYSICAL

18-09415 UNIVERSITY OF KANSAS TO USE NEPTUNIUM OXIDE FOILS FOR NEUTRON SPECTRUM MEASUREMENTS
UNIVERSITY OF KANSAS
2 PAGES, FEBRUARY 14, 1966, DOCKET NO. 5C-140, PDR

FOUR 0.4-G FOILS OF NP-237 OXIDE ENCAPSULATED IN COPPER TO BE USED ON LOAN.

*FLUX DISTRIBUTION + *NEPTUNIUM + *REACTOR, TRAINING

18-09740 HOUNGHTALING JE + NORBERG JA + HAIRE JC
ADDENDUM TO THE SPERT III HAZARDS SUMMARY REPORT -- LOW-ENRICHMENT OXIDE CORE
PHILLIPS PETROLEUM COMPANY, IDAHO
100-170C3 (REV. 21) +. 92 PAGES, 22 TABLES, 21 FIGURES, 34 REFERENCES, OCTOBER 1965, CFSTI, \$3.00 CY, \$0.75 MN

PERTINENT MECHANICAL CHARACTERISTICS OF THE E-CORE ARE EXPLAINED, AS WELL AS CHANGES MADE TO THE SPERT III CONTROL SYSTEM. INCLUDED ARE THE NUCLEAR CHARACTERISTICS OF THE CORE AS DETERMINED BY CALCULATION AND EXTRAPOLATION OF PREVIOUS EXPERIMENTAL RESULTS. ALSO, THE PREDICTED KINETIC BEHAVIOR FOR THE PLANNED TESTS AND CERTAIN ACCIDENT CONDITIONS ARE DISCUSSED. SEVERAL ACCIDENT SITUATIONS ARE CONSIDERED AND ANALYZED TO OBTAIN NUMERICAL ESTIMATES OF RADIOLOGICAL HAZARDS.

*SPERT 3 (SPECIAL POWER EXCURSION REACTOR TEST) + ACCIDENT ANALYSIS + CONTROL SYSTEM + DOSE + HAZARDS ANALYSIS + REACTOR KINETICS + REACTOR, PRESSURIZED WATER + REACTOR, TEST + SAFEGUARDS REPORT, GENERAL

18-C9744 VAUGHAN RD
BRADWELL NUCLEAR POWER STATION
THE NUCLEAR POWER GROUP, KNUTSFORD, CHESHIRE, ENG.
39 PAGES, 38 FIGURES, 4 TABLES, 1964, PP. 1-39 OF THE BERKELEY AND BRADWELL BOOK, INSTITUTION OF MECHANICAL ENGINEERS, LONDON

THE BRADWELL POWER STATION IS DESIGNED FOR A NET OUTPUT OF 300 MW(E). IT INCORPORATES TWO IDENTICAL REACTORS OF THE GRAPHITE-MODERATED GAS-COOLED TYPE. THE DESIGN OF THE REACTORS AND POWER STATION ARE DISCUSSED, INCLUDING PLANT CONFIGURATION, REACTOR CORE DIMENSIONS, FUEL ELEMENT PARAMETERS, THE CHOICE OF REACTOR GAS TEMPERATURES, THE STEAM CYCLE, THE FUEL ELEMENT, THE REACTOR CORE, FUEL HANDLING, AND BURST-CARTRIDGE EQUIPMENT. OTHER TOPICS INCLUDE REACTOR VESSEL AND GAS CIRCUITS, THE MAIN BLOWERS, CONTROL AND INSTRUMENTATION, AND TURBO-ALTERNATORS. ALTHOUGH BRADWELL IS NOT YET OPERATED AT DESIGN TEMPERATURE LEVELS, A BRIEF REVIEW IS GIVEN OF THE PERFORMANCE OF THE VARIOUS COMPONENTS. DIAGRAMS ARE INCLUDED, AND A LIST OF DESIGN PARAMETERS IS GIVEN.

*REACTOR DESCRIPTION + CONTAINMENT STRUCTURE + REACTOR, GAS COOLED + UNITED KINGDOM

18-09745 SOUTHWOOD JRM
BERKELEY NUCLEAR POWER STATION
THE NUCLEAR POWER GROUP, KNUTSFORD, CHESHIRE, ENG.
31 PAGES, 27 FIGURES, 1964, PP. 40-70 OF THE BERKELEY AND BRADWELL BOOK, INSTITUTION OF MECHANICAL ENGINEERS, LONDON

A NUMBER OF THE MAJOR FEATURES OF THE BERKELEY NUCLEAR POWER STATION ARE DISCUSSED. THESE ILLUSTRATE THE EXPERIENCE GAINED AS THE WORK PROGRESSED AND INDICATE HOW CHANGES PROMPTED BY NEW DATA WERE INCLUDED IN THE DESIGN WHERE ESSENTIAL OR WHERE CONSIDERED PRACTICALLY WITHIN THE CONSTRUCTION PROGRAM. THE TOPICS INCLUDE A BRIEF DESCRIPTION OF THE PLANT, DESIGN CONSIDERATIONS, FUEL ELEMENTS, STATION PERFORMANCE, THE CORE PERFORMANCE INCLUDING GRAPHITE CORES, SHIELDING, AND A PRESSURE VESSEL DESCRIPTION. ALSO DISCUSSED ARE BLOWERS, BOILERS, BURST CARTRIDGE DETECTION GEAR, FUELING HANDLING, THE TURBINE HOUSE, CIRCULATING WATER, AND THE ELECTRIC SYSTEM. THE CONTROL OF THE REACTOR AND THE COMMISSIONING PROGRAM ARE ALSO DISCUSSED.

*REACTOR DESCRIPTION + CONTAINMENT STRUCTURE + REACTOR, GAS COOLED + UNITED KINGDOM

18-C9746 SIMMONS WR + PERSIANI PJ + BUMP TR
FAST REACTOR TEST FACILITY (FARET) AND INITIAL EXPERIMENTAL PROGRAM
ARGONNE NATIONAL LABORATORY, ARGONNE, ILLINOIS
ANS-100(SUPPL.) + CONF. 650417(SUPPL.) +. 19 PAGES, 3 FIGURES, PAGES 37-55 OF FAST REACTOR OF TECHNOLOGY, ANS NATIONAL TOPICAL MEETING, DETROIT, MICHIGAN, APRIL 26-28, 1965, SOURCE

THE FAST REACTOR TEST FACILITY SITE, BUILDING, CONTAINMENT STRUCTURE, FUEL-HANDLING SYSTEMS, SHIELDING, COOLANT SYSTEMS, REACTOR PROPER, CONTROL SYSTEMS, EXPERIMENTAL CAPABILITIES,

CATEGORY 18
SAFETY ANALYSIS AND DESIGN REPORTS

18-09746 *CONTINUED*
DESIGN SPECIFICATIONS, LOADING, AND FUEL-TESTING PROGRAM AND OBJECTIVES ARE DESCRIBED.

*CONTAINMENT STRUCTURE + *FARET (FAST ARGONNE REACTOR EXPERIMENT TEST) + *REACTOR DESCRIPTION +
CONTAINMENT, HIGH PRESSURE + CONTAINMENT, PRESSURE VESSEL + REACTOR, BREEDER + REACTOR, FAST +
REACTOR, LIQUID METAL COOLED

18-09783 A STUDY OF A GAS-COOLED FAST BREEDER REACTOR. INITIAL STUDY, CORE DESIGN ANALYSIS AND SYSTEM
DEVELOPMENT PROGRAM. FINAL SUMMARY REPORT
GENERAL ATOMIC DIVISION, GENERAL DYNAMICS CORP.
GA-5537 +. 255 PAGES, FIGURES, TABLES, REFERENCES, AUGUST 15, 1964, CFSTI

REPORT RELATES TO DESIGN BASED ON MINIMAL EXTENSION OF PRESENT TECHNOLOGY, USING ESTABLISHED
REACTOR MATERIALS, OPERATED WELL WITHIN THEIR CAPABILITIES. CONCLUSIONS ARE THAT GAS COOLING
OFFERS ADVANTAGES BEYOND PROVISION OF AN ALTERNATIVE TECHNOLOGY, AS IT AVOIDS SOME PRACTICAL
PROBLEMS ASSOCIATED WITH SODIUM. AVOIDANCE OF THE SAFETY - AND STABILITY - DICTATED DESIGN
COMPROMISES IMPOSED BY NUCLEAR-COOLANT INTERACTION ALLOWS THE REALIZATION OF A COMBINATION OF
HIGH INTERNAL CONVERSION RATIO AND FUEL RATING WITH VERY LOW BURNUP REACTIVITY CHANGE AND LOW
COOLANT-VOID EFFECTS. THE REDUCED MODERATION INFLUENCE OF THE COOLANT RESULTS IN A TOLERABLE
REDUCTION OF DOPPLER COEFFICIENT IN VIEW OF THE REDUCED COOLANT-VOID COEFFICIENT AND LOW
EXCESS REACTIVITY REQUIREMENTS. COOLANT-LOSS RATES SUFFICIENT TO HALVE PRESSURE IN 20 SEC
CAN BE DEALT WITH BY THE NORMAL GAS CIRCULATORS. FOR THE MORE-DETAILED STUDIES, INCLUDING
ILLUSTRATION OF CONSTRUCTIONAL FEATURES AND KINETIC-BEHAVIOR EVALUATION, A 500 MWE
REFERENCE DESIGN BASED ON A 5000-LITER CORE WAS SELECTED.

*DESIGN STUDY + *REACTOR, BREEDER + *REACTOR, GAS COOLED + DOPPLER EFFECT + FLOODING COEFFICIENT +
LOSS OF COOLANT + REACTOR STABILITY + VOID COEFFICIENT

18-09948 DRESDEN NUCLEAR POWER STATION UNIT 3 PLANT DESIGN AND ANALYSIS REPORT VOL. I
COMMONWEALTH EDISON COMPANY
183 PAGES (APPROX.), TABLES, FEBRUARY 1966, DOCKET NO. 50-249, PDR

UNIT 3 WILL BE IDENTICAL WITH UNIT 2, AS AMENDED, AND IS SCHEDULED FOR 1 YEAR LATER. UNIT 3
IS A NOMINAL 2300/809 MWE NET. UNITS 2 AND 3 WILL SHARE A 310-FT STACK, A DISCHARGE CANAL,
AND A ONE (OF 3) CONTAINMENT COOLING SYSTEMS. WHILE THEY SHARE A COMMON REACTOR BUILDING AND
A COMMON TURBINE BUILDING, EACH REACTOR HAS ITS OWN PRESSURE-SUPPRESSION SYSTEM AND
CONTAINMENT. FUEL IS ZIRCALOY-2-CLAD UO₂, POWER CONTROL BY MOVABLE RODS AND BY VARYING
JET-PUMP CIRCULATING FLOW, TWO CORE-SPRAY SYSTEMS. EACH SUPPLIES ENOUGH WATER TO PREVENT
MELTING ON LOSS-OF-COOLANT ACCIDENT BECAUSE OF INNER REACTOR VESSEL. ALL DESIGN-BASIS
ACCIDENTS GIVE LESS THAN 1 RAD DOSE OFF-SITE. VOL II CONTAINS DRAWINGS AND APPENDICES. SITE
AND ENVIRONS DESCRIBED IN VOL. III OF UNIT 2.

*CONTAINMENT, PRESSURE SUPPRESSION + *DRESDEN III + *SAFEGUARDS REPORT, GENERAL + REACTOR, BOILING WATER

18-C9949 DRESDEN NUCLEAR POWER STATION UNIT 3 PLANT DESIGN AND ANALYSIS REPORT VOL. II
COMMONWEALTH EDISON COMPANY
152 PAGES (APPROX.), 100 FIGURES, FEBRUARY 1966, DOCKET NO. 50-249, PDR

CONTAINS DRAWINGS FOR VOL. I, PLUS SHORT APPENDICES ON JET-PUMP DESIGN, CONTROL-ROD DRIVE,
EXCURSION - DAMAGE LIMITS, HYPOTHETICAL NUCLEAR-EXCURSION LIMITS, AND STABILITY.

*DRESDEN III + *SAFEGUARDS REPORT, GENERAL + ACCIDENT, HYPOTHETICAL + CONTROL ROD DRIVE +
REACTOR, BOILING WATER

18-09983 DENISE RP
N. S. SAVANNAH TO REMOVE AUXILIARY FEEDWATER LINES
FIRST ATOMIC SHIP TRANSPORT, INC.
1 PAGE, MAY 17, 1966, DOCKET 50-238, ATOMIC ENERGY CLEARING HOUSE, 12(23), PAGE 19 (JUNE 6, 1966)

ORIGINAL FEEDWATER LINES INSTALLED ACCORDING TO CONVENTIONAL PLANT PRACTICE DESPITE NO DANGER
OF TUBES EXCEEDING PRIMARY COOLANT TEMPERATURE. BECAUSE OF GOOD OPERATING HISTORY, AUXILIARY
LINES REQUIREMENT REQUESTED REMOVED FROM TECHNICAL SPECIFICATIONS, THOUGH SYSTEM WILL BE
RETAINED.

*HEAT EXCHANGER + *OPERATING LIMITS/TECHNICAL SPECIFICATIONS + N S SAVANNAH + REACTOR, PRESSURIZED WATER

18-C9987 CARLSMITH RS + DELENE JG
RESPONSE OF A HELIUM-COOLED FAST REACTOR TO CHANGES IN COOLANT FLOW AND REACTIVITY
OAK RIDGE NATIONAL LABORATORY
ORNL-P-1698 + CONF-651009-4 +. 24 PAGES, PRESENTED AT CONFERENCE ON SAFETY, FUELS AND CORE DESIGN IN
LARGE FAST POWER REACTORS, ARGONNE NATIONAL LABORATORY, OCTOBER 11-14, 1965, CFSTI, \$1.00 CY, \$0.50 MM

ORNL DESIGN OF A HELIUM-COOLED FAST REACTOR STUDIED WITH RESPECT TO STEP AND RAMP REACTIVITY
INSERTIONS AND LOSS OF COOLANT PRESSURE AND FLOW.

*REACTOR, FAST + ACCIDENT, REACTIVITY + HELIUM + LOSS OF FLOW + LOSS OF PRESSURE + REACTOR, GAS COOLED

18-10047 ELLIOTT VA + KANNE WR

CATEGORY 18
SAFETY ANALYSIS AND DESIGN REPORTS

18-10047 *CONTINUED*
THE OYSTER CREEK NUCLEAR BOILER DESIGN
GENERAL ELECTRIC COMPANY, SAN JOSE
18 PAGES, 9 FIGURES, 3 TABLES, 2 REFERENCES, APRIL 1966, PRESENTED AT THE AMERICAN POWER CONFERENCE 28TH
ANNUAL MEETING, APRIL 26-28, CHICAGO, ILLINOIS, APC, \$0.25 CY

BRIEF DESCRIPTION OF REACTOR, FLOW DIAGRAM, CORE DESIGN AND INSTRUMENTATION.

*REACTOR DESCRIPTION + OYSTER CREEK + REACTOR, BOILING WATER

18-10117 PRWRA APPLICATION FOR MODIFICATION OF OPERATING AUTHORIZATION DPRA-4 BONUS REACTOR
PUERTO RICO WATER RESOURCES AUTHORITY, SAN JUAN
119 PAGES, DECEMBER 24, 1965, DOCKET NO. 115-4, PDR

PUERTO RICO WATER RESOURCES AUTHORITY REQUESTS TO TAKE OVER SOLE RESPONSIBILITY FOR OPERATING
BONUS REACTOR. REPORT CONTAINS ORGANIZATION CHARTS, JOB DESCRIPTIONS, AND EXPERIENCE
SUMMARIES OF BONUS-ASSIGNED PRWRA PERSONNEL.

*BONUS (BOILING NUCLEAR SUPERHEAT PROJECT) + *STAFFING, TRAINING, QUALIFICATION + REACTOR, SUPERHEAT

18-10156 RUDY GC + SWANSON DH + GREGORY JG + PEARCE WR + SHULTZ TG + STONE JT
SAFETY INSTRUMENTATION REVIEW AND RESULTING MODIFICATIONS FOR PATHFINDER POWER PLANT
ALLIS-CHALMERS MANUFACTURING COMPANY, BETHESDA
ACNP-64638 +. 83 PAGES, 74 FIGURES, FEBRUARY 12, 1966, DOCKET NO. 50-130, PDR

THE AS-BUILT NUCLEAR AND PROCESS SAFETY INSTRUMENTATION WAS GIVEN A COMPLETE REVIEW BY
EVALUATING IT AGAINST A MODERN GENERAL SAFETY POLICY AND A SET OF SPECIFIC DESIGN
SPECIFICATIONS. THE ORIGINAL DESIGN WAS DEFICIENT IN MANY AREAS, AND MODIFICATIONS WERE MADE
TO SATISFY THE DESIGN SPECIFICATIONS. SEVERAL NEW PROTECTIVE CHANNELS WERE ADDED, AND SECOND
CHANNELS WERE ADDED TO MOST OF THE PROCESS CHANNELS. PROVISION WAS MADE TO TEST ALL THE
CHANNELS AT POWER. RELAY MATRICES WERE ADDED TO BACK UP THE SOLID-STATE LOGIC SCRAM CIRCUITS.

*DESIGN CRITERIA + *MODIFICATION, SYSTEM OR EQUIPMENT + *PATHFINDER + *PLANT PROTECTIVE SYSTEM +
*SAFETY PRINCIPLES AND PHILOSOPHY + REACTOR SAFETY SYSTEM + REACTOR, BOILING WATER + REGULATION, AEC

18-10191 MCELROY DF
PATHFINDER TECHNICAL SPECIFICATIONS CHANGE. HIGH VESSEL COOLING RATE ALLOWED DURING INITIATION OF
EMERGENCY CONDENSER COOLING
NORTHERN STATES POWER COMPANY
2 PAGES, MAY 3, 1966, DOCKET 50-130, ATOMIC ENERGY CLEARING HOUSE, 12(20), PAGES 29-30 (MAY 16, 1966)

TECHNICAL SPECIFICATION REVISION ALLOWS EXCEEDING VESSEL COOLING RATE OF 200 F/HR, DURING
TESTING OF EMERGENCY CONDENSER, PROVIDED THAT THE TEMPERATURE CHANGE IS LESS THAN 50 F AND
THAT THE HALF-HOUR CHANGE IS LESS THAN 100 F. THE 200 F/HR LIMIT WAS INTENDED FOR THE
FLOODED CONDITION, NOT DURING DRAINED OPERATION WHEN STEAM INSULATES THE REACTOR-VESSEL HEAD
AND FLANGE FROM THE EFFECTS OF RAPID CHANGES OF REACTOR COOLANT TEMPERATURE. A 50 F COOLDOWN
IN 2 MIN OCCURS WITH SCRAM WHILE IN MANUAL PRESSURE CONTROL, OR OPENING OF THE SAFETY VALVE
UPON CLOSURE OF THE TURBINE VALVES AND DUMP VALVE.

*CONTAINMENT, HIGH PRESSURE + *EMERGENCY COOLING + *OPERATING LIMITS/TECHNICAL SPECIFICATIONS +
*PATHFINDER + REACTOR, SUPERHEAT

18-10270 ARNETT LM + ROSS CP + RUSCHE BC + TAYLOR CD
FINAL SAFETY ANALYSIS OF THE MAXIMUM CREDIBLE ACCIDENT IN THE HEAVY WATER COMPONENTS TEST REACTOR
SAVANNAH RIVER LABORATORY, DUPONT
DP-1037 +. 30 PAGES, 4 FIGURES, 7 TABLES, REFERENCES, DECEMBER 1965, CFSTI \$2.00 CY, \$0.50 MN

THE MAXIMUM CREDIBLE ACCIDENT IN THE HWCTR IS ANALYZED FOR THE CONDITIONS THAT EXIST SINCE
IODINE ABSORBERS WERE INSTALLED IN THE CONTAINMENT BUILDING. THE ABSORBERS REMOVE
RADIOIODINE ISOTOPES TO THE EXTENT THAT THE THYROID AND WHOLE-BODY DOSES AT THE SAVANNAH
RIVER PLANT BOUNDARY WOULD BE LESS BY FACTORS OF SIX AND TWENTY-FIVE, RESPECTIVELY, THAN THE
ALLOWABLE LIMITS SET FORTH IN THE CODE OF FEDERAL REGULATIONS (10-CFR 100).

*ACCIDENT, MAXIMUM CREDIBLE (MCA) + *HWCTR (HEAVY WATER COMPONENT TEST REACTOR) + FILTER + IODINE +
SAFEGUARDS REPORT, GENERAL

18-10328 CONSUMERS POWER COMPANY. PALISADES PLANT. PRELIMINARY DESCRIPTION AND SAFETY ANALYSIS
REPORT, VOLUME III
CONSUMERS POWER COMPANY
109 PAGES, 15 FIGURES, 2 TABLES, JUNE 1966, DOCKET NO. 50-255, PDR

VOL III CONTAINS VARIOUS APPENDIXES, MAINLY PERTAINING TO CONTAINMENT AND STRUCTURAL DESIGN
BASIS, AND VARIOUS WINDROSES AND SUBSTANTIATION FOR CHOSEN METEOROLOGICAL PARAMETERS.

