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A PROTOTYPE CATALOGUE: DOE NATIONAL LABORATORY TECHNOLOGIES FOR INFRASTRUCTURE MODERNIZATION

J. W. Currie
G. L. Wilfert
F. March

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under Contract DE-AC06-76RLO 1830

PNL--7268

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SUMMARY

The purpose of this report is to provide the Office of Technology Assessment (OTA) with information about selected technologies under development in the Department of Energy (DOE) through its National Laboratory System and its Program Office operations. The technologies selected are those that have the potential to improve the performance of the nation's public works infrastructure.

The product is a relational database that we refer to as a "prototype catalogue of technologies." The catalogue contains over 100 entries of DOE-supported technologies having potential application to infrastructure-related problems. The work involved conceptualizing an approach, developing a framework for organizing technology information, and collecting samples of readily available data to be put into a prototype catalogue.

In developing the catalogue, our objectives were to demonstrate the concept and provide readily available information to OTA. As such, the catalogue represents a preliminary product. The existing database is not exhaustive and likely represents only a fraction of relevant technologies developed by DOE. In addition, the taxonomy we used to classify technologies is based on the judgment of project staff and has received minimal review by individuals who have been involved in the development and testing of the technologies. Finally, end users will likely identify framework changes and additions that will strengthen the catalogue approach.

The framework for the catalogue includes four components: 1) a description of the technology, along with potential uses and other pertinent information; 2) identification of the source of the descriptive information; 3) identification of a person or group knowledgeable about the technology; and 4) a classification of the described technology in terms of its type, application, life-cycle use, function, and readiness.

The relational database management system used to develop the prototype catalogue is flexible both in terms of adding technologies and new "fields" of information and in terms of querying the database for specific information. Inclusion of an extended list of technologies within the catalogue could prove very useful to those interested in applying DOE technology to infrastructure modernization and operation.

MASTER

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I. INTRODUCTION

The U.S. government maintains a large network of laboratories that conduct research and development (R&D) to serve a wide variety of national needs. In addition, various federal agencies and the federal laboratories provide grants or purchase additional R&D work under contract to universities and to various private sector laboratories.

In 1989, the total federal R&D investment was about $57 billion. Basic and applied research represent about $9 billion each, with the remaining $38 billion used for technology development. Contracts to industrial firms represented about $27 billion, research by government laboratories about $13 billion, university grants and contracts about $10.5 billion[a].

The majority of federal R&D investments support specific agency missions. Although infrastructure modernization is not an explicit DOE mission, the Department has recognized that life-cycle energy costs and infrastructure are inextricably linked. Modernization activities through either new construction or renovation can "lock in" energy-use patterns for years to come. DOE recognizes that one of the best ways to take advantage of these potential "lost opportunities" is to ensure that within the federal sector the life-cycle costs of energy delivery systems and end-use technologies are accounted for in the planning and predesign stages of modernization programs. The responsibility has been assigned to the Federal Energy Management Program (FEMP).

Through FEMP, Pacific Northwest Laboratory (PNL) has been designated lead laboratory in infrastructure modernization. PNL, with support from FEMP and the DOE-Richland field office, is developing a framework for characterizing DOE-developed energy and non-energy technologies that can be applied to infrastructure problems.

The purpose of this report is to provide the Office of Technology Assessment (OTA) with information about selected technologies that are under development in DOE's national laboratory system and that have the potential to improve the performance and life-cycle costs of the nation's public works infrastructure. The product is a "prototype catalogue of technologies" with over 100 entries of DOE developed-technologies having applications potential to infrastructure-related problems.

(a) National Science Foundation. 1989. Federal Funds for Research and Development: FY 1987,88,89. Vol XXXVII, Washington, D.C.

PROTOTYPE CATALOGUE OF TECHNOLOGIES

Research work performed for one purpose, will often have application elsewhere. Various technology transfer programs use a variety of mechanisms to identify cross-disciplinary opportunities and to leverage the value of federally sponsored research.

One of the keys to any program of technology transfer is access to relevant information. In this report, we describe an approach used to explore ways of accessing information about technologies from any source for specific application to the nation's infrastructure, i.e., the built environment. The method employed, i.e., "technology catalogue," takes the form of a relational database.

This database serves two purposes. First, it contributes to the OTA's current study of how technological, institutional, and financial alternatives can be better used to make public works more efficient and productive. The focus here is on identifying some of the "technological" alternatives. The work also supports the DOE/FEMP Infrastructure Modernization Program, for which the Pacific Northwest Laboratory serves as lead laboratory, by creating a tool for identifying technologies that can be applied to infrastructure needs.

Before work began on the prototype catalogue of technologies, the following objectives were defined:

- Develop a catalogue of example technologies to illustrate how the programs and capabilities of the laboratories can help solve problems and improve the performance of infrastructure systems at any stage in the infrastructure life cycle.
- Provide an updatable reference for decision makers, showing how the capabilities of the DOE laboratories relate and apply to infrastructure.
- Adapt the catalogue such that it contributes to the OTA's current study of infrastructure problems for Congress. The catalogue may be presented as an Appendix to their report.
- Relate the catalogue to DOE Infrastructure Modernization Program.
- Review a limited number of programs, projects, or capabilities, exhibiting a broad range of candidate technologies. Describe each selected technology and apply the classification taxonomy.

SCOPE

To initiate and demonstrate the prototype catalogue, data on approximately 100 specific technologies in various stages of readiness at the DOE laboratories have been classified and their potential application to the infrastructure indicated. Even this limited sample of DOE research suggests

that existing DOE technologies have the potential to make large contributions to the future of our national infrastructure.

A wider application of the prototype catalogue beyond what is demonstrated here, would require funding to obtain additional data, enter it into the database, and publish the results with periodic updating.

II. TECHNOLOGY SELECTION AND ORGANIZATION

To develop a sample of the types and extent of technologies available from DOE Program Office and DOE National Laboratory research, we conducted a limited literature search. Information on candidate technologies was primarily obtained from technology overview documents from DOE headquarters and DOE's national laboratories, from laboratory periodicals, and an energy conservation database developed for the Building Energy Systems Program Office within DOE. Because of time constraints, the quantity of information was limited; however, review of this material yielded over 100 possible technologies.

The review of technologies was not intended to be comprehensive in either depth or breadth. Instead, the intent was to identify a number of technologies across the range of possibilities; thus, some technologies that are included may have wide application while others may be very narrow.

In selecting applicable technologies, we interpreted the term infrastructure broadly: the functional structure as well as support systems, such as sewer and steam lines, landscaping, etc. Material was reviewed and candidate technologies were selected with this definition in mind.

The framework for the database includes four components. First, the source of the information is identified. Because the information provided in the database is necessarily abridged, the original source will provide more background on the technology than is provided in the database. Second, a contact is identified. In many cases, the laboratory that conducted the research is identified; where possible, a contact person and phone number are also identified. Third, the technology is described and potential applications noted. Finally, the taxonomy described in Chapter III was applied to classify the technologies.

The classification of technologies was based on the judgment of project staff. Time constraints did not permit us to verify these judgments with individuals who are knowledgeable about the technology.

Although the current version of the database represents a very preliminary product, it is valuable not only because it demonstrates the validity of the concept, but because a considerable body of information is organized into a relational database. The database can be expanded to include additional fields of information as needed, can be queried according to the embedded taxonomy or to new criteria, and can be expanded to include an unlimited number of technologies.

III. TECHNOLOGY CLASSIFICATION

The taxonomy for this relational database is based on general principles drawn from a literature review of data classification systems. The system was then tailored to provide the information specifically needed for infrastructure modernization and to provide it in a user-friendly format.

Each technology entered into the catalogue is classified in six dimensions :

1. type of technology
2. generic application within infrastructure
3. stage of infrastructure life cycle
4. functional service application to infrastructure
5. infrastructure performance measures
6. technology capability/readiness.

The structure is hierarchial, so that one can define more detailed categories. For example, in Category 4, the classification is carried into three digits, but it is evident that additional detail would be useful. Category 1 has initially been limited to a single digit; however, as the catalogue is implemented beyond this initial demonstration, the taxonomy of technologies should be expanded to include considerably more detail. As data are actually assembled for the catalogue, new categories could be added to all six dimensions as needed.

The six dimensions provide an ordered set of key words that can be used for subsequent retrieval of data. In addition, the compiler of entries can specify any vector of additional key words that may be required.

A particular technology may have multiple applications within a given category (Categories 2 through 5); the database is designed to accommodate this. The key to successful entry is the ability to judge the applicability of the technology to infrastructure systems across Categories 2 through 5. Sometimes this is described in the literature about the technology, but more often an engineer or scientist will have to use his or her best professional judgment in determining the opportunity for the technology to contribute to infrastructure. Therefore the quality and utility of the Catalogue will only be as good as the quality of judgment used in classifying the entries. Any program to implement the catalogue concept on a wider basis must be undertaken with this in mind.

CLASSIFICATION OF TECHNOLOGIES

Technologies fall into eight classifications:

1. **Decision Technologies** (expert systems, artificial intelligence, and other analysis tools that can be used to evaluate large collections of data and guide decision making at any stage of the life cycle)

2. **Information Technologies** (the hardware and software for storing, retrieving and transmitting information, e.g., example management information systems)

3. **Measurement, Communications and Control Technologies** (instrument and control systems combining sensors, transducers and analyzers to produce relevant information; for example, of nondestructive evaluation methods in structural and mechanical equipment inspection or in-situ sensors to provide real-time signals such as stress level, water level, or chemical ion level)

4. **Materials and Chemical Technologies** (strong, lighter, corrosion-resistant materials and protective coatings that will improve the performance or extend the life of structures, machinery, and equipment)

5. **Mechanical and Electrical Technologies** [(mechanical) combustion systems and all classes of prime movers such as generators, engines, turbines, motors, compressors, pumps, and energy storage transfer or transformation devices; (electrical) conductors, transformers, switchgear, and other technologies that manage electrical energy; (electro-mechanical) robotics]

6. **Nuclear Technologies** (neutron activation, neutron scattering, neutron radiography, irradiation, power)

7. **Photon Technologies** (lighting, lasers, optics)

8. **Biotechnologies** (use of natural or synthetic organisms to treat waste materials, to detoxify water or soil, to aid in land and watershed management, and other applications).

