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NASA INDUSTRIAL APPLICATION CENTER University of Southern California

Denney Research Building, Third Floor Los Angeles, California 90007 (213) 741-6132

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VOLUME 4

BIBLIOGRAPHY

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Bibliography

During the course of this project we studied an extensive range of research materials covering significant research in each technology area as reported for the past ten years. It should also be noted that considerable input and knowledge was obtained from discussions with people engaged in relevant fields of research and development. In keeping with the spirit of the ATDH orientation toward emerging technology, and in order to assess the pertinence of various applications for inclusion in the project, it was necessary to contact key people and agencies for up-to-the-minute estimates of engineering development potential.

The bibliographic section lists information sources used in generating concepts for the ATDH. Copies of all listed items are maintained in the project files.

The most useful resource for the project was the extensive microfiche library maintained by NIAC which contains most of the technical reports on file in the NASA computer data base. A representative listing of microfiche documents reviewed for the ATDH project is included in this bibliography.

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12.6.5 NASA, Spinoff, 1979, LI-9000, Thermal Tile
12,6.6 Johns-Manville, Insulation Systems, 1979, Total Insulation Capability brocures (2)
12.6.7 Mobay, Pittsburg, PA, Sept 1978, General Referenoe Manual, Urethane Board Roof Insulation
12.6.8 Gaz Transport-McDonnel Douglas Corp. Astronautics, April 1978, LNG Containment System, CIP-M-1.3, Revised June 1978
12.6.9 GT-MDC, Feb 1977, Why 3-D Reinforced Insulation for LNG Containment, MDC-G6727, CIP-E-1.11

12.7 Window and Doors

12.7.1 Anderson, Bayport, Minn., 1980 Windows and Gliding Doors, brochures
12.7.2 DOE/LLL, Jan 1979, Windows for Energy Efficient Buildings
12.7.3 DOE/LLL, Dec 1978, Thermal Performance of Insulating Window Systems, LBL-8835, EEB-W-79-07
12.7.4 NASA, Spinoff, 1979, Nunsun, Window Insulation
12.7.5 NASA, Spinoff, 1979, Aluminized Mylar, Coughlin Solar Screen

12.8 Locks, Hardware

12.9 Subsurface Space Treatments

12.10 Panels (Eg. Honeycomb and Composites)

12.10.1 Hexcel, Dublin, CA, 1977, Technical Science Bulletin, Honeycomb and Prepeg in Sandwich Construction
12.10.2 Hexcel, Dublin, CA, Nov 1979, HRH-10, Aramid Fibre/Phenolic Resin Honeycomb

13. Interior Furnishings

13.1 Floor Coverings and Treatments

13.1.1 Sherwin Williams Chemicals, Cleveland, OH, 1979, 1,3-BAC and MXDA Curing Agents for Epoxy Resins for Coatings, Tech. Bulletin 159

13.2 Wall Coverings and Treatments

13.2.1 B.F. Goodrich, 1979-1980, Building Products News and Vinyl Building Products Newsletter

13.2.2 B.F. Goodrich, May 1978, Chemical Division, Vinyl Building Products: A Case Study

13.3 Ceiling Coverings and Treatments

13.4 Fabrics and Materials

13.5 Furniture

13.5.1 NASA, Spinoff, 1979, Temper Foam, Springback Foam

13.6 Variable Space Partitioning

13.7 Internal Doors, Windows

13.8 Internal Locks, Hardware

13.9 Styling and Decorative Options

13.9.1 LA Times, Jan 1980, Home Magazine, Energy Wise and Stylish Houses

13.10 Instrument Paint Applications

13.10.1 NASA, Spinoff, 1977, Space Shuttle, Intumescent Material

14. Transportation and Materials Handling

14.1 Storage and Servicing Facilities

14.1.1 NASA, Spinoff, 1978, Nickel-Zinc Battery, Electric Vehicles

14.2 Fueling/Charging Outlets

15. Residential Systems

15.1 ATH Project

15.1.1 NIAC, Univ. So. Calif., March 14, 1980, Project Plans and Concept Development

15.1.2 NIAC, Univ. So. Calif., Jan 11, 1980, Preliminary Design Concept for Water and Sewer Systems

15.1.3 NIAC, Univ. So. Calif., ATH, Jan 11, 1980, Preliminary HVAC Load Calculations
15.1.4 NIAC, Univ. So. Calif., ATH, March 21, 1980, Concepts for On-Site Waste Disposal
15.1.5 NIAC, Univ. So. Calif., ATH, May 2, 1980, Preliminary Estimate of PV Array and Redox Sizes
15.1.6 NIAC, Univ. So. Calif., ATH, May 12, 1980, ATH Concept Development for Water System

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15.2.2 Motorola Semiconductor, 1980, House of the Future
15.2.3 The Ahwatukee House, 1980 Brochure
15.2.4 Heating, Piping, and Air Conditioning, Oct 1980, Sun-Tronic House, CDA Project Showcases Energy Saving Options
15.2.5 ASHRAE Journal, Updated, Previously Nov 1975, The Energy House at Quechee Lake
15.2.6 ERDA, MED, Minimum Energy Dwelling, brochure
15.2.7 NASA, Spinoff, 1977, Tech House, The House that NASA Built
15.2.8 NASA, TSP for Tech Brief, June 1976, NASA Technology Utilization House, LAR-12134
15.2.9 NASA, 1976, Tech House, An Early Evaluation (Technology Utilization Office)
15.2.10 NASA, SP-442, 1980, Lessons of the NASA Tech House

15.3 Attitudes to Conservation

PRINT 01/2/1-4 TERMINAL=24

79N22760# ISSUE 13 PAGE 1758 CATEGORY 52 RPT#: PB-291379/6 EPA-600/1-78-068 CNT#: EPA-68-03-2464 78/12/00 111 PAGES UNCLASSIFIED DOCUMENT

UTTL: Evaluation of toxic effects of organic contaminants in recycled water TLSP: Final Report, 30 Sep. 1976 - 31 May 1978

AUTH: A/GRUENER, N.

CORP: Gulf South Research Inst., New Orleans, La. AVAIL.NTIS SAP: HC A06/MF A01

MAJS: /*CARCINOGENS/*CONTAMINANTS/*PHYSIOLOGICAL EFFECTS/*RECYCLING/*TOXICOLOGY/*WASTE WATER

MINS: / HUMAN PATHOLOGY/ MICE/ MUTATIONS/ POTABLE WATER/ TISSUES (BIOLOGY)

ABA: GRA

ABS: The results of a comprehensive series of toxicological studies designed to evaluate the health effects of the application of recycled water for drinking purposes are reported. Exposure for a limited time (20% of a lifespan) the concentrated, recycled water (about 100-1000 times present human exposure) does not lead to physiological changes in mice. Rodent and human cells were tested in vitro for general toxicity, mutagenicity, and carcinogenicity. Results for all three effects in the tissue cultures were positive. These effects were significantly increased by the presence of a liver activation system.

79N16550*# ISSUE 7 PAGE 897 CATEGORY 54 RPT#: NASA-CR-152227 CNT#: NAS2-9715 78/11/00 46 PAGES UNCLASSIFIED DOCUMENT

UTTL: Four-man rated dual catalyst system for the recovery of water from urine TLSP: Final Report

AUTH: A/BUDININKAS, P.

CORP: GARD, Inc., Niles, Ill. AVAIL.NTIS SAP: HC A03/MF A01

MAJS: /*CATALYSIS/*POTABLE WATER/*URINALYSIS/*WATER RECLAMATION

MINS: / BIOCONTROL SYSTEMS/ HUMAN WASTES/ MANNED SPACE FLIGHT/ URINE/ WATER QUALITY

ABA: G.G.

ABS: The catalytic system was integrated with a 4-man rated urine wick evaporator. During operation, urine vapor produced by the wick-evaporator was treated in the catalytic system to remove ammonia and volatile hydrocarbons, and water was recovered by condensation in a water cooled condenser. The system operated completely automatically and required no manual adjustments, except periodic supply of urine and removal of the recovered water. Although the system was designed for treating 0.325 kg urine per hour, this rate could be achieved only with a fresh wick, then gradually decreased as the wick became saturated with urine solids. The average urine treatment rates achieved during each of the three endurance tests were 0.137, 0.217, and 0.235 kg/hr. The quality of the recovered water meets drinking water standards, with the exception of a generally low pH.

79N10693* ISSUE 1 PAGE 92 CATEGORY 51 RPT#: NASA-CASE-MSC-16098-1 US-PATENT-4,118,315 US-PATENT-APPL-SN-792068 US-PATENT-CLASS-210-23F US-PATENT-CLASS-210-96M US-PATENT-CLASS-210-433M 78/10/03 7 PAGES UNCLASSIFIED DOCUMENT Filed 28 Apr. 1977

UTTL: Water system virus detection TLSP: Patent

AUTH: A/FRASER, A. S.; B/WELLS, A. F.; C/TENOSO, H. J. PAA: A/(Organon Diagnostics, El Monte, Calif.); B/(Organon Diagnostics, El Monte, Calif.); C/(Organon Diagnostics, El Monte, Calif.) PAT: C/inventors (to NASA)

CORP: National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.; Organon Diagnostics, El Monte, Calif. SAP: Avail: US Patent Office Sponsored by NASA

MAJS: /*OPTICAL EQUIPMENT/*VIRUSES/*WASTE WATER/*WATER RECLAMATION/*WATER TREATMENT

MINS: / ACETATES/ AGGLUTINATION/ FILTRATION/ HYDRAULIC EQUIPMENT/ PATENTS/ POLYSTYRENE/ POTABLE WATER

ABA: Official Gazette of the U.S. Patent Office

ABS: The performance of a waste water reclamation system is monitored by introducing a non-pathogenic marker virus, bacteriophage F2, into the waste-water prior to treatment and, thereafter, testing the reclaimed water for the presence of the marker virus. A test sample is first concentrated by absorbing any marker virus onto a cellulose acetate filter in the presence of a trivalent cation at low pH and then flushing the filter with a limited quantity of a glycine buffer solution to desorb any marker virus present on the filter. Photo-optical detection of indirect passive immune agglutination by polystyrene beads indicates the performance of the water reclamation system in removing the marker virus. A closed system provides for concentrating any marker virus, initiating and monitoring the passive immune agglutination reaction, and then flushing the system to prepare for another sample.

78N22585*# ISSUE 13 PAGE 1734 CATEGORY 51
RPT#: NASA-CASE-GSC-12158-1 US-PATENT-APPL-SN-888434
78/03/20 40 PAGES UNCLASSIFIED DOCUMENT

UTTL: Rapid, quantitative determination of bacteria in water

TLSP: Patent Application

AUTH: A/CHAPPELLE, E. W.; B/PICCIOLO, G. L.; C/THOMAS, R. R.; D/JEFFERS, E. L.; E/DEMING, J. PAA: C/(Boeing Co., Seattle); D/(Boeing Co., Seattle); E/(Hahnemann Hospital) PAT: E/inventors (to NASA)

CORP: National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md. AVAIL.NTIS

SAP: HC A03/MF A01

MAJS: /*ASSAYING/*BACTERIA/*BIOLUMINESCENCE/*FLUID FILTERS/*WATER QUALITY

MINS: / ADENOSINE TRIPHOSPHATE/ AUTOMATIC CONTROL/ CHEMILUMINESCENCE/ CONCENTRATION (COMPOSITION)/ PATENT APPLICATIONS

ABA: NASA

ABS: The methods and apparatus for the quantitative determination of bacteria in salt or fresh water, sewage effluent, drinking supply water, or estuaries are presented. A synthetic polymer hollow fiber filter/concentrator was employed to concentrate bacteria in a water sample by forcing the water across a filter or by recirculating the water through the filter to remove the filtrate. A bioluminescent assay for making a quantitative determination of water borne bacteria was provided. Systems are presented for automating the assays.

PRINT 03/2/9 TERMINAL=24

79N10555# ISSUE 1 PAGE 74 CATEGORY 44 RPT#:
PB-282652/7 UMTA-CA-06-0106-77-1-VOL-1 CNT#:
DOT-UT-60097T 77/09/01 5 VOLS 123 PAGES
UNCLASSIFIED DOCUMENT

UTTL: Study of flywheel energy storage Volume 1: Executive summary TLSP: Final Technical Report

AUTH: A/LAWSON, L. J.; B/SMITH, A. K.; C/DAVIS, G. D.

CORP: AiResearch Mfg. Co., Torrance, Calif. AVAIL.NTIS

SAP: HC A06/MF A01; also available in set of 5 reports HC E14 as PB-282651-SET

MAJS: /*ENERGY STORAGE/*FLYWHEELS/*LIFE CYCLE COSTS/* PROPULSION SYSTEM PERFORMANCE/*URBAN TRANSPORTATION

MINS: / ELECTRIC HYBRID VEHICLES/ ENERGY CONSERVATION/ ENERGY TECHNOLOGY/ REGENERATION (ENGINEERING)/ SYSTEMS ENGINEERING

ABA: GRA

ABS: The practically and viability of flywheel propulsion systems for urban mass transit vehicles was studied. The U.S. transit properties requirements show that the most suitable vehicle for deployment of flywheel propulsion is the full-size transit bus. Several propulsion concepts were hypothesized and subjected to comparative analysis with present diesel buses, trolley coaches, and battery buses in regard to performance and life-cycle economics. The following basic concepts could provide high quality transit service: pure flywheel propelled bus; flywheel/diesel engine hybrid bus; flywheel-augmented trolley coach; and flywheel/battery hybrid bus. Design studies conducted for the four propulsion configurations show a high degree of commonality of components among the four concepts. Final life-cycle cost analyses show all four concepts to be in a competitive range with present transit vehicles.

PRINT 04/2/1-29 TERMINAL=24

79N29678*# ISSUE 20 PAGE 2700 CATEGORY 45
RPT#: NASA-CR-160281 CNT#: NAS9-15368 79/00/00
103 PAGES UNCLASSIFIED DOCUMENT

UTTL: Development of reclaimed potable water quality criteria TLSP: Final Report, 29 Jul. 1977 - 31 Dec. 1978

AUTH: A/FLORY, D. A.; B/WEIR, F. W.

CORP: Spectrix Corp., Houston, Tex. AVAIL.NTIS SAP: HC A06/MF A01

MAJS: /*CRITERIA/*POTABLE WATER/*WATER QUALITY/*WATER RECLAMATION

MINS: / CONTAMINANTS/ ORGANIC COMPOUNDS/ SPACE FLIGHT/ STANDARDS/ TOXICOLOGY

ABA: G.Y.

ABS: In order to minimize launch requirements necessary to meet the demands of long-term spaceflight, NASA will reuse water reclaimed from various on-board sources including urine, feces, wash water and humidity condensate. Development of reclamation systems requires the promulgation of water quality standards for potable reuse of the reclaimed water. Existing standards for domestic U.S. potable water consumption were developed, but do not consider the peculiar problems associated with the potable reuse of recycled water. An effort was made to: (1) define a protocol by which comprehensive reclaimed water potability/palatability criteria can be established and updated; and (2) continue the effort to characterize the organic content of reclaimed water in the Regenerative Life Support Evaluation.

79N25929# ISSUE 16 PAGE 2204 CATEGORY 85 RPT#:
PB-291939/7 NSF/RA-780372 CNT#: NSF 78-SP-0933
78/05/00 70 PAGES UNCLASSIFIED DOCUMENT

UTTL: Community water management, research needs for small and urbanizing communities

AUTH: A/DELPORTO, D. A.

CORP: Ecos, Inc., Boston, Mass. AVAIL.NTIS SAP: HC A04/MF A01

MAJS: /*CITIES/*RESEARCH MANAGEMENT/*URBAN DEVELOPMENT/* WATER MANAGEMENT

MINS: / ECONOMIC FACTORS/ SEWAGE TREATMENT/ WASTE UTILIZATION/ WASTE WATER

ABA: GRA

ABS: Various methods of approach in dealing with the water needs of small and urbanizing communities are outlined. Water quality issues, such as type of contamination and sources of pollution and historical perspectives of wastewater management, the re-definition and semantics of supply and demand, the conflict of environment vs. energy, and economic considerations are covered.

79N21953# ISSUE 12 PAGE 1645 CATEGORY 85 RPT#:
PB-289386/5 W79-01978 OWRT-T-C058(7709)(1) 78/01/00
123 PAGES UNCLASSIFIED DOCUMENT

UTTL: Water reuse highlights, a summary volume of wastewater reclamation and reuse information

AUTH: A/HEATON, R. D.; B/REHFIELD, E.