*SAFEGUARDS REPORT, GENERAL + ATMOSPHERIC DIFFUSION COEFFICIENT + CONTAINMENT DESIGN + PALISADES PLANT +
REACTOR, PRESSURIZED WATER

18-10329 CONSUMERS POWER COMPANY. PALISADES PLANT. PRELIMINARY DESCRIPTION AND SAFETY ANALYSIS

CATEGORY 18
SAFETY ANALYSIS AND DESIGN REPORTS

18-10329 *CONTINUED*
REPORT, VOLUME II
CONSUMERS POWER COMPANY
173 PAGES, 12 FIGURES, JUNE 1966, DOCKET NO. 50-255, PDR

PROTECTIVE SYSTEM USES DLAL SENSORS IN EACH OF TWO CHANNELS, WITH EACH CHANNEL (EITHER THROUGH RELAY OR SOLID-STATE ACTION) REQUIRED TO TRIP TO CAUSE A SCRAM. SELF-POWERED IN-CORE NEUTRON DETECTORS GIVE OPERATING INFORMATION. SUPERVISORS WILL BE TRANSFERRED FROM BIG ROCK POINT. 1.5-IN. DROP OF CORE AWAY FROM RODS DUE TO CORE-BARREL FAILURE ANALYSED AS NO REACTIVITY PROBLEM, ALTHOUGH SOME MECHANICAL DAMAGE POSSIBLE. MAXIMUM HYPOTHETICAL ACCIDENT (DOUBLE-ENDED PIPE RUPTURE, 23 PERCENT ZIRCONIUM CLAD-WATER REACTION) YIELDS 203 REMS THYROID DOSE (2 HR) AT SITE BOUNDARY. VOL. II DESCRIBES ENGINEERED SAFEGUARDS (SAFETY INJECTION, CONTAINMENT SPRAY, CONTAINMENT AIR COOLING), I AND C, SAFETY ANALYSIS, AND CONFORMANCE WITH AEC CONSTRUCTION-PERMIT SPECIFICATIONS.

*PALISADES PLANT + *SAFEGUARDS REPORT, GENERAL + ACCIDENT, HYPOTHETICAL + DESIGN CRITERIA + ENGINEERED SAFEGUARD + REACTOR, PRESSURIZED WATER

18-10340 DUNGENESS B AGR NUCLEAR POWER STATION
CENTRAL ELECTRICITY GENERATING BOARD
12 PAGES, FIGURES, JULY 1965, SOURCE

THE UK AGR AT DUNGENESS B WILL HAVE A NET OUTPUT OF 1200 MW(E). THE COMPLETE REACTOR, INCLUDING CORE, GAS CIRCULATORS AND BOILERS, IS HOUSED WITHIN A CONCRETE PRESSURE VESSEL. AN INNER PRESSURE CYLINDER IN THE FORM OF A BELL SEPARATES THE CORE FROM THE BOILERS. THE INTERNAL WALLS OF THE CONCRETE PRESSURE VESSEL ARE CLAD WITH STAINLESS STEEL THERMAL INSULATION. THE BOILERS ARE OF THE ONCE-THROUGH TYPE WITH A SINGLE REHEATER STAGE. THE TUBE ENDS ARE LED OUT IN SUCH A WAY THAT ACCESS IS AVAILABLE FOR PLUGGING OR OTHER PURPOSES WITHOUT ENTRY INTO THE PRESSURE VESSEL. THE URANIUM DIOXIDE FUEL IS CONTAINED IN STAINLESS-STEEL CANS, ARRANGED IN THREE-RING CLUSTERS OF 36 PINS WITHIN GRAPHITE SLEEVES, TO FORM 40-INCH-LONG FUEL ELEMENTS. THE MEAN FUEL RATING IS SOME THREE TIMES GREATER THAN FOR THE MAGNOX SYSTEM.

*DUNGENESS B (UK) + *REACTOR DESCRIPTION + AGR (ADVANCED GASCOOLED REACTOR, WINDSCALE, UK) + REACTOR SAFETY SYSTEM + REACTOR, GAS COOLED + UNITED KINGDOM

18-10392 LUMB RF
TECH SPEC FOR SHORT TERM DISCHARGE RATE LIMITS MORE THAN LONG-TERM LIMITS
WESTERN NEW YORK NUCLEAR RESEARCH CENTER INC.
1 PAGE, JUNE 3, 1966, DOCKET 50-57, ATOMIC ENERGY CLEARING HOUSE, 12(26), PAGE 40 (JUNE 27, 1966)

CERTAIN OPERATIONS RELEASE RADIOISOTOPES THAT MOMENTARILY EXCEED STACK-DISCHARGE LIMITS AT WESTERN NEW YORK NUCLEAR RESEARCH CENTER. CHANGES IN TECHNICAL SPECIFICATIONS WOULD ALLOW EXCEEDING MPC EQUIVALENT OF AR-41, WITH ONLY A LOCAL INVESTIGATION, AND REPORTING TO AEC IF RELEASE EXCEEDS 100 MPC.

*AIRBORNE RELEASE + *OPERATING LIMITS/TECHNICAL SPECIFICATIONS + *STACK + REACTOR, RESEARCH

18-10475 COATES RL + HORTON NR
RSAC--A RADIOLOGICAL SAFETY ANALYSIS COMPUTER PROGRAM
PHILLIPS PETROLEUM COMPANY, IDAHO
ID0-17151 +. 208 PAGES, 3 TABLES, 7 REFERENCES, MAY 1966, CFSTI, \$6.00 CY, \$1.25 MN

AN IBM 7040 PROGRAM WHICH COMPUTES THE POTENTIAL RADIOLOGICAL DOSES RESULTING FROM A CONTINUOUS OR INSTANTANEOUS RELEASE OF FISSION PRODUCTS TO THE ATMOSPHERE. DEVELOPED AS PART OF LOUFT AND GENERAL NUCLEAR SAFETY PROGRAMS TO PROVIDE A GENERALIZED COMPUTER PROGRAM FOR A COMPLETE PARAMETRIC INVESTIGATION OF RADIOLOGICAL HAZARDS. DOSES CONSIDERED ARE CLOUD GAMMA, DEPOSITION GAMMA, INGESTION, AND INHALATION, AND ARE BASED UPON THE RELEASE OF UP TO 200 ISOTOPES, THE RELATIVE ABUNDANCE OF EACH ISOTOPE BEING DEPENDENT UPON THE OPERATING HISTORY OF THE NUCLEAR REACTOR UNDER CONSIDERATION. INCLUDED ARE THE MATHEMATICAL MODELS, CONVERSION FACTORS, ASSUMPTIONS, FLOW CHARTS, PROGRAM LISTINGS, AND OTHER DATA PERTINENT TO THE OVERALL DEVELOPMENT OF THIS PROGRAM.

*COMPUTER PROGRAM + *DOSE CALCULATION, EXTERNAL + *DOSE CALCULATION, INTERNAL + *FISSION PRODUCT RELEASE, GENERAL + SUTTON DIFFUSION FORMULA

18-10600 APPLICATION FOR LICENSES FPCE PLANT
ISOICHEM INC.
750 PAGES APPROX., 83 FIGURES, 71 TABLES, REFERENCES, JUNE 1966, DOCKET NO. 50-258, PDR

REPORT GIVES ALL THE GENERAL AND DETAILED TECHNICAL INFORMATION REQUIRED FOR AEC LICENSING OF A RADIOCHEMICAL PLANT. INCLUDED ARE SECTIONS ON - SITE DESCRIPTION, PLANT DESCRIPTION, PROCESS DESCRIPTION, EQUIPMENT DESCRIPTION, SYSTEMS ANALYSIS, PUBLIC PROTECTION, PERSONNEL PROTECTION, SAFETY, PLANT ORGANIZATION, AND STARTUP PLANS.

*APPLICATION FOR AEC LICENSE + *CERIUM + *CESIUM + *FPCE PLANT + *PROMETHIUM + *RADIOCHEMICAL PROCESSING + *SAFEGUARDS REPORT, GENERAL + *STRONTIUM + FISSION PRODUCT, SEPARATION FROM WASTE + FISSION PRODUCT, USE OF IN WASTES + HAZARDS ANALYSIS + ISOICHEM, INC. + RADIOCHEMICAL PLANT SAFETY

18-10748 GREEN L + LEVINE MM

ACCESSION NUMBER 18-10329 TO 18-10748

CATEGORY 18
SAFETY ANALYSIS AND DESIGN REPORTS

18-10748 *CONTINUED*

THE RANDOMLY PACKED SETTLED BED FAST REACTOR CONCEPT - 1000-MW(E) REACTOR DESIGN
BROOKHAVEN NATIONAL LABORATORY, UPTON, NEW YORK
BNL-887 +. 56 PAGES, 36 FIGURES, 20 TABLES, 32 REFERENCES, JUNE 1, 1965, CFSTI, \$3.00 CY, \$0.50 MN

CONCEPTUAL DESIGN FOR SODIUM-COOLED U-PU CARBIDE SPHERES. MAJOR LIMITATION IS INTEGRITY OF UNCLAD 0.12-IN. FUEL PARTICLES. BREEDING RATIO IS 1.7 TO 1.8. REPORT CONSISTS OF BED PHYSICS AND ENGINEERING (13 PAGES), THERMAL-HYDRAULIC DESIGN (7 PAGES), PLANT DESIGN (12 PAGES) AND ECONOMICS (14 PAGES).

*DESIGN STUDY + *FLUIDIZED BED + *REACTOR DESCRIPTION + REACTOR, FAST + REACTOR, LIQUID METAL COOLED

18-10837 BOYD RS

PROPOSED CHANGE NO. 2 TO LICENSE R-98, AEROJET-GENERAL NUCLEONICS INDUSTRIAL REACTOR (AGNIR)
DIVISION OF REACTOR LICENSING, USAEC
3 PAGES, AUGUST 1, 1966, DOCKET 50-228, PDR

AGNIR MAY BE LOADED WITH FUEL ELEMENTS WITH A 15-IN. ACTIVE LENGTH (INSTEAD OF 14) BECAUSE ALL TRIGA ELEMENTS MANUFACTURED IN THE NEAR FUTURE WILL BE THIS TYPE. PERMISSION GRANTED, AS INVENTORY UNCHARGED, AND REACTIVITY-STEP ANALYSIS PERFORMED WITH 3.0 PERCENT NOT INVALIDATED.

*FUEL ELEMENT + *MODIFICATION, SYSTEM OR EQUIPMENT + *OPERATING LIMITS/TECHNICAL SPECIFICATIONS + REACTOR, RESEARCH + TRIGA (TRAINING REACTOR, ISOTOPE, G.A.)

18-10857 BOYD RS

PROPOSED CHANGE 1 TO LICENSE R-31. THE CATHOLIC UNIVERSITY OF AMERICA - AGN-201
DIVISION OF REACTOR LICENSING, USAEC
3 PAGES, AUGUST 1, 1966, DOCKET 50-77, PDR

CATHOLIC UNIVERSITY AUTHORIZED TO OPEN CORE TANK OF AGN-201 (MODEL 101) TO EXAMINE FUEL DISKS AND MEASURE WEIGHT AND DIMENSIONS. PRECAUTIONS LISTED.

*EXAMINATION + *FUEL ELEMENT + *OPERATING LIMITS/TECHNICAL SPECIFICATIONS + AGN (TRAINING REACTOR, AEROJET-GEN. NUCLEONICS) + REACTOR, TRAINING

18-10859 BABB HT

CHANGE REQUEST NO. 10 FOR LICENSE NO. DPR-8
CAROLINAS VIRGINIA NUCLEAR POWER ASSOCIATES, INC.
5 PAGES, JULY 22, 1966, DOCKET 50-144, PDR

REQUESTS THAT LATEST DATE OF THE 1966 INTEGRAL CONTAINMENT-LEAK-RATE TEST BE JANUARY 1, 1967, RATHER THAN AUGUST 31, 1966, SO A SPECIAL SHUTDOWN WOULD NOT BE REQUIRED. NO INDICATION OF EXCESSIVE LEAKAGE EXISTS (ON CONTINUOUS MONITORING OF SYSTEM).

*OPERATING LIMITS/TECHNICAL SPECIFICATIONS + CONTAINMENT LEAKAGE + CVTR (CAROLINAS VIRGINIA TUBE REACTOR) + REACTOR, HEAVY WATER + REACTOR, PRESSURE TUBE + REACTOR, PRESSURIZED WATER + TEST, LEAK RATE

18-10861 NEIDIG RE

SAXTON TECHNICAL SPECIFICATION CHANGE REQUEST NO. 24
SAXTON NUCLEAR EXPERIMENTAL CORPORATION
7 PAGES, 2 TABLES, JULY 28, 1966, DOCKET 50-146, PDR

TWO ELEMENTS WILL BE REINSERTED INTO PERIPHERAL CORE POSITIONS, CONTAINING SOME TEST FUEL RODS (EITHER STAINLESS STEEL OR ZIRCALOY-4 CLAD) AND INTERNALLY PRESSURIZED TO STRESS CLAD A MAXIMUM OF 41,500 PSI. OTHER TEST RODS CONTAIN COMPONENTS OF AN ADVANCED FUEL-ROD-GRID DESIGN. THE END CLOSURES OF FIVE STANDARD RODS ARE SUBSTANDARD FOR TEST PURPOSES.

*FUEL ELEMENT + *IRRADIATION TESTING + *PRESSURE, INTERNAL + REACTOR, PRESSURIZED WATER + SAXTON

18-10862 CASE EG

AMENDMENT 3 TO LICENSE DPR-9, POWER REACTOR DEVELOPMENT COMPANY
DIVISION OF REACTOR LICENSING, USAEC
8 PAGES, JULY 27, 1966, DOCKET 50-16, PDR

AMENDMENT 3 ALLOWS AN INCREASE OF SB-124 (NEUTRON SOURCE) ACTIVITY TO 15 KILOCURIES FROM 3.6, AND LIMITS NUMBER OF SOURCES TO FOUR. SOURCE MAY BE CONTAINED IN TANTALUM OR STAINLESS STEEL.

*OPERATING LIMITS/TECHNICAL SPECIFICATIONS + FERMIL + REACTOR, BREEDER + REACTOR, FAST + REACTOR, LIQUID METAL COOLED + SOURCE, NEUTRON

18-10868 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS REPORT. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2

CONSOLIDATED EDISON COMPANY OF NEW YORK
284 PAGES, FIGURES, TABLES, MARCH 31, 1966, DOCKET NO. 50-247, PDR

CONTAINS ANSWERS TO REQUESTS FOR SPECIFIC INFORMATION PLUS GENERAL DESIGN CRITERIA FULFILLMENT, PLUS CONSIDERATION GIVEN ACRS VIEWS CONCERNING REACTOR PRESSURE VESSELS.

CATEGORY 18
SAFETY ANALYSIS AND DESIGN REPORTS

18-10868 *CONTINUED*

*SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + REACTOR, PRESSURIZED WATER

18-10869 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS REPORT. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2

CONSOLIDATED EDISON COMPANY OF NEW YORK

35 PAGES, 1 FIGURE, 2 TABLES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2, MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 1 -- APPLICANT EXPLAINS SIGNIFICANT DIFFERENCES BETWEEN INDIAN POINT II AND BROOKWOOD, CONN. YANKEE PLANTS. SHORT DISCUSSION OF THERMAL-HYDRAULIC DESIGN USING W-3 CORRELATION, FUEL-CLADDING STRESS AND HYDRIDE, XENON, AND MODERATOR-COEFFICIENT INSTABILITY, AND USE OF SECTION III OF BOILER CODE INSTEAD OF SECTION VIII.

18-10870 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS REPORT. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2

CONSOLIDATED EDISON COMPANY OF NEW YORK

1 PAGE OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2, MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2 -- CONTAINS ANALYSIS TO SHOW THAT THE PLANT MEETS 27 GENERAL DESIGN CRITERIA FOR NUCLEAR POWER PLANT CONSTRUCTION PERMITS, NOVEMBER 22, 1965.

*DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II

18-10871 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS REPORT. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2

CONSOLIDATED EDISON COMPANY OF NEW YORK

3 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2, MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 1 -- REACTOR VESSEL DESIGNED FOR FOUR TIMES PROBABLE NUMBER OF THERMAL CYCLES. CONTAINMENT WILL NOT YIELD UNDER NORMAL LOAD PLUS DESIGN PRESSURE (47 PSIG) LOAD PLUS 0.1 G HORIZONTAL AND 0.05 G VERTICAL SEISMIC ACCELERATION.

*DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + *SEISMOLOGY + CONTAINMENT, PRESSURE VESSEL + INDIAN POINT II + REACTOR, PRESSURIZED WATER

18-10872 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS REPORT INDIAN POINT NUCLEAR GENERATING UNIT NO. 2

CONSOLIDATED EDISON COMPANY OF NEW YORK

2 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS REPORT. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2, MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 2 -- ZIRCONIUM-WATER REACTION IS QUENCHED AND CORE REFLOODED IN 430 SEC WITH ONLY 5 PERCENT REACTION FOLLOWING A DOUBLE-ENDED PIPE RUPTURE WITH ONLY 2 OF 3 DIESELS, ONLY 1 OF 3 SAFETY INJECTION PUMPS, AND 1 OF 2 RESIDUAL HEAT REMOVAL PUMPS WORKING. RESULT -- CONTAINMENT DESIGN PRESSURE NOT EXCEEDED.

*DESIGN CRITERIA + *METAL WATER REACTION + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + REACTOR, PRESSURIZED WATER + SAFETY INJECTION

18-10873 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2

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QUESTION 2, CRITERION 3 -- GIVES DETAILED CRITERIA TO WHICH PLANT WILL BE DESIGNED, EXAMPLES OF MISSILES.

*DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + CONTAINMENT, MISSILE GENERATION AND PROTECTION

18-10874 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2

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QUESTION 2, CRITERION 4 -- LOSS OF LOAD AND LOSS OF FLOW ARE PROTECTED AGAINST BY ROD INSERTION, STEAM DUMP, AND BY ROTATIONAL INERTIA OF CONTROLLED LEAKAGE PUMPS.

*DESIGN CRITERIA + *LOSS OF FLCW + *LOSS OF LOAD + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + REACTOR, PRESSURIZED WATER

18-10875 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2.

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18-10875 *CONTINUED*

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5 PAGES, 1 FIGURE, 1 TABLE OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2, MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 5 -- SPATIAL-POWER-DISTRIBUTION INSTABILITIES (DUE TO XENON OSCILLATION OR MODERATOR TEMPERATURE VARIATIONS) WILL BE EXAMINED IN DETAIL. PRELIMINARY STUDIES INDICATE THAT THESE CAN BE CONTROLLED IF NECESSARY. MOST OF THE EXPERIMENTAL DATA IS ON STAINLESS-STEEL CORES, SO DAMPING DUE TO POWER COEFFICIENT CANNOT BE ACCURATELY CHECKED IN ZIRCALOY-CLAD CORE.

*DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + *XENON OSCILLATION + INDIAN POINT II + MODERATOR COEFFICIENT + POWER DISTRIBUTION + REACTOR, PRESSURIZED WATER

18-10876 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2. CONSOLIDATED EDISON COMPANY OF NEW YORK

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QUESTION 2, CRITERION 6 -- EQUILIBRIUM CORE (3.92 PERCENT ENRICHMENT) WILL YIELD (AV- 27,000) (MAX- 45000) MWD/METRIC TON OF U BURNUP. CLADDING, 0.0243 ZIRCALOY. CLADDING INTEGRITY ENSURED BY KEEPING INTERNAL GAS PRESSURE LESS THAN REACTOR PRESSURE, DNB RATIO GREATER THAN 1.3, NO FUEL CENTERLINE MELTING, AND CLADDING STRESS BELOW YIELD POINT.

*DESIGN CRITERIA + *FAILURE, CLADDING + *FUEL BURNUP + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + REACTOR, PRESSURIZED WATER + STRESS

18-10877 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2. CONSOLIDATED EDISON COMPANY OF NEW YORK

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QUESTION 2, CRITERION 7 -- OF THE 53 MAGNETIC-LATCH-DRIVEN RODS, HALF ARE FULL OUT FOR POWER OPERATION, AND REST LIMITED IN SPEED BY DRIVE MOTOR. BORON SHIM CONTROL THUS LIMITS REACTIVITY AVAILABLE FOR RAPID INSERTION. CONTROL-ROD EJECTION IS CONSIDERED INCREDIBLE.

*ACCIDENT, CONTROL ROD WITHDRAWAL + *DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + REACTOR, PRESSURIZED WATER

18-10878 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2. CONSOLIDATED EDISON COMPANY OF NEW YORK

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QUESTION 2, CRITERION 8 -- MAXIMUM AVAILABLE EXCESS REACTIVITY IS 0.305, COLD CLEAN. SHUTDOWN GROUP OF RODS MAKE REACTOR K-EFFECTIVE EQUAL TO 0.99 IN HOT ZERO-POWER FROM HOT POWER CONDITION. WITH MOST WORTHWHILE ROD STUCK OUT, CHEMICAL SHIM KEEPS REACTOR SHUT DOWN.

*DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + *SHUTDOWN MARGIN + INDIAN POINT II + REACTOR, PRESSURIZED WATER

18-10879 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2. CONSOLIDATED EDISON COMPANY OF NEW YORK

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QUESTION 2, CRITERION 9 -- BACKUP REACTIVITY IS INDEPENDENT OF CONTROL PROVISIONS, AS POWER TO ROD MECHANISMS SHUT OFF ON SCRAM, REGARDLESS OF CONTROL SIGNALS. BORIC ACID INJECTION WITH ONE PUMP WILL SHUT REACTOR DOWN IN 15 MIN WITH NO ROD INSERTION, AND IN ANOTON MAY THEN BE INJECTED FOR COLD SHUTDOWN.

*DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + *SHUTDOWN SYSTEM, SECONDARY + CHEMICAL SHIM + INDIAN POINT II + REACTOR, PRESSURIZED WATER

18-10880 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2. CONSOLIDATED EDISON COMPANY OF NEW YORK

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QUESTION 2, CRITERION 10 -- ADEQUATE CONDENSATE IS STORED TO RELEASE DECAY HEAT FOR 24 HR BY SECONDARY STEAM DUMP. RESIDUAL HEAT EXCHANGERS AND CONTAINMENT AIR COOLERS ALSO SUPPLIED.

*DECAY HEAT + *DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + REACTOR, PRESSURIZED WATER

18-10881 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2. CONSOLIDATED EDISON COMPANY OF NEW YORK

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18-10881 *CONTINUED*
MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 11 -- REACTOR VESSEL DESIGN TRANSITION TEMPERATURE SHIFT OF 275 F WAS SELECTED, BASED ON INTEGRATED FAST NEUTRON FLUX OF 3.7×10^{19} (19TH). CONTAINMENT LINE WILL BE MINIMUM OF 50 F, WELL ABOVE HDT PLUS 30.