GENERIC APPLICATION WITHIN INFRASTRUCTURE

An infrastructure is a **system** carrying out a particular **service function**; it may contain some or all of the following generic components:

1. Structures (surfaces, superstructure, substructure, foundations, fasteners)

2. Machinery (principally electrical and fossil prime movers)

3. Equipment (lighting, conduits, housings, etc.)

4. Natural Resources (land, water, air)

    4.1 Land and Mineral Resources

    4.2 Water Resources

    4.3 Air Resources

    4.4 Flora

    4.5 Fauna

5. Energy

6. Materials and Chemicals

7. Residuals (wastes) and Pollutants

8. Human Resources (managers, engineers, etc.).

LIFE CYCLE OF INFRASTRUCTURES

The stages in the life of any infrastructure system are classified as follows:

1. Policy Making and Needs Definition

2. Planning and Budgeting

3. Design

4. Construction

5. Operation and Maintenance

6. Rehabilitation/Renovation/Life Extension

7. Decommissioning

8. Demolition

9. Remediation/Site Restoration.

The infrastructure's performance can be improved through technological innovation at each of the above stages. (The taxonomy for measures of performance is found in Category 5.)

FUNCTIONAL SERVICE CLASSIFICATION OF INFRASTRUCTURE SYSTEMS

The functions performed by an infrastructure have been classified as energy, transportation, water resource and other. Each of the functions has been further subdivided as shown below.

4.1 Energy Systems

.1 **Electric Power Supply Systems** (generating, transmission, distribution and storage systems)

.2 **Gas Supply Systems** (collection and processing systems; transmission, storage, and distribution systems)

.3 **Liquid Fuel Supply Systems** (production, storage, and distribution systems)

.4 **Coal Supply Systems** (mining, storage, conveyance, etc.)

.5 **Nuclear Fuel Supply Systems** (mining, processing, storage, etc.)

.6 **Renewable Energy Supply Systems** (hydropower, geothermal, ocean thermal, wind, solar thermal, photovoltaic)

.7 **Biomass Fuels Supply Systems** (ethanol, methanol, wood, agricultural products and by-products)

.8 **Thermal Energy Distribution Systems:** (steam, hot water, chilled water - includes distribution and storage)

4.2 Transportation Systems

.1 **Vehicle Transit Systems** (roads, bridges, tunnels, etc.; also the vehicles and operating equipment)

.2 **Rail Transit Systems** (right of ways, bridges, tunnels, etc.; also the vehicles and operating equipment)

.3 **Air Transit Systems** (airports, airplane fleets, etc.)

.4 **Waterway Transit Systems:** (ports, harbors, channels, canals, locks, docks, etc.; also the ships, dredges, etc.)

.5 **Pedestrian Movement Systems** (people movers, escalators, access ways, etc.)

.6 **Space Travel Systems** (ground support systems, space vehicle systems, etc.)

4.3 Water Resource Systems

.1 **Watersheds**

.2 **Surface Water Management Systems** (dams, reservoirs, diversions, irrigation, drainage works, etc.)

.3 **Coastal Protection Systems** (breakwaters, barriers, beaches, etc.)

.4 **Ground Water Management Systems** (aquifers, wells, etc.)

.5 **Water Supply Systems** (intakes, treatment plants, distribution systems, pumps, etc.)

.6 **Wastewater (Sewerage) Disposal Systems** (collection systems, treatment systems, outfalls, etc.).

4.4 Other Infrastructure Systems

.1 **Telecommunication and Computer Systems**

.2 **Public Lighting Systems**

.3 **Waste Management and Control Systems** (includes toxic, radioactive and other hazardous wastes, as well as low-hazard solid wastes from municipal and industrial sources)

.4 **Building Systems and Other Structures** (includes building as structure, as thermal envelope, heating, ventilating and air conditioning systems, lighting systems, etc.)

.5 **Parks, Preservation Areas, Landscaped Areas and Open Lands**

.6 **Public Safety and Emergency Response Systems** (police, fire, ambulance, other elements)

.7 **Public Health Systems** (hospitals, clinics, laboratories, etc.)

.8 **Education Systems** (schools, media, etc.)

.9 **Industrial Production Systems** (standard industrial classification for input-output analysis).

Typically, public infrastructure activities compose part of the "final demand" sector served by industrial production. Reciprocally, industrial production depends upon inputs from the various infrastructure systems. Because these are often provided at no direct cost in a market sense (such as highways), the economic role of infrastructure in overall productivity is not always visible and clearly understood.

INFRASTRUCTURE PERFORMANCE MEASURES

Performance measures are the indices for planning and evaluating the infrastructure system. The following performance measures have been identified:

1. Value, Level and/or Quality of Service Function
2. Economic Efficiency and Productivity
3. Cost of Construction/Modernization
4. Cost of Operations and Maintenance (includes energy)
5. Service Life
6. Safety (vulnerability to and risk of hazards)
7. Health Impact
8. Environmental Impact.

TECHNOLOGY/CAPABILITY READINESS

Three states of readiness are included in the classification scheme:

1. **Ready for Use:** the technology or capability is fully developed and can in principle be readily transferred for use by infrastructure managers.
2. **Requires Field Testing:** the technology or capability is proven, but would require a period of adaptation and field testing to the infrastructure environment.
3. **Requires Further Development:** the technology or capability requires further development and/or testing before it can be effectively transferred to the infrastructure environment.

IV. DOE TECH: A RELATIONAL DATABASE/PROTOTYPE CATALOGUE

The database DOE_TECH was constructed using Ashton Tate's dBASE III PLUS[a]; consequently, use of the database will require a copy of dBase III plus. (A printed copy of the database is provided in the appendix to this report.) The following instructions assume that the user has a limited working knowledge of dBASE III PLUS. The dBASE III PLUS format allows manipulation of the data to provide taxonomy searches. In addition, dBASE III PLUS provides a convenient means of generating reports based upon the information contained in the database.

DESCRIPTION

Each record in DOE_TECH contains information in 38 fields under 4 topics: source of the catalogue information (Fields 1 through 8); identification of a contact for further information (Fields 9 through 11); a description of the technology (Fields 12, 13, 14, and 38); and application of the catalogue taxonomy (Fields 15 through 37). Each of the fields is discussed below.

Field #1

"RECORD_NO" is a six-column numeric field that assigns a unique numeric value to each of the technologies. The two digits after the decimal are reserved to denote when the same technology has been discussed in separate write-ups. Each write-up may describe different aspects of the technology.

Fields #2, #3, #4, #5, #6 and #7

The next four fields identify the source of the information provided by the database: "TITLE" gives the title of the article containing information about the technology; "AUTHOR," identifies the article's author; "SOURCE," the source publication; "SOURCE_DAT," the date or volume/issue; "SOURCE_PG," the page in the publication on which the technology is discussed; and "PUBLISHER," provides the name and address of the publisher of the publication.

Fields #8

"LABORATORY" identifies the cognizant DOE laboratory. Some technologies may be associated with specific programs or DOE program offices. If the program or program office is a good source of information, then this information is provided in the field.

(a) Ashton Tate is a registered trademark and dBASE III PLUS is a trademark of Ashton Tate, Torrance, California.

Field #9

"AFFILIATION" provides additional information about the organization affiliated with this technology.

Fields #10 and #11

Where possible, specific individuals with knowledge of the technology have been identified ("CONTACT") and their phone number provided ("C_PHONE").

Field #12

"NAME_TECH" is a 60-column character field for the name of the technology.

Field #13

"TECH_DESC" is a open-ended memo field which allows a short description to the technology to be carried as part of the database record.

Field #14

"TECH_USES" is a memo field which allows a short description of the uses of the technology to be carried as part of the database record.

Fields #15, #16, #17, and #18

These six-column character fields allow the technology to be classified as providing up to four separate means for improving the performance of the infrastructure: "TECH_CLAS1", "TECH_CLAS2", "TECH_CLAS3", and "TECH_CLAS4". The individual technology classifications that may be associated with a technology include: 1) decision technologies, 2) information technologies, 3) measurement, communications, and control technologies, 4) materials and chemical technologies, 5) mechanical and electrical technologies, 6) nuclear technologies, 7) photon technologies, and 8) biotechnologies.

Fields #19, #20, #21, and #22

These six-character fields allow four applications of the technology to be catalogued.

Fields #23, #24, #25, and #26

These six-character fields allow identification of four stages in the life of the infrastructure where the technology may be used.

Fields #27, #28, #29, and #30

These six-character fields allow four functional service classifications to be identified for the technology.

Fields #31, #32, #33, and #34

These six-character fields allow four infrastructure performance measures of the technology to be catalogued.

Field #35, #36, and #37

"READINESS" is a six-column character field which allows identification of three technology/capability readiness classifications.

Field #38

"COMMENTS" is a memo field for additional comments; it may include such information as cost information.

STARTING THE DATABASE

As mentioned previously, in order to access the information contained in the database, the user will need a copy of Ashton Tate dBASE III PLUS as well as a PC-compatible capable of running the software. At a minimum, the computer should have dual 5.25-inch, 360Kb floppy drives.

- Load dBASE III PLUS.
- Insert the floppy containing the database into the available drive. dBASE is now in the assist mode; this is recognized by a series of "menus" at the top of the screen. Different options on the menu are highlighted by moving the position arrows on the keyboard.
- Move the position arrows on the keyboard so that the word "Database file" is highlighted under the "Set Up" menu. Now press the "Return" key. A list of drive specifications will appear on the screen.
- Select the drive that contains the database and press the "Return" key. A list of the database files contained on the floppy in use will now be displayed.
- Move the cursor and select the desired database file; press "Return." The screen will now display a message asking if the database file is indexed.
- Type **N** (using an indexed file will be covered later). The database is now ready to use. Notice the lower bar on the screen displays how many records that particular database contains.