CORP: American Water Works Association Research Foundation, Denver, Colo. AVAIL.NTIS SAP: HC A06/MF A01
Sponsored by Dept. of Interior and EPA

MAJS: /*CITIES/*SEWAGE TREATMENT/*WASTE UTILIZATION/*WASTE WATER/*WATER RECLAMATION

MINS: / ACTIVATED CARBON/ CHLORINATION/ HEALTH PHYSICS/ PUBLIC HEALTH/ WATER QUALITY

ABA: GRA

ABS: A comprehensive summary of municipal wastewater reclamation and refuse information is presented. Advanced wastewater treatment related conferences, health effects research, legislative and funding activities, modeling, position statement, published literature, regulations, water reuse plans and demonstrations are discussed.

79N19943# ISSUE 10 PAGE 1366 CATEGORY 85 RPT#:
PB-289210/7 EISENHOWER-CONSORTIUM-BULL-6 78/08/00
27 PAGES UNCLASSIFIED DOCUMENT

UTTL: Operation and design of evapotranspiration waste disposal systems

AUTH: A/HASFURTHER, V. R.; B/FOSTER, D. H.

CORP: Wyoming Univ., Laramie. CSS: (Dept. of Civil and Architectural Engineering.) AVAIL.NTIS SAP: HC A03/MF A01
Sponsored in part by the US Forest Service, Fort Collins, Colo.

MAJS: /*EVAPOTRANSPIRATION/*SEWAGE TREATMENT/*WASTE DISPOSAL /*WYOMING

MINS: / BACTERIA/ BIOCHEMICAL OXYGEN DEMAND/ CONSTRUCTION/ FEASIBILITY ANALYSIS/ RURAL AREAS/ SYSTEMS ENGINEERING / WATER QUALITY

ABA: GRA

ABS: An evapotranspiration (ET) unit for disposal of wastewater was constructed and operated at Laramie, Wyoming, from August 1973 to September 1975. Results of the loading and wastewater treatment that occurred with the ET unit are presented. The results indicate that the use of evapotranspiration for treating wastewater from rural and mountain second homes during the warmer month of the year is feasible. The treatment of the wastewater by the ET unit through chemical and biological action is high and in many cases is within EPA standards for some uses of the water. An ET unit can be sized using standard evapotranspiration equations and examples of sizing are given. The ET unit is cost competitive with

conventional systems for individual home sites, provides zero ground and surface water pollution, and is readily adaptable to most rural and mountainous areas.

79N14971# ISSUE 5 PAGE 680 CATEGORY 85 RPT#: PB-286560/8 EPA-600/2-78-173 CNT#: EPA-R-802874
78/09/00 854 PAGES UNCLASSIFIED DOCUMENT
UTTL: Management of small waste flows TLSP: Final Report, Jun. 1971 - Jun. 1977
CORP: Wisconsin Univ. - Madison. AVAIL.NTIS SAP: HC A99/MF A01
MAJS: /*CONSTRICTIONS/*SEWAGE TREATMENT/*WASTE DISPOSAL/*WASTE WATER
MINS: / BUILDINGS/ ENVIRONMENT MANAGEMENT/ INDUSTRIAL WASTES / LAND USE/ SOIL SCIENCE
ABA: GRA
ABS: Laboratory and field investigations were evaluated to develop satisfactory methods for on-site treatment and disposal of wastewaters, regardless of the site constraints. The studies were subdivided into several categories including characteristization of household and commercial wastewaters, assessment of wastewater treatment alternatives, evaluation of soils for treatment and disposal of wastewater, estimation of infiltrative capacities of soils, design and operation of alternative systems dependent upon soil design and operation of alternative systems not dependent upon soil, management of on-site disposal systems, and institutional and regulatory control of on-site systems.

78N29993*# ISSUE 20 PAGE 2741 CATEGORY 85
RPT#: NASA-CR-151818 CNT#: NAS9-15369 PROJ. 6037.6
78/00/00 40 PAGES UNCLASSIFIED DOCUMENT
UTTL: Breadboard wash water renovation system --- using ferric chloride and ion exchange resins to remove soap and dissolved salts TLSP: Final Report, 15 Jul. 1977 - 15 Jul. 1978
CORP: Springborn Labs., Inc., Enfield, Conn. AVAIL.NTIS SAP: HC A03/MF A01
MAJS: /*BREADBOARD MODELS/*ION EXCHANGE RESINS/*IRON CHLORIDES/*SOAPS/*SYSTEMS ENGINEERING/*WATER RECLAMATION
MINS: / ADSORPTION/ CONSUMABLES (SPACECREW SUPPLIES)/ PRECIPITATION (CHEMISTRY)/ PRETREATMENT/ REVERSE OSMOSIS
ABA: A.R.H.
ABS: A total wash water renovation system concept was developed for removing objectionable materials from spacecraft wash water in order to make the water reusable. The breadboard model system described provides for pretreatment with ferric chloride to remove soap by chemical precipitation, carbon adsorption to remove trace dissolved organics, and ion exchange for removal of dissolved salts. The entire system was put into continuous operation and carefully monitored to assess overall efficiency and equipment maintenance problems that could be expected in actual use. In addition, the capacity of the carbon adsorbers and the ion-exchange resin was calculated and taken into consideration in the final evaluation of the system adequacy. The product water produced was well within the Tentative Wash Water Standards with regard to total organic carbon, conductivity, urea content, sodium chloride content, color, odor, and clarity.

78N28995# ISSUE 19 PAGE 2609 CATEGORY 85 RPT#: AD-A053522 77/06/00 121 PAGES UNCLASSIFIED DOCUMENT
UTTL: Water conservation: Residential impacts TLSP: M.S. Thesis
AUTH: A/WARNER, D. E.
CORP: Arizona State Univ., Tempe. CSS: (Dept. of Industrial Engineering.) AVAIL.NTIS SAP: HC A06/MF A01
MAJS: /*CONSERVATION/*RESIDENTIAL AREAS/*WATER CONSUMPTION
MINS: / COST ANALYSIS/ ENERGY CONSERVATION/ POLICIES/ WATER MANAGEMENT/ WATER RESOURCES
ABA: Author (GRA)
ABS: The purpose of this study was to determine the constraints and mis-understandings associated with residential water conservation and to analyze the actual savings in dollars, water and energy that are achieved by the selection and installation of water conserving facilities. Residential water conservation programs have only been implemented during crisis or emergency situations. However, the recent awareness on the part of the American public, primarily due to the deterioration of energy resources, has focused greater attention on the interrelationships between water and energy. Research is undertaken to determine the potential constraints to a residential water conservation program and the reasons for conserving water. An analysis of various water conserving facilities is developed and applied to a residential area with an estimate of savings in dollars, water and energy. Additional impacts are reviewed as a result of this residential conservation program.

78N26030# ISSUE 16 PAGE 2200 CATEGORY 85
77/00/00 11 PAGES UNCLASSIFIED DOCUMENT DCAF F012830

UTTL: Public acceptance of expanded uses of renovated wastewater

AUTH: A/OLSON, B. H.

CORP: California Univ., Irvine. AVAIL.NTIS SAP: HC A02/MF A01
Presented at the Intern. Conf. on Advan. Treat. and Reclamation of Wastewater

MAJS: /*ACCEPTABILITY/*HUMAN REACTIONS/*WASTE WATER/*WATER RECLAMATION

MINS: / CALIFORNIA/ PSYCHOLOGICAL FACTORS/ RESOURCES MANAGEMENT

ABA: Author

ABS: To determine attitudes toward expanded uses of reclaimed water, a survey of 153 adults living in a California community currently using renovated wastewater was conducted. Many respondents were not aware that reclaimed water was being used in their community. Most respondents which were aware of renovated wastewater use in the community could not identify areas which received reclaimed water. Individuals surveyed were in favor of using reclaimed water to supplement existing water supplies as long as the uses were not in the home. Public attitude was favorable to reclaimed water practices such as car washes, industrial use, and commercial laundries. Men accepted reclaimed water more than women. Education was an important variable in determining attitudes towards renovated wastewater. College graduates had a higher level of acceptance than noncollege graduates. Certain psychological variables: aversion to the unclean, aversion to human waste, and overconcern with health were found to be negatively correlated with attitudes toward reclaimed water usages. Other psychological variables: faith in science and technology, ecological concern and aversion toward change were found to have no effect on attitudes toward reclaimed water.

78N26029# ISSUE 16 PAGE 2200 CATEGORY 85
77/00/00 41 PAGES UNCLASSIFIED DOCUMENT DCAF F012830

UTTL: Potable water quality of advanced wastewater treatment plant effluents --- water reclamation in the United States

AUTH: A/ENGLANDE, A. J., JR.; B/SMITH, J. K.; C/ENGLISH, J. N. PAA: B/(Gulf S. Res. Inst., New Orleans); C/(EPA, Cincinnati)

CORP: Tulane Univ., New Orleans, La. CSS: (School of Public Health.) AVAIL.NTIS SAP: HC A03/MF A01
Presented at the Intern. Conf. on Advan. Treat. and Reclamation of Wastewater

MAJS: /*EFFLUENTS/*POTABLE WATER/*UNITED STATES OF AMERICA/*WASTE WATER/*WATER RECLAMATION/*WATER TREATMENT

MINS: / CONTAMINANTS/ DECONTAMINATION/ REGULATIONS/ SYSTEM EFFECTIVENESS

ABA: Author

ABS: Extensive chemical, physical, and biological analyses of effluent quality from six advanced water treatment (AWT) demonstration facilities were conducted, and the results were compared to current drinking water regulations in the United States. Those pilot plant sites evaluated included: Lake Tahoe, California; Blue Plains, District of Columbia; Pomona, California; Dallas, Texas; and Escondido and Orange County, California. Each AWT plant is described and respective performance parameter summaries are provided. Parameters which were found to exceed drinking water standards in most of the treated effluents included: nitrogen (ammonia and nitrate), phenol, odor, CCE, turbidity, and specific heavy metals. All systems, however, were characterized by high quality effluents and produced water approaching potable quality.

78N26028# ISSUE 16 PAGE 2200 CATEGORY 85
77/00/00 14 PAGES UNCLASSIFIED DOCUMENT DCAF F012830

UTTL: Potable reuse research

AUTH: A/HEATON, R. D.

CORP: AWWA Research Foundation, Denver, Colo. AVAIL.NTIS SAP: HC A02/MF A01
Presented at the Intern. Conf. on Advan. Treat. and Reclamation of Wastewater

MAJS: /*POTABLE WATER/*WASTE WATER/*WATER RECLAMATION/*WATER TREATMENT

MINS: / RESEARCH AND DEVELOPMENT/ RESOURCES MANAGEMENT/ SEWAGE TREATMENT

ABA: Author

ABS: The activities of ten water utilities and federal agencies in the U.S. relating to wastewater reclamation and reuse for potable purposes as contrasted to more conventional methods of reuse, are reported. The renovation of sewage effluents to a water product suitable for human use and consumption is being demonstrated in any of three ways: (1) direct potable reuse or the classical pipe-to-pipe definition where highly treated wastewaters from a reclamation plant are reintroduced into the existing water distribution system; (2) planned indirect reuse or the purposeful and knowledgeable discharge of highly treated effluents upstream of an existing water supply intake; and (3) groundwater recharge with spreading or injection of advanced water treatment effluents into a potable aquifer.

78N26018# ISSUE 16 PAGE 2198 CATEGORY 85
77/00/00 11 PAGES UNCLASSIFIED DOCUMENT DCAF F012830

UTTL: The occurrence and fate of organic micro-pollutents in a water reclaimed for potable reuse

AUTH: A/VANRENSBURG, J. F. J.; B/VANROSSUM, P. G.; C/HATTINGH, W. H. J.

CORP: National Inst. for Water Research, Pretoria (South Africa). AVAIL.NTIS SAP: HC A02/MF A01
Presented at the Intern. Conf. on Advan. Treat. and Reclamation of Wastewater

MAJS: /*HYDROCARBONS/*INDUSTRIAL PLANTS/*ORGANIC COMPOUNDS/*PESTICIDES/*POLLUTION CONTROL/*WATER TREATMENT

MINS: / POTABLE WATER/ PUBLIC HEALTH/ TOXIC HAZARDS/ WATER POLLUTION/ WATER RECLAMATION

ABA: Author

ABS: The occurrence of toxic compounds such as chlorinated pesticides, organophosphate pesticides, polynuclear aromatic hydrocarbons, volatile halogenated hydrocarbons and organic material in the feed and the final water produced by the Stander reclamation plant is described. In addition, the efficacy of a pilot reclamation plant to remove a number of selected organic compounds was also studied. It is concluded that the water reclamation for potable reuse by the Stander reclamation plant should permit little, if any, health hazard. It was also shown that the pilot reclamation plant was very effective in removing organic compounds such as those observed in the reclaimed water from the Stander plant.

78N26014# ISSUE 16 PAGE 2198 CATEGORY 85
77/00/00 46 PAGES UNCLASSIFIED DOCUMENT DCAF F012830

UTTL: The application of activated carbon for waste water treatment

AUTH: A/VANLIER, W. C.; B/VANDENBERG, E.; C/LEFTINGA, C.

CORP: Norit N. V., Amersfoort (Netherlands).; Haskoning, Consulting Engineers, Nijmegen (Netherlands). State Agricultural Univ., Wageningen (Netherlands). AVAIL.NTIS SAP: HC A03/MF A01
Prepared in cooperation with Haskoning, Consulting Engineers, Nijmegen and State Agricultural Univ., Wageningen Presented at the Intern. Conf. on Advan. Treat. and Reclamation of Wastewater

MAJS: /*ACTIVATED CARBON/*WASTE WATER/*WATER TREATMENT

MINS: / SOUTH AFRICA/ TECHNOLOGY ASSESSMENT/ WATER QUALITY/ WATER RECLAMATION

ABA: G.Y.

ABS: The results of the carbon treatment step of an independent physico-chemical (ipc) study, applied on sewage of purely domestic origin are reported. In the study two types of carbon were used, powdered activated carbon (pac) and granular activated carbon (gac). Comparison is made between pac and gac runs, along with comparisons with other investigators.

78N25764 ISSUE 16 PAGE 2165 CATEGORY 54 RPT#: SABS-1167-1977 ISBN-0-626-04469-3 77/11/00 42 PAGES In AFRIKAANS and ENGLISH UNCLASSIFIED DOCUMENT DCAF F533900

UTTL: Standard specification for the production of men's protective shoes with stuck-on pre-moulded unit soles and heels

CORP: South African Bureau of Standards, Pretoria. SAP: Avail: Issuing Activity

MAJS: /*PROTECTIVE CLOTHING/*SHOES/*SPECIFICATIONS

MINS: / ADHESIVE BONDING/ CHROMIUM OXIDES/ IMPACT STRENGTH/ PH

ABA: M.V.

ABS: Specifications are given for two types of men's protective shoes, made according to the stuck-on principle. Criteria for acceptance include chromic oxide content, pH, impact strength, bursting strength, wet stitch tear strength, and adhesion between layers. Sampling and inspection methods are given.

78N25744# ISSUE 16 PAGE 2162 CATEGORY 51
77/00/00 9 PAGES UNCLASSIFIED DOCUMENT DCAF F012830

UTTL: Studies on the isolation and identification of hepatitis viruses in water

AUTH: A/GRABOW, W. O. K.; B/PROZESKY, O. W. PAA: B/(Natl. Inst. for Virology, Johannesburg)

CORP: National Inst. of Dental Research, Bethesda, Md. AVAIL.NTIS SAP: HC A02/MF A01
Presented at the Intern. Conf. on Advan. Treat. and Reclamation of Wastewater

MAJS: /*ANTIGENS/*BIOASSAY/*VIRUSES/*WASTE WATER/*WATER POLLUTION

MINS: / CHROMATOGRAPHY/ INFECTIOUS DISEASES/ PUBLIC HEALTH/ WATER TREATMENT

ABA: Author

ABS: Antigens associated with hepatitis viruses were successfully isolated from seeded water samples by means of affinity chromatography. The antibodies trap the virus particles, while non-specific material passes through. After washing, the antigens were released for identification in purified and concentrated form. The hepatitis B associated antigen was identified by means of radioimmunoassay and electron microscopy. Application of the procedure to waste water indicated that the hepatitis B virus is rarely present in polluted water. The hepatitis A associated agent was identified by infectivity tests

using Saguinus nigricollis marmosets.