*BRITTLE FRACTURE + *DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + CONTAINMENT, PRESSURE VESSEL + INDIAN POINT II + REACTOR, PRESSURIZED WATER

18-10882 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2 CONSOLIDATED EDISON COMPANY OF NEW YORK
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QUESTION 2, CRITERION 12 -- ROD-CLUSTER CONTROL ASSEMBLIES ARE FULLY GUIDED AND FLEXIBLE. TESTS SHOW NO FUNCTIONAL IMPAIRMENT WITH MISALIGNMENTS IN EXCESS OF MAXIMUM POSSIBLE.

*CONTROL ROD + *DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + REACTOR, PRESSURIZED WATER

18-10883 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2. CONSOLIDATED EDISON COMPANY OF NEW YORK
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QUESTION 2, CRITERION 13 -- CONTROL-ROOM SHIELDING IS PROVIDED SO THAT A REFERENCE ACCIDENT WOULD RESULT IN LESS THAN 1.5 REMS WHOLE BODY AND 3 REMS THYROID, EVEN IF WORKERS REMAIN THERE INDEFINITELY.

*DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + *SHIELDING + BUILDING + INDIAN POINT II + REACTOR, PRESSURIZED WATER

18-10884 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2. CONSOLIDATED EDISON COMPANY OF NEW YORK
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QUESTION 2, CRITERION 14 -- PERIODIC BORON CONCENTRATION SAMPLES ARE TAKEN AT POWER AND DURING SHUTDOWN. DURING REFUELING, BF₃ MONITORING GIVES AN AUDIBLE INDICATION OF DECREASING SHUTDOWN MARGIN. THE MAXIMUM DILUTION RATE (580 PPM/HR) GIVES AMPLE TIME FOR CORRECTIVE ACTION.

*CHEMICAL SHIM + *DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + INSTRUMENTATION, NUCLEAR + REACTOR, PRESSURIZED WATER

18-10885 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2 CONSOLIDATED EDISON COMPANY OF NEW YORK
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QUESTION 2, CRITERION 15 -- COINCIDENCE ALLOWS ON-LINE TESTING, USING SIMULATED SIGNALS, OF SCRAM CHANNELS UP TO THE THREE RELAYS PROVIDING TWO-OF-THREE MATRICES FOR TRIPPING THE TWO SCRAM BREAKERS. ALSO, ENGINEERED SAFEGUARDS. CORE IS COUPLED SO THAT ALL OUT-OF-CORE INSTRUMENTS WILL SEE A ROD EJECTION ACCIDENT.

*COUPLED CORES + *DESIGN CRITERIA + *INSTRUMENTATION, COINCIDENT + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + *TEST, SYSTEM OPERABILITY + EMERGENCY SYSTEM + PLANT PROTECTIVE SYSTEM

18-10886 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2. CONSOLIDATED EDISON COMPANY OF NEW YORK
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QUESTION 2, CRITERION 16 -- LOSS OF ELECTRIC POWER CAUSES ROD INSERTION, EITHER DIRECTLY OR THROUGH THE INSTRUMENTS. COMPONENTS ARE DESIGNED SO THAT ACCIDENT WILL NOT INTERFERE WITH FUNCTIONING.

*DESIGN CRITERIA + *LOSS OF POWER + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + INSTRUMENTATION, GENERAL + REACTOR, PRESSURIZED WATER + SAFE FAILURE CRITERION

18-10887 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2. CONSOLIDATED EDISON COMPANY OF NEW YORK
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QUESTION 2, CRITERION 17 -- IN ANALYSIS WHEREIN NO SAFETY WATER INJECTION ALLOWED BUT ONLY ONE

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18-10887 *CONTINUED*

EACH CONTAINMENT SPRAY PUMPS OR AIR COOLERS FAILED, PRESSURE PEAK WAS 43.4 PSIG (HYDROGEN BURNS AFTER 44 PERCENT ZIRCONIUM REACTION). IN OTHER DOUBLE-ENDED PIPE RUPTURES, PRESSURE PEAK WAS 40 PSIG.

*CONTAINMENT DESIGN + *DESIGN CRITERIA + *PRESSURE, INTERNAL + *REGULATION, AEC + INDIAN POINT II + LOSS OF COOLANT + METAL WATER REACTION + REACTOR, PRESSURIZED WATER + SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS

18-10888 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2. CONSOLIDATED EDISON COMPANY OF NEW YORK
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QUESTION 2, CRITERION 18 -- EITHER FOUR OF THE FIVE CONTAINMENT AIR COOLERS OR ONE OF THE TWO SPRAY PUMPS IS ADEQUATE FOR HEAT REMOVAL FROM CONTAINMENT FOLLOWING A PIPING RUPTURE. ANY TWO OF THE THREE DIESELS WILL SUPPLY THESE LOADS. AUTOMATIC BUS SWITCHING ARRANGEMENTS ALLOW DIESEL B OR C TO SUPPLY CURRENT TO PUMP A IF DIESEL A FAILS.

*CONTAINMENT AIR COOLING + *CONTAINMENT SPRAY + *DESIGN CRITERIA + *LOSS OF COOLANT + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + EMERGENCY POWER, ELECTRIC + INDIAN POINT II + PRESSURE, INTERNAL + REACTOR, PRESSURIZED WATER

18-10889 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2. CONSOLIDATED EDISON COMPANY OF NEW YORK
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QUESTION 2, CRITERION 19 -- WITH THE DESIGN LEAK RATE AT 47 PSIG (0.1 PERCENT PER DAY) AND FOUR FAN-FILTER UNITS OPERATING THE HYPOTHETICAL LOSS OF COOLANT (WITH NO SAFETY INJECTION) OFFSITE DOSE WILL BE HALF THE 10-CFR-100 LIMITS. REFERENCE-VOLUME LEAK-RATE TEST IS USED PLUS AIR MEASURED ON RETURN TO PRESSURE AFTER THE TEST. THICK-WALLED CONCRETE VESSEL WILL MINIMIZE ATMOSPHERIC EFFECTS. TEST MUST BE MADE WITH PLANT SHUT DOWN.

*CONTAINMENT LEAKAGE + *DESIGN CRITERIA + *DOSE + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + LOSS OF COOLANT + REACTOR, PRESSURIZED WATER + TEST, LEAK RATE

18-10890 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2. CONSOLIDATED EDISON COMPANY OF NEW YORK
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QUESTION 2, CRITERION 20 -- CONTAINMENT PENETRATIONS ARE PRESSURIZED SLIGHTLY ABOVE CONTAINMENT PRESSURE BY AIR BACKED WITH NITROGEN. EXCESSIVE LEAKAGE IS MONITORED BY INTEGRATED AIR FLOW. EACH PENETRATION CAN BE TESTED SEPARATELY AT ANY TIME.

*CONTAINMENT PENETRATION + *DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + CONTAINMENT LEAKAGE CONTROL + INDIAN POINT II + REACTOR, PRESSURIZED WATER + TEST, LEAK RATE

18-10891 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2. CONSOLIDATED EDISON COMPANY OF NEW YORK
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QUESTION 2, CRITERION 21 -- TWO OF THE THREE DIESELS PROVIDE ADEQUATE POWER FOR ENGINEERED SAFEGUARDS. VITAL INSTRUMENTS AND CONTROLS ARE SUPPLIED FROM 125-V DC BATTERIES.

*DESIGN CRITERIA + *EMERGENCY POWER, ELECTRIC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + ELECTRIC POWER, VITAL + INDIAN POINT II + REACTOR, PRESSURIZED WATER + REGULATION, AEC

18-10892 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2. CONSOLIDATED EDISON COMPANY OF NEW YORK
5 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2, MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 22 -- SIX CLASSES OF CONTAINMENT-ISOLATION VALVE SCHEME ARE SET UP, WITH VARIOUS COMBINATIONS OF AUTOMATIC AND OR REMOTE MANUAL VALVE CLOSURE, AND AUTOMATIC OR MANUAL SEAL-WATER INJECTION INTO THE CLOSED LINE.

*CONTAINMENT PENETRATION, CLOSURE OF + *DESIGN CRITERIA + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + REACTOR, PRESSURIZED WATER

18-10893 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2. CONSOLIDATED EDISON COMPANY OF NEW YORK
4 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2, MARCH 31, 1966, DOCKET NO. 50-247, PDR

CATEGORY 18
SAFETY ANALYSIS AND DESIGN REPORTS

18-10893 *CONTINUED*

QUESTION 2, CRITERION 23 -- LISTS VARIOUS TESTS OF ENGINEERED SAFEGUARDS THAT CAN BE PERFORMED IN THE PLANT DURING ITS LIFE. FOR EXAMPLE, SAFETY INJECTION CAN INJECT WATER INTO REACTOR DURING HEATUP OR COOLDOWN BY ENERGIZING SYSTEM AND OBSERVING PRESSURIZER WATER LEVEL. PUMPS CAN BE TESTED BY USING MINIMUM FLOW RECIRCULATION LINE DURING OPERATION, AND CONTAINMENT AIR COOLING AND FILTRATION UNITS BY ACTUATING VALVES AND BY AEROSOL INJECTION.

*ENGINEERED SAFEGUARD + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS +
*TEST, SYSTEM OPERABILITY + DESIGN CRITERIA + INDIAN POINT II + REACTOR, PRESSURIZED WATER

18-10894 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2
CONSOLIDATED EDISON COMPANY OF NEW YORK
1 PAGE OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 24 -- SPENT FUEL IS STORED IN A STAINLESS-STEEL-LINED CONCRETE PIT WITH NO GRAVITY DRAINS. SPILLED LIQUID WASTE MOVES THROUGH FLOOR DRAINS TO A HOLDUP TANK. CONTROLLED VENTILATION SWEEPS AIR FROM VARIOUS ROOMS TO THE PLANT VENTILATION SYSTEM.

*CONTAINMENT, GENERAL + *DESIGN CRITERIA + *REGULATION, AEC +
*SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + FUEL STORAGE + INDIAN POINT II +
REACTOR, PRESSURIZED WATER + WASTE HANDLING

18-10895 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2
CONSOLIDATED EDISON COMPANY OF NEW YORK
2 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 25 - FUEL STORAGE AND HANDLING -- REFUELING WATER IS BORATED. SPENT ASSEMBLIES ARE STORED UNDERWATER WITH 12-IN. EDGE-TO-EDGE SPACING, SO THE RACK MULTIPLICATION IS LESS THAN 0.9. WATER-FILLED CANALS, ETC., ARE LINED WITH STAINLESS STEEL.

*DESIGN CRITERIA + *FUEL HANDLING + *FUEL STORAGE + *REGULATION, AEC +
*SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + REACTOR, PRESSURIZED WATER

18-10896 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2.
CONSOLIDATED EDISON COMPANY OF NEW YORK
1 PAGE OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 26 - HOLDUP CAPACITY FOR RADIOACTIVE EFFLUENTS -- VARIOUS STORAGE AND CLEANUP FACILITIES PROVIDED.

*DESIGN CRITERIA + *REGULATION, AEC + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + *WASTE STORAGE +
INDIAN POINT II + REACTOR, PRESSURIZED WATER

18-10897 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2
CONSOLIDATED EDISON COMPANY OF NEW YORK
1 PAGE OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 2, CRITERION 27 - MONITORING OF ACCIDENT-RELEASED RADIOACTIVITY -- VARIOUS SYSTEMS PROVIDED TO INHIBIT CONTAINMENT-PENETRATION LEAKAGE AND TO MONITOR LOCATIONS AND SYSTEMS.

*DESIGN CRITERIA + *MONITOR, RADIATION, EMERGENCY + *REGULATION, AEC +
*SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + REACTOR, PRESSURIZED WATER

18-10927 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2
CONSOLIDATED EDISON COMPANY OF NEW YORK
3 PAGES OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 19I - DESIGN CRITERIA AND JUSTIFICATION, HOW FULFILLED, AND TEST METHODS -- WHILE FAILURE OF CORE SUPPORT IS CONSIDERED INCREDIBLE, CORE DOWNWARD DROP WOULD BE LIMITED TO LESS THAN 2 IN. (LESS THAN 0.3 PERCENT REACTIVITY) BY THE IN-CORE INSTRUMENTATION STRUCTURE AND ENERGY ABSORBERS. THE ENERGY ABSORBERS WOULD REST ON THE INSIDE OF THE BOTTOM HEAD OF THE VESSEL AND WOULD SUPPORT THE CORE THROUGH THE IN-CORE INSTRUMENTATION STRUCTURES.

*CORE COMPONENTS, MISCELLANEOUS + *DESIGN CRITERIA + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS +
*SUPPORT STRUCTURE + FAILURE, COMPONENT + INDIAN POINT II + INSTRUMENTATION, IN CORE +
REACTOR, PRESSURIZED WATER

18-10928 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2
CONSOLIDATED EDISON COMPANY OF NEW YORK
1 PAGE OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2,
MARCH 31, 1966, DOCKET NO. 50-247, PDR

QUESTION 19J - DESIGN CRITERIA AND JUSTIFICATION, HOW FULFILLED, AND TEST METHOD -- FOR THE

CATEGORY 18
SAFETY ANALYSIS AND DESIGN REPORTS

18-10928 *CONTINUED*

OPERATIONAL RELIABILITY OF REACTOR SAFETY, CONTAINMENT ISOLATION, AND ENGINEERED SAFEGUARDS SYSTEM, THE DESIGN INCLUDES FAIL-SAFE AND/OR REDUNDANCE, ETC. ANSWERS ARE DISCUSSED IN QUESTION 2 (CRITERIA 15, 22, 23), QUESTIONS 6 THROUGH 10.

*DESIGN CRITERIA + *ENGINEERED SAFEGUARD + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + INDIAN POINT II + REACTOR, PRESSURIZED WATER + REDUNDANCE + SAFE FAILURE CRITERION

18-10929 FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2 CONSOLIDATED EDISON COMPANY OF NEW YORK
25 PAGES, 1 TABLE OF FIRST SUPPLEMENT TO PRELIMINARY SAFETY ANALYSIS. INDIAN POINT NUCLEAR GENERATING UNIT NO. 2, MARCH 31, 1966, DOCKET NO. 50-247, PDR

ELEVEN QUESTIONS ON CONTAINMENT DESIGN ARE ANSWERED, RELATED TO LOAD CARRIED BY THE LINER, SPlicing OF RE-BARS, PENETRATION REINFORCEMENT, EARTHQUAKE DESIGN, DAMPING FACTORS, ADDITIVE STRESSES, AND WIND LOADING.

*CONTAINMENT STRUCTURE + *SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS + *SEISMOLOGY + INDIAN POINT II + REACTOR, PRESSURIZED WATER + STRESS ANALYSIS

18-10993 NEW SYSTEM OF TECHNICAL SPECIFICATIONS PROPOSED FOR NUCLEAR REACTORS
U. S. ATOMIC ENERGY COMMISSION
PRESS RELEASE J-193 +. 3 PAGES, AUGUST 15, 1966, DPI

AEC HAS A PROPOSED REVISION IN THE FEDERAL REGISTER REGARDING TECHNICAL SPECIFICATIONS, WHEREIN DETAILED COMPONENT DESIGN INFORMATION WOULD BE ELIMINATED WHERE IT HAS LITTLE BEARING ON SAFETY. INSTEAD, THE SPECIFICATIONS WILL FOCUS ON ACCIDENT-PREVENTING AND CONSEQUENCE-LIMITING FEATURES OF THE DESIGN, AND APPLICANT WILL PROPOSE SPECIFICATIONS FOR THESE FEATURES. A PRELIMINARY SAFEGUARDS REPORT WILL BE REQUIRED AT THE CONSTRUCTION-PERMIT STAGE. A GUIDE FOR THE ORGANIZATION AND CONTENTS OF SAFETY ANALYSIS REPORT IS NOW AVAILABLE FROM THE DIRECTOR OF REGULATIONS.

*OPERATING LIMITS/TECHNICAL SPECIFICATIONS + *REGULATION, AEC + *SAFEGUARDS REPORT, GENERAL

18-10995 MOLTEN-SALT REACTOR PROGRAM. SEMIANNUAL PROGRESS REPORT FOR PERIOD ENDING FEBRUARY 28, 1966
OAK RIDGE NATIONAL LABORATORY
ORNL-3736 +. 216 PAGES, FIGURES, REFERENCES, JUNE, 1966, CFSTI, \$6.00 CY, \$1.25 MN

REPORTS IN THIS SERIES WILL BE INDEXED AS PERTINENT ITEMS APPEAR. SECTIONS TREAT MSRE OPERATIONS AND COMPONENT DEVELOPMENT, GENERAL MATERIALS AND FUEL-SALT WORK, AND LARGE REACTOR DESIGN.

*OPERATING EXPERIENCE + COOLANT CHEMISTRY + MATERIAL + MSRE (MOLTEN SALT REACTOR EXPERIMENT) + REACTOR, MOLTEN SALT

18-11000 KELLER DL
PROGRESS RELATING TO CIVILIAN APPLICATIONS DURING APRIL, 1966
BATTELLE MEMORIAL INSTITUTE
BMI-1771 +. 33 PAGES, 5 TABLES, SEPTEMBER 1, 1966, CFSTI \$2.00 CY, \$0.50 MN

REPORTS IN THIS SERIES WILL BE ABSTRACTED AS PERTINENT INFORMATION IS RECORDED. PROGRAMS ARE REACTOR MATERIALS AND COMPONENTS (IRRADIATION EFFECTS ON 347 STAINLESS STEEL, GRAPHITE DENSIFICATION, CHROMIUM-RHENIUM ALLOY, EXPLOSIVE WELDING OF ZIRCALOY-ALUMINUM TUBING), PLUS STUDIES OF FUELS (DEVELOPMENT OF AARR FUEL PLATES AND BeO-THO₂-PUO₂ FUELS, EFFECT OF HIGH BURNUP ON UO₂ CEO₂ AND UO₂-ZRO₂ FUELS), PLUS URANIUM-PLUTONIUM MONONITRIDE FUELS, COATED PARTICLE FUELS, AND CORROSION STUDIES OF THE FLUORIDE VOLATILITY PROCESS.

*RESEARCH CONTRACT + FUEL BURNUP + FUEL ELEMENT + NITRIDE + PLUTONIUM + URANIUM + URANIUM DIOXIDE + WELDING

18-11001 KELLER DL
PROGRESS RELATING TO CIVILIAN APPLICATIONS DURING MAY, 1966
BATTELLE MEMORIAL INSTITUTE
BMI-1774 +. 22 PAGES, 5 TABLES, SEPTEMBER 1, 1966, CFSTI \$2.00 CY, \$0.50 MN

REPORTS IN THIS SERIES WILL BE ABSTRACTED AS PERTINENT INFORMATION IS RECORDED. PROGRAMS ARE REACTOR MATERIALS AND COMPONENTS (IRRADIATION EFFECTS ON 347 STAINLESS STEEL, GRAPHITE DENSIFICATION, CHROMIUM-RHENIUM ALLOY, EXPLOSIVE WELDING OF ZIRCALOY-ALUMINUM TUBING), PLUS STUDIES OF FUELS (DEVELOPMENT OF AARR FUEL PLATES AND BeO-THO₂-PUO₂ FUELS, EFFECT OF HIGH BURNUP ON UO₂ CEO₂ AND UO₂-ZRO₂ FUELS), PLUS URANIUM-PLUTONIUM MONONITRIDE FUELS, COATED PARTICLE FUELS, AND CORROSION STUDIES OF THE FLUORIDE VOLATILITY PROCESS.

*RESEARCH CONTRACT + FUEL BURNUP + FUEL ELEMENT + NITRIDE + PLUTONIUM + URANIUM + URANIUM DIOXIDE + WELDING

18-11021 QUARTERLY STATUS REPORT ON ADVANCED REACTOR TECHNOLOGY (ART) FOR PERIOD ENDING APRIL 30, 1966
LOS ALAMOS SCIENTIFIC LABORATORY
LA-3524 +. 69 PAGES, 5 FIGURES, 26 TABLES, MAY, 1966, CFSTI \$3.00 CY, \$0.75 MN

THIS REPORT IS ONE OF A SERIES OF SUCH REPORTS ON THE SUBJECTS ENUMERATED BELOW. PROGRAMS

ACCESSION NUMBER 18-10928 TO 18-11021

CATEGORY 18
SAFETY ANALYSIS AND DESIGN REPORTS

18-11021 *CONTINUED*
REPORTED ON MOLTEN PLUTONIUM SUPPORTING RESEARCH, UHTREX, PLASMA THERMOCOUPLE, AND HEAT PIPES.

*PLUTONIUM + REACTOR, BREECHER + REACTOR, LIQUID METAL COOLED

18-11028 PENNINGTON RT
THREE TANK SEPARATE SUPERHEAT REACTOR
U. S. PAT. 3,212,986 +. 6 PAGES, OCTOBER 19, 1965, PATENT (U. S.)

IMPROVED REFUELING, CONTROL, AND SAFETY ARE CLAIMED BY PLACING THE MODERATOR (WATER) IN A PROCESS TUBE, SURROUNDING IT WITH FUEL RODS, AND THEN LETTING STEAM FLOW THROUGH AND AROUND RODS. THUS, COMPLICATED DUCTING AND STEAM CONNECTIONS ARE NOT NEEDED. CONTROL IS ACHIEVED BY VARYING MODERATOR CONTENT. SHOULD A PROCESS TUBE BREAK, WATER WOULD DRAIN OUT OF THE BOTTOM OF THE STEAM PLENUM RATHER THAN REFLOOD THE CORE.