VIEWING THE DATABASE

Once the database is in use, the browse command will allow the user to view the database in a row and column format, with each of the four fields representing a column. The first column will be the field containing the SIC code. The "Browse" command can be accessed directly from the dot prompt or through the "Assist" mode.

- With the desired database in, use the "Escape" key to return to the dot prompt.

- At the dot prompt, type **BROWSE.** This command will display the database in a row and column format. To view the database, use the position arrows on the keyboard to scroll up and down or from side to side through the database.

Sometimes it is not necessary to use all fields of information. If this is the case, the "Browse Fields" command is a logical choice. For example, if the user wishes to view only the "NAME_TECH" and "TECH_DESC" fields,

- Type **BROWSE FIELDS NAME_TECH,TECH_DESC at the dot prompt.** This command could be duplicated for any of the desired fields.

Another method of viewing the database is by using the "Append" command. This command displays the information for each record as an entire screen. All fields for a given record appear on the screen at one time. The "Append" command can be executed either in the assist mode or directly from the dot prompt.

- At the dot prompt, type **APPEND.**

APPENDIX

PROTOTYPE CATALOGUE OF DOE TECHNOLOGIES

OTA SUMMARY

RECORD NUMBER: 1.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: JOHN M. TALBOTT
PHONE: 202-586-9446
TECHNOLOGY: Mathematical Modeling of Indoor Air Quality

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	Residuals
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Health	PERFORM 2:	Environ.
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This project is developing an indoor air quality model which, as a tool, will allow the research community to analyze how the building affects air movement.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 2.01

TITLE:

AUTHOR:
PUBLISHER:

SOURCE: PNL Profile
SOURCE DATE: Fall 1986

SOURCE PAGE: 5
LABORATORY: PACIFIC NORTHWEST LABS
AFFILIATION:
CONTACT: Jim Jarrett
PHONE: 509-376-0731
TECHNOLOGY: Self-contained Radioluminescent Lights

TECH. CLASS 1:	Photon	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Equip.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Public Lights	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of Constr.	PERFORM 2:	Life
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Self-contained radioluminescent lights using tritium gas to supply the energy to produce light.

TECHNOLOGY USES
Radioluminescent lights can provide reliable, self-contained and inexpensive runway lights for remote locations where electrical systems are expensive, difficult to maintain or nonexistent. Other applications include lights for marine navigation, highways, signs and instrument lighting. Radioluminescent lights are used extensively in buildings where reliable power cannot be assured in case of emergency.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 2.02

TITLE: Radioluminescent Lights Improved

AUTHOR:
PUBLISHER:

SOURCE: PNL Profile
SOURCE DATE: July-August 1988

SOURCE PAGE: 12
LABORATORY: PACIFIC NORTHWEST LABS
AFFILIATION:
CONTACT:
PHONE: 509-375-2231
TECHNOLOGY: Radioluminescent Lights

TECH. CLASS 1:	Photon	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Equip.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Public Lights	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of Constr.	PERFORM 2:	Life
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
A method has been developed to mix heavily tritiated polymers with phosphors in a radioluminescent film that can be produced as a thin sheet of plastic or molded in other configurations.

The new material generates more light and weighs considerablyless per unit of light output than materials used to produce existing radioluminescent lights.

TECHNOLOGY USES
Radioluminescent lights provide stable light sources wherever electrical power is unavailable or difficult to install or maintain.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 3.01

TITLE: ELCAP

AUTHOR:
PUBLISHER:

SOURCE: PNL Profile
SOURCE DATE: Fall 1986

SOURCE PAGE: 6
LABORATORY: PACIFIC NORTHWEST LABS
AFFILIATION:
CONTACT: Bill Sandusky
PHONE: 503/375-3709
TECHNOLOGY: Electricity Conservation

TECH. CLASS 1:	Information	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Policy & Needs	LIFE CYCLE 2:	Plan. & Budget
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Electric	FUNCTION 2:	Buildings
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	Cost of Constr.
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Information about actual energy use in buildings.

TECHNOLOGY USES
Electricity-use patterns for appliances, heating, cooling, lighting, etc. and conservation potential.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 4.01

TITLE: ELCAP

AUTHOR:
PUBLISHER:

SOURCE: PNL Profile
SOURCE DATE: Fall 1986

SOURCE PAGE: 6
LABORATORY: PACIFIC NORTHWEST LABS
AFFILIATION:
CONTACT: Bill Sandusky
PHONE: 509/375-3709
TECHNOLOGY: Microprocessor-Controlled Data Logger

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Policy & Needs	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Electric	FUNCTION 2:	Buildings
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
A logger consists of a standard electrical box that houses a power supply, a telecommunications modem, a microprocessor-based data acquisition and storage system, up to eight power metering boards, and other circuitry to support a small meteorological station.

TECHNOLOGY USES
The data logger can record measurements of loads placed on a building's electrical supply from uses such as lighting, heating, furnaces and appliances. The loggers collects data in real time. A logger typically records at hourly intervals and calculates an average value of the hour's energy consumption which is stored in memory.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 5.01

TITLE: Watching Over Hanford

AUTHOR:
PUBLISHER:

SOURCE: PNL Profile
SOURCE DATE: Spring 1987

SOURCE PAGE: 2
LABORATORY: PACIFIC NORTHWEST LABS
AFFILIATION:
CONTACT: Leigh Prater
PHONE: 509-375-2231
TECHNOLOGY: Groundwater Monitoring for Hazardous Chemicals

TECH. CLASS 1:	TECH. CLASS 2:
TECH. CLASS 3:	TECH. CLASS 4:
APPLICATION 1:	APPLICATION 2:
APPLICATION 3:	APPLICATION 4:
LIFE CYCLE 1:	LIFE CYCLE 2:
LIFE CYCLE 3:	LIFE CYCLE 4:
FUNCTION 1:	FUNCTION 2:
FUNCTION 3:	FUNCTION 4:
PERFORM 1:	PERFORM 2:
PERFORM 3:	PERFORM 4:
READINESS 1:	READINESS 2:
READINESS 3:	

DESCRIPTION
The groundwater monitoring program for hazardous chemicals monitors for more than 375, chemicals including solvents, pesticides and metals.

TECHNOLOGY USES
Groundwater monitoring is done to assure that groundwater meets the requirements of the Resource Conservation and Recovery Act of 1976.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 6.01

TITLE: Exploratory Research Program

AUTHOR:
PUBLISHER:

SOURCE: PNL Profile
SOURCE DATE: Summer 1987

SOURCE PAGE: 2
LABORATORY: PACIFIC NORTHWEST LABS
AFFILIATION:
CONTACT: Bill Bonne
PHONE: 509-376-3340
TECHNOLOGY: In-Situ Vitrification (ISV)

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Residuals	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Remediation	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:		FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Health	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
In situ vitrification is a method of stabilizing chemicals and wastes in place by using electrical current to heat the waste and surrounding soil and transforming it into an obsidian-like material.

TECHNOLOGY USES
Isolation of hazardous wastes in soils.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 6.02

TITLE: In Situ Vitrification: To Clean up the Environmen
nt
AUTHOR:
PUBLISHER:

SOURCE: PNL Profile
SOURCE DATE: July-August 1988

SOURCE PAGE: 6
LABORATORY: PACIFIC NORTHWEST LABS
AFFILIATION:
CONTACT: James L. Buelt
PHONE: 509-376-3929
TECHNOLOGY: In-Situ Vitrification

TECH. CLASS 1:	Materials	TECH. CLASS 2:
TECH. CLASS 3:		TECH. CLASS 4:
APPLICATION 1:	Residuals	APPLICATION 2:
APPLICATION 3:		APPLICATION 4:
LIFE CYCLE 1:	Remediation	LIFE CYCLE 2:
LIFE CYCLE 3:		LIFE CYCLE 4:
FUNCTION 1:		FUNCTION 2:
FUNCTION 3:		FUNCTION 4:
PERFORM 1:	Health	PERFORM 2:
PERFORM 3:		PERFORM 4:
READINESS 1:	Field Test	READINESS 2:
READINESS 3:		

DESCRIPTION
ISV is a thermal treatment process that converts contaminated soil into chemically inert, stable glass and crystalline product by passing an electric current between electrodes inserted in the soil.

A square array of four electrodes is inserted into the ground at the desired treatment width and depth. A mixture of flaked graphite and glass frit is placed between the electrodes to establish a path for the electric current. The power from the electric current heats the soil up to 2000 C (3,600 F). The heat melts the soil and rocks, and research shows that the heat decomposes organic materials. As the molten material cools, it forms a glass block that chemically and physically resembles natural obsidian.

Laboratory tests have determined that the product is more durable than granite and marble, greatly reducing the possibility of environmental contamination due to water or wind erosion and plant or animal intrusion.

TECHNOLOGY USES

The EPA has included ISV technology into its Superfund Innovative Technology Evaluation program. The technology has been selected by EPA for use in the cleanup of the 3.5-acre Pristine chemical dump site in Reading, Ohio.

ISV has potential application to remediate hazardous waste for a sizable number of the 200,000 firms required to meet waste disposal regulations under Resource Conservation and Recovery Act.

The process is not intended to replace all waste treatment methods. It is best suited for in-place remediation of hazardous chemical or radioactive contaminated soils and sludges that contain both toxic metals and organics.

Other potential ISV uses include barrier wall construction, general soil stabilization, and the formation of footings and foundations.

COMMENTS

1. ISV eliminates the need to excavate the waste, thus reducing possible exposure to humans and costs associated with removal. In some applications ISV is less expensive than excavating, transporting and reburying the soil in a secure landfill.