78N18992# ISSUE 9 PAGE 1239 CATEGORY 85 RPT#: PB-274874/7 EPA-600/2-77-210 CNT#: EPA-R-803292 77/11/00 127 PAGES UNCLASSIFIED DOCUMENT

UTTL: Wastewater characterization and process reliability for potable wastewater reclamation
AUTH: A/PETRASEK, A. C. PAA: A/(Texas A and M Univ., College Station)
CORP: Dallas Dept. of Water Utilities, Tex. AVAIL.NTIS SAP: HC A07/MF A01
MAJS: /*POTABLE WATER/*SEWAGE TREATMENT/*WATER RECLAMATION
MINS: / ACTIVATED SLUDGE/ METALS/ PHOSPHORUS/ WATER POLLUTION/ WATER TREATMENT
ABA: Author
ABS: The reliability of individual unit processes was evaluated and the effects of process instability on product water-quality were investigated. The sequence of unit processes used to treat municipal wastewater consisted of screening, degritting, primary clarification, biological treatment with completely-mixed activated sludge, high-pH lime coagulation, single-stage recarbonation with liquid carbon dioxide, gravity filtration, and two-stage activated carbon adsorption.

78N12908# ISSUE 3 PAGE 407 CATEGORY 85 RPT#: PB-270210/8 EPA-600/2-77-095 CNT#: EPA-S-800990 77/05/00 304 PAGES UNCLASSIFIED DOCUMENT

UTTL: Detection and inactivation of enteric viruses in wastewater TLSP: Final Report, Oct. 1969 - Jan. 1975
AUTH: A/SHUVAL, H. I.; B/KATZENELSON, E.
CORP: Hebrew Univ., Jerusalem (Israel). CSS: (Environmental Health Lab.) AVAIL.NTIS SAP: HC A14/MF A01
MAJS: /*DEACTIVATION/*VIRUSES/*WASTE WATER/*WATER POLLUTION
MINS: / BIOASSAY/ FLUID FILTERS/ MEMBRANES/ OZONE/ POLLUTION MONITORING/ SPECTROPHOTOMETRY
ABA: GRA
ABS: The development and evaluation of methods for concentrating and assaying low levels of viruses in large volumes of water were investigated. Studies on the use of ozone in inactivating viruses in water and wastewater were also reported. Of the eight virus concentration methods evaluated, filtration with cellulose nitrate membranes, aluminum hydroxide and PE-60 proved most promising. The feasibility of using hollow fiber membranes was demonstrated and rapid method capable of detecting viruses in water in less than 24 hours using fluorescent antibodies was developed.

77N21723# ISSUE 12 PAGE 1627 CATEGORY 44 RPT#: PB-260490/8 W77-01052 OWRT-A-061-OKLA(1) 76/07/00 144 PAGES UNCLASSIFIED DOCUMENT

UTTL: An exploratory study of possible energy savings as a result of water conservation practices
AUTH: A/REID, G. W.
CORP: Oklahoma Univ., Norman. CSS: (Bureau of Water Resources Research.) AVAIL.NTIS SAP: HC A07/MF A01
Sponsored by Dept. of Interior
MAJS: /*ENERGY CONSERVATION/*ENERGY CONSUMPTION/*WATER CONSUMPTION
MINS: / COST ANALYSIS/ COST EFFECTIVENESS/ FUEL CONSUMPTION/ WASTE WATER/ WATER RECLAMATION/ WATER TREATMENT
ABA: GRA
ABS: Energy consumption from the use of various alternatives of water conservation practices is evaluated. Comparisons of eighty-one possible household water conservation devices and reuse systems with conventional water use methods and comparisons of flow reduction from residential uses as results of the alternatives are included. Total monetary savings in energy of alternatives associated with pumping, heating, transmission and operating for water production and wastewater treatment are compared with the total monetary savings in water of the water-saving devices. A cost-effectiveness analysis and the ratings of the conservation alternatives in terms of both energy and water saved are included.

77N17617# ISSUE 8 PAGE 1059 CATEGORY 45 RPT#: PB-257936/5 GE75TMP-72 EPA-600/4-76-036 CNT#: EPA-68-01-0759 76/07/00 92 PAGES UNCLASSIFIED DOCUMENT

UTTL: Monitoring groundwater quality: Illustrative examples TLSP: Final Report
AUTH: A/TINLIN, R. M.
CORP: General Electric Co., Santa Barbara, Calif. CSS: (Center for Advanced Studies.) AVAIL.NTIS SAP: HC A05/MF A01
MAJS: /*GROUND WATER/*SEDIMENT TRANSPORT/*WATER POLLUTION
MINS: / AQUIFERS/ ARIZONA/ ARKANSAS/ BRINES/ CALIFORNIA/ CITIES/ CONNECTICUT/ NEW YORK/ NITROGEN/ WASTE DISPOSAL/ WATER QUALITY
ABA: GRA
ABS: The report is designed to show by example site specific procedures for monitoring various classes of groundwater pollution sources. The first of five case histories of actual or potential groundwater pollution is presented with the monitoring techniques and their efficacy. The case history covers brine disposal in Arkansas, plating waste contamination in Long Island, New York, landfill leachate pollution in Milford,

Connecticut, an oxidation pond near Tucson, Arizona, and multiple-source nitrate pollution in the Fresno-Clovis, California, metropolitan area.

77N17610# ISSUE 8 PAGE 1058 CATEGORY 45 RPT#: CONF-760534-1 76/00/00 18 PAGES UNCLASSIFIED DOCUMENT
UTTL: Modular Integrated Utility System (MIUS) as a potential influence on community development
AUTH: A/MIXON, W. R.
CORP: Oak Ridge National Lab., Tenn. AVAIL.NTIS SAP: HC A02/MF A01
Sponsored by ERDA Presented at 5th Ann. Environmental Pollution Symp., Menlo Park, Calif., 12 May 1976
MAJS: /*POLLUTION CONTROL/*RESOURCES MANAGEMENT/*URBAN DEVELOPMENT/*UTILITIES
MINS: / ENVIRONMENTAL ENGINEERING/ LAND USE/ RESIDENTIAL AREAS/ WASTE DISPOSAL
ABA: EPA
ABS: The concept is described for a relatively small plant located within a community to furnish all electricity, space heating and cooling, solid and liquid waste disposal, and potable water within a total systems approach. The resource requirements of one utility are met by utilizing the effluent of another. Possible impacts on land use and community development are emphasized.

76N16669# ISSUE 7 PAGE 880 CATEGORY 45 RPT#: PB-245259/7 WTS-11852 CNT#: DI-14-31-0001-5006 75/07/00 148 PAGES UNCLASSIFIED DOCUMENT
UTTL: Individual home wastewater characterization and treatment
AUTH: A/BENNETT, E. R.; B/LINSTEDT, K. D.
CORP: Colorado Univ., Boulder.; Colorado State Univ., Fort Collins. CSS: (Environmental Resources Center.) AVAIL.NTIS SAP: HC $6.00
Prepared in cooperation with Colorado Univ., Boulder
MAJS: /*RURAL AREAS/*SEWAGE/*WATER TREATMENT
MINS: / AEROBIOLOGY/ COLORADO/ POLLUTION MONITORING/ WASTE DISPOSAL
ABA: GRA
ABS: Disposal of wastewater from isolated homes in mountain and rural locations in Colorado presents unique and difficult problems. The flow and pollution patterns from individual homes are examined along with existing and potential treatment methods. Field evaluation of home wastewater flow and pollutional characteristics was accomplished. Data for individual fixtures and appliances were obtained with measurement of many pollutional parameters. A brief evaluation of the home treatment methods was accomplished.

74N19607*# ISSUE 10 PAGE 1236 CATEGORY 34 RPT#: NASA-TN-D-7600 L-9431 74/04/00 36 PAGES UNCLASSIFIED DOCUMENT
UTTL: Domestic wash water reclamation for reuse as commode water supply using filtration: Reverse-osmosis separation technique
AUTH: A/HALL, J. B., JR.; B/BATTEN, C. E.; C/WILKINS, J. R.
CORP: National Aeronautics and Space Administration, Langley Research Center, Hampton, Va. AVAIL.NTIS SAP: HC $3.25
Washington
MAJS: /*HYGIENE/*POTABLE WATER/*SANITATION/*WATER RECLAMATION/*WATER TREATMENT
MINS: / CHEMICAL ANALYSIS/ LIFE SUPPORT SYSTEMS/ PURIFICATION/ SYSTEMS ENGINEERING
ABA: Author
ABS: A combined filtration-reverse-osmosis water recovery system has been evaluated to determine its capability to reclaim domestic wash water for reuse as a commode water supply. The system produced water that met all chemical and physical requirements established by the U.S. Public Health Service for drinking water with the exception of carbon chloroform extractables, methylene blue active substances, and phenols. It is thought that this water is of sufficient quality to be reused as commode supply water. The feasibility of using a combined filtration and reverse-osmosis technique for reclaiming domestic wash water has been established. The use of such a technique for wash-water recovery will require a maintenance filter to remove solid materials including those less than 1 micron in size from the wash water. The reverse-osmosis module, if sufficiently protected from plugging, is an attractive low-energy technique for removing contaminants from domestic wash water.

74N18724# ISSUE 10 PAGE 1127 CATEGORY 3 RPT#: NBS-TN-789 73/07/00 186 PAGES UNCLASSIFIED DOCUMENT
UTTL: Technical options for energy conservation in buildings TLSP: Final Report
CORP: National Bureau of Standards, Washington, D.C. CSS: (Building Environment Div.) SAP: Avail: SOD HC $2.35 Domestic Postpaid or $2.00 GPO Bookstore as C13.46:789
Prepared for Natl. Conf. of States on Building Codes and Standards and NBS Joint Emergency Workshop on Energy Conserv. in Buildings, Washington, D. C., 19 Jun. 1973

MAJS: /*BUILDINGS/*ENERGY POLICY/*STRUCTURAL DESIGN
MINS: / AIR CONDITIONING EQUIPMENT/ ENERGY CONSUMPTION/ HEATING EQUIPMENT/ THERMAL INSULATION/ WINDOWS (APERTURES)
ABA: Author
ABS: Actions pertinent to existing buildings and new buildings are described. Regarding existing buildings, principal topics include summer cooling, winter heating, and other energy conserving features--i.e., insulation, fenestration, lighting, appliances, domestic hot water, and human comfort. Suggested actions include those which can be accomplished voluntarily or without expense, and also actions which require some modest effort or expense on the part of the building owner or occupant. Regarding new buildings, energy conservation actions are described that deal with building design and mechanical systems. The report concludes with a summary of mechanisms for implementation of such actions and criteria for use in evaluation of them.

73N22931*# ISSUE 13 PAGE 1595 CATEGORY 34
RPT#: NASA-TM-X-2781 L-8831 73/05/00 27 PAGES
UNCLASSIFIED DOCUMENT
UTTL: Evaluation of a multifiltration water reclamation subsystem to reclaim domestic clothes wash water
UNOC: Evaluation of multifiltration water reclamation subsystem to reclaim domestic clothes wash water
AUTH: A/HALL, J. B., JR.
CORP: National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. AVAIL.NTIS SAP: HC $3.00
Washington
MAJS: /*FILTRATION/*SYSTEMS ANALYSIS/*WATER RECLAMATION
MINS: / DETERGENTS/ ENVIRONMENT POLLUTION/ PHOSPHATES/ POTABLE WATER/ PURIFICATION
ABA: Author
ABS: An evaluation has been performed of a multifiltration water reclamation subsystem to determine its capability to recover water from domestic clothes wash water. A total of 32.89 kg (72.5 lb) of clothes were washed during eight wash cycles which used 1.4 lb of detergent, 145 gallons of hot water and 133.9 gallons of cold water. Water recovered at a weighted average process rate of 3.81 gallons per hour met the majority of the 23 requirements established for potable water by the U.S. Public Health Service. Average power consumed during this evaluation was approximately 71 watt-hours per gallon of water recovered. Filter replacement, which was required primarily for the control of micro-organisms in the recovered water averaged 4.86 filters per 100 gallons of wash water processed. The subsystem removed approximately 98 percent and virtually 100 percent of the phosphates and surfactants, respectively, from the wash water.

73N19161*# ISSUE 10 PAGE 1124 CATEGORY 5 RPT#: NASA-CR-128839 MCR-73-7 MCR-72-277 CNT#: NAS9-12504
73/01/00 42 PAGES UNCLASSIFIED DOCUMENT
UTTL: Water recovery and solid waste processing for aerospace and domestic applications
UNOC: Waste water processing and potable water management TLSP: Final Report. Executive Summary
AUTH: A/MURAWCZYK, C.
CORP: Martin Marietta Corp., Denver, Colo. AVAIL.NTIS SAP: HC $4.25
MAJS: /*WATER MANAGEMENT/*WATER RECLAMATION
MINS: / POTABLE WATER/ WATER CONSUMPTION/ WATER POLLUTION
ABA: Author
ABS: The work is described accomplished in compiling information needed to establish the current water supply and waste water processing requirements for dwellings, and for developing a preliminary design for a waste water to potable water management system. Data generated was used in formulation of design criteria for the preliminary design of the waste water to potable water recycling system. The system as defined was sized for a group of 500 dwelling units. Study tasks summarized include: water consumption, nature of domestic water, consumer appliances for low water consumption, water quality monitoring, baseline concept, and current and projected costs.

73N19159*# ISSUE 10 PAGE 1124 CATEGORY 5 RPT#: NASA-CR-128858 DWR-630-09-VOL-2 CNT#: NAS9-12503
72/12/00 2 VOLS 212 PAGES UNCLASSIFIED DOCUMENT
UTTL: Study of water recovery and solid waste processing for aerospace and domestic applications. Volume 2: Final report
UNOC: Waste disposal and water reclamation technology for land use and aerospace engineering application
AUTH: A/GUARNERI, C. A.; B/REED, A.; C/RENMAN, R. E.
CORP: Grumman Aerospace Corp., Bethpage, N.Y. AVAIL.NTIS SAP: HC $12.75
MAJS: /*AEROSPACE ENGINEERING/*LAND USE/*WASTE DISPOSAL/*WATER RECLAMATION
MINS: / CONTAMINATION/ COST ESTIMATES/ TECHNOLOGY UTILIZATION
ABA: Author
ABS: The manner in which current and advanced technology can be applied to develop practical solutions to existing and emerging water supply and waste disposal problems is evaluated. An overview of water resource factors as they affect new community planning, and requirements imposed on residential waste treatment

systems are presented. The results of equipment surveys contain information describing: commercially available devices and appliances designed to conserve water; devices and techniques for monitoring water quality and controlling back contamination; and advanced water and waste processing equipment. System concepts are developed and compared on the basis of current and projected costs. Economic evaluations are based on community populations of from 2,000 to 250,000. The most promising system concept is defined in sufficient depth to initiate detailed design.

73N19158*# ISSUE 10 PAGE 1124 CATEGORY 5 RPT#: NASA-CR-128857 DWR-630-09-VOL-1 CNT#: NAS9-12503
72/12/00 2 VOLS 32 PAGES UNCLASSIFIED DOCUMENT
UTTL: Study of water recovery and solid waste processing for aerospace and domestic applications. Volume 1: Final report summary
UNOC: Water reclamation and waste disposal technology applied to land use and aerospace engineering
AUTH: A/GUARNERI, C. A.; B/REED, A.; C/RENMAN, R. E.
CORP: Grumman Aerospace Corp., Bethpage, N.Y. AVAIL.NTIS SAP: HC $3.75
MAJS: /*AEROSPACE ENGINEERING/*LAND USE/*WASTE DISPOSAL/*WATER RECLAMATION
MINS: / COST ESTIMATES/ TECHNOLOGY UTILIZATION/ THERMODYNAMICS
ABA: J.M.P.
ABS: This study of water reclamation and waste disposal is directed toward a more efficient utilization of natural resources. From an ecological standpoint improved methods of land use, water processing equipment, and ideal population profiles are investigated. Methods are described whereby significant reduction in water usage can be achieved by the adoption of presently available and practically applied technological concepts. Allowances are made for social, natural, and economic contingencies which are likely to occur up to the year 2000.