*CONTROL, GENERAL + *FLOODING, SUPERHEATER + *FUEL HANDLING + MODERATOR + REACTOR, PRESSURE TUBE + REACTOR, SUPERHEAT

18-11029 SILVESTER AG
NUCLEAR REACTOR WITH EMERGENCY COOLANT CROSS FLOW
U. S. PAT. 3,215,606 +. 10 PAGES, NOVEMBER 2, 1965, PATENT (U. S.)

THIS FAST-REACTOR DESIGN IS INTENDED TO MINIMIZE (A) SODIUM JETS HITTING THE VESSEL HEAD IN A REACTIVITY ACCIDENT, (B) EXCESSIVE NEUTRONS HITTING THE VESSEL HEAD DURING COOLANT BOILING, (C) AND TO RENDER THE CORE SAFE IN A PIPE-RUPTURE ACCIDENT. NORMALLY, COOLANT FLOWS THROUGH THE CORE THEN UP PAST A SOLID MODERATOR SECTION (PROTECTION B), AND IS DIVERTED HORIZONTALLY THROUGH HOLES IN CLOSED PROCESS TUBES (PROTECTION A). THE NORMAL COOLANT LINES ARE WELL ABOVE CORE TOP, SO SPECIAL EMERGENCY COOLANT LINES ARE PROVIDED TO MAINTAIN COOLANT LEVEL ABOVE CORE (PROTECTION C), USING HOLES IN PROCESS TUBE ABOVE CORE BUT BELOW NORMAL COOLANT OUTLET.

*EMERGENCY COOLING + *LOSS OF COOLANT + CORE COMPONENTS, MISCELLANEOUS

18-11030 ASTLEY ER + FINCH LM + HENNING RJ
FAST FUEL TEST REACTOR
U. S. PAT. 3,212,982 +. 6 PAGES, OCTOBER 19, 1965, PATENT (U. S.)

TO PROVIDE A MINIMUM VOID CORE VOLUME YET WITH THE ENDS OF THE PROCESS TUBE ADEQUATELY SEPARATED, HEXAGONAL PROCESS TUBES ARE ARRANGED IN A SKEWED-CONICAL RELATIONSHIP (AS IN BELGIAN BR-2), WITH EACH PROCESS TUBE TWISTED WITH RESPECT TO THE VERTICAL. CONVENTIONAL FUEL RODS ARE USED IN THE PROCESS TUBES, BEING COOLED WITH LIQUID SODIUM. SIX REFLECTOR-CONTROL DRUMS ARE USED.

*CORE COMPONENTS, MISCELLANEOUS + REACTOR, FAST + REACTOR, PRESSURE TUBE + REACTOR, TEST

18-11031 GUENTHER RW
NUCLEAR REACTOR CORE CLAMPING SYSTEM
U. S. PAT. 3,215,608 +. 6 PAGES, NOVEMBER 2, 1965, PATENT (U. S.)

SPECIAL CLAMPS TO MINIMIZE SEPARATION BETWEEN CORE AND REFLECTOR ELEMENTS, DESPITE THERMAL EXPANSION OR DIFFERENT DIMENSIONS OF THE MATERIALS.

*CORE COMPONENTS, MISCELLANEOUS + REFLECTOR + SUPPORT STRUCTURE

18-11050 YANKEE REQUESTED TO CLARIFY REACTOR VESSEL MATERIAL YIELD STRENGTHS
U. S. ATOMIC ENERGY COMMISSION
1 PAGE, DOCKET 50-29, JUNE 29, 1966, ATOMIC ENERGY CLEARING HOUSE, 12(28), PAGE 20 (JULY 11, 1966)

YANKEE REQUESTED TO SUPPLY INFORMATION BASED ON THE IN-VESSEL SURVEILLANCE SPECIMENS TO DETERMINE IF RADIATION HAS SIGNIFICANTLY ALTERED PROPERTIES OF MATERIALS.

*CONTAINMENT, PRESSURE VESSEL + *RADIATION DAMAGE + BRITTLE FRACTURE + REACTOR, PRESSURIZED WATER + YANKEE

18-11088 REACTOR DEVELOPMENT PROGRAM PROGRESS REPORT, JULY 1966
ARGONNE NATIONAL LABORATORY
ANL-7245 +. 74 PAGES, 17 FIGURES, 17 TABLES, REFERENCES, AUGUST 26, 1966, CFSTI, \$3.00 CY

ARGONNE NATIONAL LABORATORY PROGRESS REPORT, JULY 1966. THIS REPORT IS ONE OF A SERIES OF SUCH REPORTS ON THE SUBJECTS ENUMERATED BELOW. TOPICS COVERED IN THIS REPORT ARE - IRRADIATION OF FUEL PINS, TREAT MELTDOWN TEST, INTEGRAL SODIUM LOOP, FAST-REACTOR SAFETY CONTAINMENT, EQUATION OF STATE OF REFRACTORIES SUCH AS UO₂, METAL-WATER REACTIONS, AND PLUTONIUM VOLATILITY SAFETY.

CONTAINMENT DESIGN + EQUATION OF STATE + FUEL MELTDOWN + METAL WATER REACTION + PLUTONIUM + REACTOR DYNAMICS + REACTOR, FAST + SODIUM + TREAT (TRANSIENT TEST REACTOR FACILITY) + URANIUM DIOXIDE

CATEGORY 18
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18-11089 NILSON R
HEAVY WATER STEAM IN DIRECT CYCLE MARVIKEN
AB ATOMENERGI, STOCKHOLM
5 PAGES, 4 FIGURES, 1 TABLE, 6 REFERENCES, NUCLEAR ENGINEERING, 11(121), PAGES 456-463 (JUNE 1966)

BRIEF REACTOR DESCRIPTION OF SUPERHEAT REACTOR, 593 MW(TH), 200 MW(E). UNIQUE STEAM FLOW OUT BOTTOM OF VESSEL. MODIFIED PRESSURE-SUPPRESSION SYSTEM USED.

*REACTOR DESCRIPTION + REACTOR, HEAVY WATER + REACTOR, SUPERHEAT + SWEDEN

18-11162 CAMPANA RJ
DESIGN OF THE SNAP-15A GENERATOR
GENERAL ATOMIC
GA-5296 +. 34 PAGES, 9 FIGURES, 12 TABLES, JUNE 1964, CFSTI \$2.00 CY, \$0.50 MN

THIS REPORT SUMMARIZED THE CONSIDERATIONS AND ANALYSIS LEADING TO THE DESIGN OF A PU-238 FUELED, METAL-THERMOCOUPLE GENERATOR PROVIDING ABOUT 1 MW AT GREATER THAN 4.5 V FOR 5 YEARS WITH VERY HIGH RELIABILITY EVEN UNDER EXTREME ENVIRONMENTAL CONDITIONS. BEFORE THE DESIGN WAS COMPLETED, A FEW EXPERIMENTAL GENERATORS WERE BUILT AND TESTED. THEY INFLUENCED THE FINAL DESIGN, ESPECIALLY WITH RESPECT TO THE TRANSIENT RESPONSE OF THE GENERATOR LOAD VOLTAGE TO STEP CHANGES IN THE AMBIENT TEMPERATURE. THE PRESENTATION OF THE WORK IS MADE IN THE CHRONOLOGICAL SEQUENCE IN WHICH THE DESIGN EVOLVED.

*DESIGN STUDY + *PLUTONIUM + *THERMOELECTRIC CONVERSION + SNAP 15 (SYSTEMS FOR NUCLEAR AUXILIARY POWER)

18-11164 NUCLEAR REACTOR INSTALLATION
SULZER FRERES COSIETE ANONYME, SWITZERLAND
FRENCH PATENT 1,382,728 + CRNL-TR-1309 +. FEBRUARY 17, 1964, PATENT (FOREIGN), JCL \$1.10 FS, \$0.80 MF

A LEAK DETECTOR FOR THE STEAM GENERATOR OF A GAS-COOLED REACTOR MAY BE MADE BY PLACING A PH METER IN THE STEAM CIRCUIT BECAUSE CO₂ CAUSES PH CHANGES. OR, A BYPASS-STEAM CONDENSER DRAINS INTO A TANK WITH A LIQUID LEVEL AND A VACUUM PUMP. CARBON DIOXIDE LEAKAGE WOULD CAUSE A CHANGE IN THE TANK PRESSURE NOT ACCOUNTED FOR BY THE TEMPERATURE OF THE CONDENSATE. ALSO, THE PH OF THE CONDENSED STEAM MAY INDICATE THE LEAK IN THE TUBE.

*HEAT EXCHANGER + *INSTRUMENTATION, PROCESS + *LEAK DETECTION + CARBON DIOXIDE + FRANCE + REACTOR, GAS COOLED

18-11224 THTR STATUS REPORT, 1965
EUROPEAN ATOMIC ENERGY COMMUNITY - EURATOM + BROWN BOVERI, KURPP REAKTORBAU GMBH, DUSSELDORF + KERNFORSCHUNGSANLAGE JULICH DES LANDES NORDRHEIN-WESTFALEN
EUR-3000.E +. 122 PAGES, 54 FIGURES, 3 TABLES, DECEMBER 1965, DEP. MN.

THE THTR IS A 300-MW(E) PEBBLE-BED HIGH-TEMPERATURE HELIUM-COOLED REACTOR ON THE THORIUM CYCLE. BRIEF DISCUSSIONS OF VARIOUS MECHANICAL, THERMAL, AND PHYSICS DESIGN ASPECTS AND PROBLEMS. SIX-HUNDRED FUEL BALLS PER HOUR MUST BE TESTED FOR BURNUP. ONE SCHEME IS TO BLOW THE BALLS THROUGH THE GLORY HOLE OF A LOW-POWER WATER BOILER AND HAVE NUCLEAR INSTRUMENTS DIVERT SPENT BALLS.

*REACTOR DESCRIPTION + FUEL BURNUP + GERMANY + REACTOR, GAS COOLED

18-11230 ADVISORY COMMITTEE ON REACTOR SAFEGUARDS REPORTS TO AEC ON PROPOSED MINNESOTA SITE
ATOMIC ENERGY COMMISSION, WASHINGTON, D.C.
PRESS REL. J-137 +. DOCKET NO. 50-263, MAY 27, 1966, DPI

PRELIMINARY REVIEW OF MONTICELLO, MINNESOTA, SITE IS ACCEPTABLE, BASED ON PRELIMINARY INFORMATION. FLOODS, MINIMUM RIVER FLOWS (AND EFFECTS ON CONDENSER COOLING AND WASTE DISCHARGE), TORNADOS, AND DESIGN WERE CONSIDERED.

*ACRS (ADVISORY COMMITTEE ON REACTOR SAFEGUARDS) + MONTICELLO + REACTOR, BOILING WATER + SITING, REACTOR + SITING, WASTE DISPOSAL

18-11231 NSP - MONTICELLO NUCLEAR GENERATING PLANT - FACILITY DESCRIPTION AND SAFETY ANALYSIS REPORT - VOLUME I
NORTHERN STATES POWER COMPANY
333 PAGES, FIGURES, TABLES, AUGUST 1966, DOCKET NO. 50-263, PDR

SINGLE-CYCLE BWR (SIMILAR TO DRESDEN 2), 1469 MW(TH) INITIAL OPERATING POWER, WITH DESIGN FOR 1674. ZIRCALOY-CLAD FUEL, TWO CONTROLLED-RECIRCULATION-FLOW LOOPS FEEDING 20 JET PUMPS, PRESSURE-SUPPRESSION CONTAINMENT, 13 ENGINEERED SAFEGUARDS. ALL NEUTRON MONITORS ARE IN THE CORE. CONTAINMENT INERT ATMOSPHERE WILL PREVENT HYDROGEN-OXYGEN REACTION AFTER LOSS OF COOLANT. DURING CONTAINMENT ISOLATION, STEAM IS RELIEVED TO THE SUPPRESSION POOL (RCIC). VARIOUS ACCIDENTS CONSIDERED. ALL LEAKAGE IS ASSUMED TO BE COLLECTED BY BUILDING-EXHAUST SYSTEM, FILTERED BY A STANDBY SYSTEM, AND DISCHARGED UP THE STACK. THUS, OFF-SITE DOSES ARE WELL BELOW 10 CFR 100 SPECIFICATIONS.

*SAFEGUARDS REPORT, GENERAL + CONTAINMENT ATMOSPHERE, INERT + ENGINEERED SAFEGUARD + REACTOR, BOILING WATER

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18-11232 NSP - MONTICELLO NUCLEAR GENERATING PLANT - FACILITY DESCRIPTION AND SAFETY ANALYSIS REPORT -
VOLUME II
NORTHERN STATES POWER COMPANY
203 PAGES, FIGURES, TABLES, AUGUST 1966, DOCKET NO 50-263, PDR

CONTAINS FIGURES FOR VOL I AND ITS SIX APPENDIXES, INCLUDING A RELIABILITY ANALYSIS OF THE
REACTOR PROTECTIVE SYSTEM, CONTROL-ROD-DRIVE SYSTEM DISCUSSION, JET-PUMP DESIGN AND
DEVELOPMENT, CORE-SPRAY TEST PROGRAM INCLUDING MEASUREMENTS OF ELECTRICALLY HEATED RODS BEING
SPRAYED, AND CAPABILITY OF THE CONTAINMENT TO RETAIN FISSION PRODUCTS.

*CORE SPRAY + *PUMP, JET + *SAFEGUARDS REPORT, GENERAL + *TEST, PROOF + CONTAINMENT, GENERAL +
CONTROL ROD DRIVE + FISSION PRODUCT RETENTION + MONTICELLO + REACTOR, BOILING WATER + RELIABILITY ANALYSIS

18-11235 BOILING NUCLEAR SUPERHEATER (BONUS) POWER STATION. PROJECT COMPLETION REPORT
USAEC, OAK RIDGE OPERATIONS OFFICE, OAK RIDGE
ORO-649 +. 160 PAGES, FIGURES, TABLES, JUNE 1966, CFSTI \$5.00 CY, \$1.00 MN

BRIEF DESCRIPTION OF REACTOR, PLUS PROJECT SCHEDULES AND COSTS. INDICATES REASONS WHY
SCHEDULES SLIPPED AND COST INCREASED. PHOTOGRAPHS SHOW STAGES OF CONSTRUCTION.

*ECONOMICS + *REACTOR DESCRIPTION + BONUS (BOILING NUCLEAR SUPERHEAT PROJECT) + REACTOR, BOILING WATER +
REACTOR, SUPERHEAT

18-11247 LEYBUNSKII AI
THE BN-350 ATOMIC POWER STATION
JPRS-31,193 + TT65-31690 +. PAGES 1-30, TRANSLATED FROM ATOMNAYA STANTSIIYA, APRIL 1965, CFSTI, \$2.00 CY,
\$C.50 MN

REVIEW OF DESIGN OF 1000 MW(TH), FAST, SODIUM-COOLED REACTOR FOR POWER AND DESALTING. BR-5
TESTS SHOW THAT SWELLING OF THE PLUTONIUM DIOXIDE CORE CRACKED THE CLAD WHERE THE CLAD-CORE
GAP WAS MINIMAL. MIXED (PU,U)O₂ CAN GET A 10 PERCENT BURNUP. TWO RADIAL ZONES ARE USED TO
EVEN THE POWER DISTRIBUTION.

*REACTOR DESCRIPTION + FAILURE, FUEL ELEMENT + PLUTONIUM DIOXIDE + REACTOR, BREEDER +
REACTOR, DESALINATION + REACTOR, FAST + REACTOR, LIQUID METAL COOLED +
UNION OF SOVIET SOCIALIST REPUBLICS + URANIUM DIOXIDE

18-11250 WORDEN JR + PURCELL WL + SCHMID LC
PHYSICS EXPERIMENT HIGH POWER DENSITY CORE OF THE PRTR
BATTTELLE-NORTHWEST, RICHLAND
BNWL-221 +. 35 PAGES, 11 FIGURES, 7 TABLES, 20 REFERENCES, JANUARY 1966, CFSTI \$2.00 CY

THE NEW CORE WILL HAVE SHORTENED FUEL ELEMENTS (TO INCREASE THE FLUX) AND PORATED MODERATOR
(TO REDUCE FLUX PEAKS). THE DRIVER-FUEL WILL BE MIXED (U, PU) OXIDE. THIRTEEN CORE
POSITIONS WILL BE AVAILABLE FOR LONG-TERM (2 YEARS) TEST FUEL. DESCRIBES STARTUP AND
AT-POWER TESTING OF NEW FUEL, AND PRESCRIPTIONS FOR VARIOUS REACTOR-PHYSICS PROPERTIES.

*REACTOR STARTUP TESTING + PLUTONIUM DIOXIDE + PRTR (PLUTONIUM RECYCLE TEST REACTOR) +
REACTOR, HEAVY WATER + REACTOR, PRESSURE TUBE + URANIUM DIOXIDE

18-11251 ENGINEERING MATERIALS LIST
DIVISION OF TECHNICAL INFORMATION USAEC
TID-4100 (SUPPLEMENT 34) +. 54 PAGES, AUGUST 1966, DTIC, FREE

MISCELLANEOUS INSTRUMENTS AND EQUIPMENT.

*ENGINEERING DRAWING LIST

18-11260 HTGR BASE PROGRAM. QUARTERLY PROGRESS REPORT FOR THE PERIOD ENDING NOVEMBER 30, 1965
GENERAL ATOMIC
GA-6869 +. 62 PAGES, FIGURES, TABLES, JANUARY 15, 1966, DOCKET NO. 50-171, CFSTI \$3.00 CY, \$0.75 MN

A CALIBRATION ERROR FOR A TEMPERATURE SENSOR WAS FOUND AND INDICATES THAT THE GAIL-LOOP POWER
ESTIMATED FOR THE PAST NINE CYCLES MAY HAVE BEEN 5 TO 10 PERCENT LOWER THAN REPORTED.
CESIUM-137 PLATEOUT IN THE MAIN PIPING OF THE IN-PILE LOOP INDICATES A DECREASE IN ACTIVITY
AT ELBOWS, WHICH IS CONTRADICTORY TO BENCH STUDIES. PROTOTYPE SAFETY-ROD TESTS INDICATED AN
INADEQUATE SHOCK ABSORBER, RESULTING IN PROGRESSIVE ROD FAILURE. A SHOCK ABSORBER IS BEING
INCORPORATED INTO THE ROD, WITH NO CHANGE IN OTHER COMPONENTS.

*INSTRUMENTATION, ABNORMAL INDICATION + PEACH BOTTOM + REACTOR, GAS COOLED + REACTOR, GRAPHITE MODERATED

18-11261 HTGR BASE PROGRAM. QUARTERLY PROGRESS REPORT FOR THE PERIOD ENDING AUGUST 31, 1965
GENERAL ATOMIC
GA-6671 +. 107 PAGES, FIGURES, TABLES, SEPTEMBER 30, 1965, DOCKET NO. 50-171, CFSTI \$4.00 CY, \$0.75 MN

THIS REPORT IS ONE OF A SERIES OF SUCH REPORTS ON THE FOLLOWING SUBJECTS - TESTING OF
PRESTRESSED CONCRETE REACTOR VESSELS, IN-PILE LOOP STUDIES, REACTOR-PHYSICS ANALYSIS, AND
FUEL DEVELOPMENT AND REPROCESSING STUDIES FOR A 1000 MW(TH) REACTOR. THE GAIL IN-PILE LOOP

CATEGORY 18
SAFETY ANALYSIS AND DESIGN REPORTS

18-11261 *CONTINUED*

OPERATED AT FULL POWER OF 77.2 KW. DURING THE FIRST 200 MWH, THE FISSION-PRODUCT-RELEASE INCREASE WAS ATTRIBUTED TO TEMPERATURE INCREASE, WHICH CHANGES BY AN ORDER OF MAGNITUDE FOR EACH 100 DEGREES C. THE ECONOMICS OF LOW-ENRICHMENT U AND TH-U WITH PU MAKEUP FUEL CYCLES IS REVIEWED. DESIGN AND PERFORMANCE STUDIES ARE REVIEWED FOR SHORT HEXAGONAL BLOCK ELEMENTS AS AN ALTERNATIVE TO CYLINDRICAL ELEMENTS. THE BLOCK ELEMENTS SHOULD OPERATE 90 F LOWER AND RETAIN METALLIC FISSION PRODUCTS BETTER. DEVELOPMENT STUDIES ARE REVIEWED FOR LOOSE AND BONDED COATED-PARTICLE FUEL SYSTEMS.

*FISSION PRODUCT RELEASE, GENERAL + *FISSION PRODUCT TRANSPORT + COATED PARTICLE + CONCRETE, PRESTRESSED + CONTAINMENT, PRESSURE VESSEL + GRAPHITE + PEACH BOTTOM + RADIOCHEMICAL PROCESSING + REACTOR, GAS COOLED + REACTOR, GRAPHITE MODERATED

18-11270 ETTINGER HJ + MOSS WD + BUSEY H
CHARACTERISTICS OF THE AEROSOL PRODUCED FROM BURNING SODIUM AND PLUTONIUM
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS

LA-3491 +. 51 PAGES, 28 FIGURES, 7 TABLES, 12 REFERENCES, FEBRUARY, 1966, CFSTI \$3.00 CY, \$0.50 MN

SIZE CHARACTERISTICS OF THE AEROSOL PRODUCED DURING SODIUM AND PLUTONIUM FIRES WERE DETERMINED FOR DIFFERENT ATMOSPHERES RANGING FROM AIR TO 100 PERCENT NITROGEN. GRAM QUANTITIES OF SODIUM, PLUTONIUM-COBALT-CERIUM ALLOY, AND ALPHA- AND DELTA-PHASE PLUTONIUM WERE BURNED SEPARATELY. THE AEROSOL PRODUCED BY BURNING GRAM QUANTITIES OF SODIUM WAS COMPARED WITH THAT PRODUCED BY A FIRE INVOLVING 600 POUNDS OF SODIUM. DATA WERE OBTAINED REGARDING THE FRACTION OF PLUTONIUM ALLOY AIRBORNE DURING A PLUTONIUM FIRE. FIRES SIMULATING A REACTOR ACCIDENT INVOLVING BOTH FUEL AND COOLANT DEFINED THE RELATIVE AIRBORNE CONCENTRATIONS OF PLUTONIUM AND SODIUM. SODIUM AEROSOLS PRODUCED FROM SMALL- AND LARGE-SCALE FIRES HAVE COMPARABLE SIZE CHARACTERISTICS. AEROSOL PARAMETERS CAN BE DETERMINED FOR ANY SPECIAL CONDITIONS WITHOUT BUILDING A LARGE SYSTEM FOR SUCH TESTS. OXYGEN CONCENTRATION OF THE BURNING ATMOSPHERE DOES NOT AFFECT THE PARTICLE SIZE OF THE AEROSOL PRODUCED FROM BURNING PLUTONIUM METAL OR ALLOY. FIRES INVOLVING PLUTONIUM ALLOY AND SODIUM PRODUCE AIRBORNE PARTICLES THAT HAVE A PLUTONIUM-SODIUM RATIO RANGING FROM 0.34 TO LESS THAN 0.008 PERCENT. THE HIGH INITIAL RATIO IS RAPIDLY REDUCED AS THE MOLTEN SODIUM BLANKETS THE RELEASE OF PLUTONIUM.