OTA SUMMARY

RECORD NUMBER: 7.01

TITLE: Advancing Science Through New Research

AUTHOR:
PUBLISHER:

SOURCE: PNL Profile
SOURCE DATE: Summer 1987

SOURCE PAGE: 4
LABORATORY: PACIFIC NORTHWEST LABS
AFFILIATION:
CONTACT: Ron Melton
PHONE: 509-375-2932
TECHNOLOGY: Expert Systems

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of Constr.	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
Knowledge-based systems to more efficiently manage build operations.

TECHNOLOGY USES
Building managers may come and go, but the expert system can preserve the history of the building so a new person may have an easier time dealing with building problems and operations.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 8.01

TITLE: Biobarrier Product Benefits Farmers

AUTHOR:
PUBLISHER:

SOURCE: PNL Profile/Christina E. Cowan
SOURCE DATE: Fall 1987/August 29, 1989

SOURCE PAGE: 0
LABORATORY: PACIFIC NORTHWEST LABS
AFFILIATION:
CONTACT: Pete Van Voris
PHONE: 509-375-2498
TECHNOLOGY: Herbicide Biobarrier

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	Equip.
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Surface Water	FUNCTION 2:	Water Supply
FUNCTION 3:		FUNCTION 4:	Parks
PERFORM 1:	Cost of Constr.	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	Field Test
READINESS 3:			

DESCRIPTION
The combining of controlled release technology and herbicides to provide long-term (hundreds of years) control of plant root growth.

TECHNOLOGY USES
1. The biobarrier product Root Stop (TM), developed by Pacific Northwest Laboratory, prevents plants roots from clogging drip irrigation systems.

2. A biobarrier product gasket material developed by Pacific Northwest Laboratory, and marketed by Mantaline, prevents plant roots from clogging sewer lines.

3. A biobarrier fabric has been developed to inhibit plant growth in the zone around the fabric. The fabric has been used to prevent plant root damage under airport runways, under walkways, and under parking lots.

4. The shorter life biobarrier fabric (10 to 20 year life) is

beingdeveloped for landscaping use. Uses include placing the fabric in shrub beds to exclude weeds and grass, and around sprinkler heads to keep grass from interfering with pop-up sprinklers.

5. Biobarrier fabric has been used to prevent plant growth over areas where hazardous waste is located, and to prevent weed and grass growth at electric power substations.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 8.02

TITLE:

AUTHOR:
PUBLISHER:

SOURCE: Interview: Christina E. Cowan
SOURCE DATE: August 29, 1989

SOURCE PAGE: 0
LABORATORY: PACIFIC NORTHWEST LABS
AFFILIATION:
CONTACT: Pete Van Voris
PHONE: 509-375-2498
TECHNOLOGY: Pesticide Biobarrier

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Construct.	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:		FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
The combining of controlled release technology and pesticides to provide long-term (hundreds of years) control of insects in wooden structures.

TECHNOLOGY USES
1. PNL is developing a pesticide fabric material to be used around foundations of wooden structures to provide long-term control of termites burrowing into the wood.

2. PNL is developing a pesticide material to be placed in the cavity of building walls to control by repelling cockroaches, silverfish, ants, etc., from making their homes within the wall.

3. PNL is developing a caulking compound to be used where structural wood meets the foundation support to repel termites, cockroaches, silverfish, ants, etc.

OTA SUMMARY

RECORD NUMBER: 8.03

TITLE:

AUTHOR:
PUBLISHER:

SOURCE: Interview: Christina E. Cowan
SOURCE DATE: August 29, 1989

SOURCE PAGE: 0
LABORATORY: PACIFIC NORTHWEST LABS
AFFILIATION:
CONTACT: Pete Van Voris
PHONE: 509-375-2498
TECHNOLOGY: Herbicide/Pesticide Biobarrier

TECH. CLASS 1:	Materials	TECH. CLASS 2:
TECH. CLASS 3:		TECH. CLASS 4:
APPLICATION 1:	Structures	APPLICATION 2:
APPLICATION 3:		APPLICATION 4:
LIFE CYCLE 1:	Construct.	LIFE CYCLE 2:
LIFE CYCLE 3:		LIFE CYCLE 4:
FUNCTION 1:		FUNCTION 2:
FUNCTION 3:		FUNCTION 4:
PERFORM 1:	Cost of O&M	PERFORM 2:
PERFORM 3:		PERFORM 4:
READINESS 1:	Devel.	READINESS 2:
READINESS 3:		

DESCRIPTION
The use of a combination of herbicide and pesticide in controlled release formulations injected into the core of a utility pole to control fungus, molds, and burrowing insects.

TECHNOLOGY USES
1. Protection of utility poles, fence posts and other wood that is buried in the ground or any wood structure that rests on the ground.

COMMENTS

CTA SUMMARY

RECORD NUMBER: 9.01

TITLE: Remote Sensing: Making Sense of Our Environment

AUTHOR:
PUBLISHER:

SOURCE: PNL Profile
SOURCE DATE: September/October 1988

SOURCE PAGE: 4
LABORATORY: PACIFIC NORTHWEST LABS
AFFILIATION:
CONTACT: George E. Wukelic
PHONE: 509-376-5860
TECHNOLOGY: Remote Sensing

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Natural Res.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Plan. & Budget	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:		FUNCTION 2:	Parks
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	Health
PERFORM 3:		PERFORM 4:	
READINESS 1:	Field Test	READINESS 2:	
READINESS 3:			

DESCRIPTION

TECHNOLOGY USES
1. Develop computerized procedures for estimating evapotranspiration across large arid regions.

2. Remote sensing information can help in the selection of sites for structures and activities that have minimal impact on groundwater and ecological systems.

2. Provide information to be used in selecting hazardous waste storage location.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 10.01

TITLE: Custom-Tailored Robots for Special Needs

AUTHOR:
PUBLISHER:

SOURCE: PNL Profile
SOURCE DATE: November/December 1988

SOURCE PAGE: 2
LABORATORY: PACIFIC NORTHWEST LABS
AFFILIATION:
CONTACT: Ronald H. Hall
PHONE: 509-375-2341
TECHNOLOGY: Robotics

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	Mech. & Elec.
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Human Res.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Waste Mgt.	FUNCTION 2:	Safety
FUNCTION 3:	Prod.	FUNCTION 4:	
PERFORM 1:	Life	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Robotics integrate mechanical linkages, sensory systems, computer-based controls, biomechanics, and human factors into multipurpose, reprogrammable tools to assist humans.

TECHNOLOGY USES
1. Robots have special advantages in dangerous jobs and in contaminated environments.

2. Robots can be used to characterize, sample, excavate and remediate hazardous waste sites.

3. Robots are being developed that are remotely controlled, light weight, on nonmetallic mobile systems to carry such sensors as ground-penetrating radar and metal detectors to map locations of objects in the ground.

4. Mobile robots can inspect and dispose of bombs, handle communications

in hostage situations, perform search and rescue missions, and control vehicles in secure areas.

5. Highly sophisticated robotic systems can be used in law enforcement training facilities. These systems can be programmed to simulate the actions of intruders and bystanders, and sensors can track the trainee's position and weapon.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 11.01

TITLE: Custom-Tailored Robots for Special Needs

AUTHOR:
PUBLISHER:

SOURCE: PNL Profile
SOURCE DATE: November/December 1988

SOURCE PAGE: 2
LABORATORY: PACIFIC NORTHWEST LABS
AFFILIATION:
CONTACT: Ronald H. Hall
PHONE: 509-375-2341
TECHNOLOGY: Remote Manipulators

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	Mech. & Elec.
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Human Res.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Health	FUNCTION 2:	Prod.
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Remote manipulators are devices that allow a human to control the movement of a remotely located robotics arm by manipulating a master control.

TECHNOLOGY USES
Researchers are increasing the productivity of remote manipulators by incorporating human factors technologies that allow the operator to visualize the position of the robotics arm without seeing it.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 12.01

TITLE: Understanding the Human-Machine Interface

AUTHOR:
PUBLISHER:

SOURCE: PNL Profile
SOURCE DATE: November/December 1988

SOURCE PAGE: 7
LABORATORY: PACIFIC NORTHWEST LABS
AFFILIATION:
CONTACT: Barry Kantowitz
PHONE:
TECHNOLOGY: Human/Technology Interface

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Human Res.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Plan. & Budget	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	All	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	Life
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
Understanding and predicting how humans will interface with new technology.

TECHNOLOGY USES
1. Understanding and predicting how individuals interact with computers.

2. Identify better ways to design systems for air traffic controllers that will enhance the safety of flying.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 13.01

TITLE: Research into the Underworld

AUTHOR:
PUBLISHER:

SOURCE: PNL Profile
SOURCE DATE: January/February 1989

SOURCE PAGE: 2
LABORATORY: PACIFIC NORTHWEST LABS
AFFILIATION:
CONTACT: Raymond E. Wildung
PHONE: 509-376-5680
TECHNOLOGY: Subsurface Microbiological Processes

TECH. CLASS 1:	Biotechnologies	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Residuals	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	Remediation
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Waste Mgt.	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Health	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Field Test	READINESS 2:	Devel.
READINESS 3:			

DESCRIPTION
PNL's microbiological research defines the nature of microorganisms in various deep hydrogeological environments, their ability to decompose organic chemicals, and the relationship of these processes to specific conditions in the subsurface.

TECHNOLOGY USES
1. Microbes can break down organic and some inorganic pollutants in soil and convert them into harmless gases such as carbon dioxide.

2. Microbes are being used to create harmless compounds from gases that have leaked from underground gasoline tanks.

3. Microorganisms may be used to create biological barriers to prevent the movement of subsurface contaminants.

4. Researchers found that microorganisms can convert nitrate, a pollutant,

to harmless nitrogen gas.