73N13849* ISSUE 4 PAGE 472 CATEGORY 5 72/00/00
10 PAGES UNCLASSIFIED DOCUMENT
UTTL: Domestic applications for aerospace waste and water management technologies
UNOC: Aerospace technology for solving domestic solid waste disposal, water purification, and water recovery problems
AUTH: A/DISANTO, F.; B/MURRAY, R. W.
CORP: General Electric Co., Philadelphia, Pa. CSS: (Missile and Space Div.)
In NASA. Marshall Space Flight Center Space for Mankind's Benefit p 221-230 (SEE N73-13829 04-30)
MAJS: /*AEROSPACE ENGINEERING/*TECHNOLOGY TRANSFER/*WASTE DISPOSAL/*WATER RECLAMATION/*WATER TREATMENT
MINS: / WATER MANAGEMENT/ WATER POLLUTION/ WATER RESOURCES
ABA: Author
ABS: Some of the aerospace developments in solid waste disposal and water purification, which are applicable to specific domestic problems are explored. Also provided is an overview of the management techniques used in defining the need, in utilizing the available tools, and in synthesizing a solution. Specifically, several water recovery processes will be compared for domestic applicability. Examples are filtration, distillation, catalytic oxidation, reverse osmosis, and electrodialysis. Solid disposal methods will be discussed, including chemical treatment, drying, incineration, and wet oxidation. The latest developments in reducing household water requirements and some concepts for reusing water will be outlined.

72N17316# ISSUE 8 PAGE 1042 CATEGORY 13 RPT#: PB-202778-6 MTR-6009-6-VOL-6 CNT#: OST-26 71/06/00
7 VOLS 331 PAGES UNCLASSIFIED DOCUMENT
UTTL: A technology assessment methodology. Volume 6: Water pollution: Domestic wastes
UNOC: Home sewage treatment technology TLSP: Final Report
AUTH: A/WENK, V. D.
CORP: Mitre Corp., McLean, Va. AVAIL.NTIS SAP: HC $6.00/MF $0.95
MAJS: /*SEWAGE/*TECHNOLOGY ASSESSMENT/*WASTE DISPOSAL/*WATER POLLUTION/*WATER TREATMENT
MINS: / ECONOMICS/ ENVIRONMENTAL CONTROL/ HUMAN WASTES
ABA: Author (GRA)
ABS: A general technology assessment methodology is used to determine the impacts of widespread use of individual home sewage treatment technology during the 1970-1989 time period. The effects of varying rates of diffusion of this technology are analyzed in terms of selected measures of economic and environmental impact. Social and institutional impacts are discussed. Various action options available to identified interest groups are analyzed in terms of their effect upon technology diffusion rates and specific impact areas. The normative nature of this technology assessment called for the use of a dynamic interactive model of the technology diffusion process.

69N32085*# ISSUE 18 PAGE 3301 CATEGORY 4
69/05/00 10 PAGES UNCLASSIFIED DOCUMENT
UTTL: Water supply for the crew during spaceflights
UNOC: Spacecrew water supplies based on physico-chemical regeneration of human waste products
AUTH: A/MOISEYEV, A. A.

CORP: Scripta Technica, Inc., Washington, D. C.
AVAIL.NTIS
IN ITS PROBL. OF SPACE BIOL., VOL. 7 MAY 1969 P
362-372 /SEE N69-32044 18-05/
MAJS: /*METABOLIC WASTES/*POTABLE WATER/*SPACE FLIGHT
FEEDING/*WASTE UTILIZATION
MINS: / CHEMICAL COMPOSITION/ LIFE SUPPORT SYSTEMS/ PURITY

PRINT 05/2/1-57 TERMINAL=24

79N29651# ISSUE 20 PAGE 2697 CATEGORY 44 RPT#: SAND-78-7039 CNT#: EY-76-C-04-0789 79/01/00 54 PAGES UNCLASSIFIED DOCUMENT

UTTL: Regional conceptual design and analysis studies for residential photovoltaic systems. Volume 1: Executive summary TLSP: Final Report

CORP: General Electric Co., Philadelphia, Pa. CSS: (Valley Forge Space Center.) AVAIL.NTIS SAP: HC A04/MF A01

MAJS: /*BUILDINGS/*PHOTOVOLTAIC CONVERSION/*SOLAR ARRAYS/* SPACE HEATING (BUILDINGS)/*SYSTEMS ENGINEERING/* TECHNOLOGY ASSESSMENT

MINS: / COST EFFECTIVENESS/ ENERGY CONVERSION EFFICIENCY/ HEAT STORAGE

ABA: DOE

ABS: A wide range of roof-mounted array systems was studied including PV-only systems and combined and separate PV/thermal collection systems which provide heat for space conditioning and domestic hot water. The attractiveness of the system options were assessed in terms of performance and economic competitiveness based on hourly weather data for twelve designated regions of the US representing a broad spectrum of climatic characteristics. The study determined that if PV economic goals are achieved, PV-only solar energy systems for residential use should be emphasized because of their potential economic viability in all regions. On the basis of the costs and benefits used in the analysis, residential systems without batteries are preferred over systems with batteries assuming utility feedback acceptance at some differential buy-back rate such as 40 to 50% of the sell rate. Side-by-side PV/thermal systems become more viable across the nation with a PV system cost to thermal system cost ratio of 1.

79N29637# ISSUE 20 PAGE 2695 CATEGORY 44 RPT#: ANL/EES-TM-35 CNT#: W-31-109-ENG-38 78/12/00 81 PAGES UNCLASSIFIED DOCUMENT

UTTL: Assessment of the technoeconomic feasibility or Seasonal Thermal Energy Storage systems (STES)

CORP: B and A Engineers Ltd., Chicago, Ill. AVAIL.NTIS SAP: HC A05/MF A01

MAJS: /*ECONOMIC FACTORS/*ENERGY STORAGE/*SOLAR ENERGY CONVERSION/*TECHNOLOGY ASSESSMENT/*THERMAL ENERGY/* WATER HEATING

MINS: / BUILDINGS/ CONSTRUCTION MATERIALS/ COST ANALYSIS/ ILLINOIS/ LIQUID FILLED SHELLS

ABA: DOE

ABS: The feasibility of the use of seasonal thermal energy storage systems employing large volumes of water is examined on the bases of technology and economics. Three building types are considered: single-family houses, low-rise multi-family apartment buildings, and small commercial buildings. Construction costs are based on prevailing conditions in the suburban Chicago area marketplace. Various types of vessels above and below ground are considered along with possible vessel materials.

79N29636# ISSUE 20 PAGE 2695 CATEGORY 44 RPT#: ANL-79-15 CNT#: W-31-109-ENG-38 79/02/00 283 PAGES UNCLASSIFIED DOCUMENT

UTTL: Design and installation manual for thermal energy storage

AUTH: A/COLE, R. L.; B/NIELD, K. J.; C/RHODE, R. R.; D/WOLOSEWICZ, R. M. PAT: A/ed.; B/ed.; C/ed.; D/ed.

CORP: Argonne National Lab., Ill. CSS: (Solar Energy Group.) AVAIL.NTIS SAP: HC A13/MF A01

MAJS: /*ENERGY STORAGE/*SOLAR ENERGY CONVERSION/*STRUCTURAL DESIGN/*SYSTEMS ENGINEERING/*THERMAL ENERGY

MINS: / COST ESTIMATES/ INSTALLATION MANUALS/ INSULATION/ MAINTENANCE/ POSITION (LOCATION)

ABA: DOE

ABS: Information on the design and installation of thermal energy storage in solar heating systems is provided. The manual presented includes sizing storage, choosing a location for the storage device, and insulation requirements. Both air-based and liquid-based systems are covered with topics on designing rock beds, tank types, pump and fan selection, installation, costs, and operation and maintenance. Topics relevant to heating domestic water include safety, single- and dual-tank systems, domestic water heating with air- and liquid-based space heating system, and stand-alone domestic hot water systems.

79N29634# ISSUE 20 PAGE 2695 CATEGORY 44 RPT#: LA-UR-79-239 CONF-790106-5 CNT#: W-7405-ENG-36 79/00/00 9 PAGES UNCLASSIFIED DOCUMENT

UTTL: Trombe walls and direct gain: Patterns of nationwide applicability

AUTH: A/NOLL, S. A.; B/ROACH, J. F.; C/BEN-DAVID, S. PAA: C/(New Mex. Univ., Albuquerque)

CORP: Los Alamos Scientific Lab., N. Mex. CSS: (Systems, Analysis, and Assessment Div.) AVAIL.NTIS SAP: HC A02/MF A01

Presented at 3d Natl. Passive Solar Conf., San Jose, 11-13 Jan. 1979

MAJS: /*ECONOMIC ANALYSIS/*SOLAR HEATING/*SYSTEMS ANALYSIS/* WALLS

MINS: / COST ANALYSIS/ DESIGN ANALYSIS/ PERFORMANCE/ SYSTEMS ENGINEERING/ TABLES (DATA)

ABA: DOE
ABS: The economic performance of Trombe wall and direct gain passive solar heating designs are elevated on a nationwide basis using the LASL/UNM solar economic performance code. Both designs are integrated into a ranch style tract home concept thereby facilitating regional comparisons. Solar add-on costs are established for each design with regional differences in material and labor prices accounted for at each site. System sizes are optimized against the natural gas and electric resistance heating alternatives, the current price and future escalation of which is established for each locale. Results for each passive solar design are summarized on a state-by-state basis followed by a discussion of their comparative economic performance.

79N29625# ISSUE 20 PAGE 2694 CATEGORY 44 RPT#: COO-4577-6 CNT#: EG-77-S-02-4577 79/03/15 16 PAGES UNCLASSIFIED DOCUMENT
UTTL: Phase-one experiment test plan solar photovoltaic/thermal residential experiment
AUTH: A/KERN, E. C., JR.
CORP: Lincoln Lab., Mass. Inst. of Tech., Lexington. AVAIL.NTIS SAP: HC A02/MF A01
MAJS: /*EXPERIMENTAL DESIGN/*PHOTOVOLTAIC CELLS/*SOLAR HOUSES/*SYSTEMS ANALYSIS/*THERMAL ENERGY
MINS: / ENERGY CONVERSION/ HEAT PUMPS/ PERFORMANCE/ PHOTOVOLTAIC EFFECT
ABA: DOE
ABS: Objectives, rationale, and method of a one-year experiment using a residential photovoltaic/thermal power system are presented. Data archived and processed to investigate: (1) series heat pump system performance; and (2) electric utility impacts. A parallel heat pump system is investigated in a subsequent experiment.

79N28780# ISSUE 19 PAGE 2579 CATEGORY 44 RPT#: CONF-781235-2 CNT#: W-31-109-ENG-38 78/00/00 14 PAGES UNCLASSIFIED DOCUMENT
UTTL: Electric rates for commercializing thermal storage in buildings
AUTH: A/ASBURY, J.; B/HOLT, L.
CORP: Argonne National Lab., Ill. AVAIL.NTIS SAP: HC A02/MF A01
Presented at Symp. on Commercialization of Solar and Conservation Technol., Miami Beach, Fla., 11 Dec. 1978
MAJS: /*COST ANALYSIS/*ELECTRICITY/*HEAT STORAGE
MINS: / ECONOMIC ANALYSIS/ UTILITIES
ABA: DOE
ABS: The economic benefits are described of thermal storage in residential buildings, and alternative electric-rate designs to commercialize thermal-storage technologies are analyzed. Storage in three residential applications are considered: electric storage heating, storage air conditioning, and storage domestic water heating. The storage systems collect off-peak electric energy for thermal applications during peak-load hours. The economic rationale for the systems is that the marginal cost of utility-supplied energy is considerably lower during off-peak hours than during on-peak hours. The design and implementations of effective electric rates is the key to commercializing the storage technologies. Four types of rates are evaluated: time-of-use rates, demand charges, and two forms of load management contract rates (a monthly credit and an off-peak discount). The criteria used to evaluate the rates are: combined utility and customer benefits (efficiency), political acceptability, simplicity, and practical feasibility. Alternative rate types are evaluated and findings are presented for each storage application.

79N28771# ISSUE 19 PAGE 2578 CATEGORY 44 RPT#: DOE/CS-0038/2 79/01/00 319 PAGES UNCLASSIFIED DOCUMENT
UTTL: Solar heating and cooling demonstration project summaries
CORP: Department of Energy, Washington, D. C. CSS: (Div. of Solar Applications Developments.) AVAIL.NTIS SAP: HC A14/MF A01
MAJS: /*AIR CONDITIONING/*SOLAR COOLING/*SOLAR HEATING
MINS: / BUILDINGS/ ECONOMIC ANALYSIS/ ENERGY SOURCES/ SOLAR ENERGY CONVERSION
ABA: DOE
ABS: The demonstration program includes commercial and residential-type buildings sponsored by DOE alone, or jointly with other Federal agencies, city and state governments, and private agencies. The commercial projects include a wide variety of building types, such as: office buildings, schools, fire stations, civic centers, factories, and libraries. Residential projects include both single and multifamily dwellings of various configurations. Approximately 200 projects will be instrumented to measure the performance of the solar systems. Analysis of the collected data will provide definitive guides for design criteria and permit realistic economic assessment of various solar systems. The demonstrations are discussed in three sections: commercial demonstration program-non-federal buildings; commercial demonstration program-federal buildings; and residential demonstration program-federal buildings. Maps showing the locations

(by state) of the buildings are provided at the beginning of each section along with an index that identifies each project and page number for the corresponding descriptive information. A map depicting the distribution of all demonstration projects is included in this introduction. The comparable map from last year's publication is also shown to depict the increase in the number of projects. The contents of this document are based on information available as of November 1, 1978.

79N28721*# ISSUE 19 PAGE 2571 CATEGORY 44
RPT#: NASA-CR-161237 OEC-ER-014 CNT#:
EX-76-C-01-2404 79/06/00 258 PAGES UNCLASSIFIED DOCUMENT
UTTL: Solar heating, cooling, and hot water systems installed at Richland, Washington TLSP: Final Report
CORP: Engineering Olympic Corp., Richland, Wash.
AVAIL.NTIS SAP: HC A12/MF A01
Sponsored by NASA
MAJS: /*COOLING SYSTEMS/*HEAT STORAGE/*SOLAR ENERGY CONVERSION/*SOLAR HOUSES/*WASHINGTON
MINS: / HEAT TRANSFER/ PUBLIC RELATIONS/ SOLAR COLLECTORS/ SYSTEMS ENGINEERING
ABA: M.M.M.
ABS: The project described is part of the U. S. Department of Energy's solar demonstration program, and became operational in April 1978. The solar system uses 8,000 square feet of flat-plate liquid collectors in a closed loop to deliver solar energy through a liquid-liquid heat exchanger to the building heat-pump duct work or 9,000-gallon thermal energy storage tank. A 25-ton Arkla solar-driven absorption chiller provides the cooling, in conjunction with a 2,000 gallon chilled water storage tank and reflective ponds on three sides of the building surplus heat. A near-by building is essentially identical except for having conventional heat-pump heating and cooling, and can serve as an experimental control. An on-going public relations program was provided from the beginning of the program, and resulted in numerous visitors and tour groups.

79N27683# ISSUE 18 PAGE 2434 CATEGORY 44 RPT#:
LBL-8583 CONF-790108-3 CNT#: W-7405-ENG-48
79/00/00 9 PAGES UNCLASSIFIED DOCUMENT
UTTL: Modeling passive solar buildings with hand calculations --- conferences
AUTH: A/GOLDSTEIN, D. B.
CORP: California Univ., Berkeley. Lawrence Berkeley Lab.
AVAIL.NTIS SAP: HC A02/MF A01
Presented at 3d Natl. Passive Solar Conf., San Jose, Calif., 11-13 Jan. 1979
MAJS: /*BUILDINGS/*CONFERENCES/*DYNAMIC RESPONSE/*SOLAR COLLECTORS/*THERMAL ENERGY
MINS: / DIFFUSION/ HEAT TRANSFER/ MATHEMATICAL MODELS/ SOLAR ENERGY CONVERSION
ABA: DOE
ABS: An analytic model of passive solar building performance was derived. Heat balances were used on the surfaces of materials that absorb sunlight along with solutions to the diffusion equation, to derive response functions for surface temperature as a function of solar flux and ambient temperature. These expressions are combined to form building response functions. These explicit building response functions allow one to write relatively simple, analytic expressions for room temperature as a function of time over the course of a design day in terms of ambient temperature, sunlight, and heater output. Parallels between the analytic model and computer codes can be exploited to provide a better intuitive understanding of the programs and to assist in the incorporation of accurate passive solar simulation into these codes.