*PARTICLE SIZE + *PLUTONIUM + *SODIUM + AEROSOL PRODUCTION + AEROSOL PROPERTIES + AEROSOL, RADIOACTIVE + AIR CLEANING + AIRBORNE RELEASE + ALLOY + FIRE + INCINERATION + OXIDATION

18-11277 FACILITY DESCRIPTION AND SAFETY ANALYSIS REPORT FOR THE GENERAL ELECTRIC TEST REACTOR - VOLUME 11

GENERAL ELECTRIC, VALLECITOS ATOMIC POWER LABORATORY
APED-5000-A +. 208 PAGES, FIGURES, TABLES, DOCKET 50-70 JULY 1965, PDR

BRIEFLY DESCRIBES TESTING AND OPERATING PROCEDURES, AND THE MONITORING PROGRAM FOR WASTES AND EFFLUENTS. THE MCA IS DESCRIBED AS A LOSS OF COOLANT WHILE AT FULL POWER, PLUS CONCURRENT FAILURE TO SCRAM, RESULTING IN MELTING OF THE FUEL PLATES. FISSION-PRODUCT RELEASE FROM A 50-DAY EQUILIBRIUM CORE WOULD RESULT IN 2-HR EXPOSURE DOSES AT THE BOUNDARY FOR THE WORST METEOROLOGICAL CONDITIONS OF 0.824 RAD DIRECT GAMMA, 0.235 RAD FROM A PASSING CLOUD, AND 0.015 RAD FROM GROUND DEPOSITION. DESCRIPTIONS AND SAFETY ANALYSES OF THE EXPERIMENTAL FACILITIES ARE GIVEN. THESE INCLUDE IN-CORE AND POOL IRRADIATION, CAPSULE EXPERIMENTS, A BEAM-PORT FACILITY, A HIGH-TEMPERATURE GAS LOOP (GAIL), A BOILING-WATER LOOP, A PRESSURIZED-WATER LOOP, A GENERAL-PURPOSE GAS LOOP, AND A GAMMA-IRRADIATION FACILITY.

*IN PILE LOOP + *SAFEGUARDS REPORT, GENERAL + *SAFETY REVIEW (OPERATIONS, EXPERIMENTS) + GETR (GENERAL ELECTRIC TEST REACTOR) + POWER UPGRATING + REACTOR, TEST

18-11278 FACILITY DESCRIPTION AND SAFETY ANALYSIS REPORT FOR THE GENERAL ELECTRIC TEST REACTOR. VOLUME 1

GENERAL ELECTRIC, ATOMIC POWER EQUIPMENT DEPT, CALIFORNIA
APED-5000-A, VOL. I +. 161 PAGES, FIGURES, JULY 1965, DOCKET NO. 50-70, PDR

THIS REPORT SUPERSEDES APED-5000 IN REPLY TO AEC REQUESTS FOR ADDITIONAL TECHNICAL INFORMATION AS A RESULT OF A REQUEST FOR POWER UPGRATING OF THE GETR FROM 33 MW TO 50. INCLUDED IS A DESCRIPTION OF THE SITE, ASPECTS OF ADMINISTRATION, AND A DETAILED DESCRIPTION OF THE FACILITY. ETR ELEMENTS ARE USED WITH LIGHT WATER AT 150 PSI FOR COOLANT. THE DESIGN ACCOMMODATES LOOP EXPERIMENTS AROUND THE VESSEL IN A THERMAL FLUX OF 1.5 TIMES 10 TO THE 14.

*POWER UPGRATING + *SAFEGUARDS REPORT, GENERAL + GETR (GENERAL ELECTRIC TEST REACTOR) + REACTOR, TEST

18-11289 DELETION OF RADIATION LEVEL LIMIT IN CONTROL ROOM
GENERAL ELECTRIC COMPANY

2 PAGES, AUGUST 1966, DOCKET NO. 50-203, PDR

CHANGE 7. RECENT SURVEYS INDICATE THAT CERTAIN UNOCCUPIED PORTIONS OF THE CONTROL ROOM EXCEED THE LIMIT OF 10 MR/HR. ADEQUATE SHIELDING EXISTS AT OCCUPIED AREAS, SO THE SECTION REFERRING TO DOSE RATE IN CONTROL ROOM IS DELETED.

*OPERATING LIMITS/TECHNICAL SPECIFICATIONS + CRITICAL ASSEMBLY FACILITY + PERSONNEL EXPOSURE, RADIATION

18-11290 PATHFINDER REQUESTS SUBSTITUTION OF NOISE ANALYSIS FOR REACTIVITY OSCILLATOR FOR TRANSFER FUNCTION MEASUREMENTS
NORTHERN STATES POWER COMPANY

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SAFETY ANALYSIS AND DESIGN REPORTS

18-11290 *CONTINUED*
5 PAGES, AUGUST 1966, DOCKET NO. 50-130, PDR

REQUEST STATES THAT 1957 DECISION WAS BASED ON LACK OF ASSURANCE IN NOISE-ANALYSIS TECHNIQUES, NOW CONSIDERED MORE RELIABLE. STABILITY-ANALYSIS PROGRAM WOULD BE ESSENTIALLY UNCHANGED.

*NOISE ANALYSIS + PATHFINDER + REACTOR, BOILING WATER + REACTOR, SUPERHEAT

18-11291 CHANGES AT THERMAL CRITICAL ASSEMBLY
GENERAL ELECTRIC COMPANY
4 PAGES, AUGUST 1966, DOCKET NO. 50-24, PDR

CHANGE 7 DELETES REQUIREMENT THAT CONTROL-ROOM DOSE RATE BE LESS THAN 10 MR/HR, AND REVISES SPECIFICATIONS FOR BORAL AND BORON-STAINLESS STEEL SAFETY SHEETS.

*OPERATING LIMITS/TECHNICAL SPECIFICATIONS + CONTROL ROD, SHIM SAFETY + CRITICAL ASSEMBLY FACILITY + PERSONNEL EXPOSURE, RADIATION

18-11292 CATHOLIC UNIVERSITY SUBMITS AGN-201 TECHNICAL SPECIFICATIONS
THE CATHOLIC UNIVERSITY OF AMERICA, WASHINGTON, D. C.
2 PAGES, AUGUST 1966, DOCKET NO. 50-77, PDR

TECHNICAL SPECIFICATIONS SECTIONS INCLUDE THOSE FOR THE REACTOR, THE CORE, CONTROL AND INSTRUMENTATION SYSTEMS, EXPERIMENTAL LIMITATIONS, SURVEILLANCE REQUIREMENTS, AND ADMINISTRATIVE REQUIREMENTS. THEY WERE BASED ON A SUGGESTED DRL DRAFT, WITH MINOR CHANGES.

*OPERATING LIMITS/TECHNICAL SPECIFICATIONS + AGN (TRAINING REACTOR, AEROJET-GEN. NUCLEONICS) + REACTOR, TRAINING

18-11293 NEW TECHNICAL SPECIFICATIONS MODEL FOR RESEARCH REACTOR
BRIGHAM YOUNG UNIVERSITY, PROVO, UTAH
3 PAGES, AUGUST 1966, DOCKET NO. 50-262, PDR

IN A LETTER REQUESTING MORE INFORMATION REGARDING THE PROPOSED AI L-77 REACTOR FOR THE UNIVERSITY OF UTAH, DRL INCLUDED A COPY OF THE TECHNICAL SPECIFICATIONS FOR A TRIGA SETUP AS CONFORMING TO THE NEW FORMAT FOR RESEARCH REACTORS.

*OPERATING LIMITS/TECHNICAL SPECIFICATIONS + REACTOR, HOMOGENEOUS + REACTOR, RESEARCH

18-11295 FERMI TECHNICAL SPECIFICATIONS POWER COEFFICIENT REQUIREMENT LOWERED
POWER REACTOR DEVELOPMENT COMPANY, DETROIT
7 PAGES, AUGUST 1966, DOCKET NO. 50-16, PDR

EXTREMELY CONSERVATIVE ASSUMPTIONS AND USE OF ACTUAL REACTOR PARAMETERS ALLOW ADEQUATE LEEWAY, SO THE ACTUAL COEFFICIENT OF 0.18 PLUS OR MINUS 0.013 (RATHER THAN 0.2) LEADS TO THE SAME SAFE RESULTS IN VARIOUS ACCIDENT ANALYSES.

*OPERATING LIMITS/TECHNICAL SPECIFICATIONS + FERMI + POWER COEFFICIENT + REACTOR, BREEDER + REACTOR, FAST + REACTOR, LIQUID METAL COOLED

18-11300 AMENDMENT 17 - ANSWERS TO QUESTIONS ABOUT LACBWR RECEIVED FROM DIVISION OF REACTOR LICENSING
ALLIS-CHALMERS MANUFACTURING COMPANY, BETHESDA
ACNP-66512 +. 22 PAGES, 3 TABLES, 3 REFERENCES, FEBRUARY 1966, DOCKET NO. 115-5, PDR

A FENCE IS ERECTED 300 FT OR MORE FROM THE STACK TO ALLOW OPERATION WITH A SINGLE STACK-BLOWER. OTHER BWR EXPERIENCE JUSTIFIES ASSERTION THAT THERE IS A LARGE DECONTAMINATION FACTOR FOR IODINE RELEASED TO PRIMARY COOLANT. STACK MONITORS ARE TO ALARM AT MAXIMUM DOWNWIND CONCENTRATION EQUAL TO THE MPC, AND REACTOR BUILDING ISOLATES AT MAXIMUM DOWNWIND CONCENTRATION EQUAL TO 10 TIMES THE MPC. ALTERNATIVE POWER SOURCES FOR CRUCIAL ISOLATION VALUES LISTED. CONTROL-ROD LATERAL RESTRAINTS WERE SHOWN TO BE NOT NECESSARY BY MOCKUP TESTING.

*CONCENTRATION, CENTERLINE, MAXIMUM + *EMERGENCY POWER, ELECTRIC + *LICENSING STATUS OF NUCLEAR PROJECTS + *MONITOR, RADIATION, STACK + CONTROL ROD + ENGINEERED SAFEGUARD + LACROSSE BOILING WATER REACTOR + REACTOR, BOILING WATER + SOURCE, CONTINUOUS

18-11361 QUAD CITIES STATION, UNIT 1 - PLANT DESIGN ANALYSIS APPLICATION FOR CONSTRUCTION PERMIT AND OPERATING LICENSE
COMMONWEALTH EDISON COMPANY, CHICAGO
7 PAGES, MAY 31, 1966, DOCKET NO. 50-254, PDR

CORPORATE INFORMATION AND URANIUM REQUIREMENTS. UNIT 1 WILL BE SIMILAR TO THAT OF DRESDEN 2, AND LICENSED FOR A REFERENCE DESIGN OF 2300 MW(TH)/715 MW(E) NET BUT INTENDED FOR LATER OPERATION OF 2600 MW(TH). LOCATED 20 MILES NE OF ROCK ISLAND-MOLINE ON THE MISSISSIPPI RIVER. ZIRCALOY-2-CLAD FUEL IS IN A CORE 15-3/4 FT IN DIAMETER AND 12 FT TALL, WITH 177 B4C CONTROL RODS AND 324 TEMPORARY FIXED-CONTROL RODS. CONTROLLED CIRCULATING FLOW WITH 2 LOOPS AND 20 JET PUMPS. PRESSURE-SUPPRESSION CONTAINMENT, WITH A CONCRETE REACTOR BUILDING DESIGNED FOR 1/4-PSI INTERNAL PRESSURE, AND EXHAUST TO 310-FT STACK THROUGH STANDBY

CATEGORY 18
SAFETY ANALYSIS AND DESIGN REPORTS

18-11361 *CONTINUED*
GAS-TREATMENT SYSTEM REDUCES ALL OFFSITE DOSES TO LESS THAN 1 REM.

*SAFEGUARDS REPORT, PRELIMINARY + ECONOMICS + QUAD CITIES 1 + REACTOR, BOILING WATER

18-11362 QUAD-CITIES STATION, UNIT 1 - PLANT DESIGN ANALYSIS, VOLUME 1
COMMONWEALTH EDISON COMPANY, CHICAGO
360 PAGES, DOCKET NO. 50-254, MAY 31, 1966 PDR

POPULATION CENTER (34,000) IS 5 MILES NE OF SITE. GROWTH FIGURES GIVEN. MOLINE, ILLINOIS, IS 20 MILES AWAY. DATA INDICATES LOW-LEVEL NIGHTTIME INVERSION ONE-THIRD OF TIME BASED ON WIND AND CLOUD COVER AND SIMILARITY TO CONDITIONS FOR JOLIET, ILLINOIS. GROUND MOTION EQUIVALENT TO 0.12 G IS BASIS FOR PLANT DESIGN- 0.24G FOR CONTAINMENT AND HEAT REMOVAL. FUEL-ELEMENT PERFORMANCE LIMITS ESTABLISHED BY TESTS AND OPERATING EXPERIENCE. EXCURSIONS YIELDING LESS THAN 425 CAL/G OF UO₂ WILL NOT RUPTURE RODS, AND 280 IS DESIGN LIMIT. INTEGRATED FAST-NEUTRON FLUX IS 2.3 TIMES 10¹⁷ (17TH) IN 40 YEARS, IN THE 6-1/8-IN. 3028 VESSEL CLAD WITH STAINLESS STEEL, AND DESIGNED FOR 10 (19TH) WITH AN NDT SHIFT OF 260 F. RELAYS WILL BE USED IN THE SAFETY SYSTEM.

*SAFEGUARDS REPORT, PRELIMINARY + BRITTLE FRACTURE + CONTAINMENT, PRESSURE VESSEL + FUEL ELEMENT + LAPSE RATE, STABLE + QUAD CITIES 1 + REACTOR, BOILING WATER

18-11363 QUAD CITIES STATION, UNIT 1 - PLANT DESIGN ANALYSIS, VOLUME II
COMMONWEALTH EDISON COMPANY, CHICAGO
360 PAGES, DOCKET NO. 50-254, MAY 31, 1966 PDR

CONTAINS ILLUSTRATIONS AND SIX APPENDIXES (GLOSSARY, RELIABILITY ANALYSIS OF REACTOR PROTECTIVE SYSTEM, CONTROL-ROD-DRIVE SYSTEM, JET-PUMP DEVELOPMENT, CORE-SPRAY TEST, EARTHQUAKE-DESIGN CRITERIA). APPENDIX B CONSISTS OF A SERIES OF ASSERTIONS WITH A PLOT OF RELIABILITY VS FAULT RATE FOR 1/2, 2/3, 2/4, AND DUAL BUS (1/2) X 2. APPENDIX D DESCRIBES SOME DESIGN AND OPERATIONAL CONSIDERATIONS. APPENDIX E - TESTS SHOW THAT 0.05 GPM IS NEEDED PER FUEL ROD TO LIMIT THE CLADDING TEMPERATURE TO 1600 F. APPENDIX F IS AN INDEPENDENT SEISMOLOGICAL REPORT RECOMMENDING THAT CRITICAL COMPONENTS BE DESIGNED FOR 0.12 G.

*SAFEGUARDS REPORT, PRELIMINARY + CONTROL ROD DRIVE + CORE SPRAY + DESIGN STUDY + PUMP, JET + QUAD CITIES 1 + REACTOR SAFETY SYSTEM + REACTOR, BOILING WATER + RELIABILITY ANALYSIS + SEISMOLOGY

18-11364 QUAD-CITIES STATION, UNIT 1 - PLANT DESIGN ANALYSIS, VOLUME 1
COMMONWEALTH EDISON COMPANY, CHICAGO
1 PAGE, DOCKET NO. 50-254, PAGE III-4-4, MAY 31, 1966 PDR

DURING THE EQUIVALENT OF 10 FULL-POWER YEARS OF OPERATION OF GE BOILING-WATER REACTOR, A STEADY-STATE THERMAL OVER-POWER CONDITION IN THE RANGE OF 105 TO 110 PERCENT OF RATED REACTOR POWER OCCURRED ONLY ONCE.

*INCIDENT, ACTUAL, GENERAL + *REACTOR POWER + REACTOR, BOILING WATER

18-11365 QUAD CITIES STATION, UNIT 1 - PLANT DESIGN ANALYSIS, VOLUME 1
COMMONWEALTH EDISON COMPANY, CHICAGO
18 PAGES, PAGES XIV-3-3 TO 6 AND 3-15 TO 30 OF QUAD CITIES STATION, PLANT DESIGN ANALYSIS, VOLUME I DOCKET NO. 50-254, MAY 31, 1966 PDR

DRESDEN 1 EXPERIENCE WITH FUEL FAILURES QUOTED TO BE LESS THAN 1 MILLICURE/SEC, (KR-85 TO REPRESENT 54 CURIES - LESS THAN 1 PERCENT) IN THE GAS PLENUM. HALOGENS IN STEAM ARE ABOUT 10 TO THE MINUS 5 THAT IN WATER. A FURTHER FACTOR OF 10 TO THE MINUS 2 OCCURS IN THE CONDENSER. THUS A REACTOR EXCURSION RUPTURING 330 FUEL RODS WOULD RELEASE ONLY 10 TO THE MINUS 4 CURIES/SEC OF HALOGENS UP THE STACK THROUGH AIR EJECTOR. STEAM-LINE BREAK ESTIMATED ON DRESDEN-1 COOLANT ACTIVITY AND WATER CARRYOVER- HOT CLOUD BREAKS BUILDING WALLS AND RISES TO 164-4100 FT (DEPENDING ON WIND), WITH DOSES IN MILLIREM RANGE. LOSS OF COOLANT WITH 100 PERCENT MELTDOWN GIVES LESS THAN 0.5 REM OFF-SITE BECAUSE OF THE HALOGEN RETENTION IN WATER, CHARCOAL ABSORPTION, AND STACK RELEASE. EVERE CHARCOAL FILTER HAS BEEN RETAINING ORGANIC HALOGENS WITH A FILTER EFFICIENCY OF 99.8-99.9 PERCENT AT RELATIVE HUMIDITY OF 10 TO 15 PERCENT.

*AIRBORNE RELEASE + *DOSE + *SAFEGUARDS REPORT, PRELIMINARY + ACCIDENT, CONTROL ROD DROPOUT + FAILURE, FUEL ELEMENT + LOSS OF COOLANT + OPERATING EXPERIENCE + QUAD CITIES 1 + REACTOR, BOILING WATER + STEAM LINE RUPTURE

18-11366 QUAD-CITIES STATION, UNIT 1 - PLANT DESIGN ANALYSIS, VOLUME 1
COMMONWEALTH EDISON COMPANY, CHICAGO
14 PAGES, 3 REFERENCES, 1 TABLE, PAGES V-1-16 TO 31, DOCKET NO. 50-254, MAY 31, 1966 PDR

IMMEDIATELY AFTER THE MAJOR PIPE RUPTURE, THE TEMPERATURE OF THE WATER IN THE SUPPRESSION CHAMBER APPROACHES 130 F, AND THE MAXIMUM SYSTEM PRESSURE APPROACHES 39 PSIG DURING THE BLOWDOWN OF THE PRIMARY COOLANT INTO THE DRYWELL. THE CONTAINMENT PRESSURE IS A FUNCTION OF THE METAL-WATER REACTION RATE. ALTHOUGH THE CORE-COOLING SYSTEMS ARE ASSUMED NOT TO FUNCTION IN ORDER TO PROVIDE A BASIS FOR METAL-WATER REACTIONS, ONE OF THE TWO CONTAINMENT COOLING SYSTEMS IS ASSUMED TO FUNCTION NORMALLY. THE DRYWELL SPRAY IS SUFFICIENT TO TRANSPORT THE DECAY HEAT, THE HEAT STORED IN THE CORE, AND ANY HEAT RESULTING FROM THE METAL-WATER REACTION TO THE WET-WELL IN THE FORM OF HOT LIQUID. THE ENERGY TRANSPORTED TO THE WATER IN THE

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18-11366 *CONTINUED*

SUPPRESSION CHAMBER IS REMOVED FROM THE CONTAINMENT SYSTEM BY HEAT EXCHANGERS. TO OBVIATE THE POSSIBILITY OF AN ENERGY RELEASE WITHIN THE PRIMARY CONTAINMENT FROM A HYDROGEN-OXYGEN REACTION UNDER CONDITIONS MORE SEVERE THAN CAN CURRENTLY BE FORESEEN, THE DESIGN INCLUDES AN INERTING SYSTEM TO REDUCE THE OXYGEN CONCENTRATION OF THE ATMOSPHERE WITHIN THE PRIMARY CONTAINMENT.