5. Microorganisms in the presence of a carbon source can degrade carbon tetrachloride.

6. Soon researchers will be able to extend laboratory-scale understanding of processes controlling contaminant migration in groundwater to real time and under complex conditions.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 14.01

TITLE: Sludge-to-Oil Reactor System Solving a Universal P
Problem
AUTHOR:
PUBLISHER:

SOURCE: PNL Profile
SOURCE DATE: January/February 1989

SOURCE PAGE: 8
LABORATORY: PACIFIC NORTHWEST LABS
AFFILIATION:
CONTACT: Peter M. Molton
PHONE: 509-376-6654
TECHNOLOGY: Sludge-to-Oil Reactor System (STORS)

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Residuals	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Liquid fuel	FUNCTION 2:	Wastewater
FUNCTION 3:	Waste Mgt.	FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Field Test	READINESS 2:	
READINESS 3:			

DESCRIPTION
At a STORS facility, raw sewage--a brown liquid containing about one percent solids--is pumped into a settling tank where the solid content is raised to four percent. A centrifuge extracts more liquid from the sediment, bringing the solid content to 20 percent. A caustic alkali is added as a catalyst and the sewage is pumped onto a thermochemical reactor. In the reactor the mixture is heated to 700 degrees F and held under its own steam pressure for about an hour.

TECHNOLOGY USES
1. STORS reduces the sludge volume by 80 percent and can produce up to three times as much energy as it uses, offsetting processing costs.

2. STORS facilities will be smaller than those needed for sludge digestion or composting, and it is estimated that STORS capital and operating costs will be only half that of incineration.

COMMENTS

1. Plans are being developed for a full-scale demonstration of STORS in Chicago.

OTA SUMMARY

RECORD NUMBER: 14.02

TITLE: Converting Sewage Sludge into Fuel Oil: Sludge-to o-Oil Reactor System
AUTHOR:
PUBLISHER:

SOURCE: Technology for U.S. Industry
SOURCE DATE: September 1988

SOURCE PAGE: 28
LABORATORY: PACIFIC NORTHWEST LABS
AFFILIATION:
CONTACT: Peter M. Molton
PHONE: 509-375-2927
TECHNOLOGY: Sludge-to-Oil Reactor System

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Residuals	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Construct.	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Liquid fuel	FUNCTION 2:	Waste Mgt.
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION

TECHNOLOGY USES
1. With some additional development, the process can be modified to convert organic wastes (straw, cornstalks, garbage, and paper) and certain categories of hazardous chemicals into useful petroleum substitutes that can be upgraded to fuel by conventional refining methods.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 15.01

TITLE: Hazardous Waste Treated

AUTHOR:
PUBLISHER:

SOURCE: PNL Profile
SOURCE DATE: January/February 1989

SOURCE PAGE: 12
LABORATORY: PACIFIC NORTHWEST LABS
AFFILIATION:
CONTACT:
PHONE: 509-375-2789
TECHNOLOGY: Grout Technology

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Residuals	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Waste Mgt.	FUNCTION 2:	Prod.
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Health	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Field Test	READINESS 2:	
READINESS 3:			

DESCRIPTION
Researchers have developed an economically efficient method for hazardous waste treatment by converting acidic heavy metal wastes to nonhazardous grouts.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 16.01

TITLE: Learning From the Past to Ensure the Future

AUTHOR:
PUBLISHER:

SOURCE: PNL Profile
SOURCE DATE: May/June 1989

SOURCE PAGE: 2
LABORATORY: PACIFIC NORTHWEST LABS
AFFILIATION:
CONTACT: Glendon W. Gee
PHONE: 509-376-8424
TECHNOLOGY: Barriers to Isolate Hazardous Waste

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Residuals	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Waste Mgt.	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Health	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
Barriers are being designed to minimize intrusion by humans, animals and vegetation; resist wind and water erosion and deposition; and minimize water seepage into the waste and contaminant movement into groundwater

TECHNOLOGY USES
1) Barriers can be used for virtually any type of chemical or radioactive waste at any scale under a wide range of site conditions.

2) Even wastes that have been incinerated and immobilized in a cement mixture may use barriers for additional protection.

COMMENTS
Barriers made of geologic materials don't generate secondary wastes, and they're usually the most cost-effective technology for containing waste.

OTA SUMMARY

RECORD NUMBER: 17.01

TITLE: Cleanup of Federal Land: A New Approach

AUTHOR:
PUBLISHER:

SOURCE: PNL Profile
SOURCE DATE: May/June 1989

SOURCE PAGE: 5
LABORATORY: PACIFIC NORTHWEST LABS
AFFILIATION:
CONTACT: Walter W. Laity
PHONE: 509-375-2780
TECHNOLOGY: Environmental Cleanup

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Residuals	APPLICATION 2:	
APPLICATION 3:			APPLICATION 4:
LIFE CYCLE 1:	Plan. & Budget	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Waste Mgt.	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Health	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Environmental Management Operations (EMO) provides technology derived from DOE research, development and demonstration programs to solve waste cleanup problems at DOE and other federal sites.

TECHNOLOGY USES
1. Environmental cleanup of radioactive and hazardous waste sites at federal facilities.

2. Government agencies can request EMO's services from DOE-RL through any of several arrangements for an interagency transfer of funds. An agreement is in place between DOE-RL and the U.S. Army Toxic and Hazardous Materials Agency to evaluate the best use of the agency's research dollars for remediation. In another agreement with the U.S. Air Force Logistics, Engineering and Environmental Operations Command, EMO is reviewing regulatory compliance at two bases.

3. EMO provides another means to transfer technology developed by federally funded research for federal and private sector use.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 18.01

TITLE: Measuring Beryllium Dust On-Site for a Safer Workp
place: Mobile Beryllium Monitor
AUTHOR:
PUBLISHER:

SOURCE: Technology for U.S. Industry
SOURCE DATE: September 1988

SOURCE PAGE: 5
LABORATORY: LOS ALAMOS NATIONAL LAB
AFFILIATION:
CONTACT: David Cremens
PHONE: 505-667-1034
TECHNOLOGY: Mobile Beryllium Monitor

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Natural Res.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Waste Mgt.	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Safety	PERFORM 2:	Health
PERFORM 3:		PERFORM 4:	
READINESS 1:	Field Test	READINESS 2:	
READINESS 3:			

DESCRIPTION
Beryllium particles represent a significant health hazard when inhaled. The Mobile Beryllium Monitor determines the mass of beryllium collected on filters by focusing high-power laser pulses on the filter surface to generate a microplasma. The material on the filter is vaporized to individual atoms that are then excited by the high plasma temperature. Spectral and temporal resolution of the plasma light permits measurement of the beryllium mass on the filter.

TECHNOLOGY USES
1. The Mobile Beryllium Monitor for the first time provides a simple, rapid, on-site, sensitive method to measure the mass of beryllium dust particles collected on air-sampling filters.

2. The monitor can be used in potentially hazardous working environments not only to measure beryllium particles but also to measure other hazardous materials like asbestos, lead, and arsenic.

3. With minor modifications, the monitor can analyze airborne particles it collects automatically at regular intervals and can analyze air samples continuously and directly by forming the spark freestanding in air.

COMMENTS

1. The monitor does not require a highly skilled technician, is at least 250 times more rapid than widely used non-nuclear methods and 20 times more rapid and 3,000 times more sensitive than nuclear methods.

OTA SUMMARY

RECORD NUMBER: 19.01

TITLE: Easy Detection of Gas Leaks: Backscatter Absorption Gas Imaging
AUTHOR:
PUBLISHER:

SOURCE: Technology for U.S. Industry
SOURCE DATE: September 1988

SOURCE PAGE: 11
LABORATORY: LAWRENCE LIVERMORE NATIONAL LABORATORY
AFFILIATION:
CONTACT: Gordon Longerbean
PHONE: 414-422-6416
TECHNOLOGY: Gas Leak Detection

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Gas	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Life	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
The backscatter absorption gas imaging unit weighs about 18 pounds and is designed for one-person operation. The soulder-mounted unit is tethered to a handcart containing power and control units and, if desired, a television monitor. The unit can be operated from a normal 120 volt AC power line or small, 200 watt gasoline-driven AC generator.

A laser beam scans the components under surveillance in synchronization with the flying infrared spot of an infrared image detector. The electronic signals are processed to produce a black-and-white image of the scene that is displayed on a unit-mounted viewfinder of the camcorder type.

TECHNOLOGY USES
1. Market surveys indicate excellent potential for applications in natural gas distribution systems.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 20.01

TITLE: Continuous, Unattended Monitoring of Process Strea
ams: pH Sensor for Hi-Temp./Hi-Pres. Aqueous Envi
AUTHOR:
PUBLISHER:

SOURCE: Technology for U.S. Industry
SOURCE DATE: September 1988

SOURCE PAGE: 12
LABORATORY: ARGONNE NATIONAL LABORATORY
AFFILIATION:
CONTACT: Tech. Trans. Center
PHONE: 312-972-7694
TECHNOLOGY: pH Sensor

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Machinery	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Thermal	FUNCTION 2:	Water Supply
FUNCTION 3:	Wastewater	FUNCTION 4:	Prod.
PERFORM 1:	Value	PERFORM 2:	Cost of Constr.
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	Devel.
READINESS 3:			

DESCRIPTION
The pH sensor can be used at temperatures up to at least 300C and pressures up to at least 100 atm. The sensor provides an easily measured and recorded electrical signal proportional to the pH of the solution. The sensor is a combination of a very stable, long-life reference electrode of completely new design and a novel palladium-membrane pH electrode that provides a thermodynamically well defined measure of pH.

The advantages of this sensor over previously used pH measuring devices are 1) long, unattended, trouble-free operation, 2) simplicity of construction and operation, and 3) thermodynamically well defined pH response.

TECHNOLOGY USES
1. Continuous, unattended monitoring of pH in high-temperature/high-pressure aqueous process streams.