79N24501# ISSUE 15 PAGE 2007 CATEGORY 44 RPT#:
DOE/CS-0042/3 CNT#: EX-76-C-01-2531 78/07/00 25 PAGES UNCLASSIFIED DOCUMENT
UTTL: SOLCOST: Space heating handbook with service hot water and heat loads calculations
CORP: SOLCOST Service Center, Fort Collins, Colo.
AVAIL.NTIS SAP: HC A02/MF A01
MAJS: /*SOLAR COOLING/*SOLAR ENERGY/*SOLAR HEATING/*SPACE HEATING (BUILDINGS)/*WATER HEATING
MINS: / COST ANALYSIS/ HEATING EQUIPMENT/ SYSTEMS ENGINEERING
ABA: DOE
ABS: The SOLCOST is a simplified design method for residential and light commercial solar heating and cooling as well as solar hot water systems. It features heat load calculations, solar vs. conventional cost comparison and solar system sizing. Examples using the system are shown.

79N24317# ISSUE 15 PAGE 1983 CATEGORY 34 RPT#:
NTIS/PS-79/0233/1 79/04/00 249 PAGES UNCLASSIFIED DOCUMENT
UTTL: Heat pumps, volume 1. Citations from the Engineering Index data base --- bibliography TLSP: Progress Report, 1977
AUTH: A/HUNDEMANN, A. S.
CORP: National Technical Information Service, Springfield, Va. AVAIL.NTIS SAP: HC $28.00/MF $28.00
MAJS: /*BIBLIOGRAPHIES/*HEAT PUMPS/*SOLAR HEATING/*SPACE

HEATING (BUILDINGS)/*WATER HEATING
MINS: / ABSTRACTS/ BUILDINGS/ DRYING/ ENERGY CONSERVATION/ SOLAR COOLING/ THERMODYNAMIC EFFICIENCY
ABA: GRA
ABS: Design, performance, and applications of heat pumps are discussed in abstracts from worldwide literature. The heat pumps, which extract heat from one temperature source and deliver the extracted heat for use at a higher temperature are discussed with regard to their energy conserving potential in residential, commercial, and industrial applications. Air to air, air to water, and water to water heat systems are covered. The use of heat pumps, including solar assisted heat pumps, in heating and cooling of buildings and heating of swimming pools is emphasized. This updated bibliography contains 242 abstracts, none of which is new to the previous edition.

79N22635# ISSUE 13 PAGE 1740 CATEGORY 44 RPT#: EPRI-ER-771 CNT#: EPRI PROJ. RP-549 78/05/00 275 PAGES UNCLASSIFIED DOCUMENT
UTTL: EPRI Methodology for Preferred Solar Systems (EMPSS) computer program documentation. User's guide
AUTH: A/NATHANSON, D.; B/MERRIAM, R. L.
CORP: Little (Arthur D.), Inc., Cambridge, Mass.
AVAIL.NTIS SAP: HC A12/MF A01
Sponsored by EPRI
MAJS: /*AIR CONDITIONING/*COMPUTER PROGRAMS/*SOLAR HOUSES
MINS: / SOLAR ENERGY CONVERSION/ SOLAR HEATING/ USER MANUALS (COMPUTER PROGRAMS)/ UTILITIES
ABA: DOE
ABS: A computer program was developed by which the benavior of residential solar heating and cooling systems could be analyzed. Unlike several other programs by which buildings and the performance solar heating and cooling equipment can be analyzed, this program is capable of estimating the cost of backup electrical energy from a utility's actual cost of supply, in addition to its rate structures. In its present form the program permits the specification of a wide variety of solar or conventional heating and cooling devices which use electrical energy. Both the thermal loads of the residence and the utility's system-wide load are dependent upon a weather tape which is used in hourly computations extending over one year. Monthly costs of electrical energy are based upon the hourly electrical demand of the residence and the utility's cost-of-supply model. When combined with equipment costs and specified economic parameters, these monthly energy costs are used to predict total life-cycle costs for each system considered, and to show payback periods when compared with conventional equipment. Detailed descriptions of the program elements and of its input and output data streams are provided.

79N20489# ISSUE 11 PAGE 1446 CATEGORY 44 RPT#: HUD-PDR-156(3) CNT#: IAA H-5574 78/04/00 147 PAGES UNCLASSIFIED DOCUMENT
UTTL: Solar dwelling design concepts
CORP: AIA Research Corp., Washington, D. C. AVAIL.NTIS
SAP: MF A01; SOD HC
MAJS: /*DESIGN ANALYSIS/*SOLAR ENERGY/*SOLAR HOUSES
MINS: / DESIGN ANALYSIS/ ENERGY CONSERVATION/ SOLAR COOLING/ SOLAR HEATING/ STRUCTURAL DESIGN
ABA: G.Y.
ABS: A general resource document is presented which is intended for use by designers, home builders, community leaders, local officials and home owners who are interested in the application of solar heating and cooling to residential structures or are considering participating in the federal solar energy program. The publication provides historical background information, a concise report on existing solar dwellings and systems, a list of design considerations and numerous dwelling and site design concepts.

79N19467# ISSUE 10 PAGE 1299 CATEGORY 44 RPT#: PB-289204/0 NBS-BSS-116 CNT#: E(49-1)-3800 78/11/00 64 PAGES UNCLASSIFIED DOCUMENT
UTTL: Geographical variation in the heating and cooling requirements of a typical single-family house, and correlation of these requirements to degree days
AUTH: A/ARENS, E. A.; B/CARROLL, W. L.
CORP: National Bureau of Standards, Washington, D.C. CSS: (Center for Building Technology.) AVAIL.NTIS SAP: HC A04/MF A01
Sponsored in part by HUD and Assistant Sec. for Policy Develop. and Res.
MAJS: /*CLIMATE/*COOLING/*ENERGY CONSUMPTION/*HEATING
MINS: / BUILDINGS/ ENERGY CONSERVATION/ ENERGY POLICY/ VARIATIONS
ABA: GRA
ABS: Test Reference Year (TRY) hourly climate data tapes are assessed to determine how well they represent long-term average climate when used for estimating average annual heating and cooling requirements. A method to adjust heating and cooling requirements is presented. The geographic variations of annual heating and cooling requirements across the U.S. are quantified by computing the heating and cooling requirements of a typical ranch-style residence for the 8760 hours of each of the 60 TRY tapes and the results are adjusted. The effectiveness of degree-day data for predicting these computed annual heating and

cooling requirements is examined, and the variability of heating and cooling requirements within degree-day zones of 1000 degree-day width is presented.

79N19460*# ISSUE 10 PAGE 1296 CATEGORY 44
RPT#: NASA-CR-158174 JPL-5101-78 DOE/JPL-1012-78/9
78/07/31 58 PAGES UNCLASSIFIED DOCUMENT
UTTL: Thermal and other tests of photovoltaic modules performed in natural sunlight
AUTH: A/STULTZ, J. W.
CORP: Jet Propulsion Lab., California Inst. of Tech., Pasadena. AVAIL.NTIS SAP: HC A04/MF A01
Sponsored by NASA and DOE
MAJS: /*ELECTRONIC MODULES/*PHOTOVOLTAIC CELLS/*SOLAR CELLS /*THERMODYNAMIC PROPERTIES
MINS: / COOLING/ COST EFFECTIVENESS/ ELECTRICAL PROPERTIES/ INSTALLING/ PERFORMANCE TESTS/ STRUCTURAL DESIGN/ WATER
ABA: L.S.
ABS: The bulk of the testing was the characterization of twenty-nine modules according to their nominal operating cell temperature (NOCT) and the effect on NOCT of changes in module design, various residential roof mounting configurations, and dirt accumulation. Other tests, often performed parallel with the NOCT measurements, evaluated the improvement in electrical performance by cooling the modules with water and by channeling the waste heat into a phase change material (wax). Electrical degradation resulting from the natural marriage of photovoltaic and solar water heating modules was also demonstrated. Cost effectiveness of each of these techniques are evaluated in light of the LSA cost goal of $0.50 per watt.

79N19455*# ISSUE 10 PAGE 1297 CATEGORY 44
RPT#: NASA-CR-150869 CNT#: NAS8-32244 78/12/00 69 PAGES UNCLASSIFIED DOCUMENT
UTTL: Final system instrumentation design package for Decade 80 solar house
CORP: Copper Development Association, Inc., New York, N. Y. AVAIL.NTIS SAP: HC A04/MF A01
MAJS: /*INSTRUMENT PACKAGES/*SOLAR HOUSES/*SOLAR PONDS (HEAT STORAGE)
MINS: / COOLING SYSTEMS/ PIPE FLOW/ PYRANOMETERS/ SOLAR ENERGY CONVERSION
ABA: M.M.M.
ABS: The final configuration of the Decade 80 solar house to monitor and collect system performance data is presented. A review demonstrated by actual operation that the system and the data acquisition subsystem operated satisfactorily and installation of instrumentation was in accordance with the design. This design package is made up of (1) site and system description, (2) operating and control modes, and (3) instrumentation program (including sensor schematic).

79N19453*# ISSUE 10 PAGE 1297 CATEGORY 44
RPT#: NASA-CR-150871 CNT#: NAS8-32093 78/12/00 109 PAGES UNCLASSIFIED DOCUMENT
UTTL: Preliminary design package for residential heating/cooling system: Rankine air conditioner redesign
CORP: Honeywell, Inc., Minneapolis, Minn. AVAIL.NTIS SAP: HC A06/MF A01
Prepared for DOE
MAJS: /*AIR CONDITIONING/*PRODUCT DEVELOPMENT/*RANKINE CYCLE /*SOLAR HOUSES
MINS: / FINANCIAL MANAGEMENT/ HEAT GENERATION/ SOLAR COLLECTORS/ SOLAR GENERATORS/ SYSTEM EFFECTIVENESS
ABA: Author
ABS: A summary of the preliminary redesign and development of a marketable single family heating and cooling system is presented. The interim design and schedule status of the residential (3-ton) redesign, problem areas and solutions, and the definition of plans for future design and development activities were discussed. The proposed system for a single-family residential heating and cooling system is a single-loop, solar-assisted, hydronic-to-warm-air heating subsystem with solar-assisted domestic water heating and a Rankine-driven expansion air-conditioning subsystem.

79N18447# ISSUE 9 PAGE 1156 CATEGORY 44 RPT#: ORNL-5363 CNT#: W-7405-ENG-26 78/04/00 486 PAGES UNCLASSIFIED DOCUMENT
UTTL: Buildings energy use data book, edition 1
AUTH: A/LIEPINS, G. E.; B/SMITH, M. A.; C/ROSE, A. B.; D/HAYGOOD, K.
CORP: Oak Ridge National Lab., Tenn. CSS: (Regional and Urban Studies Section.) AVAIL.NTIS SAP: HC A21/MF A01
MAJS: /*AIR CONDITIONING/*BUILDINGS/*ENERGY POLICY/*SOLAR HOUSES
MINS: / CLIMATOLOGY/ ECONOMIC FACTORS/ ENERGY CONSERVATION/ FUEL CONSUMPTION/ SOLAR ENERGY CONVERSION/ TABLES (DATA)
ABA: F.O.S.
ABS: The initial effort is reported of Oak Ridge National Laboratory to develop the document Buildings Energy Use Data Book for use as a desk-top reference for conservation and solar applications, conservation planning and policy. An assembly and display of

statistics which characterize current and past energy end use activities in the residential/commercial sector are presented along with data on other factors which influence the residential/commercial sector in the nation. Statistical data on energy use in the residential/commercial sector in the form of tables, graphs, and charts are presented. A large amount of relevant data in an easily retrievable and usable format is presented. The following topics are covered: sector definitions, buildings inventory, appliance inventory, heating and cooling units inventory, appliance efficiencies, structural characteristics, climatological and appliance fuel use, national economic and demographic determinants, fuel consumption and prices, and a survey of selected energy studies. A list of data sources is provided at the end of topic.

79N14535# ISSUE 5 PAGE 618 CATEGORY 44
78/09/00 24 PAGES UNCLASSIFIED DOCUMENT
UTTL: A detailed analysis of the impact of onsite equipment on utility costs --- marginal costs of providing backup power for solar energy systems
CORP: Office of Technology Assessment, Washington, D. C.
AVAIL.NTIS SAP: HC A99/MF A01; HC S0D
In its Appl. of Solar Technol. to Today's Energy Needs, Vol. 2 p 729-752 (SEE N79-14530 05-44)
MAJS: /*COST ANALYSIS/*ECONOMIC IMPACT/*FUEL CONSUMPTION/*SOLAR ENERGY CONVERSION/*UTILITIES
MINS: / DOMESTIC ENERGY/ ELECTRIC POWER/ ENERGY REQUIREMENTS / HEATING EQUIPMENT
ABA: A.R.H.
ABS: Cases are examined where 1,000 homes equipped with a specific kind of energy equipment are added to the utility grid and cases are examined where 25 percent and 100 percent of the houses in the utility are assumed to be converted to use the system being examined. Two sets of two tables are provided for each of the four cities examined. The first of each pair presents information about the overall impact of the load under examination on utility costs, on the demand for nuclear, coal, and peaking capacity, and on the annual fuel demands of the utility. The second of each pair presents the ratios between the marginal cost of serving loads created by adding solar energy equipment with the marginal costs incurred by changing loads and adding a similar number of buildings served with conventional energy equipment. The first of the two sets for each city presents information assuming that standard utility rates are charged and the second set assumes that consumers purchase energy during offpeak periods to help reduce utility peaks. Details of how these tables were computed are explained.

79N14533# ISSUE 5 PAGE 617 CATEGORY 44
78/09/00 50 PAGES UNCLASSIFIED DOCUMENT
UTTL: Calculation of backup requirements
CORP: Office of Technology Assessment, Washington, D. C.
AVAIL.NTIS SAP: HC A99/MF A01; HC S0D
In its Appl. of Solar Technol. to Today's Energy Needs, Vol. 2 p 43-9% (SEE N79-14530 05-44)
MAJS: /*COMPUTATION/*DEMAND (ECONOMICS)/*ENERGY REQUIREMENTS /*SOLAR ENERGY CONVERSION/*SYSTEMS ANALYSIS
MINS: / COMPUTER PROGRAMS/ FORTRAN/ HEAT TRANSFER/ SOLAR COLLECTORS/ SOLAR COOLING/ SOLAR HEATING
ABA: A.R.H.
ABS: A critical question in the operation of a solar energy system is the amount of backup energy required and the pattern of this backup demand. Techniques are provided for approximating the optimum performance of several types of solar cogeneration systems including the optimum operation of possible combinations of storage equipment. A FORTRAN program was developed to (1) determine the onsite energy demand of the building which includes heating, cooling, hot water, and miscellaneous electrical demands; (2) determine the output of solar collector, and (3) determine the fraction of the onsite energy demand that can be met from solar energy directly or from storage and the fraction that must be supplied from external energy sources (utility electricity, gas, or oil).

79N14530# ISSUE 5 PAGE 617 CATEGORY 44 RPT#:
OTA-E-77-VOL-2 LC-78-600060 78/09/00 764 PAGES
UNCLASSIFIED DOCUMENT
UTTL: Application of solar technology to today's energy needs, volume 2 --- systems analysis and analytical methods
CORP: Office of Technology Assessment, Washington, D. C.
AVAIL.NTIS SAP: HC A99/MF A01; HC S0D
MAJS: /*ENERGY TECHNOLOGY/*NUMERICAL ANALYSIS/*SOLAR ENERGY CONVERSION/*STATISTICAL ANALYSIS/*SYSTEMS ANALYSIS/*TECHNOLOGY UTILIZATION
MINS: / COST ANALYSIS/ DOMESTIC ENERGY/ ECONOMIC IMPACT/ FUEL CONSUMPTION/ FUELS/ SYSTEM EFFECTIVENESS/ UTILITIES
ANN: Analytical methods are presented for evaluating the economic and technical merits of numerous small-scale solar systems designed to meet the energy requirements of homes, apartment buildings, shopping centers, industries, and small communities.