*CONTAINMENT SPRAY + *CONTAINMENT, PRESSURE SUPPRESSION + *METAL WATER REACTION + *QUAD CITIES 1 + *ZIRCALOY + CHEMICAL REACTION + CONTAINMENT ATMOSPHERE, INERT + HYDROGEN + OXYGEN + REACTOR, BOILING WATER + SAFEGUARDS REPORT, PRELIMINARY

18-11414 ILIFFE CE

ECONOMICS OF PLUTONIUM BREEDING, PLUTONIUM INVENTORY, AND URANIUM CONVERSION
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, RISLEY
TRG-1207(R) +. 30 PAGES, 1966, BIS, \$0.90

A FORMULA IS DERIVED FOR THE COST OF A NUCLEAR POWER PROGRAM, THAT CONSUMES ONLY SUCH PLUTONIUM AS IS PRODUCED WITHIN IT. AS APPLIED TO PLUTONIUM-FUELED FAST REACTORS, THE FORMULA ACCOUNTS FOR PLUTONIUM THROUGH A QUANTITY X (THE DISCOUNTED AMOUNT OF ELECTRICITY GENERATED BY SUCH REACTORS EXPRESSED AS A FRACTION OF THE CORRESPONDING AMOUNT FOR ZERO DOUBLING TIME) AND A UNIT CREDIT K, (THE REDUCTION IN SYSTEM GENERATING COST PER UNIT VALUE OF ANY PLUTONIUM SURPLUS TO THE SYSTEM). THE FRACTION X AND UNIT CREDIT K ARE DISPLAYED GRAPHICALLY IN TERMS OF FAST-REACTOR INVENTORY RATING AND DOUBLING TIME FOR BOTH POWER PROGRAMS AND FOR DIFFERENT RATES OF PLUTONIUM PRODUCTION FROM ADVANCED THERMAL REACTORS, BOTH WITH AND WITHOUT OPERATION OF SOME OF THE FAST REACTORS ON A U-235 FEED. A SIMILAR FORMULA IS SHOWN TO APPLY TO ADVANCED THERMAL REACTORS.

*ECONOMIC STUDY + *PLUTONIUM + *REACTOR, BREEDER + MATHEMATICAL STUDY + STATISTICAL ANALYSIS

18-11429 HORST KM

SOUTHWEST EXPERIMENTAL FAST OXIDE REACTOR DEVELOPMENT PROGRAM. QUARTERLY REPORT NO. 6
GENERAL ELECTRIC COMPANY, SAN JOSE, CALIFORNIA
GEAP-4994 +. 129 PAGES, 45 FIGURES, 17 TABLES, OCTOBER 1965, CFSTI, \$4.00 CY, \$1.00 MN

SOUTHWEST EXPERIMENTAL FAST OXIDE REACTOR DEVELOPMENT PROGRAM PROGRESS REPORT. THIS REPORT IS ONE OF A SERIES OF SUCH REPORTS ON THE SUBJECTS ENUMERATED BELOW. THESE INCLUDE - EXPERIMENTAL PROGRAM IN ZPR III, FUEL, SPECIAL INSTRUMENTATION, CORE ASSEMBLY STEADY-STATE AND TRANSIENT (HEAT TRANSFER) CHARACTERISTICS, REACTIVITY CONTROLS FOR EXPERIMENTATION, FUEL HANDLING, CORE DESIGN.

*RESEARCH CONTRACT + CRITICAL ASSEMBLY FACILITY + FUEL HANDLING + HEAT TRANSFER + INSTRUMENTATION, GENERAL + REACTOR, BREEDER + REACTOR, FAST + REACTOR, LIQUID METAL COOLED + SEFOR (SOUTHWEST EXP. FAST OXIDE REACTOR) + TEST, PHYSICS

CATEGORY 19
BIBLIOGRAPHIES

19-10430 ARGONNE NATIONAL LABORATORY PUBLICATIONS, JULY 1, 1964 - JUNE 30, 1965
ARGONNE NATIONAL LABORATORY, ARGONNE, ILLINOIS
ANL-7087 +. 328 PAGES, AUGUST 1965 CFSTI, \$7.00 CY, \$1.50 MN

THIS PUBLICATION LIST IS A BIBLIOGRAPHY OF SCIENTIFIC AND TECHNICAL ACCOUNTS ORIGINATED AT ARGONNE AND PUBLISHED DURING FISCAL YEAR 1965. IT INCLUDES ITEMS PUBLISHED AS JOURNAL ARTICLES, TECHNICAL REPORTS, BOOKS, ETC., ALL OF WHICH HAVE BEEN MADE AVAILABLE TO THE PUBLIC. THE LIST IS DIVIDED INTO THREE PARTS - THE FIRST A LIST DIVISION, THE SECOND AN ALPHABETICAL AUTHOR INDEX, AND THE THIRD PART A KWIC SUBJECT INDEX. INCLUDED ARE SECTIONS ON RADIOLOGICAL PHYSICS, REACTOR PHYSICS, REACTOR ENGINEERING, INDUSTRIAL HYGIENE AND SAFETY, FIRE PROTECTION, AND CHEMICAL ENGINEERING.

*BIBLIOGRAPHY + *BURNOUT HEAT FLUX + *CHEMICAL REACTION + *DOSE MEASUREMENT, EXTERNAL + *HEAT TRANSFER + *REACTOR DYNAMICS + *REACTOR STABILITY + ACCIDENT ANALYSIS + FARET (FAST ARGONNE REACTOR EXPERIMENT TEST) + METAL WATER REACTION + NOISE + REACTIVITY COEFFICIENT + REACTOR KINETICS + REACTOR TRANSIENT + REACTOR, BREEDER + REACTOR, FAST + REACTOR, LIQUID METAL COOLED + SPACE DEPENDENT DYNAMICS + VOID COEFFICIENT

19-11286 TEETER CE + LECKY JA + MARTENS JH
CATALOG OF NUCLEAR REACTOR CONCEPTS. PART I. HOMOGENEOUS AND QUASI-HOMOGENEOUS REACTORS. SECTION VI. SOLID HOMOGENEOUS (SEMI-HOMOGENEOUS) REACTORS
ARGONNE NATIONAL LABORATORY, ARGONNE, ILLINOIS
ANL-7228 +. 78 PAGES, REFERENCES, JUNE 1966, CFSTI \$3.00 CY, \$0.75 MN.

THIS REPORT HAS NO DIRECT SAFETY IMPLICATIONS. HOWEVER, TOGETHER WITH ANL-6906, ANL-7092, ANL-7138, AND ANL-7180, IT FORMS A CATALOG OF REACTOR CONCEPTS THAT MIGHT BE USEFUL IN SAFETY WORK.

*REACTOR, HOMOGENEOUS

19-11346 BITTEL R
SOME ASPECTS OF RADIOHYDROLOGY - LITERATURE SURVEY
COMMISSARIAT A L'ENERGIE ATOMIQUE + CENTRE ETUDES NUCLEAIRES DE SACLAY
CEA-BIB-59 +. 46 PAGES, 2 FIGURES, 2 TABLES, SEPTEMBER 1965, DEP. MN, IN FRENCH

THIS WORK (PART OF RESEARCH UNDERTAKEN IN THE HEALTH PROTECTION DEPARTMENT WITH A VIEW TO EXAMINING THE CONSEQUENCES OF LIQUID WASTE IN WATER) IS CONCERNED WITH THE VARIOUS ASPECTS OF HYDROLOGICAL PROBLEMS ARISING FROM THE PRESENCE OF RADIOELEMENTS IN RIVERS BETWEEN THE POINT OF DISPOSAL AND THE PLACES AT WHICH THE WATER IS USED BY MAN. THE FOLLOWING QUESTIONS ARE CONSIDERED - PHYSICAL AND MECHANICAL FACTORS INVOLVED IN THE DISPERSION OF THE EFFLUENTS, CHEMICAL FACTORS DUE TO THE BEHAVIOUR OF THE RADIOELEMENTS, STUDY OF EXCHANGES BETWEEN LIQUID AND SOLID PHASES INVOLVING RADIOELEMENT TRANSFER, AND STUDY OF PARTICULAR PROBLEMS (SEDIMENTATION, SEDIMENT DISPERSION, PROBLEMS DUE TO THE WATER-BED ITSELF, PHENOMENA OCCURRING AT THE MOUTH OF RIVERS).

*HYDROLOGICAL CONSIDERATION, GENERAL + *SURFACE WATER, DISPOSAL MEDIA + DISPERSION + HYDROLOGICAL CONSIDERATION, QUALITY OF WATER + HYDROLOGICAL CONSIDERATION, RATE OF MOVEMENT + MINERAL EXCHANGE + PRECIPITATION + RIVER, GENERAL + SEDIMENT + SURFACE WATER, GENERAL + SURFACE WATER, PROPERTY + SURFACE WATER, SEDIMENT + SURFACE WATER, SUSPENDED MATERIAL + WASTE DISPOSAL, RIVER + WATER TREATMENT + WATER, DRINKING

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ATMOSPHERIC DIFFUSION COEFFICIENT				CANADA			
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16-10676	16-10684			CARBON			
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5-09385	5-09641	5-09644	5-09645	17-11287	17-11364	18-11364	
5-09646	5-09647	5-09954	5-09957	INCIDENT, ACTUAL, HUMAN ERROR			
5-10700	5-10701	5-10844	5-10848	17-10192	17-10198	17-11042	
5-10849	5-10850	5-11058	5-11170	INCIDENT, ACTUAL, NONNUCLEAR			
5-11173	5-11464	5-11468	6-10685	17-11037			
6-10686	6-10853	17-11058		INCIDENT, ACTUAL, NONREACTOR			
HEAT TRANSFER, CONVECTION				12-10564	15-10563	17-10561	17-10562
5-09385	5-09625	5-09628	5-09641	17-10563	17-10564	17-10987	17-11045
5-09644	5-09647	5-09960	5-11321	INCIDENT, ACTUAL, RECOVERY FROM			
HEAT TRANSFER, NATURAL CONVECTION				17-10343			
5-09625	17-10517			INCINERATION			
HEAT TRANSFER, RADIANT				7-11270	14-11314	14-11702	14-11703
5-09631	5-09632	5-09633	5-09634	15-11314	18-11270		
HEAVY WATER				INCONEF			
6-10803	6-10804	6-11155	9-10851	17-11248			
HEIGHT OF RISE				INDIAN POINT I			
16-10786	16-10787			1-09856	2-09856	2-09857	5-11039
HELIUM				5-11046	5-11051	12-09856	17-10049
5-10556	6-09987	7-08682	17-11276	17-11039	17-11046	17-11051	
18-09987				INDIAN POINT II			
HFIR (HIGH FLUX ISOTOPE REACTOR)				1-09856	2-09856	2-09857	5-10880
6-10957	6-10960	9-10960	17-10602	5-10881	5-10898	5-10899	5-10927
17-10616				6-10874	6-10875	7-10876	8-10872
HIGH RADIATION				8-10887	8-10899	9-10877	9-10878
11-10699				9-10879	9-10882	9-10884	9-10886
HIGH TEMPERATURE				9-10891	9-10897	9-10928	11-10887
4-09601	5-09631	5-09632	6-10715	11-10892	11-10929	12-09856	12-10883
8-10295	9-10447	9-10465	9-10470	12-10888	12-10889	12-10890	12-10893
9-10471	17-10799			12-10894	12-10895	12-10896	12-10897
HOT CELL				18-10868	18-10870	18-10871	18-10872
1-09662	1-09664	12-09607	12-09652	18-10874	18-10875	18-10876	18-10877
12-09653	12-09654	12-09655	12-09658	18-10878	18-10879	18-10880	18-10881
12-09659	12-09661	12-09662	12-09664	18-10882	18-10883	18-10884	18-10886
12-09665	12-09666	12-09667	12-09669	18-10887	18-10888	18-10889	18-10890
12-09671	12-09672	12-09673	12-09674	18-10891	18-10892	18-10893	18-10894
12-09675	12-10564	12-10809	13-09657	18-10895	18-10896	18-10897	18-10927
13-09670	13-10809	17-10564		18-10928	18-10929		
HOT SPOT				INFORMATION RETRIEVAL			
5-09978	5-11325	17-09978	17-10860	1-10525			
HUMIDITY				INGESTION			
16-10660	16-10765	16-10971		4-09603	14-09603	14-11124	
HWCTR (HEAVY WATER COMPONENT TEST REACTOR)				INHALATION			
7-10270	17-10746	18-10270		4-09603	14-09603	14-11313	15-09984
HYDRAULIC ANALYSIS				17-09984			
2-11154	5-11327	6-10686	6-10852	INSTABILITY			
6-10952	6-10970	6-11107	6-11154	11-10734	11-10035	11-10331	
9-10472	9-11418			INSTRUMENTATION CALIBRATION			
5-09385				5-11326	9-10508	14-10080	15-10080
HYDRAULIC EXPERIMENT				15-10508	15-11126	15-11714	
HYCRIDE				INSTRUMENTATION, ABNORMAL INDICATION			
1-10337				18-11260			
HYDRODYNAMIC ANALYSIS				INSTRUMENTATION, AIR SAMPLING			
5-10428	5-10487	5-10555	5-10560	7-11724	7-11725	7-11727	7-11732
5-10573	5-11326	5-11327	5-11464	14-11130	15-11130	16-11113	
5-11465	5-11510			INSTRUMENTATION, AMPLIFIER			

9-11253				5-10846	18-11300		
INSTRUMENTATION, COINCIDENT				LAMPRE I (LASL MOLTEN PU REACTOR EXPERIMENT)			
9-10885	18-10885			6-10959	9-11417		
INSTRUMENTATION, COMPONENT				LANTHANUM			
11-11019				14-09485			
INSTRUMENTATION, CONTROL				LAPSE RATE, STABLE			
9-10469	9-10470	9-10471	9-11416	18-11362			
INSTRUMENTATION, DETECTION FAILED FUEL ELEMENT				LAPSE RATE, UNSTABLE			
9-10448	9-10473	17-10746		16-09616			
INSTRUMENTATION, FLOW				LASL (LOS ALAMOS SCIENTIFIC LABORATORY)			
5-11326	9-10448	9-11416		15-10099	16-10648	16-10665	16-11114
INSTRUMENTATION, GENERAL				LEAD			
1-10409	5-10578	5-11326	6-10040	15-10812			
6-10578	6-11424	7-10578	9-10040	LEAK DETECTION			
9-10290	9-10388	9-10434	9-10461	7-10559	7-11729	18-11164	
9-10472	9-10473	9-10515	9-10569	LEAK RATE			
9-10886	9-11253	9-11416	9-11424	11-09751	17-11276		
9-11433	12-11424	13-11133	18-10886	LIAPUNOV'S FUNCTION			
18-11429				9-11450			
INSTRUMENTATION, IN CORE				LICENSING STATUS OF NUCLEAR PROJECTS			
5-10927	9-10448	9-10461	9-10504	13-11329	13-11330	18-11300	
9-10569	17-10046	17-11004	17-11005	LIQUID SCRUBBER			
18-10927				7-09373			
INSTRUMENTATION, LIQUID LEVEL DETECTION				LITHIUM			
9-11436	17-11005			5-09629	5-09647	7-11727	
INSTRUMENTATION, METEOROLOGICAL				LOFT (LOSS OF FLUID TEST)			
16-09617	16-10644	16-10645	16-10646	1-09854	4-11054	5-10578	5-10867
16-10650	16-10651	16-10657	16-10668	6-10578	7-09854	7-10578	7-10867
16-10669	16-10678	16-11113		11-10867	12-09854		
INSTRUMENTATION, NUCLEAR				LOSS OF COOLANT			
7-10559	9-10291	9-10434	9-10448	4-11252	5-09605	5-09954	5-10532
9-10469	9-10470	9-10471	9-10884	5-10701	5-10899	5-11452	6-09783
9-11416	9-11437	13-11133	18-10884	6-10532	7-10532	7-11365	8-10887
INSTRUMENTATION, PROCESS				8-10899	11-09925	11-10293	11-10887
9-11416	9-11436	9-11451	13-11133	12-10888	12-10889	14-11252	17-11052
17-10193	17-10990	18-11164		18-09783	18-10887	18-10888	18-10889
INSTRUMENTATION, PROTECTIVE				18-11029	18-11365		
9-11240	13-11133			LOSS OF FLOW			
INSTRUMENTATION, RADIATION MONITORING				5-09639	6-09987	6-10874	18-09987
7-11724	9-10508	9-10513	15-08713	18-10874			
15-10508	15-10513	15-10670	15-11125	LOSS OF LOAD			
15-11126	15-11318			5-11058	6-10874	17-11058	18-10874
INSTRUMENTATION, REGULATING				LOSS OF POWER			
17-11042				9-10886	17-10052	17-11038	18-10886
INSTRUMENTATION, SURVEILLANCE				LOSS OF PRESSURE			
7-10559				5-10701	6-09987	18-09987	
INSTRUMENTATION, SWITCH				MAINTENANCE AND REPAIR			
17-10989				12-09607	12-09659	12-09660	12-09668
INSTRUMENTATION, TEMPERATURE				12-09669	12-09672	13-09657	16-10646
5-11452	5-11460	5-11462	6-11424	17-10044	17-10984	17-11246	
9-10447	9-10448	9-10469	9-10470	MASS TRANSFER			
9-10471	9-10515	9-11416	9-11424	5-09624	5-09953	5-11327	7-10586
12-11424	17-10194			7-11678	11-11678		
INSTRUMENTATION, TESTING				MATERIAL			
11-11019	13-11133	15-11126		5-10847	11-09393	17-10995	18-10995
IODINE				MATHEMATICAL STUDY			
5-10578	6-10578	7-08682	7-08895	5-10316	5-10487	5-10548	6-10509
7-09369	7-10270	7-10557	7-10577	7-11275	9-10292	9-10472	9-10473
7-10578	7-10586	7-11678	7-11688	9-10509	9-11450	9-11451	15-11123
7-11689	7-11690	7-11691	7-11693	15-11127	18-11414		
7-11694	7-11695	7-11722	7-11728	MAXIMUM PERMISSIBLE CONCENTRATION (MPC)			
7-11729	7-11730	7-11731	7-11732	14-11313	14-11317	15-10812	
11-11678	12-10564	14-11124	14-11320	MAXIMUM PERMISSIBLE DOSE (MPD)			
14-11352	15-09932	15-11320	15-11352	15-10812			
17-10564	18-10270			MEASUREMENT, GENERAL			
ION EXCHANGE				6-09697	6-09725	9-10290	9-10472
14-11124				16-10662	16-10664	16-10765	16-11115
IONOSPHERE				MEASUREMENT, REACTIVITY			
16-10968				6-10804	9-11437		
IRRADIATION TESTING				MEASUREMENT, STRAIN GAGE			
7-10575	11-10699	12-09652	12-09669	6-09725	11-09922	11-10035	11-11019
12-09672	12-09673	17-09439	17-09788	MEASUREMENT, SUBCRITICALITY			
17-10605	17-10616	18-10861		6-09697			
ISOCEM, INC.				MEASUREMENT, TEMPERATURE			
12-10600	13-10600	18-10600		9-10447	9-10469	9-10470	9-10471
ITALY				16-10646			
6-10865	12-09668	14-11312	15-11312	MERCURY			
16-09620	17-10044	17-10045		5-09629			
JAPAN				METAL			
3-11221	6-10642	13-11221	15-10099	5-09920	7-10350	11-09393	11-09920
15-11128				11-09922	11-09923	11-09924	11-09925
KEWB (KINETIC EXPERIMENT ON WATER BOILERS)				12-10966			
2-11154	6-11154			METAL WATER REACTION			
KIWI				1-09854	5-10430	6-10430	6-10610
15-11125				6-10957	6-10958	6-11088	7-09854
KIWI TNT (TRANSIENT NUCLEAR TEST)				8-10359	8-10530	8-10872	8-10887
4-10520	6-10040	6-11316	9-10040	8-11366	11-10530	11-10887	12-09854
KRYPTON				18-10872	18-10887	18-11088	18-11366
7-09350	7-09731	7-10558	7-11715	19-10430			
7-11716	13-10702	15-11714		METAL, LIQUID			
LACROSSE BOILING WATER REACTOR				5-09629	5-09630	5-09638	5-09642