2. In the future the reference electrode will be able to be coupled with

other sensing electrodes, opening the possibility of monitoring the concentration of many constituents in these high-temperature, high-pressure process streams.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 21.01

TITLE: More Sensitive Analysis: X-Ray Microprobe/Microscope
AUTHOR:
PUBLISHER:

SOURCE: Technology for U.S. Industry
SOURCE DATE: September 1988

SOURCE PAGE: 16
LABORATORY: BROOKHAVEN NATIONAL LABORATORY
AFFILIATION:
CONTACT: Keith Jones
PHONE: 516-282-4588
TECHNOLOGY: X-Ray Microprobe/Microscope

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Natural Res.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Plan. & Budget	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Coal	FUNCTION 2:	Nuclear
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Field Test	READINESS 2:	
READINESS 3:			

DESCRIPTION
The x-ray microprobe/microscope can measure the concentration and spatial distribution of trace amounts of elements, from silicon to uranium, with excellent resolution and sensitivity.

The device uses simple components to collimate x-rays to a small size so that the well-known technique of x-ray fluorescence can be used to identify each element. In a marked improvement of this basic technique, the specimen is excited with an intense beam of continuous energy x-rays. The new source produces more x-rays per unit area per second than any other x-ray source.

TECHNOLOGY USES
1. An important application for the collimated x-ray microprobe/microscope is for geological and metallurgical studies where the instrument can be used to determine and map elemental distributions in heterogeneous geological samples.

OTA SUMMARY

RECORD NUMBER: 22.01

TITLE: Microanalysis of Heterogeneous Materials: High-Resolution X-Ray Microprobe
AUTHOR:
PUBLISHER:

SOURCE: Technology for U.S. Industry
SOURCE DATE: September 1988

SOURCE PAGE: 17
LABORATORY: ORY-12
AFFILIATION:
CONTACT: Donald A. Carpenter
PHONE: 615-576-8385
TECHNOLOGY: X-Ray Microprobe

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	Machinery
APPLICATION 3:	Natural Res.	APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	All	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Field Test	READINESS 2:	
READINESS 3:			

DESCRIPTION
The HRXRP-5 is an analytical device that produces high-resolution color images of the distributions of chemical elements in materials, ceramics, composites, and biological and geological materials. It was developed for nondestructive, high-resolution microanalysis of materials with heterogeneous structures and compositions.

Using an intense, highly collimated x-ray beam as a fluorescence probe, a typical analysis is carried out in air with little or no sample preparation. Analysis is fast enough to maintain high sample throughput. A spatial resolution of nearly 5 micrometers is obtained routinely.

TECHNOLOGY USES
1. Principal applications of the HRXRP-5 to engineered materials are in the evaluation of failure modes, identifying and mapping of impurity inclusions, and verification of elemental distributions. Since no vacum chamber is required, relatively large specimens can be analyzed.

2. Evaluation of microelectronic and corrosion protection films.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 23.01

TITLE: Nondestructive, High-Resolution Materials Characte
erization: 3-Dimensional Chemical X-Ray Microscop
AUTHOR:
PUBLISHER:

SOURCE: Technology for U.S. Industry
SOURCE DATE: September 1988

SOURCE PAGE: 18
LABORATORY: LAWRENCE LIVERMORE NATIONAL LABORATORY
AFFILIATION:
CONTACT: John H. Kinney
PHONE: 415-422-6669
TECHNOLOGY: Three-Dimensional Chemical X-Ray Microscope

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	Machinery
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	All	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Field Test	READINESS 2:	
READINESS 3:			

DESCRIPTION
The three-dimensional chemical x-ray microscope provides a nondestructive, high-resolution method for characterizing materials.

The experimental assembly consists of an x-ray source, a rotary stage for the sample, a detector system, and an analyzing computer. Parallel x-rays pass through the sample and are recorded by the detector system, which provides a high-resolution, two-dimensional picture of the sample. The sample is rotated by a small angle and another image is collected. This process continues until the sample has been rotated 180 degrees. Then a tomographic reconstruction program on the computer system converts the two-dimensional images into multiple cross sections of the sample, which are rendered into a three-dimensional picture by another software program.

TECHNOLOGY USES
1. Three-dimensional visualization allows scientists to see inside material to study the distribution of elements, phases, and networks and

determine how various parts of a sample are interconnected. For example, it allows recording of data on the internal structure of a material that is under pressure and study of how pores and cracks form in the material as a result of the pressure.

2. Study of crack propagation.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 24.01

TITLE: Reducing Corrosion of Steel Surfaces: Zinc-Phosphate Coating System
AUTHOR:
PUBLISHER:

SOURCE: Technology for U.S. Industry
SOURCE DATE: September 1988

SOURCE PAGE: 23
LABORATORY: BROOKHAVEN NATIONAL LABORATORY
AFFILIATION:
CONTACT: Toshifumi Sugama
PHONE: 516-282-4029
TECHNOLOGY: Reducing Corrosion

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	Machinery
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Construct.	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	All	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	Effic.
PERFORM 3:	Cost of Constr.	PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
A zinc-phosphate coating system has been developed to reduce corrosion of steel surfaces. The coating is applied by a process that uses a solution of three chemicals and water to deposit a highly dense, flexible, and adherent zinc-phosphate crystal coating of controlled particle size and shape. Because the solution contains a unique ingredient, an organic polymer, the coating is highly resistant to corrosion, has great ductility, and bonds well to paint and polymer topcoats.

TECHNOLOGY USES
1. The zinc-phosphate coating system works equally well on either low- or high-carbon steel.

2. The coating can be used to protect vehicle bodies, appliances, ships, etc.

COMMENTS

1. The annual cost of corrosion has been estimated to be between 2 to 3 percent of the U.S.'s gross national product.

OTA SUMMARY

RECORD NUMBER: 25.01

TITLE: Treating Mixed Hazardous Waste: Biodegradation System for Toxic Organic Waste Processing
AUTHOR:
PUBLISHER:

SOURCE: Technology for U.S. Industry
SOURCE DATE: September 1988

SOURCE PAGE: 29
LABORATORY: IDAHO NATIONAL LABORATORY
AFFILIATION:
CONTACT: Jane Welch
PHONE: 208-526-8318
TECHNOLOGY: Biodegradation System

TECH. CLASS 1:	Biotechnologies	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Residuals	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Waste Mgt.	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Health	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Field Test	READINESS 2:	Devel.
READINESS 3:			

DESCRIPTION
A biodegradation system that introduces organisms to detoxify hazardous wastes at very high levels of efficiency has been developed. The system includes a bioreactor (where living cells "feed" on toxic materials to produce carbon dioxide), accessory hardware, and a supply of the detoxifying microorganisms.

TECHNOLOGY USES
1. The Biodegradation System will continually bioprocess an inflow of hazardous wastes of organic compounds such as toluene, xylene, and pseudocumene, rendering the compounds safe for conventional disposal through the sewer system.

2. The process is applicable to any mixed waste containing biodegradable compounds.

3. Any hospital or biotechnology laboratory dealing with hazardous wastes

could be a potential user of this technology.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 26.01

TITLE: FERMAR Dual-Phase Steel: Saving Steel Dollars

AUTHOR:
PUBLISHER:

SOURCE: Technology for U.S. Industry
SOURCE DATE: September 1987

SOURCE PAGE: 43
LABORATORY: LBL
AFFILIATION:
CONTACT: Robert Morris
PHONE: 415-486-6502
TECHNOLOGY: FERMAR

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	All	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
FERMAR is a low-cost, high-strength steel. It is based on the principles of microcomposites. It is a mosaic-like steel composed of two different fibrous phases--martensite and ferrite--produced by special heat treatments or by carefully controlled rolling and quenching of the steel.

TECHNOLOGY USES
1. Production of high-strength wire from FERMAR does not require the expensive and environmentally hazardous lead bath heat treatment now used in conventional wires. FERMAR-produced wire is stronger and more ductile than conventional wire.

2. The FERMAR product microstructure provides considerably improved resistance to fatigue, corrosion, and low-temperature fractures. This combination of properties can lead to a reduction of about 20 percent of the steel needed for prestressed concrete.

3. This high-strength, high-ductility material can result in lighter structures.

COMMENTS

1. About four million tons of steel in the U.S. are used for reinforced concrete. About 230,000 tons of steel in the U.S. are used in prestressed concrete. FERMAR steels would cost about 25 percent less than conventional steels used in reinforced and prestressed concrete.

OTA SUMMARY

RECORD NUMBER: 26.02

TITLE: Plaudits & Patents

AUTHOR:
PUBLISHER:

SOURCE: LBL Research Review
SOURCE DATE: Vol. 12, No. 3/4; Fall/Winter 1987

SOURCE PAGE: 42
LABORATORY:
AFFILIATION: Materials and Chemical Sciences Division, LBL
CONTACT: Gareth Thomas
PHONE: 415-486-6502
TECHNOLOGY: FERMAR: Dual-Phase Steel

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	Construct.
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:		FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	Effic.
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
FERMAR is a low-cost, high-strength steel having a structure that provides improved fatigue, corrosion, and low-temperature fracture resistance.

TECHNOLOGY USES

COMMENTS
The characteristics of this new steel could lead to a 20 percent reduction in the steel needed for prestressed concrete. It would eliminate the need for strategic materials and potential environmental hazards of manufacture.

OTA SUMMARY

RECORD NUMBER: 27.01

TITLE: Leak Detector May Be 'Sound' Investment For Utilit
ty Companies
AUTHOR:
PUBLISHER:

SOURCE: Logos
SOURCE DATE: Spring 1988

SOURCE PAGE: 8
LABORATORY: ARGONNE NATIONAL LABORATORY
AFFILIATION:
CONTACT: David S. Kupperman
PHONE: 312-972-7694
TECHNOLOGY: Acoustic Leak Detector

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Equip.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Gas	FUNCTION 2:	Liquid fuel
FUNCTION 3:	Thermal	FUNCTION 4:	Water Supply
PERFORM 1:	Cost of Constr.	PERFORM 2:	Life
PERFORM 3:	Health	PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
The acoustic leak detector is an acoustic-monitoring system that can accurately locate pipe leaks. The detector records sounds created when pressurized gas or liquid escapes from a damaged pipe. This information is fed into a computer, which provides the location of the leak. The system works while pipes are in use and can identify leak sources by type and location. The detector is a transportable unit consisting of two acoustic sensors, a signal processor and a video monitor. Field results indicate that a gas or steam leak in the range of 2,000 cubic feet per minute can be detected at distances of up to 1,500 feet. Water leaks of 2 gallons per minute can be heard 500 feet away.