79N13550# ISSUE 4 PAGE 483 CATEGORY 44 RPT#: NTIS/PS-78/1016/1 78/09/00 221 PAGES UNCLASSIFIED DOCUMENT

UTTL: Solar space heating and air conditioning, volume 2. Citations from the engineering index data base TLSP: Progress Report, 1976 - Aug. 1977

AUTH: A/HUNDEMANN, A. S.

CORP: National Technical Information Service, Springfield, Va. AVAIL.NTIS SAP: HC $28.00/MF $28.00

MAJS: /*BIBLIOGRAPHIES/*ENERGY POLICY/*SOLAR HEATING

MINS: / ABSTRACTS/ ECONOMIC FACTORS/ ENERGY TECHNOLOGY/ FEASIBILITY ANALYSIS/ HEAT PUMPS/ RANKINE CYCLE/ SOLAR COOLING

ABA: GRA

ABS: Studies from worldwide literature on the use of solar energy to heat and cool buildings are discussed, with emphasis on the heating and cooling of residential buildings and schools. Design, technical feasibility, economics, and performance simulation studies are cited. Abstracts pertaining to solar assisted heat pump systems and assessment of solar heated Rankine cycle cooling are included. This bibliography contains 215 abstracts.

79N13547# ISSUE 4 PAGE 483 CATEGORY 44 RPT#: NTIS/PS-78/1017/9 NTIS/PS-77/0829 NTIS/PS-76/0728 78/09/00 103 PAGES UNCLASSIFIED DOCUMENT
Supersedes NTIS/PS-77/0829; NTIS/PS-76/0728

UTTL: Solar space heating and air conditioning, volume 3. Citations from the engineering index data base TLSP: Progress Report, Sep. 1977 - Sep. 1978

AUTH: A/HUNDEMANN, A. S.

CORP: National Technical Information Service, Springfield, Va. AVAIL.NTIS SAP: HC $28.00/MF $28.00

MAJS: /*AIR CONDITIONING/*BIBLIOGRAPHIES/*SOLAR HEATING

MINS: / ABSTRACTS/ BUILDINGS/ ECONOMIC FACTORS/ ENVIRONMENT EFFECTS/ FEASIBILITY ANALYSIS/ HEAT PUMPS/ PERFORMANCE TESTS/ SCHOOLS/ SOLAR COOLING/ SYSTEMS ENGINEERING

ABA: GRA

ABS: The use of solar energy to heat and cool buildings is studied, with emphasis on the heating and cooling of residential buildings and schools. Design, technical feasibility, economics, and performance simulation studies are cited. Abstracts pertaining to solar assisted heat pump systems and assessment of solar heated Rankine cycle cooling are included. This updated bibliography contains 97 abstracts, all of which are new entries to the previous edition.

79N13546# ISSUE 4 PAGE 483 CATEGORY 44 RPT#: NTIS/PS-78/1015/3 NTIS/PS-77/0827 NTIS/PS-76/0727 NTIS/PS-75/689 NTIS/PS-75/345 78/09/00 96 PAGES UNCLASSIFIED DOCUMENT
Supersedes NTIS/PS-77/0827; NTIS/PS-76/0727; NTIS/PS-75/689; NTIS/PS-75/345

UTTL: Solar space heating and air conditioning volume 3. Citations from the NTIS data base TLSP: Progress Report, Sep. 1977 - Sep. 1978

AUTH: A/HUNDEMANN, A. S.

CORP: National Technical Information Service, Springfield, Va. AVAIL.NTIS SAP: HC $28.00/MF $28.00

MAJS: /*AIR CONDITIONING/*BIBLIOGRAPHIES/*SOLAR HEATING

MINS: / ABSTRACTS/ BUILDINGS/ ECONOMIC FACTORS/ ENVIRONMENT EFFECTS/ FEASIBILITY ANALYSIS/ SCHOOLS/ SOLAR COOLING/ SOLAR ENERGY/ SYSTEMS ENGINEERING

ABA: GRA

ABS: Design, technical feasbility, performance, and economic factors pertaining to solar heating and cooling of buildings are discussed. Commercial buildings, schools, and residential buildings are covered, with emphasis on the assessment of solar heating and cooling systems for residential buildings. A few abstracts on solar energy as a national energy resource; solar energy research program alternatives; and social environmental and institutional factors affecting the feasibility of using solar energy for heating and cooling buildings. This updated bibliography contains 90 abstracts, all of which are new entries to the previous edition.

79N13545# ISSUE 4 PAGE 483 CATEGORY 44 RPT#: NTIS/PS-78/1014/6 78/09/00 247 PAGES UNCLASSIFIED DOCUMENT

UTTL: Solar space heating and air conditioning, volume 2. Citations from the NTIS data base TLSP: Progress Report, 1976 - Aug. 1977

AUTH: A/HUNDEMANN, A. S.

CORP: National Technical Information Service, Springfield, Va. AVAIL.NTIS SAP: HC $28.00/MF $28.00

MAJS: /*AIR CONDITIONING/*BIBLIOGRAPHIES/*SOLAR HEATING

MINS: / ABSTRACTS/ BUILDINGS/ ECONOMIC FACTORS/ ENVIRONMENT EFFECTS/ FEASIBILITY ANALYSIS/ SCHOOLS/ SOLAR COOLING/ SOLAR ENERGY/ SYSTEMS ENGINEERING

ABA: GRA

ABS: Design, technical feasibility, performance, and economic factors pertaining to solar heating and cooling of buildings are discussed. Commercial buildings, schools, and residential buildings are covered, with emphasis on the assessment of solar heating and cooling systems for residential buildings. A few abstracts are included on solar energy as a national energy resource; solar energy research

program alternatives; and social, environmental, and institutional factors affecting the feasibility of using solar energy for heating and cooling buildings. This updated bibliography contains 241 abstracts, one of which are new entries to the previous edition.

79N13530# ISSUE 4 PAGE 481 CATEGORY 44 RPT#: COO-2577-13 CNT#: EY-76-S-02-2577 77/12/00 92 PAGES UNCLASSIFIED DOCUMENT

UTTL: Solar evacuated tube collector: Absorption chiller systems simulation

AUTH: A/LEFLAR, J. A.; B/DUFF, W. S.

CORP: Colorado State Univ., Fort Collins. CSS: (Solar Energy Applications Lab.) AVAIL.NTIS SAP: HC A05/MF A01

MAJS: /*AIR CONDITIONING EQUIPMENT/*ENERGY TECHNOLOGY/* RADIATION ABSORPTION/*SOLAR COLLECTORS

MINS: / ENERGY STORAGE/ MATHEMATICAL MODELS/ PIPES (TUBES)

ABA: DOE

ABS: A residential air conditioning system incorporating an absorption chiller and evacuated tube collectors is simulated and the design parameters studied. Mathematical models of the evacuated tube collector and absorption chiller based on experimental results of the components were created and incorporated into a complete system simulation. The chiller model includes transient start-up effects and the evacuated tube collector model includes numerous optical effects. A standard chiller in a humid climate (Washington, D. C.) and a unit with a modified charge for dry climates (Fort Collins, Colorado) are studied. Design parameters considered include the use of chilled water storage to reduce transient start-up effects of the absorption unit, the effects of removing heat from the solar system for preheating service hot water, the use of a tempering valve to prevent over-firing of the absorption unit in dry climates, and solar storage sizing considerations. A cooling system design is specified.

79N13513# ISSUE 4 PAGE 479 CATEGORY 44 RPT#: HCP/M70066-01/2 78/05/00 88 PAGES UNCLASSIFIED DOCUMENT

UTTL: Solar Heating And Cooling Of Buildings (SHACOB) commercialization report. Part B: Analysis of market development, volume 2

CORP: Little (Arthur D.), Inc., Cambridge, Mass. AVAIL.NTIS SAP: HC A05/MF A01

MAJS: /*AIR CONDITIONING/*COMMERCIAL ENERGY/*MARKET RESEARCH /*MATHEMATICAL MODELS/*SOLAR HEATING

MINS: / AEROSPACE ENVIRONMENTS/ DATA BASES/ ECONOMIC ANALYSIS/ ENVIRONMENT MANAGEMENT/ GOVERNMENT PROCUREMENT/ INCENTIVE TECHNIQUES/ INDUSTRIES/ SOLAR COOLING/ SOLAR ENERGY

ABA: DOE

ABS: The SHACOB Commercialization Model is designed to gauge the impacts of selected federal incentive programs to encourage the development of solar energy equipment for hot water heating, space heating, and space cooling in residential and commercial buildings. The origin of the major economic and technical data base elements used in the model are discussed and trends of these elements are projected over the time frame. The status of the solar industry is reviewed briefly. The results of the SHACOB Model analysis are discussed in the following areas: a comparison of the four major incentive scenarios, the sensitivity of the SHACOB Model to key data assumptions, the impact of single incentives (versus incentive packages), a comparative view of the National Energy Plan (NEP) projections versus the COMP/NEP approach, and a brief investigation of possible phased incentive programs designed to avoid the disruptive effects resulting from the sudden termination of major incentives.

79N13512# ISSUE 4 PAGE 479 CATEGORY 44 RPT#: HCP/M70065-01/1 CNT#: EM-77-C-01-8727 78/05/00 40 PAGES UNCLASSIFIED DOCUMENT

UTTL: Solar Heating And Cooling Of Buildings (SHACOB) commercialization report. Part A: Options and strategies. Volume 1: Executive summary

CORP: Midwest Research Inst., Kansas City, Mo. AVAIL.NTIS SAP: HC A03/MF A01

MAJS: /*AIR CONDITIONING/*COMMERCIAL ENERGY/*MANAGEMENT PLANNING/*MATHEMATICAL MODELS/*SOLAR HEATING

MINS: / AEROSPACE ENVIRONMENTS/ BUILDINGS/ GOVERNMENT PROCUREMENT/ SOLAR COOLING/ WATER RESOURCES

ABA: DOE

ABS: Potential barriers to the commercialization of solar heating and cooling of buildings in the residential and commercial sectors are analyzed, and government incentives that could accelerate the commercialization process are investigated. Solar hot water and space heating are emphasized.

79N13511# ISSUE 4 PAGE 479 CATEGORY 44 RPT#: HCP/T22221-01/1-VOL-1 CNT#: NSF C-75-22221-01 78/01/00 227 PAGES UNCLASSIFIED DOCUMENT

UTTL: Applied research on energy storage and conversion for photovoltaic and wind energy systems. Volume 1: Study summary and concept screening TLSP: Final Report

CORP: General Electric Co., Philadelphia, Pa. CSS: (Space Div.) AVAIL.NTIS SAP: HC A11/MF A01

Sponsored in part by DOE
MAJS: /*ENERGY CONVERSION/*ENERGY STORAGE/*PHOTOVOLTAIC CONVERSION/*WIND (METEOROLOGY)
MINS: / FLYWHEELS/ STORAGE BATTERIES/ UNDERGROUND STORAGE
ABA: DOE
ABS: Storage technologies, particularly those which might be best suited for use in conjunction with wind and photovoltaics, were reviewed. The potential worth added by incorporating storage was extensively analyzed for both wind and photovoltaics. Energy storage concepts studied include: (1) above ground pumped hydro storage; (2) underground pumped hydro storage; (3) thermal storage oil; (4) thermal storage steam; (5) underground compressed air storage (5) pneumatic storage; (7) lead acid batteries; (8) advanced batteries; (9) inertial storage (flywheel); (10) hydrogen generation and storage; and (11) superconducting magnetic energy storage. Results, conclusions, and recommendations of the investigations are presented.

79N13510# ISSUE 4 PAGE 478 CATEGORY 44 RPT#: HCP/T22221-01/2-2 CNT#: NSF C-75-22221-01 78/01/00 344 PAGES UNCLASSIFIED DOCUMENT
UTTL: Applied research on energy storage and conversion for photovoltaic and wind energy systems. Volume 2: Photovoltaic systems with energy storage TLSP: Final Report
CORP: General Electric Co., Philadelphia, Pa. CSS: (Space Div.) AVAIL.NTIS SAP: HC A15/MF A01
Sponsored in part by DOE
MAJS: /*ENERGY CONVERSION/*ENERGY STORAGE/*PHOTOVOLTAIC CONVERSION/*WIND (METEOROLOGY)
MINS: / FLYWHEELS/ HYDROGEN PRODUCTION/ STORAGE BATTERIES/ UNDERGROUND STORAGE
ABA: DOE
ABS: Energy storage technologies deemed best suited for use in conjunction with a photovoltaic energy conversion system in utility, residential and intermediate applications are evaluated. Break-even cost goals are developed for several storage technologies in each application. These break-even costs are then compared with cost projections to show technologies and time frames of potential economic viability. The results, conclusions and recommendations pertaining to use of energy storage with photovoltaic energy conversion systems are given. Candidate storage concepts studied include: (1) above ground and underground pumped hydro; (2) underground compressed air; (3) electric batteries; (4) flywheels, and (5) hydrogen production and storage.

79N13507# ISSUE 4 PAGE 478 CATEGORY 44 RPT#: COO-2577-14 CNT#: EY-76-S-02-2577 78/03/00 101 PAGES UNCLASSIFIED DOCUMENT
UTTL: Evaluation of high performance evacuated tubular collectors in a residential heating and cooling system: Colorado State University Solar House 1 TLSP: Progress Report, 1 Oct. 1976 - 30 Sep. 1977
AUTH: A/DUFF, W. S.; B/CONWAY, T. M.; C/MEREDITH, G. O. G.; D/PRATT, R. B.
CORP: Colorado State Univ., Fort Collins. CSS: (Solar Energy Applications Lab.) AVAIL.NTIS SAP: HC A06/MF A01
MAJS: /*COLORADO/*SOLAR COLLECTORS/*SOLAR COOLING/*SOLAR HEATING/*SOLAR HOUSES
MINS: / FLAT PLATES/ HEAT TRANSMISSION/ LITHIUM COMPOUNDS/ SOLAR ENERGY/ TEMPERATURE DISTRIBUTION
ABA: DOE
ABS: The CSU Solar House I is configured with a prototype Corning evacuated tubular collector and a lithium bromide water chiller designed for solar operation. Data were collected for this configuration since January 1977. An operating and control system for the configuration was developed and to the performance of the residential solar heating, cooling, and hot water system was compared with performance of the previous system. Many problems were encountered in the evolution of the operating and control systems due to the different operating characteristics of evacuated tubular collectors, such as their rapid thermal response and the possibility of much higher temperatures as compared to a flat plate collector.

79N13506# ISSUE 4 PAGE 478 CATEGORY 44 RPT#: AD-A058626 AFCEC-TR-78-6 CNT#: F08635-76-C-0276 78/07/00 203 PAGES UNCLASSIFIED DOCUMENT
UTTL: Solar assisted heat pump study for heating of military facilities TLSP: Final Report, Jul. 1976 - Nov. 1977
AUTH: A/BEASON, F. L.; B/STROTHER, L. W.
CORP: Dubin-Bloome Associates, New York. AVAIL.NTIS SAP: HC A10/MF A01
Tyndall AFB, Fla. AFCEC
MAJS: /*ENERGY CONSERVATION/*HEAT PUMPS/*MILITARY AIR FACILITIES/*SOLAR ENERGY/*SOLAR HEATING/*SYSTEM EFFECTIVENESS
MINS: / ARKANSAS/ ECONOMIC ANALYSIS/ ENERGY TECHNOLOGY/ LIFE CYCLE COSTS/ TECHNOLOGY ASSESSMENT/ WATER TEMPERATURE
ABA: Author (GRA)
ABS: This study identified 21 generic solar assisted heat pump systems and subjectively evaluated them. The six most promising systems were evaluated in further detail. A complete objective analysis of the two most promising systems was then made to determine which could be most economical to install in a family

housing unit at Little Rock Air Force Base, Arkansas. The system chosen was a solar hot water heating system in parallel with a water source heat pump. Preliminary drawings intergrating this system into a family housing unit at Little Rock AFB were developed. The system selected had a 27-32 year pay back.