5-09647	5-09954	5-10120	5-10532	16-10679	18-09415		
5-10560	5-11453	6-10532	7-10532	NEUTRON			
7-11717	9-11436			15-11126	15-11254	16-10672	
METECROLOGY				NEVADA TEST SITE			
2-11091	14-11091	15-11091	16-10644	15-10083	15-10099	15-11125	
16-10645	16-10646	16-10657	16-10659	NFS (NUCLEAR FUEL SERVICES)			
16-10660	16-10662	16-10664	16-10669	13-11329	13-11330		
16-10671	16-10675	16-10676	16-10680	NIOBIUM			
16-10681	16-10684	16-10765	16-10766	1-10337	14-10080	15-10080	15-11165
16-11115	16-11116			NITRIDE			
MILLING				7-09350	7-11273	8-10294	18-11000
12-09311	17-09311	17-10201		18-11001			
MINERAL EXCHANGE				NITROGEN			
14-11351	19-11346			7-10506	7-11273	12-10506	17-10193
MIST				NOBLE GAS			
7-09371				7-09359	7-09374	7-09731	7-09732
ML 1 (MOBILE LOW POWER PLANT NO. 1)				7-10558	7-11273	7-11698	7-11715
17-10608				7-11716	7-11723	11-11698	15-11714
MOCKUP				16-10676			
8-10531	11-10531	15-10099		NOISE			
MODERATOR				5-10430	6-10430	17-10864	19-10430
6-10865	6-10979	18-11028		NOISE ANALYSIS			
MODERATOR COEFFICIENT				1-10619	2-11154	6-10619	6-10642
6-09695	6-10803	6-10804	6-10875	6-10802	6-10856	6-10943	6-10945
6-10954	18-10875			6-10976	6-11154	6-11155	6-11266
MODIFICATION, SYSTEM OR EQUIPMENT				9-10945	18-11290		
9-09416	9-10156	9-10388	9-10473	NORWAY			
9-10566	12-10564	17-09416	17-10199	6-10717	9-10717	17-11004	17-11005
17-10564	17-10566	17-10568	17-10858	NOZZLE			
18-10156	18-10837			5-10272	11-10743		
MOLECULAR SIEVE				NRTS (NATIONAL REACTOR TEST STATION)			
7-09370	7-10577			9-10472			
MOLTEN FUEL				NSPP (NUCLEAR SAFETY PILOT PLANT)			
9-11436	12-09602	17-09602		1-09854	7-09854	12-09854	
MOLYBDENUM				NUCLEAR DETONATION			
7-09352	16-10679	16-10682		14-10074	15-10074	16-10645	16-10671
MONITOR, RADIATION, AIR				16-10968	16-11119		
7-09729	7-11723	9-10513	12-09663	NUCLEAR EXPLOSION DEBRIS			
13-11704	14-09663	14-11130	14-11704	16-09613	16-10657	16-10661	16-10665
15-10513	15-11130	15-11704	16-10648	16-10668	16-10677	16-10679	16-10766
16-10814	16-11113			16-10769	16-11116		
MONITOR, RADIATION, BACKGROUND				NUCLEATE BOILING			
9-10513	13-11704	14-10077	14-11704	5-09643	5-09646	17-09417	
15-10077	15-10512	15-11704		OCEAN AND SEA			
MONITOR, RADIATION, EMERGENCY				14-09274	14-11131	15-09274	15-11129
7-11723	9-10897	12-10897	13-11704	15-11131	15-11311		
14-11704	15-11704	18-10857		OPERATING EXPERIENCE			
MONITOR, RADIATION, ENVIRONMENTAL				7-10506	7-11365	7-11708	9-10473
9-10513	13-11704	14-10077	14-10080	9-10566	12-09674	12-10506	15-10196
14-11312	14-11704	15-10077	15-10080	17-09650	17-10046	17-10049	17-10050
15-10513	15-11041	15-11254	15-11312	17-10051	17-10052	17-10054	17-10193
15-11704	16-11114	17-11041		17-10196	17-10197	17-10202	17-10278
MONITOR, RADIATION, GAS				17-10344	17-10345	17-10566	17-10604
13-11704	14-11704	15-11704		17-10713	17-10746	17-10833	17-10836
MONITOR, RADIATION, GENERAL				17-10866	17-10984	17-10995	17-11427
7-09360	7-10559	13-11704	14-11704	18-10995	18-11365		
15-11704				OPERATING LIMITS/TECHNICAL SPECIFICATIONS			
MONITOR, RADIATION, GENERAL PRACTICE				5-11039	5-11046	6-10567	17-10567
13-11704	14-11704	15-11126	15-11704	17-11039	17-11042	17-11046	18-09983
MONITOR, RADIATION, LIQUID				18-10191	18-10392	18-10837	18-10857
15-11318				18-10859	18-10862	18-10993	18-11289
MONITOR, RADIATION, PERSONNEL				18-11291	18-11292	18-11293	18-11295
9-10508	15-10078	15-10086	15-10087	OPERATIONS REPORTS, ANALYSIS			
15-10508	15-11254			17-09417	17-10517	17-10604	17-10746
MONITOR, RADIATION, SAMPLING				OPERATIONS REPORTS, GENERAL			
7-11723	13-11704	14-11704	15-11704	12-09653	12-09665	12-09674	17-09594
MONITOR, RADIATION, STACK				17-10860	17-11422		
7-11723	13-11704	14-11704	15-10195	ORGANIC COOLANT			
15-11704	16-10195	18-11300		5-09956			
MONITORING SYSTEM				ORGANIC IODIDE			
9-10461	9-10515	9-10569	9-11416	7-08895	7-10577	7-11678	7-11681
15-10670				7-11688	7-11689	7-11690	7-11693
MONTE CARLO				7-11694	7-11695	7-11699	7-11700
1-10932				7-11711	7-11726	11-11678	11-11699
MONTECELLO				11-11700			
18-11230	18-11232			ORNL (OAK RIDGE NATIONAL LABORATORY)			
MPBE (MOLTEN PLUTONIUM BURNUP EXPERIMENT)				9-10291	9-10388	12-11328	13-11328
6-10959				15-10093	15-10096	15-10099	15-10812
MSRE (MOLTEN SALT REACTOR EXPERIMENT)				OSCILLATOR, REACTIVITY			
6-11444	12-11444	17-10995	18-10995	6-10717	6-11084	9-10717	17-11084
MTR (MATERIAL TESTING REACTOR)				OUT OF PILE LOOPS AND EXPERIMENTS			
3-11223	12-09675	17-10864	17-11238	7-10586			
N S SAVANNAH				OXIDATION			
7-11732	18-09983			5-10988	7-09374	7-10505	7-11270
NDT DATA (NIT DUCTILITY TRANSITION)				7-11691	8-10341	8-10410	17-10988
5-09926	5-10898	7-11272	11-09393	18-11270			
11-09923	11-09924	11-09926	11-10331	OXIDE			
11-10699	11-11272	17-11044		5-10553	7-10534	7-10535	8-10294
NEODYMIUM				OXIGEN			
7-09352				7-04374	8-11366	18-11366	
NEPTUNIUM				OYSTER CREEK			

17-10053	18-10047			7-11715	7-11716		
OZONE				POROUS MEDIA			
14-11309	15-11309	16-10644	16-10659	5-11227	7-09370	7-11275	7-11716
PAKISTAN				POTASSIUM			
17-10603				5-09642	5-09647	14-09483	14-10077
PALISADES PLANT				14-10080	14-11350	14-11351	15-10077
18-10328	18-10329			15-10080			
PARTICLE SIZE				POWER COEFFICIENT			
7-09273	7-09371	7-09729	7-09913	5-11040	6-10039	6-10567	6-10690
7-10302	7-10350	7-10587	7-10588	6-11084	13-10039	17-10567	17-11040
7-10589	7-11270	7-11705	7-11706	17-11084	18-11295		
7-11707	7-11710	7-11712	7-11717	POWER DISTRIBUTION			
7-11719	7-11720	7-11724	14-11132	2-09858	5-10848	6-10800	6-10875
14-11506	15-11132	15-11506	16-09614	17-10607	17-10799	17-10863	18-10875
16-11120	18-11270			POWER UPGRATING			
PARTICLE SIZE DISTRIBUTION				17-10052	17-10712	18-11277	18-11278
7-09913	7-10302	7-10350	7-10587	PRECIPITATION			
7-10588	7-10589	7-11705	7-11706	16-09611	16-10646	16-10652	16-10661
7-11707	7-11709	7-11720	7-11727	16-10665	16-10669	16-10672	16-10680
14-11506	15-11506	16-10679	16-10766	16-10684	16-10769	16-11115	19-11346
16-10968	16-10973			PRESSURE DROP			
PARTICLE, RADIOACTIVE				5-11452	5-11510	17-10045	
4-09603	14-09603	15-11123	16-09614	PRESSURE, EXTERNAL			
16-10668	16-10678	16-10766		11-10035	16-10818		
PARTICULATE				PRESSURE, INTERNAL			
7-09273	7-09735	7-11682		3-10308	5-09957	5-10899	6-09725
PATHFINDER				6-10685	6-10958	6-11081	8-10530
9-10156	17-08480	18-10156	18-10191	8-10531	8-10887	8-10899	11-09618
18-11290				11-10293	11-10308	11-10331	11-10529
PBF (POWER BURST FACILITY)				11-10530	11-10531	11-10887	12-10888
1-09854	6-10614	6-11316	7-09854	17-11038	17-11081	18-10861	18-10887
12-09854				18-10888			
PEACH BOTTOM				PRESSURIZER			
17-11276	18-11260	18-11261		17-10604			
PERIOD METER				PROCEDURES AND MANUALS			
9-11240				12-10827			
PERSONNEL EXPOSURE, RADIATION				PROMETHIUM			
1-08719	3-08719	7-09360	14-11320	12-10600	13-10600	18-10600	
15-08713	15-08719	15-10091	15-10196	PROMPT CRITICALITY			
15-11121	15-11320	15-11348	17-09312	6-10667			
17-09313	17-10196	17-10198	17-10561	PROMPT NEUTRON LIFETIME			
17-11045	17-11287	18-11289	18-11291	1-10805	1-11161	6-10611	6-10617
PERSONNEL PROTECTIVE DEVICE				6-10805	6-10855	6-11161	9-10855
12-09402	12-09607	12-09666	15-09984	PROPERTY, PHYSICAL			
15-10196	17-09984	17-10196		1-08716	5-08969	5-10847	6-10715
PERTURBATION METHOD				9-08716	16-10663	18-08716	
6-10939	6-10942			PRTR (PLUTONIUM RECYCLE TEST REACTOR)			
PHASE CHANGE				5-10988	6-09694	17-10988	18-11250
5-09635	5-09636	5-09637		PULSED NEUTRON TECHNIQUE			
PIPING				1-10619	1-10805	6-09697	6-10619
11-09925				6-10642	6-10692	6-10716	6-10719
PIQUA				6-10805	6-10939	6-10940	6-10941
9-09416	17-09416	17-09594	17-10605	6-10943	6-10953	9-10716	
PLANT PROTECTIVE SYSTEM				PUMP			
9-10156	9-10292	9-10885	9-11416	4-11055	5-11039	5-11046	17-11039
18-10156	18-10885			17-11046			
PLASTICITY				PUMP, JET			
11-10034	11-10331	11-10529	11-10720	18-11232	18-11363		
PLC SHARE PROGRAM				PYROLYTIC			
3-10311	8-10311	14-10074	15-10074	1-10656	8-10341	13-10656	
PLUM BROOK				QUAD CITIES 1			
5-11325				7-11365	8-11366	18-11361	18-11362
PLUTONIUM				18-11363	18-11365	18-11366	
1-10618	1-10619	4-09603	4-11163	RADIATION DAMAGE			
6-09695	6-10039	6-10619	6-10803	5-08969	5-09917	5-09918	5-09921
6-10804	6-10854	6-10956	6-11088	5-09926	7-10534	7-11274	9-11433
6-11090	6-11156	7-09913	7-10534	11-09393	11-09917	11-09918	11-09921
7-10535	7-10854	7-11270	7-11271	11-09926	11-10699	11-11274	17-11238
7-11712	7-11720	7-11721	8-10295	18-11050			
9-10851	12-10966	12-11328	13-10039	RADIATION EFFECT			
13-11328	14-09603	14-11313	15-10086	5-08969	5-09917	5-09918	5-09920
17-10607	17-10799	17-11045	17-11090	5-09926	7-11274	9-10447	11-09917
18-11000	18-11001	18-11021	18-11088	11-09918	11-09920	11-09926	11-11274
18-11163	18-11270	18-11414		14-08712	14-11309	15-11309	16-09613
PLUTONIUM DIOXIDE				RADIATION IN PERSPECTIVE			
18-11247	18-11250			1-08719	3-08719	15-08719	15-11349
PLUTONIUM OXIDE				RADIATION MODEL			
5-09978	6-09695	6-10539	6-10979	5-09633			
7-09913	7-11712	7-11720	17-09978	RADIATION PROTECTION, ORGANIZATION			
PM 2A (PORTABLE MEDIUM NUCLEAR POWER PLANT)				1-08719	3-08719	14-11320	15-08719
17-10983				15-11128	15-11320	15-11348	15-11349
POISON, SOLUBLE				RADIATION SAFETY AND CONTROL			
2-11154	6-11154	9-11304	17-09788	1-08719	3-08719	7-09360	7-09736
17-10860	17-10866			14-11132	15-08719	15-11126	15-11128
POLAND				15-11132	15-11348	15-11349	17-10834
6-11177				RADIATION, PUBLIC EDUCATION/ACCEPTANCE			
POCL BOILING				1-10335	1-10565	17-10335	17-10565
5-09642	5-09644	5-09645	5-09954	RADIOACTIVITY, RELEASE			
POPULATION EXPOSURE				3-10839	15-10563	15-11714	16-10652
14-10080	15-10080	15-11121		16-10971	17-10562	17-10563	
POROUS DIFFUSION				RADIOCHEMICAL ANALYSIS			

5-10846	7-10302	14-11317	16-10663	5-10430	5-11083	6-10430	6-10538
16-10682				6-10612	6-10613	6-10615	6-10641
RADIOCHEMICAL PLANT SAFETY				6-10649	6-10685	6-10688	6-10714
1-10703	7-11687	12-10600	13-10600	6-10800	6-10933	6-10950	6-11059
13-10702	13-10703	13-10704	13-11133	6-11060	6-11081	6-11085	6-11415
13-11330	18-10600			7-10933	9-10714	17-11059	17-11060
RADIOCHEMICAL PROCESSING				17-11081	17-11083	17-11085	19-10430
1-10409	1-10705	1-10805	6-10805	REACTOR, AEC OWNED			
7-09736	7-10534	9-11436	12-09602	5-10988	17-10988	17-10989	
12-09675	12-10600	13-10600	13-10702	REACTOR, ARMY			
13-10705	13-10810	13-11132	13-11329	17-10983	17-11082		
13-11330	15-10195	16-10195	17-09602	REACTOR, BEO MODERATED			
17-10198	17-10835	18-10600	18-11261	17-11427			
RADIOGRAPHY				REACTOR, BOILING WATER			
15-10196	17-10196			5-10574	5-10846	5-11058	5-11322
RADIOISOTOPE				5-11323	5-11324	6-09377	6-10709
1-10409	7-11715	7-11716	15-11714	6-10852	6-10853	6-10946	6-10952
16-09620				6-11174	7-11365	8-11366	8-11413
RADIOLOGICAL ASSISTANCE				9-10156	9-10709	9-10946	9-11049
16-10645				9-11304	15-09984	17-08480	17-09984
RADIOLYTIC GAS				17-10044	17-10045	17-10046	17-10053
9-10566	17-10566	17-10866	17-11005	17-10278	17-10568	17-10606	17-10984
RADIUM				17-11004	17-11005	17-11037	17-11038
5-10532	5-10560	6-10532	7-10532	17-11047	17-11049	17-11058	17-11174
RACON				17-11246	17-11364	17-11413	18-09948
14-10077	14-10080	15-10077	15-10080	18-09949	18-10047	18-10156	18-11230
15-11123	16-10664			18-11231	18-11232	18-11239	18-11290
RAINOUT				18-11300	18-11361	18-11362	18-11363
14-09274	14-11312	15-09274	15-11312	18-11364	18-11365	18-11366	
16-09611	16-10678	16-10817	16-10972	REACTOR, BREEDER			
16-11114	16-11115			1-10695	5-10430	6-09783	6-10430
RARE EARTH				6-10567	6-10695	6-10935	6-10936
14-08712	16-09611			6-10937	6-10959	6-10978	6-11424
RAVENSWOOD				7-10297	7-10533	7-10552	9-10935
1-09856	2-09856	2-09857	12-09856	9-10937	9-10978	9-11424	11-09746
REACTIVITY COEFFICIENT				12-11424	17-09650	17-10050	17-10567
1-08441	5-10430	6-08441	6-09694	17-10986	17-11259	18-09746	18-09783
6-09695	6-10430	6-10709	6-11249	18-10862	18-11021	18-11247	18-11295
9-10709	19-10430			18-11414	18-11429	19-10430	
REACTIVITY EFFECT				REACTOR, CIRCULATING FUEL			
5-09978	6-09725	6-10935	6-10938	6-11444	12-11444		
9-10935	17-09788	17-09978	17-10863	REACTOR, DESALINATION			
REACTIVITY EFFECT, ANOMALOUS				18-11247			
17-09417	17-10605	17-11036		REACTOR, FAST			
REACTIVITY, EXCESS				1-10695	5-10430	5-10532	5-10547
1-10718	6-10709	6-10718	6-10953	5-10548	5-10549	5-10550	5-10551
6-11090	6-11152	9-10709	17-11090	5-10553	5-10554	5-10556	5-10560
REACTOR CONTROL				6-09987	6-10430	6-10532	6-10536
9-10292				6-10537	6-10538	6-10540	6-10541
REACTOR COOLANT				6-10542	6-10543	6-10544	6-10545
5-09605	5-10120	5-10556	7-10297	6-10546	6-10550	6-10611	6-10617
REACTOR DESCRIPTION				6-10643	6-10649	6-10667	6-10695
11-09746	17-11276	18-09744	18-09745	6-10715	6-10801	6-10855	6-10865
18-09746	18-10047	18-10340	18-10748	6-10935	6-10936	6-10937	6-10938
18-11089	18-11224	18-11239	18-11247	6-10942	6-10945	6-10950	6-10959
REACTOR DYNAMICS				6-10978	6-10978	6-11006	6-11088
7-11154	5-10430	6-09404	6-09989	6-11156	6-11269	6-11424	7-10297
6-10430	6-10509	6-10689	6-10691	7-10532	7-10533	7-10534	7-10535
6-10697	6-10531	6-10939	6-10947	7-10550	8-10530	8-10531	9-10504
6-10948	6-10951	6-10953	6-10960	9-10855	9-10935	9-10937	9-10945
6-10970	6-10578	6-11006	6-11088	9-10978	9-10978	9-11006	9-11417
6-11154	6-11179	6-11303	6-11415	9-11424	11-09746	11-10529	11-10530
9-10472	9-10473	9-10509	9-10960	11-10531	12-11424	17-10050	17-10986
9-10978	9-11006	18-11088	19-10430	18-09746	18-09987	18-10748	18-10862
REACTOR KINETICS				18-11030	18-11088	18-11247	18-11295
5-10316	5-10430	5-10532	5-10549	18-11429	19-10430		
5-10553	5-10578	6-09694	6-09740	REACTOR, FAST BREEDER			
6-10430	6-10532	6-10578	6-10658	5-11040	17-11040		
6-11155	7-10532	7-10578	18-09740	REACTOR, FAST BURST			
19-10430				6-09737	6-10696	17-11082	
REACTOR OFFGAS				REACTOR, FLUX TRAP			
7-10297				17-10602			
REACTOR POWER				REACTOR, GAS COOLED			
5-10121	17-10193	17-10194	17-11364	6-09783	6-09987	6-11090	6-11266
18-11364				6-11415	11-09747	11-11012	12-11012
REACTOR SAFETY SYSTEM				15-10086	17-09650	17-10343	17-10345
6-10509	9-10156	9-10292	9-10388	17-10608	17-10833	17-11090	17-11276
9-10473	9-10509	18-10156	18-10340	17-11427	18-09744	18-09745	18-09783
18-11363				18-09987	18-10340	18-11164	18-11224
REACTOR STABILITY				18-11260	18-11261		
5-10430	6-08896	6-09377	6-09404	REACTOR, GENERAL			
6-09783	6-10430	6-10693	6-10694	17-10835			
6-10697	6-10802	6-10930	6-10951	REACTOR, GRAPHITE MODERATED			
6-10952	9-10292	18-09783	19-10430	5-11083	6-10609	6-10610	6-10614
REACTOR STARTUP EXPERIENCE, INITIAL				6-10957	6-11090	6-11153	6-11249
17-10712	17-10836			6-11266	6-11316	9-10504	15-10086
REACTOR STARTUP TESTING				17-10050	17-11083	17-11090	17-11276
17-08480	17-11258	17-11276	18-11250	18-11260	18-11261		
REACTOR TEST FACILITY				REACTOR, HEAVY WATER			
5-09605				5-10988	6-10954	6-10955	6-11415
REACTOR TRANSIENT				9-10461	9-10569	9-10955	14-11130