TECHNOLOGY USES
1. The acoustic leak detector can be used to pinpoint leaks more precisely than thraditional methods.

2. The acoustic leak detector can locate leaks up to one-third of a mile

away, determine the volume and monitor flow.

3. The acoustic leak detector can accurately locate leaks in any pipe carrying water or steam beneath streets. It can be used on pipes carrying thermal energy--hot water, steam or chilled water.

COMMENTS

1. Many of the steam and hot water distribution systems builtprior to 1950 are in need of leak detection and repair.

2. The acoustic leak detector is expected to be commercially available by 1990, at an estimated cost of $40,000 to $50,000.

OTA SUMMARY

RECORD NUMBER: 28.01

TITLE: Food Additive Serves Up New Ways to Reduce Acid Ra
ain
AUTHOR:
PUBLISHER:

SOURCE: Logos
SOURCE DATE: Winter 1989

SOURCE PAGE: 9
LABORATORY: ARGONNE NATIONAL LABORATORY
AFFILIATION:
CONTACT: John B.L. Harkness
PHONE: 312-972-7694
TECHNOLOGY: Argonox

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	Mat'l & Chem.
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Electric	FUNCTION 2:	Buildings
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Environ.	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Field Test	READINESS 2:	
READINESS 3:			

DESCRIPTION
A family of chemical additives based on ferrous iron and a common food additive has been developed that offers an inexpensive way to remove more than 70 percent of nitrogen-oxide emissions from coal-burning boilers.

TECHNOLOGY USES
When used in conjunction with modifications in combustion conditions, this technology has the potential to lower nitrogen-oxide emissions from a thousand parts per million (ppm) to about 100 ppm.

COMMENTS
1. Argonox offers clear advantages over "selective catalytic reduction" (SCR), a well-known alternative technology. SCR technology is very expensive compared to Argonox.
2. The next step is to take Argonox out of the laboratory and demonstrate it at a coal-fired boiler.
3. Argonox technology makes it possible to remove both nitrogen oxides and

sulfur oxides from stack gases fitted with the two most widely used sulfur-dioxide scrubber chemistries. The Argonox additive does not adversely affect sulfur-dioxide removal.

OTA SUMMARY

RECORD NUMBER: 29.01

TITLE: Study Shows Idling Shortens Life of Diesel Engines
s
AUTHOR:
PUBLISHER:

SOURCE: Argonne News
SOURCE DATE: March/April 1988

SOURCE PAGE: 7
LABORATORY: ARGONNE NATIONAL LABORATORY
AFFILIATION:
CONTACT: Larry R. Johnson
PHONE: 312-972-7694
TECHNOLOGY: Reduction in Idling Lengthens Diesel Engine Life

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Machinery	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Vehicle	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Effic.	PERFORM 2:	Cost of O&M
PERFORM 3:	Life	PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
A study of diesel engine idling indicates that idling causes twice as much damage to a truck's engine as driving.

TECHNOLOGY USES

COMMENTS
1. Because cooling fans blow over the engine block and diesel fuel lines, an idling engine is actually colder than one that is turned off after the first hour.

2. Idling lowers fuel economy and damages a diesel engine. Engine damage results from the low temperature at idle-about 10 degrees lower than the 175 F required for efficient diesel engine operation.

3. Idling causes additional damage because the diesel fuel doesn't burn

completely. Soot is deposited on valves, pistons and rings.

OTA SUMMARY

RECORD NUMBER: 30.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: STEVE WALDER
PHONE: 202-586-9444
TECHNOLOGY: Commercial Standards

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	Residuals
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Health	PERFORM 2:	Environ.
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Energy conservation standards for new commercial and multi-family high-rise buildings. These standards are mandatory for all new federal construction of this category, and voluntary for all others. Criteria are set for four compliance paths.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 31.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: SAM TAGORE
PHONE: 202-586-9210
TECHNOLOGY: Non-Intrusive Moisture Probe

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	Mat'l & Chem.
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Life	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Moisture is the primary cause of building envelope system failure. This probe can be taken into the field to provide a reliable measure of the moisture content of roof systems without roof penetration.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 32.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: S. J. TAYLOR
PHONE: 202-586-9214
TECHNOLOGY: Foundation Design Tools Including Handbooks

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Handbooks and design tools, focused on either the architect/engineer or builder audience, which provide state-of-the-art information on energy-efficient foundation designs.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 33.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: JEFF CHRISTIAN
PHONE: 615-574-5207
TECHNOLOGY: Alternative CFC-Based Insulation In Walls and Foundation

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	Energy
APPLICATION 3:	Mat'l & Chem.	APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Reports on impacts of CFC restrictions on foundation insulation levels. Alternatives to CFC blown extruded polystyrene will be evaluated.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 34.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: S. J. TAYLOR
PHONE: 202-586-9214
TECHNOLOGY: Composite/Pre-Built Wall Systems

TECH. CLASS 1:	TECH. CLASS 2:
TECH. CLASS 3:	TECH. CLASS 4:
APPLICATION 1:	APPLICATION 2:
APPLICATION 3:	APPLICATION 4:
LIFE CYCLE 1:	LIFE CYCLE 2:
LIFE CYCLE 3:	LIFE CYCLE 4:
FUNCTION 1:	FUNCTION 2:
FUNCTION 3:	FUNCTION 4:
PERFORM 1:	PERFORM 2:
PERFORM 3:	PERFORM 4:
READINESS 1:	READINESS 2:
READINESS 3:	

DESCRIPTION
Provides design information on innovative wall systems pre-built for delivery to a site or for inclusion into manufactured housing. These systems will integrate novel insulation techniques with attributes such as acoustics, and infiltration.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 35.01

TITLE:

AUTHOR:
PUBLISHER:

SOURCE:
SOURCE DATE:

SOURCE PAGE: 0
LABORATORY:
AFFILIATION:
CONTACT: SAM TAGORE
PHONE: 202-586-9210
TECHNOLOGY: Simplified Thermal Analysis of Roofs (STAR)

TECH. CLASS 1:	TECH. CLASS 2:
TECH. CLASS 3:	TECH. CLASS 4:
APPLICATION 1:	APPLICATION 2:
APPLICATION 3:	APPLICATION 4:
LIFE CYCLE 1:	LIFE CYCLE 2:
LIFE CYCLE 3:	LIFE CYCLE 4:
FUNCTION 1:	FUNCTION 2:
FUNCTION 3:	FUNCTION 4:
PERFORM 1:	PERFORM 2:
PERFORM 3:	PERFORM 4:
READINESS 1:	READINESS 2:
READINESS 3:	

DESCRIPTION
The roofing industry needs accessible computer models to analyze and optimize product performance for energy performance. Star is a user friendly pc-baced computer code for thermal analysis of one-dimensional roof heat flow problems.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 36.01

TITLE: The Unknown Rays

AUTHOR:
PUBLISHER: Communications Resources Office

SOURCE: The Quarterly
SOURCE DATE: Vol. 16, No.4

SOURCE PAGE: 23
LABORATORY: Lawrence Livermore National Laboratory
AFFILIATION:
CONTACT:
PHONE: 415-422-6416
TECHNOLOGY: X-Rays

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	Machinery
APPLICATION 3:	Equip.	APPLICATION 4:	
LIFE CYCLE 1:	Construct.	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:		FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Life	PERFORM 2:	Safety
PERFORM 3:		PERFORM 4:	
READINESS 1:	Field Test	READINESS 2:	
READINESS 3:			

DESCRIPTION
X-Ray technology can be used to check welds and porosity of materials, check for cracks or other manufacturing defects, or aid construction crews in determining what is behind existing walls and floors. X-Rays have also been used by other divisions to determine the composition of unknown materials such as steel alloys.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 37.01

TITLE: New "Popeye" Lens Tracks Missiles, Meteors and Sta
ars
AUTHOR:
PUBLISHER: Communications Resources Office

SOURCE: The Quarterly
SOURCE DATE: Vol. 20, No. 1; February, 1989

SOURCE PAGE: 2
LABORATORY: Lawrence Livermore National Laboratory
AFFILIATION: O-Division, LLNL
CONTACT: Bruce Williams
PHONE: 415-422-6416
TECHNOLOGY: Optical Imaging System

TECH. CLASS 1:	Measurement	TECH. CLASS 2:
TECH. CLASS 3:		TECH. CLASS 4:
APPLICATION 1:	Equip.	APPLICATION 2:
APPLICATION 3:		APPLICATION 4:
LIFE CYCLE 1:	Design	LIFE CYCLE 2: O & M
LIFE CYCLE 3:		LIFE CYCLE 4:
FUNCTION 1:	Air Transit	FUNCTION 2:
FUNCTION 3:		FUNCTION 4:
PERFORM 1:	Value	PERFORM 2:
PERFORM 3:		PERFORM 4:
READINESS 1:	Field Test	READINESS 2:
READINESS 3:		

DESCRIPTION
"Popeye" is a wide-field-of-view, high resolution optical imaging system. It uses concentric lens elements and a spherical image surface to produce high-resolution images over a broad area.