79N13491*# ISSUE 4 PAGE 476 CATEGORY 44 RPT#: NASA-CR-150851 CNT#: NAS8-32244 78/10/00 8 PAGES UNCLASSIFIED DOCUMENT

UTTL: Instrumentation at the Decade 80 solar house in Tucson, Arizona TLSP: Collation of Monthly Reports, May - Sep. 1978

CORP: Copper Development Association, Inc., New York, N. Y. AVAIL.NTIS SAP: HC A02/MF A01

MAJS: /*BUILDINGS/*ENERGY POLICY/*EQUIPMENT SPECIFICATIONS/* SOLAR COOLING/*SOLAR HEATING

MINS: / AUXILIARY POWER SOURCES/ ENERGY TECHNOLOGY/ SOLAR ENERGY/ SOLAR ENERGY CONVERSION/ SYSTEMS ENGINEERING

ABA: G.G

ABS: Modifications, problems and solutions for the instrumentation system that occurred during the period from May through September, 1978, are described. The solar house was built to show the use of copper in home building and to demonstrate the use of solar energy to provide space heating and cooling and domestic hot water. The auxiliary energy sources are electrical resistance heating for the domestic hot water and a gas-fired boiler for space heating and operation of the adsorption air conditioning units.

79N10523*# ISSUE 1 PAGE 70 CATEGORY 44 RPT#: NASA-CR-150788 CNT#: NAS8-32251 78/08/00 228 PAGES UNCLASSIFIED DOCUMENT

UTTL: Design package for concentrating solar collector panels

CORP: Northrup, Inc., Hutchins, Tex. AVAIL.NTIS SAP: HC A11/MF A01
Prepared for DOE

MAJS: /*CONCENTRATORS/*ENERGY POLICY/*SOLAR COLLECTORS/* THERMAL RADIATION

MINS: / ENERGY TECHNOLOGY/ FRESNEL LENSES/ SOLAR ARRAYS/ SOLAR ENERGY ABSORBERS/ SPECIFICATIONS

ABA: S.B.S.

ABS: Information used to evaluate the design of the Northrup concentrating collector is presented. Included are the system performance specifications, the applications manual and the detailed design drawings of the collector. The collector is a water/glycol/working fluid type, with a dipped galvanized steel housing, transparent acrylic Fresnel lens cover, copper absorber tube, and fiber glass insulation. It weights 98 pounds. A collector assembly includes four collector units within a tracking mount array.

79N10516*# ISSUE 1 PAGE 69 CATEGORY 44 RPT#: NASA-CR-150803 CNT#: NAS8-32092 78/07/00 43 PAGES UNCLASSIFIED DOCUMENT

UTTL: Solar heating and cooling system design and development TLSP: Status Summary, Apr. - Jun. 1978

CORP: General Electric Co., Philadelphia, Pa. AVAIL.NTIS SAP: HC A03/MF A01
Prepared for DOE

MAJS: /*COOLING SYSTEMS/*DESIGN ANALYSIS/*SOLAR COOLING/* SOLAR ENERGY CONVERSION/*SOLAR HEATING

MINS: / ENERGY CONVERSION EFFICIENCY/ HEATING EQUIPMENT/ MAINTENANCE/ PROTOTYPES

ABA: J.M.S.

ABS: The development of eight protctype solar heating and combined heating and cooling systems is reportec. Manufacture, test, installation, maintenance, problem resolution, and monitoring the operation of pro'otype systems is included. Heating and cooling equipment for single family residential and commercial applications and eight operational test sites (four heating and four heating and cooling) is described.

79N10515*# ISSUE 1 PAGE 69 CATEGORY 44 RPT#: NASA-CR-150804 WYLE-TR-531-26 CNT#: NAS8-32036 78/07/00 29 PAGES UNCLASSIFIED DOCUMENT

UTTL: Indoor test for thermal performance evaluation cn the Northrup concentrating solar collector

CORP: Wyle Labs., Inc., Huntsville, Ala. CSS: (Solar Energy Systems Div.) AVAIL.NTIS SAP: HC A03/MF A01
Prepared for DOE

MAJS: /*ENERGY POLICY/*ENVIRONMENT SIMULATION/*PERFORMANCE TESTS/*SOLAR COLLECTORS

MINS: / ENERGY TECHNOLOGY/ FRESNEL LENSES/ SOLAR ARRAYS/ SOLAR ENERGY ABSORBERS/ SOLAR SIMULATORS

ABA: S.B.S.

ABS: The test procedure used and the results obtainec from an evaluation test program conducted on a Northrup concentrating solar collector under simulated conditions are described. The tests were made using the Marshall Space Flight Center's solar simulator. A time constant test and incident angle modifier test were also conducted to determine the transient effect and the incident angle effect on the collector. The Northrup concentrating solar collector is a water/glycol/working fluid type, with a dipped galvanized steel housing, transparent acrylic Fresnel lens cover, copper absorber tube, and fiber glass

insulation. It weighs approximately 98 pounds. The gross collector area is about 29.4 sq ft per collector. A collector assembly includes four collector units within a tracking mount array.

78N29615# ISSUE 20 PAGE 2693 CATEGORY 44 RPT#: NTIS/PS-78/0444/6 78/05/00 54 PAGES UNCLASSIFIED DOCUMENT

UTTL: Energy conservation through building design. Citations from the NTIS data base TLSP: Progress Report, 1964 - Apr. 1978

AUTH: A/HUNDEMANN, A. S.

CORP: National Technical Information Service, Springfield, Va. AVAIL.NTIS SAP: HC $28.00/MF $28.00

MAJS: /*BIBLIOGRAPHIES/*BUILDINGS/*ENERGY CONSERVATION/* STRUCTURAL DESIGN

MINS: / STANDARDS/ STRUCTURAL ENGINEERING/ THERMAL INSULATION/ WINDOWS

ABA: GRA

ABS: This bibliography contains 48 abstracts. Federally-funded research on energy conservation through design of residential and commercial buildings is discussed. Topic areas cover the impact of building codes and standards on new construction and retrofitting of existing buildings, energy calculations for new building design, methods for estimating life cycle costs of alternative energy conservation techniques, inclusion of thermal insulation during building design, and window strategies.

78N28609*# ISSUE 19 PAGE 2555 CATEGORY 44 RPT#: NASA-CR-150728 CNT#: NAS8-32244 78/06/00 24 PAGES UNCLASSIFIED DOCUMENT

UTTL: Collation of monthly and semiannual reports covering instrumentation at the Decade 80 house in Tucson, Arizona

CORP: Cooper Development Association, Inc., New York, N. Y. AVAIL.NTIS SAP: HC A02/MF A01 Prepared for DOE

MAJS: /*CONSTRUCTION/*COPPER/*SOLAR ENERGY

MINS: / DATA ACQUISITION/ SOLAR COOLING/ SOLAR HEATING/ SOLAR HOUSES/ TECHNOLOGY ASSESSMENT

ABA: G.Y.

ABS: The Decade 80 solar house, located in Tucson, Arizona, was built to show the use of copper in home building and to demonstrate the use of solar energy to provide space heating and cooling and domestic hot water. The auxiliary energy sources are electrical resistance heating for the domestic hot water and a gas fired boiler for space heating and operation of the absorption air conditioning units. The Semi-Annual report gives an overview of the instrumentation effort with the back-up monthly reports reflecting more detail of the effort that went into the implementation of the data acquisition system.

78N25643# ISSUE 16 PAGE 2148 CATEGORY 44 RPT#: TID-28104 CNT#: EG-77-C-04-3787 IGT PROJ. 8987 78/01/00 287 PAGES UNCLASSIFIED DOCUMENT

UTTL: Application analysis of solar total energy to the residential sector TLSP: Quarterly Technical Status Report, 1 Oct. - 31 Dec. 1977

AUTH: A/WHALEY, T.; B/YUDOW, B.; C/MALIK, N.; D/GANZE, M.; E/FOSTER, B.; F/GOFF, T.; G/WURM, J.; H/DEYOE, D.; I/SMITH, G. PAA: C/(GKC); D/(GKC); H/(S. Cal. Gas); I/(Honeywell)

CORP: Institute of Gas Technology, Chicago, Ill. AVAIL.NTIS SAP: HC A13/MF A01

MAJS: /*COMPUTER PROGRAMS/*MARKET RESEARCH/*SOLAR ENERGY

MINS: / COST ANALYSIS/ ENERGY CONSERVATION/ ENERGY POLICY/ FUEL CONSUMPTION

ABA: ERA

ABS: The application of solar total energy to appropriate segments of the residential sector, the market penetration potential for STE systems, and criteria for selecting suitable demonstration sites throughout the United States are presented. Concentration of single-family houses, townhouses, lowrise apartments, and high-rise apartments were projected to the 1980-1990 time frame for eleven regions of the country. The performance of both a low temperature system and a high-temperature system was analyzed by a computer program that simulates hourly performance of the conceptual STES designs.

78N25614# ISSUE 16 PAGE 2145 CATEGORY 44 RPT#: ANL/OEPM-77-3 CNT#: W-31-109-ENG-38 77/08/00 306 PAGES UNCLASSIFIED DOCUMENT

UTTL: Battery storage performance requirements for terrestrial solar photovoltaic power systems TLSP: Final Report

CORP: Bechtel Corp., San Francisco, Calif.; Argonne National Lab., Ill. AVAIL.NTIS SAP: HC A14/MF A01 Prepared for ANL, Argonne, Ill.

MAJS: /*PHOTOVOLTAIC CONVERSION/*SOLAR CELLS/*SOLAR ENERGY CONVERSION/*STORAGE BATTERIES/*SYSTEMS ENGINEERING

MINS: / COMPUTERIZED SIMULATION/ CURRENT DENSITY/ ENERGY REQUIREMENTS/ ENERGY STORAGE/ LITHIUM SULFUR BATTERIES / SOLAR ARRAYS

ABA: ERA

ABS: A broad spectrum of terrestrial photovoltaic applications was evaluated by considering the types of loads served and the characteristics of system

components. Low, intermediate, and high power systems, such as used in a single residence, a multiple residence, a shopping center or a central station power plant were studied. A computer program was developed to assist in determining battery voltages and currents during operation of the photovoltaic systems. Modeling was limited to single-crystal silicon solar cells and the characteristics of a Li-Al/FeS battery. Battery requirements for this application are generally no more severe than for other battery applications and, in some respects (e.g., energy density), may be less severe. Specific conclusions and recommendations are presented. System requirements and battery capabilities are summarized in tabular form.

77N22478*# ISSUE 13 PAGE 1720 CATEGORY 44 RPT#: PB-276616/0 DAC/PL-77/101 CNT#: HUD-B-75-S1-08-001 77/03/00 136 PAGES UNCLASSIFIED DOCUMENT

UTTL: Davis energy conservation report, practical use of the sun TLSP: Final Report
CORP: City of Davis, Calif. AVAIL.NTIS SAP: HC A07/MF A01
MAJS: /*ENERGY CONSERVATION/*ENERGY POLICY/*SOLAR ENERGY
MINS: / BUILDINGS/ CALIFORNIA/ EDUCATION/ HEATING/ LAND USE/ TRANSPORTATION
ABA: GRA
ABS: A comprehensive energy conservation program for the City of Davis is described, including: Building Code, planning, solar houses, and public education.

77N17573*# ISSUE 8 PAGE 1053 CATEGORY 44 RPT#: CONF-760536-1 76/00/00 11 PAGES UNCLASSIFIED DOCUMENT

UTTL: Potential for energy conservation technology transfer
AUTH: A/HISE, E. C.
CORP: Oak Ridge National Lab., Tenn. AVAIL.NTIS SAP: HC A02/MF A01
Sponsored by ERDA Presented at Southern Interstate Nuclear Board Meeting, Winston-Salem, North Carolina, 24 May 1976
MAJS: /*ENERGY CONSERVATION/*ENERGY POLICY/*TECHNOLOGY TRANSFER
MINS: / AIR CONDITIONING/ BUILDINGS/ COST ANALYSIS/ ENERGY CONSUMPTION/ HEATING/ INSULATION
ABA: EPA
ABS: The segment of energy consumption related to space conditioning and water heating in residential, commercial, and institutional buildings is discussed specifically. Within this constraint building energy consumption is discussed, considering three choices: drastic alteration of life style; even greater energy operating costs; or relatively large capital expenditures to reduce building energy consumption. It is concluded that the average existing residence can, through insulation, reduce its energy consumption to 60 percent of present for an expenditure of $500 to $1000 and a pay back of 5 to 10 years. The average existing commercial or institutional building can save even more. New construction can show greater energy savings at little or no additional construction cost. It is concluded that the average existing residential heating/cooling system (equipment) can be modified or replaced to reduce its energy consumption to 60 percent or even 40 percent of the present at a cost of a few hundred to $3000 as a function of the problem.

77N13533*# ISSUE 4 PAGE 492 CATEGORY 44 RPT#: NASA-CR-135056 MCR-76-394 ERDA/NASA-19768 CNT#: NAS3-19768 76/09/00 303 PAGES UNCLASSIFIED DOCUMENT

UTTL: Definition study for photovoltaic residential prototype system TLSP: Final Report
AUTH: A/IMAMURA, M. S.; B/HULSTROM, R. L.; C/COOKSON, C.; D/WALDMAN, B. H.; E/LANE, R. A. PAA: D/(Brooks Waldman Assoc.); E/(Brooks Waldman Assoc.)
CORP: Martin Marietta Corp., Denver, Colo. AVAIL.NTIS SAP: HC A14/MF A01
MAJS: /*BUILDINGS/*ENERGY POLICY/*PHOTOVOLTAIC CELLS/* PROTOTYPES/*SOLAR ENERGY CONVERSION
MINS: / COMPUTER PROGRAMS/ ELECTRIC BATTERIES/ ENERGY TECHNOLOGY/ SOLAR ARRAYS/ SOLAR HEATING
ABA: Author
ABS: A parametric sensitivity study and definition of the conceptual design is presented. A computer program containing the solar irradiance, solar array, and energy balance models was developed to determine the sensitivities of solar insolation and the corresponding solar array output at five sites selected for this study as well as the performance of several solar array/battery systems. A baseline electrical configuration was chosen, and three design options were recommended. The study indicates that the most sensitive parameters are the solar insolation and the inverter efficiency. The baseline PST selected is comprised of a 133 sq m solar array, 250 ampere hour battery, one to three inverters, and a full shunt regulator to limit the upper solar array voltage. A minicomputer controlled system is recommended to provide the overall control, display, and data acquisition requirements. Architectural renderings of two photovoltaic residential concepts, one above ground and the other underground, are presented. The institutional problems were defined in the areas of legal liabilities during and after installation of the

PST, labor practices, building restrictions and architectural guides, and land use.

77N13532*# ISSUE 4 PAGE 491 CATEGORY 44 RPT#: NASA-CR-135039 DOC-76SDS4225 CNT#: NAS3-19769
76/09/00 271 PAGES UNCLASSIFIED DOCUMENT
UTTL: Definition study for photovoltaic residential prototype system
AUTH: A/SHEPARD, N. F.; B/LANDES, R.; C/KORNRUMPF, W. P.
CORP: General Electric Co., Philadelphia, Pa. CSS: (Space Div.) AVAIL.NTIS SAP: HC A12/MF A01
MAJS: /*BUILDINGS/*PHOTOVOLTAIC CELLS/*RESIDENTIAL AREAS/* SOLAR ENERGY
MINS: / ENERGY STORAGE/ ROOFS/ SOLAR ENERGY CONVERSION/ SOLAR GENERATORS
ABA: Author
ABS: A site evaluation was performed to assess the relative merits of different regions of the country in terms of the suitability for experimental photovoltaic powered residences. Eight sites were selected based on evaluation criteria which included population, photovoltaic systems performance and the cost of electrical energy. A parametric sensitivity analysis was performed for four selected site locations. Analytical models were developed for four different power system implementation approaches. Using the model which represents a direct (or float) charge system implementation the performance sensitivity to the following parameter variations is reported: (1) solar roof slope angle; (2) ratio of the number of series cells in the solar array to the number of series cells in the lead-acid battery; and (3) battery size. For a Cleveland site location, a system with no on site energy storage and with a maximum power tracking inverter which feeds back excess power to the utility was shown to have 19 percent greater net system output than the second place system. The experiment test plan is described. The load control and data acquisition system and the data display panel for the residence are discussed.