15-11130	17-10746	17-10836	17-10866	17-10616	17-10863	17-10864	17-11083
17-10988	17-11004	17-11005	17-11258	17-11238	17-11258	17-11422	18-09740
18-10859	18-11089	18-11250		18-11030	18-11277	18-11278	
REACTOR, HIGH FLUX				REACTOR, THERMAL			
17-11258				5-10574	6-11006	9-11006	
REACTOR, HOMOGENEOUS				REACTOR, TRAINING			
2-11154	6-11154	18-11293	19-11286	18-09415	18-10857	18-11292	
REACTOR, LARGE				REACTOR, WATER			
6-10719	6-10801	6-10978	9-10978	5-10574	6-10620	6-10685	9-10620
REACTOR, LIQUID METAL COOLED				RECOMBINER			
5-10430	5-11040	6-10430	6-10509	7-09731	7-09732		
6-10609	6-10959	6-10978	6-11153	RECOVERY PROCESS			
6-11249	6-11424	7-10297	7-10533	14-11506	15-11506		
7-10552	7-10558	7-10559	8-10359	REDUNDANCE			
9-10439	9-10504	9-10509	9-10978	9-10928	18-10928		
9-11424	11-09746	12-11424	17-10050	REFLECTOR			
17-10986	17-11040	18-09746	18-10748	6-10696	18-11031		
18-10862	18-11021	18-11247	18-11295	REGULATING SYSTEM			
18-11429	19-10430			17-11042			
REACTOR, MOLTEN SALT				REGULATION, AEC			
6-11444	12-11444	17-10995	18-10995	1-09855	1-09856	1-10687	2-09855
REACTOR, ORGANIC COOLED				2-09856	3-10807	3-10808	5-10880
9-09416	17-09416	17-09594	17-10605	5-10881	6-10874	6-10875	7-10876
REACTOR, POOL TYPE				8-10872	8-10887	9-10156	9-10877
6-10685	17-09982	17-10193	17-10194	9-10878	9-10879	9-10882	9-10884
17-11052				9-10885	9-10886	9-10891	9-10897
REACTOR, POWER				11-10873	11-10887	12-09855	12-09856
17-11259				12-10687	12-10883	12-10888	12-10889
REACTOR, PRESSURE TUBE				12-10890	12-10893	12-10894	12-10895
5-10988	6-10954	6-10955	9-10955	12-10896	12-10897	15-09984	15-11041
17-10836	17-10988	18-10855	18-11028	17-09984	17-11041	18-10156	18-10870
18-11030	18-11250			18-10871	18-10872	18-10873	18-10874
REACTOR, PRESSURIZED WATER				18-10875	18-10876	18-10877	18-10878
1-09854	1-09856	2-09856	2-09857	18-10879	18-10880	18-10881	18-10882
5-09926	5-10578	5-10867	5-10880	18-10883	18-10884	18-10885	18-10886
5-10881	5-10898	5-10899	5-10927	18-10887	18-10888	18-10889	18-10890
5-11039	5-11046	5-11051	6-09740	18-10891	18-10893	18-10894	18-10895
6-10578	6-10612	6-10709	6-10874	18-10896	18-10897	18-10993	
6-10875	6-11084	7-09854	7-10578	REGULATION, GENERAL			
7-10867	7-10876	8-10872	8-10887	3-11505			
8-10899	9-10292	9-10473	9-10709	REGULATION, IAEA			
9-10877	9-10878	9-10879	9-10882	1-10310	3-10310		
9-10884	9-10886	9-10891	9-10897	RELEASE RATE			
9-10928	9-11418	11-09618	11-09748	7-10297			
11-09751	11-09926	11-10867	11-10887	RELIABILITY ANALYSIS			
11-10892	11-10929	12-09854	12-09856	11-09925	18-11232	18-11363	
12-10883	12-10888	12-10889	12-10890	RELIABILITY, COMPONENT			
12-10893	12-10894	12-10895	12-10896	4-11054	17-10833		
12-10897	17-09417	17-09439	17-09788	REMOTE MANIPULATING AND VIEWING			
17-10049	17-10052	17-10604	17-10607	12-09607			
17-10746	17-10836	17-10860	17-10983	RESEARCH CONTRACT			
17-11039	17-11044	17-11046	17-11051	6-11424	9-11424	12-11424	18-11000
17-11057	17-11084	18-09740	18-09983	18-11001	18-11429		
18-10328	18-10329	18-10859	18-10861	REVIEW			
18-10868	18-10871	18-10872	18-10874	1-09855	2-09855	9-10448	12-09855
18-10875	18-10876	18-10877	18-10878	RHODIUM			
18-10879	18-10880	18-10881	18-10882	7-09352			
18-10883	18-10884	18-10886	18-10887	RISO (RESEARCH LABORATORY, DENMARK)			
18-10888	18-10889	18-10890	18-10891	12-09654			
18-10892	18-10893	18-10894	18-10895	RIVER, GENERAL			
18-10896	18-10897	18-10927	18-10928	19-11346			
18-10929	18-11050			ROSSI ALPHA			
REACTOR, PULSED				1-11161	6-10611	6-10696	6-10935
6-09737	6-10643	6-10865	6-11059	6-10938	6-11161	9-10935	
6-11060	6-11081	17-10193	17-10194	ROVER PROGRAM			
17-10858	17-11048	17-11059	17-11060	7-09729	15-11125		
17-11081				RUBIDIUM			
REACTOR, RESEARCH				5-11453			
1-10565	2-11154	6-10957	6-10960	RUTHENIUM			
6-11059	6-11060	6-11081	6-11154	7-09352	7-10558	14-08712	15-11165
6-11155	9-10388	9-10960	17-10344	SAFE FAILURE CRITERION			
17-10565	17-10603	17-10712	17-10713	9-10886	9-10928	17-11038	18-10886
17-10834	17-10858	17-11036	17-11042	18-10928			
17-11059	17-11060	17-11081	18-10392	SAFEGUARDS REPORT, GENERAL			
18-10837	18-11293			6-09740	7-10270	12-10600	13-10600
REACTOR, SPACE				18-09740	18-09948	18-09949	18-10270
15-11125				18-10328	18-10329	18-10600	18-10993
REACTOR, SUPERHEAT				18-11231	18-11232	18-11277	18-11278
5-10574	5-11322	5-11323	5-11324	SAFEGUARDS REPORT, PRELIMINARY			
6-11085	6-11174	8-11413	9-10566	7-11365	8-11366	18-11361	18-11362
9-11043	17-08480	17-08480	17-10051	18-11363	18-11365	18-11366	
17-10197	17-10202	17-10517	17-10566	SAFEGUARDS REPORT, RESPONSE TO AEC QUESTIONS			
17-11037	17-11043	17-11085	17-11174	5-10880	5-10881	5-10898	5-10899
17-11248	17-11413	18-10117	18-10191	5-10927	6-10874	6-10875	7-10876
18-11028	18-11089	18-11239	18-11290	8-10872	8-10887	8-10899	9-10877
REACTOR, TEST				9-10878	9-10879	9-10882	9-10884
1-10718	3-11223	5-11083	5-11325	9-10885	9-10886	9-10891	9-10897
5-11457	6-09724	6-09740	6-10610	9-10928	11-10873	11-10887	11-10892
6-10612	6-10613	6-10614	6-10718	11-10929	12-10883	12-10888	12-10889
6-10949	6-10957	6-10960	6-11176	12-10890	12-10893	12-10894	12-10895
6-11269	6-11316	9-10960	17-10345	12-10896	12-10897	18-10868	18-10870

18-10871	18-10872	18-10873	18-10874	2-09680			
18-10875	18-10876	18-10877	18-10878	SITING, REACTOR			
18-10879	18-10880	18-10881	18-10882	1-09852	1-09855	1-09856	2-09851
18-10883	18-10884	18-10885	18-10886	2-09852	2-09855	2-09856	2-09857
18-10887	18-10888	18-10889	18-10890	2-09858	2-11014	2-11154	2-11158
18-10891	18-10892	18-10893	18-10894	6-11154	11-11014	12-09852	12-09855
18-10895	18-10896	18-10897	18-10927	12-09856	18-11230		
18-10928	18-10929			SITING, WASTE DISPOSAL			
SAFETY INJECTION				18-11230			
8-10872	17-10051	18-10872		SLAB			
SAFETY PRINCIPLES AND PHILOSOPHY				6-09696			
1-09855	1-10335	1-10525	2-09855	SMOKE			
5-10553	6-10709	7-10297	7-10552	7-11718	7-11724		
9-10156	9-10709	9-11240	12-09855	SNAP 10A (SYSTEMS FOR NUCLEAR AUXILIARY POWER)			
17-10335	18-10156			4-10037			
SAFETY REVIEW (OPERATIONS, EXPERIMENTS)				SNAP 15 (SYSTEMS FOR NUCLEAR AUXILIARY POWER)			
3-10842	13-10842	18-11277		4-11163	18-11163		
SALT				SNAP 8 (SYSTEMS FOR NUCLEAR AUXILIARY POWER)			
12-09602	17-09602			9-11433			
SAMPLING				SNAP, GENERAL (SYSTEMS FOR NUCLEAR AUX. POWER)			
4-11252	5-10578	6-10570	7-09729	4-09601	4-09603	14-09603	
7-09736	7-10578	7-11705	7-11711	SNAPTRAN (SNAP TRANSIENT REACTOR TEST SERIES)			
7-11718	7-11719	7-11723	7-11728	4-11054	5-10578	6-10578	6-10714
7-11732	14-11252	15-11123	16-09611	6-10933	6-10934	7-10578	7-10933
16-09620	16-10665	16-10672	16-10678	9-10714			
16-10680	16-10681	16-10684	16-10769	SODIUM			
16-10814	16-10817	16-11114		2-11158	5-09629	5-09630	5-10120
SAMPLING, HIGH ALTITUDE				6-10715	6-11088	7-08692	7-10297
16-10652	16-10653	16-10657	16-10662	7-10533	7-10552	7-10558	7-10559
16-10668	16-10669	16-10671	16-10678	7-11270	7-11680	7-11717	7-11718
16-10682				7-11719	7-11720	8-10359	8-10530
SAN ONOFRE				9-10504	11-10530	14-11350	18-11088
9-11418	17-11057			18-11270			
SAVANNAH RIVER PLANT				SODIUM COEFFICIENT			
1-10703	7-11696	11-11696	13-10703	6-10536	6-10537	6-10538	6-10540
17-10989				6-10541	6-10542	6-10543	6-10617
SAVANNAH RIVER PRODUCTION REACTORS				6-10649	6-10801	6-10978	6-11006
9-10461				9-10978	9-11006		
SAXTON				SOIL			
5-09978	6-11084	17-09417	17-09978	14-10080	15-10080		
17-10607	17-11084	18-10861		SOIL, NUCLIDE OCCURRENCE			
SCATTERING (SKYSHINE)				14-09483	14-10077	14-11312	15-10077
16-09617				15-11312			
SCRAM, FALSE				SOIL, PROPERTY			
9-09416	17-09416	17-10604	17-10836	14-09483			
SCRUBBER				SOIL, RADIONUCLIDE MOVEMENT THROUGH			
7-09735	7-11271	7-11723	11-09748	14-10080	15-10080		
SEAL				SOL-GEL PROCESS			
11-10325				8-10294			
SEDIMENT				SOLVENT EXTRACTION PROCESS			
14-09485	19-11346			13-11329	13-11330		
SEFOR (SOUTHWEST EXP. FAST OXIDE REACTOR)				SOURCE, CONTINUOUS			
1-10695	6-10695	6-10935	6-10936	16-09616	16-10669	18-11300	
6-10937	6-10978	6-11424	9-10935	SOURCE, ELEVATED			
9-10937	9-10978	9-11424	12-11424	16-09616	16-10669	16-10787	
18-11429				SOURCE, GROUND LEVEL			
SEISMOLOGY				16-10650			
3-10311	8-10311	11-10929	18-10871	SOURCE, LINE			
18-10929	18-11363			16-09616			
SEPARATOR				SOURCE, NEUTRON			
7-11715				15-10083	15-10086	15-10099	16-09613
SERVOMECHANISM				18-10862			
9-10388				SOURCE, POINT			
SHELL				15-10083	16-09616	16-10650	16-10669
11-09394	11-10034	11-10035	11-10331	SOURCE, RADIATION			
11-11016	11-11020			1-10409	12-09656	15-10096	17-10990
SHIELDING				SOURCE, RADIATION, LOST			
12-10883	14-10085	15-09937	15-10085	15-10563	17-10562	17-10563	
15-11121	17-10343	17-10984	18-10883	SPACE DEPENDENT DYNAMICS			
SHIPPING CONTAINER				2-11154	5-10430	6-09725	6-10430
1-10310	3-10056	3-10308	3-10309	6-10685	6-10717	6-10719	6-10802
3-10310	3-10807	3-10808	3-10839	6-10976	6-10978	6-11107	6-11154
3-11221	3-11222	3-11223	11-10308	6-11155	6-11315	9-10717	9-10978
12-09661	13-11221			19-10430			
SHIPPINGPORT				SPACECRAFT			
9-10473	11-09751	17-09788	17-10604	5-09634	6-10800	9-10508	15-10508
SHOCK WAVE				SPAIN			
3-10311	5-10487	5-10560	8-10311	12-09675			
11-10529	11-11019			SPERT 1 (SPECIAL POWER EXCURSION REACTOR TEST)			
SHUTDOWN MARGIN				6-10949	6-10957	6-10958	
1-10805	6-09725	6-10692	6-10802	SPERT 3 (SPECIAL POWER EXCURSION REACTOR TEST)			
6-10805	6-10939	6-10940	6-10941	6-09740	6-10612	18-09740	
6-10942	6-10543	6-10945	6-11432	SPERT 4 (SPECIAL POWER EXCURSION REACTOR TEST)			
9-10878	9-10945	17-10602	18-10878	6-09724	6-10613		
SHUTDOWN SYSTEM, SECONDARY				SPHERF			
9-10879	18-10879			5-09636	6-09696	11-11020	
SILVER				SPRAY, GENERAL			
7-10586				5-09629	5-09630	7-11698	11-11698
SITE CLIMATOLOGY				SRE (SODIUM REACTOR EXPERIMENT)			
16-10645	16-10646	16-10671	16-10765	6-10609	6-11153	6-11249	
SITING, GENERAL				STACK			

7-11271	16-10676	16-10765	16-10787	SURVEY, RADIATION, ENVIRONMENTAL			
18-10392				14-09274	14-11312	14-11320	15-09274
STAFFING, TRAINING, QUALIFICATION				15-10195	15-11041	15-11312	15-11320
17-10053	17-10835	18-10117		16-10195	17-11041		
STATISTICAL ANALYSIS				SURVEY, RADIATION, GENERAL			
18-11414				7-09360	17-10343		
STATISTICAL CORRELATION				SUTTON DIFFUSION FORMULA			
5-10316	15-11127			5-10475	15-10475	18-10475	
STEAM				SWEDEN			
5-09643	5-10120	5-10121	5-10556	6-10611	6-10647	6-10855	9-10855
5-10574	5-10847	5-11452	7-08682	12-09653	14-09486	18-11089	
7-09370	7-11678	8-10341	11-11678	SWITZERLAND			
STEAM LINE RUPTURE				12-09652			
7-11365	18-11365			SYSTEM DESCRIPTION			
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5-09917	5-09918	5-09926	7-10586	TECHNETIUM			
11-09917	11-09918	11-09926	11-10331	7-09352			
11-10699	11-11009	11-11010	11-11011	TELLURIUM			
STEEL LINER				15-10812			
11-09747	11-10007			TEMPERATURE COEFFICIENT			
STEEL, STAINLESS				1-08441	6-08441	6-09694	6-10039
5-09921	5-10847	6-10696	6-10854	6-10954	6-10956	6-10979	6-11006
7-10586	7-10854	7-11274	11-09921	6-11059	6-11090	6-11153	6-11176
11-10007	11-11274	12-11056	17-10048	9-11006	13-10039	17-10712	17-11059
17-11246				17-11090			
STEP (SAFETY TEST ENGINEERING PROGRAM)				TEMPERATURE GRADIENT			
4-11054	5-10578	6-10578	7-10578	5-11225	6-10975		
STOICHIOMETRY				TEMPERATURE TRANSIENT			
17-11248				5-09622	5-09623	5-09630	5-09961
STORAGE CONTAINER				5-10532	5-10547	5-10548	5-10549
3-10806	11-10806	12-09656	12-09659	5-10554	5-10555	5-11225	5-11321
12-09661	13-10806			5-11460	6-10532	7-10532	11-10293
STRATOSPHERE				TENSILE PROPERTY			
16-10659	16-10680	16-10682	16-10769	5-09917	5-09920	5-09921	5-09926
16-11113				7-11272	11-09917	11-09920	11-09921
STRESS				11-09922	11-09923	11-09924	11-09926
5-09926	7-10876	7-11272	11-09922	11-10331	11-10699	11-11272	
11-09923	11-09924	11-09926	11-10034	TEST, COMPONENT			
11-10035	11-10331	11-10699	11-10720	9-10291			
11-11011	11-11272	17-10050	17-11276	TEST, CONTROL ROD DRIVE			
18-10876				17-11427			
STRESS ANALYSIS				TEST, DESTRUCTIVE			
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5-10898	6-09725	7-11272	9-08716	6-10714	9-10714	11-09926	11-11010
11-09925	11-09926	11-10034	11-10034	17-10983			
11-10035	11-10035	11-10308	11-10720	TEST, DOP FILTER			
11-10743	11-10929	11-11020	11-11272	7-11722	7-11725		
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7-11272	11-11272			TEST, FILTER			
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7-09352	7-09731	7-10558	12-10600	7-11731	7-11732	17-10991	
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15-11165	15-11312	15-11352	16-09611	7-11728	7-11729	7-11730	7-11731
16-09620	16-10682	18-10600		7-11732			
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SULFUR				15-10508			
2-09853				TEST, LEAK RATE			
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17-11051	18-10927	18-11031		TEST, NONDESTRUCTIVE			
SURFACE CONTAMINATION				7-10299	12-09672	12-10827	
7-10586	16-10573			TEST, PHYSICS			
SURFACE FILM DEPOSIT				4-09601	6-10567	6-11424	9-11424
17-09417	17-09439	17-09788	17-10054	12-11424	17-10052	17-10517	17-10567
17-10604	17-10605			18-11429			
SURFACE TO VOLUME RATIO				TEST, PREOPERATIONAL			
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19-11346				TEST, PROOF			
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15-11131				9-10282	9-10515	9-10885	10-10282
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15-11129	19-11346			18-10893			
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6-10658	6-10685	6-10686	6-10715	13-11133	14-09485	16-11119	17-10833
6-10852	6-10853	6-10952	6-10958	17-11090	18-09744	18-09745	18-10340
6-10970	6-11107	6-11154	7-10533	UNITED STATES			
7-11679	11-10293			1-09664	2-09680	11-09676	12-09655
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11-09751				URANIUM			
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THERMAL INSULATION				6-10619	6-10938	6-10956	6-10957
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5-11051	11-11011	17-11048	17-11051	7-11721	8-10294	12-09602	13-10656
17-11082	17-11238			13-10703	14-10077	14-10080	15-10077
THERMAL PROPERTY				15-10080	15-10812	17-09602	17-10199
5-09647	5-09954	5-09961	5-10547	17-10201	18-11000	18-11001	
5-10549	5-10845	5-11227	5-11321	URANIUM CARBIDE			
7-10575	7-11691			6-11156	7-08682	7-09350	7-10557
THERMODYNAMICS				URANIUM DIOXIDE			
5-09635	5-10120	5-10121	5-10553	1-10703	5-09978	5-10273	5-10532
5-10845	7-08682	7-10557		5-10988	5-11083	5-11227	6-09695
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4-11163	18-11163			13-10702	13-10703	15-10812	17-09978
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11-10007	11-10743			18-11000	18-11001	18-11088	18-11247
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7-11273				6-10539	6-10610	6-10612	6-10615
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14-11132	15-11132			6-10979	6-11156	7-09352	7-09359
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16-10681	16-11116			URANIUM SULFIDE			
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7-11710				URANIUM, NATURAL			
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17-10563	17-10564			5-10553	8-10294		
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6-09404	6-09989	6-10654	6-10689	8-11413	17-11413		
6-10691	6-10852	6-10853	6-10856	VELA UNIFORM PROGRAM, PROJECT SHOAL			
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5-10845				13-10809	14-09663	15-11349	
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1-10310	3-10056	3-10308	3-10309	VIBRATION			
3-10310	3-10807	3-10808	3-10839	17-10836			
3-10840	3-10842	3-11221	11-10308	VOID COEFFICIENT			
12-09652	12-09653	12-09654	12-09656	2-11154	5-10430	6-09695	6-09783
12-09658	12-09659	12-09660	12-09663	6-10430	6-10540	6-10617	6-10647
12-09665	12-09667	12-09671	12-09673	6-10649	6-10852	6-11154	6-11176
13-10842	13-11221	14-09663		6-11177	18-09783	19-10430	
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13-09670				16-10684	16-10766		
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5-10550	5-11083	6-10550	6-10610	13-10702	13-11330	14-11312	15-11312
6-10614	6-10854	6-10957	6-11088	WASTE DISPOSAL, GENERAL			
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18-11088				14-11703			
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17-11048	17-11059	17-11060	17-11081	15-11312	15-11320		
18-10837				WASTE DISPOSAL, OCEAN			
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13-10702	14-11130	15-11130	17-10200	WASTE DISPOSAL, RIVER			
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16-10682	16-10769	16-10818	16-10971	WASTE HANDLING			
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WASTE TREATMENT, SOLID				6-08896	6-09695	6-10688	6-11432
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WATER TREATMENT				6-10346	6-10694	6-10875	6-11432
5-10846	14-11317	19-11346		9-10473	17-10049	17-10604	18-10875
WATER VAPOR				YANKEE			
7-11271	7-11678	7-11688	7-11689	17-09439	17-10052	17-10860	17-11044
7-11690	7-11695	7-11696	7-11699	18-11050			
7-11712	7-11729	11-11678	11-11696	ZIRCALLOY			
11-11699				8-11366	9-11043	12-09602	17-09602
WATER, DRINKING				17-11043	18-11366		
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19-11346				4-10037	5-09921	7-09352	7-10558
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5-11173	5-11452	5-11457	5-11463	17-09602			
5-11465	7-09370	7-09731	7-09732	ZPPR (ANL ZERO POWER PLUTONIUM REACTOR)			
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15-11320	16-10660			ZPR III (ANL ZERO POWER REACTOR)			
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FOLLOWING IS A LIST OF AUTHORS WHOSE DOCUMENTS
HAVE BEEN ABSTRACTED IN THIS PUBLICATION

ABLITT JF				4-10037		
17-10833				BARTNOFF S		
ACKERMAN FJ				17-09417		
7-11690				BATES AEG		
ACKERMAN J				9-10388		
7-11701				BATES RG		
ACKLEY RD				15-10670		
7-11689				BAUER AA		
ADAMS RE				7-10535		
7-11689	7-11709	7-11711		BAUMEISTER KJ		
ADLEY FE				5-11325		
7-11686				BAURMASH L		
AEBY JW				7-11717	7-11718	
16-10648	16-10665	16-11114		BEAN CH		
AHLQUIST AJ				17-10606		
4-10520				BEATTY DC		
AKAISHI J				17-10052		
17-11287				BEATTY RA		
AKCASU AZ				17-10606		
6-10951	6-10976			BECK CK		
ALBRECHT RW				1-09855	2-09855	12-09855
6-10943				BECK GP		
ALCORN FM				6-11059	17-11059	
6-11176				BECK HL		
ALEKSEYEV CV				14-10080	15-10080	
5-10844				BECK JV		
ALGER DL				5-09961		
1-08441	6-08441			BECKER M		
ALLAN AR				6-10941		
7-11683				BEISSWENGER H		
ALTOMARE S				7-10535		
5-11325				BELLERMANN W		
AMLOT LW				11-11012	12-11012	
6-10950				BELLIER J		
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11-09923				YOSHIDA T			
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WHITBY KT				12-09669			
7-09273				ZAOSTROVSKII FP			
WHITE L				5-11170			
5-11510				ZEBROSKI EI			
WHITEHEAD HC				6-10539			
16-10817				ZEBROSKI EL			
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WHITT KW				5-09624			
17-09594				ZENKEVICH BA			
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WICKER CO				9-09416	17-09416	17-09594	
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