76N28670# ISSUE 19 PAGE 2481 CATEGORY 44 RPT#: PB-250825/7 EPA-230/1-75-004 CNT#: EPA-68-01-2440 EPA-68-01-2445 75/03/00 143 PAGES UNCLASSIFIED DOCUMENT
UTTL: Comprehensive evaluation of energy conservation measures. appendices TLSP: Final Report
AUTH: A/LIMAYE, D. R.; B/SHARKO, J. R.; C/PRICE, J. P.; D/ORLANDO, J. A.
CORP: Mathematica, Inc., Princeton, N. J. AVAIL.NTIS SAP: HC $6.00
MAJS: /*ENERGY CONSERVATION/*ENERGY POLICY
MINS: / BUILDINGS/ DATA BASES/ ELECTRICITY/ ENERGY CONSUMPTION/ FUEL CONSUMPTION/ HEAT PUMPS/ INDUSTRIES/ RESIDENTIAL AREAS/ TRANSPORTATION/ WATER
ABA: GRA
ABS: Appendices provide detailed methodology, data base and technical discussions in the areas of energy consumption, space heating, hot water heating, heat pumps, and total energy systems.

76N28669# ISSUE 19 PAGE 2481 CATEGORY 44 RPT#: PB-250824/0 EPA-230/1-75-003 CNT#: EPA-68-01-2440 EPA-68-01-2445 75/03/00 449 PAGES UNCLASSIFIED DOCUMENT
UTTL: Comprehensive evaluation of energy conservation measures TLSP: Final Report
AUTH: A/LIMAYE, D. R.; B/SHARKO, J. R.; C/PRICE, J. P.; D/ORLANDO, J. A.
CORP: Mathematica, Inc., Princeton, N. J. AVAIL.NTIS SAP: HC $11.75
MAJS: /*COOLING/*ENERGY CONSERVATION/*ENERGY POLICY/*HEATING /*INSULATION
MINS: / ECONOMIC FACTORS/ ENERGY CONVERSION EFFICIENCY/ ENVIRONMENT EFFECTS/ SOCIAL FACTORS/ WASTE ENERGY UTILIZATION
ABA: GRA
ABS: An analysis of the relative social, economic, and environmental impacts and energy savings associated with thirty proposed energy conservation measures is presented. Residential, commercial, industrial, power generation and transportation energy consumption are covered. Projections are national for the years 1977, 1980, 1985, and 1990. A ranking of measures compares the relative costs and effectiveness of measures. The methodology can be adapted to a variety of situations.

76N23720# ISSUE 14 PAGE 1820 CATEGORY 44 RPT#: SAND-75-5717 CONF-750725-1 75/00/00 11 PAGES UNCLASSIFIED DOCUMENT
UTTL: Integrated photovoltaic-thermal solar energy conversion systems
AUTH: A/SAMARA, G. A.
CORP: Sandia Labs., Albuquerque, N. Mex. AVAIL.NTIS SAP: HC $4.00
Sponsored by ERDA Presented at the Natl. Solar Photovoltaic Program Review Meeting, Los Angeles, Calif., 22-25 Jul. 1975
MAJS: /*PHOTOVOLTAIC CELLS/*SOLAR CELLS/*SOLAR COLLECTORS/* THERMAL ENERGY
MINS: / COMPUTER PROGRAMS/ CONCENTRATORS/ ECONOMIC ANALYSIS/ ENERGY CONVERSION EFFICIENCY/ FEASIBILITY ANALYSIS/ SILICON/ TECHNOLOGY ASSESSMENT

ABA: Author (ERA)
ABS: Sandia's Solar Energy Systems Computer Analysis Code (SOLSYS) is being utilized to assess the technical and economic feasibility of combined photovoltaic systems relative to various utilization scenarios. Combined systems using concentrators and high efficiency (approximately greater than 10 percent) silicon cells can provide residences (or communities) with a reasonable balance of electrical and thermal energy. The device analysis code has been used to redesign the silicon cell for high temperature, high illumination operation. A design yielding 12 percent efficiency at 50 suns and 100 C has been selected. Modified cells have been fabricated and tested. Results have confirmed code predictions. A combined collector has been built and is being tested. Thermal efficiencies greater than 50 percent at 50 suns and 100 C can be expected.

75N28546# ISSUE 19 PAGE 2409 CATEGORY 44 RPT#: PB-240472/1 75/03/25 24 PAGES UNCLASSIFIED DOCUMENT
UTTL: Measure for reducing energy consumption for homeowners and renters
CORP: Federal Power Commission, Washington, D. C. CSS: (Office of Energy Systems.) AVAIL.NTIS SAP: HC $3.25
MAJS: /*ENERGY CONSERVATION/*ENERGY POLICY/*FUEL CONSUMPTION
MINS: / AIR CONDITIONING/ HEATING/ TABLES (DATA)
ABA: GRA
ABS: A comprehensive set of measures is described that can lead to a large reduction in the quantity of fuel consumed by the typical residence. It is indicated that the savings given are not additive, since most energy conservation measures interact with one another. In addition, for the two most important areas of space heating and hot water heating, estimates of energy saved for the various options are given for different regions of the country.

75N27567*# ISSUE 18 PAGE 2277 CATEGORY 44 RPT#: NASA-CR-143201 CNT#: NSG-1162 75/08/00 50 PAGES UNCLASSIFIED DOCUMENT
UTTL: Space and energy conservation housing prototype unit development TLSP: Final Report, Apr. - Aug. 1975
AUTH: A/SUNSHINE, D. R.
CORP: Hampton Inst., Va. CSS: (Dept. of Agriculture.) AVAIL.NTIS SAP: HC $3.75
MAJS: /*ARCHITECTURE/*ENERGY CONSERVATION/*PROTOTYPES
MINS: / BUILDINGS/ CONSTRUCTION/ CONSTRUCTION MATERIALS/ ENERGY POLICY/ SOLAR ENERGY/ URBAN DEVELOPMENT
ABA: Author
ABS: Construction plans are discussed for a house which will demonstrate the application of advanced technology to minimize energy requirements and to help direct further development in home construction by defining the interaction of integrated energy and water systems with building configuration and construction materials. Housing unit designs are provided and procedures for the analysis of a variety of housing strategies are developed.

75N17279# ISSUE [illegible] PAGE 945 CATEGORY 92 RPT#: LBL-3066 CONF-7[illegible]-1 CNT#: W-7405-ENG-48 74/06/00 21 PAGES UNCLASSIFIED DOCUMENT
UTTL: Comparison of computer programs used for modeling solar heating and air conditioning systems for buildings
AUTH: A/GRAVEN, R. M.
CORP: California Univ., Berkeley. Lawrence Berkeley Lab. AVAIL.NTIS SAP: HC $3.25
Presented at the Intern. Solar energy Soc., Fort Collins, Colorado, 19 Aug. 1974
MAJS: /*AIR CONDITIONING/*COMPUTER PROGRAMS/*SOLAR HEATING
MINS: / SOLAR ENERGY/ TECHNOLOGY UTILIZATION
ABA: Author (NSA)
ABS: A comparison of the major architectural structure of computer programs available to aid in the design of solar heating and cooling systems for buildings is presented. A brief description of each program including the size, availability, inputs required, and the flow of information through the program is outlined. The equipment required to run the programs and the costs of obtaining and running the programs is summarized. The pertinent details required to select a computer program for educational or commercial applications are summarized.

75N15195# ISSUE 6 PAGE 677 CATEGORY 44 RPT#: PB-235426/4 W-DESC-SS-10275-4 NSF/RA/N-74-023A CNT#: NSF C-84 74/05/00 68 PAGES UNCLASSIFIED DOCUMENT
UTTL: Solar heating and cooling of buildings. Phase C: Final report. Executive summary
CORP: Westinghouse Electric Corp., Baltimore, Md. CSS: (Special Systems.) AVAIL.NTIS SAP: HC $4.25 HC also available from NTIS $25.00/set of 4 reports as PB-235425-SET also available from NTIS $9.00/set of 3 executive summaries as PB-235420
MAJS: /*AIR CONDITIONING/*ENVIRONMENTAL CONTROL/*SOLAR HEATING
MINS: / COSTS/ ECONOMIC FACTORS/ FEASIBILITY ANALYSIS/ PERFORMANCE TESTS/ SOLAR ENERGY/ SYSTEMS ANALYSIS
ABA: Author (GRA)
ABS: Results of a comprehensive analysis of the technical,

economic, social, environmental, and institutional factors affecting the feasibility of using solar energy for heating and cooling systems are summarized. Results indicate that solar heating and cooling could become economically competitive in most regions of the country in the 1985-1990 period.

75N15193# ISSUE 6 PAGE 677 CATEGORY 44 RPT#: PB-235428/0 W-DESC-SS-10275-2 NSF/RA/N-74-023C CNT#: NSF C-854 74/05/00 400 PAGES UNCLASSIFIED DOCUMENT

UTTL: Solar heating and cooling of buildings. Phase 0: Final report. Volume 2: Appendices A-N TLSP: Final Report, Oct. 1973 - May 1974

CORP: Westinghouse Electric Corp., Baltimore, Md. CSS: (Special Systems.) AVAIL.NTIS SAP: HC $10.25 HC also available from NTIS $25.00/set of 4 reports as PB-235425-SET

MAJS: /*AIR CONDITIONING/*ENERGY POLICY/*SOLAR ENERGY CONVERSION

MINS: / ECONOMIC FACTORS/ FEASIBILITY ANALYSIS/ NOISE REDUCTION/ POLLUTION CONTROL

ABA: GRA

ABS: Appendices are presented to a study of the technical, economic, social, environmental, and institutional factors affecting the feasibility of using solar energ for heating and cooling of buildings. Titles of the appendices are: Building and usage selection; solar collector and solar heating/cooling; future fuel prices; Westinghouse building code; changes in standard building practice, insulation and materials, structures; thermal and noise comfort in buildings; residential and nonresidential building design; reliability and maintainability; safety and code aspects for solar systems; solar cooling by adsorption air-conditioners; informational material development; control requirements; a state-of-the-art review of solar heating and cooling systems and subsystems; and absorption air-conditioning. For Vol. 1, see N75-15192.

75N15192# ISSUE 6 PAGE 677 CATEGORY 44 RPT#: PB-235427/2 W-DESC-SS-10275-1 NSF/RA/N-74-023B CNT#: NSF C-854 74/05/00 361 PAGES UNCLASSIFIED DOCUMENT

UTTL: Solar heating and cooling of buildings. Phase 0: Final report, volume 1 TLSP: Final Report, Oct. 1973 - May 1974

CORP: Westinghouse Electric Corp., Baltimore, Md. CSS: (Special Systems.) AVAIL.NTIS SAP: HC $10.00 HC also available from NTIS $25.00/set of 4 reports as PB-235425-SET

MAJS: /*AIR CONDITIONING/*ENERGY POLICY/*SOLAR ENERGY CONVERSION

MINS: / CLIMATOLOGY/ COST ANALYSIS/ UTILITIES

ABA: GRA

ABS: A comprehensive analysis was made of technical, economic, social, environmental and institutional factors affecting the feasibility of using solar energy for heating and cooling buildings. Solar heating and cooling systems can become competitive in most regions of the country in the 1985-1990 period. Heating-only systems can be competitive in the 1975-1980 period in limited regions of the country. Impressive progress has recently been made in solar collectors but further reduction in costs is necessary to capture a large market. Five regions of the country containing more than 75 percent of the population have been identified as the market for solar systems. The amount of fossil fuel that can be saved by use of solar energy will build up slowly and could reach 50 million barrels of oil per year by 1990.

75N15191# ISSUE 6 PAGE 676 CATEGORY 44 RPT#: PB-235433/0 DOC-74SD4219-VOL-3-BK-1 NSF/RA/N-74-021C CNT#: NSF C-855 74/05/00 354 PAGES UNCLASSIFIED DOCUMENT

UTTL: Solar heating and cooling of buildings, phase 0: Feasibility and planning study. Volume 3, book 1, appendix A, task 1: Development of requirements, Appendix B, task 2: Systems definition TLSP: Final Report

CORP: General Electric Co., Philadelphia, Pa. CSS: (Space Div.) AVAIL.NTIS SAP: HC $10.00 HC also available from NTIS $45.00/set of 5 reports as PB-235430-SET

MAJS: /*AIR CONDITIONING/*ENERGY POLICY/*SOLAR ENER. CONVERSION

MINS: / CLIMATOLOGY/ COMPUTER PROGRAMS/ ENERGY STORAGE/ FEASIBILITY ANALYSIS/ HEAT PUMPS

ABA: GRA

ABS: Appendices to the study of solar heating and cooling of buildings are presented. The development is reported of requirements and a collector solar flux computer program, a preliminary solar heating and cooling screening model, a peak design loads computation program, and building parameters used to develop heating and cooling loads. Systems definition, including descriptions of models for heat pumps, solar absorption cooling systems, solar Rankine systems, nocturnal cooling, solar collector simulation, skytherm heating and cooling systems, and collector performance are described. Also discussed are thermal energy storage, heat recovery HVAC systems, on-going research pertinent to solar heating and cooling of

buildings, system performance data plots, and climatological optimization of solar collectors.

75N15190# ISSUE 6 PAGE 676 CATEGORY 44 RPT#: PB-235423/1 TRW-25168.002 NSF/RA/N-74-0028 CNT#: NSF C-853 74/05/31 534 PAGES UNCLASSIFIED DOCUMENT
UTTL: Solar heating and cooling of buildings, phase 0. Volume 2: Final report TLSP: Final Report
CORP: TRW Systems Group, Redondo Beach, Calif. AVAIL.NTIS SAP: MC $12.50 MC also available from NTIS $20.00/set of 3 reports as PB-235421-SET
MAJS: /*AIR CONDITIONING/*ENERGY POLICY/*SOLAR ENERGY CONVERSION
MINS: / CLIMATOLOGY/ COST ANALYSIS/ ENVIRONMENTAL QUALITY
ABA: GRA
ABS: Functional performance, and operational requirements for solar water heating, space heating, and cooling systems for a range of building types in various climatic regions of the U.S. are established. The report assesses market capture potential for solar heating/cooling applications and identifies cost-effective system/building/region combinations. Social and environmental impacts are considered along with projected first costs, present value, and equivalent costs (including operation and maintenance costs).

75N12442# ISSUE 3 PAGE 318 CATEGORY 44 RPT#: TID-26534 73/00/00 10 PAGES UNCLASSIFIED DOCUMENT
UTTL: Residential energy conservation
AUTH: A/MOYERS, J. C.
CORP: Oak Ridge National Lab., Tenn. AVAIL.NTIS SAP: MC $3.25
Sponsored by AEC
MAJS: /*ENERGY CONSERVATION/*ENERGY CONSUMPTION/*RESIDENTIAL AREAS
MINS: / AIR CONDITIONING/ DEMAND (ECONOMICS)/ ELECTRIC POWER SUPPLIES/ HEAT PUMPS/ THERMAL INSULATION
ABA: NSA
ABS: One-third of the total electrical sales in the U. S. went to residential users in 1970. Refrigeration, water heating, space heating, and air conditioning are used most extensively in that order. An all-electric home energy consumption breakdown was made. The performance of heat pumps was computed for Atlanta, Philadelphia, and Minneapolis. The efficiency of window air conditioners was studied. The overall economic data are computed involving properly installed insulation.

74N18724# ISSUE 10 PAGE 1127 CATEGORY 3 RPT#: NBS-TN-789 73/07/00 186 PAGES UNCLASSIFIED DOCUMENT
UTTL: Technical options for energy conservation in buildings TLSP: Final Report
CORP: National Bureau of Standards, Washington, D.C. CSS: (Building Environment Div.) SAP: Avail: SCD MC $2.35 Domestic Postpaid or $2.00 GPO Bookstore as C13.46:789
Prepared for Natl. Conf. of States on Building Codes and Standards and NBS Joint Emergency Workshop on Energy Conserv. in Buildings, Washington, D. C., 19 Jun. 1973
MAJS: /*BUILDINGS/*ENERGY POLICY/*STRUCTURAL DESIGN
MINS: / AIR CONDITIONING EQUIPMENT/ ENERGY CONSUMPTION/ HEATING EQUIPMENT/ THERMAL INSULATION/ WINDOWS (APERTURES)
ABA: Author
ABS: Actions pertinent to existing buildings and new buildings are described. Regarding existing buildings, principal topics include summer cooling, winter heating, and other energy conserving features--i.e., insulation, fenestration, lighting, appliances, domestic hot water, and human comfort. Suggested actions include those which can be accomplished voluntarily or without expense, and also actions which require some modest effort or expense on the part of the building owner or occupant. Regarding new buildings, energy conservation actions are described that deal with building design and mechanical systems. The report concludes with a summary of mechanisms for implementation of such actions and criteria for use in evaluation of them.