TECHNOLOGY USES
The system is useful in tracking moving objects while providing an absolute frame of reference.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 38.01

TITLE: New System Detects Gas Leaks

AUTHOR:
PUBLISHER: Communications Resourses Office

SOURCE: The Quarterly
SOURCE DATE: Vol. 20, No. 1; February, 1989

SOURCE PAGE: 4
LABORATORY: Lawrence Livermore National Laboratory
AFFILIATION: Laser Imaging Systems, Inc.
CONTACT: Thomas G. McRay
PHONE: 415-422-6416
TECHNOLOGY: Backscatter Absorption Gas Imaging (BAGI)

TECH. CLASS 1:	Measurement	TECH. CLASS 2:
TECH. CLASS 3:		TECH. CLASS 4:
APPLICATION 1:	Equip.	APPLICATION 2:
APPLICATION 3:		APPLICATION 4:
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:
LIFE CYCLE 3:		LIFE CYCLE 4:
FUNCTION 1:	Gas	FUNCTION 2:
FUNCTION 3:		FUNCTION 4:
PERFORM 1:	Safety	PERFORM 2:
PERFORM 3:		PERFORM 4:
READINESS 1:	Field Test	READINESS 2:
READINESS 3:		

DESCRIPTION
The backscatter absorption gas imaging technique uses a carbon dioxide laser and an infrared image detector to produce a black-and-white image of the scene being viewed, showing any escaping gas at the site.

TECHNOLOGY USES
BAGI was designed to help detect gas leaks in pressurized pipes, fittings and vessels from a remote location.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 39.01

TITLE: Three-Dimensional Chemical X-Ray Microscope Looks at Internal Structure of Materials
AUTHOR:
PUBLISHER: Communications Resources Office

SOURCE: The Quarterly
SOURCE DATE: Vol. 20, No. 1; February, 1989

SOURCE PAGE: 5
LABORATORY: Lawrence Livermore National Laboratory
AFFILIATION:
CONTACT: John H. Kinney
PHONE: 415-422-6416
TECHNOLOGY: 3-D Chemical X-Ray Microscope

TECH. CLASS 1:	Decision	TECH. CLASS 2:	Materials
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Mat'l & Chem.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	All	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
This is a three-dimensional chemical x-ray microscope developed to study the internal chemical structure of materials. The microscope provides a nondestructive, high-resolution method for characterizing materials.

TECHNOLOGY USES

COMMENTS
The 3-D chemical x-ray microscope is faster than current imaging methods, which are only capable of characterizing the surface of a material, and it requires samples almost a million times smaller than current methods.

OTA SUMMARY

RECORD NUMBER: 40.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: SAM TAGORE
PHONE: 202-586-9210
TECHNOLOGY: PROPOR

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	Mat'l & Chem.
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
A computer code for determining the thermal conductivities and specific heat. Computed directly from field measurements of temperature and heat flow.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 41.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: SAM TAGORE
PHONE: 202-586-9210
TECHNOLOGY: Roof Thermal Research Apparatus (RTRA)

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	Mat'l & Chem.
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
This is an outdoor facility for testing thermal and moisture properties of real roof reactions under field conditions. The apparatus has four independent, fully instrumented test stations.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 42.01

TITLE: Lab Inventions Honored

AUTHOR:
PUBLISHER: Communications Resources Office

SOURCE: The Quarterly
SOURCE DATE: Vol. 17, No. 3; October, 1986

SOURCE PAGE: 4
LABORATORY: Lawrence Livermore National Laboratory
AFFILIATION:
CONTACT: Richard Ryon
PHONE: 415-422-6416
TECHNOLOGY: X-Ray Microanalyzer

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Mat'l & Chem.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Construct.	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	All	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
The x-ray microanalyzer allows the first method for non-destructive, simultaneous measurement of various properties of micron-sized material samples by a single instrument.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 43.01

TITLE: News Review: Smokestack Cleaning Process Can Redu
ce Acid Rain
AUTHOR:
PUBLISHER: Public Information Dept., LBL

SOURCE: LBL Research Review
SOURCE DATE: Vol. 11, No. 3; Fall 1986

SOURCE PAGE: 40
LABORATORY: Lawrence Berkeley Laboratory
AFFILIATION: Applied Science Division, LBL
CONTACT: Shih-Ger (Ted) Chang
PHONE: 415-486-6502
TECHNOLOGY: Smokestack Cleaning Process

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	Mat'l & Chem.
APPLICATION 3:	Residuals	APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Electric	FUNCTION 2:	Coal
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Effic.	PERFORM 2:	Environ.
PERFORM 3:		PERFORM 4:	
READINESS 1:	Field Test	READINESS 2:	
READINESS 3:			

DESCRIPTION
The new process stems from a Japanese development for the simultaneous desulfurization and denitrification of flue gases in a wet-scrubbing system. The original process involved adding iron chelates to the scrubbing liquor to enhance the absorption of nitrogen oxides. This process was too costly and was thus not adopted commercially. The new process uses a different type of iron chelate - an iron cysteine compound, which is much cheaper and much more easily recycled. This process can also be used in spray-dry scrubbing systems, unlike the original system which could only be in wet-scrubbing systems.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 44.01

TITLE: News Review: Compact Generator Passes Earth-Sounding Test
AUTHOR:
PUBLISHER:

SOURCE: LBL Research Review
SOURCE DATE: Vol. 11, No. 4; Winter, 1986

SOURCE PAGE: 42
LABORATORY:
AFFILIATION: Earth Sciences Division, LBL
CONTACT: Frank Morrison
PHONE: 415-486-6502
TECHNOLOGY: Compact Portable Electromagnetic Generator

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Natural Res.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Prod.	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	Safety
PERFORM 3:		PERFORM 4:	
READINESS 1:	Field Test	READINESS 2:	
READINESS 3:			

DESCRIPTION
This is a lightweight power generator which can produce short bursts of an ionized gas that expands through a magnetic field at extremely high velocities. The current generated is fed into a loop of wire which is laid out on the ground. The current creates a strong magnetic field in the loop, so that when the current in the loop is interrupted, the change in the magnetic field induces currents in the conductive earth below. The currents in the earth decay to zero, revealing information on the conductivity distribution by the characteristics of the decay. Repeated measurements yield enough information for a computer to generate a 'picture' of rock structures to depths of 10 to 20 kilometers.

TECHNOLOGY USES
The electromagnetic sounding technique could become important to seismic reflections geophysics and to drilling for resources. A future area of study is the development of this generator for earthquake prediction.

OTA SUMMARY

RECORD NUMBER: 45.01

TITLE: Technical Capsules

AUTHOR:
PUBLISHER:

SOURCE: Oak Ridge National Laboratory Review
SOURCE DATE: Vol. 19, No. 4

SOURCE PAGE: 20
LABORATORY: Oak Ridge National Laboratory
AFFILIATION: Instrumentation and Controls Division
CONTACT: Michael Emery
PHONE: 615-576-3365
TECHNOLOGY: Integrated Gas Analysis and Sensing Chip (IGAS)

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Mat'l & Chem.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Gas	FUNCTION 2:	Waste Mgt.
FUNCTION 3:	Prod.	FUNCTION 4:	
PERFORM 1:	Safety	PERFORM 2:	Health
PERFORM 3:	Environ.	PERFORM 4:	
READINESS 1:	Field Test	READINESS 2:	
READINESS 3:			

DESCRIPTION
The IGAS mimics human sense of smell to detect odors, which are analyzed by a chemical sensor to evaluate complex mixtures of hazardous gases. This technology is capable of recognizing individual gases and measuring concentrations.

TECHNOLOGY USES
IGAS has potential applications in process and environmental monitoring and control.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 46.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: SAM TAGORE
PHONE: 202-586-9210
TECHNOLOGY: Thermal Conductivity Measurements Over Range of Environments

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	Mat'l & Chem.
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
Development of a technique for determining the temperature dependence of the thermal conductivities of roof insulations over the full range of temperature exposure.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 47.01

TITLE: Gas-Fired Chiller Could Alleviate Peak Electrical Demand
AUTHOR:
PUBLISHER: National Technical Information Service U.S. Dept. of Commerc

SOURCE: Accomplishments in Technology Transfer
SOURCE DATE: April 1990 (In Press)

SOURCE PAGE: 51
LABORATORY: Oak Ridge National Laboratoy
AFFILIATION: Technology Transfer Contact, ORNL
CONTACT: Don Jared
PHONE: 615-574-4192
TECHNOLOGY: Gas-Driven Air Conditioner

TECH. CLASS 1:	TECH. CLASS 2:
TECH. CLASS 3:	TECH. CLASS 4:
APPLICATION 1:	APPLICATION 2:
APPLICATION 3:	APPLICATION 4:
LIFE CYCLE 1:	LIFE CYCLE 2:
LIFE CYCLE 3:	LIFE CYCLE 4:
FUNCTION 1:	FUNCTION 2:
FUNCTION 3:	FUNCTION 4:
PERFORM 1:	PERFORM 2:
PERFORM 3:	PERFORM 4:
READINESS 1:	READINESS 2:
READINESS 3:	

DESCRIPTION
Researchers at Oak Ridge National Laboratory (ORNL) have invented a gas-driven air conditioner, known as the triple-effect absorption chiller. The triple-effect absorption chiller apparatus cools by releasing high-pressure refrigerant, heated by natural gas. As the hot refrigerant cools and condenses, it releases heat and then expands and evaporates to create a cooling efect. Triple-effect absorption produces two units of refrigeration for each unit of gas input, making it 50 percent more efficient than a double-effect chiller. The triple-effect absorption chiller will be more economical to operate that an electric chiller under any foreseeable gas-to-elecric price ratio. This technology will help solve the peak electric load problem in summer by shifting part of the air conditioning demand to the gas supply network.

TECHNOLOGY USES
Air conditioner

COMMENTS

The ORNL contractor, Martin Marietta Energy Systems, Inc., has granted a license to the Trane Company of La Crosse, Wisconsin, to produce the chiller. Trane will develop it under a joint funding program with the Gas Research Institute of Chicago.

OTA SUMMARY

RECORD NUMBER: 48.01

TITLE: Refrigerators, Freezers, and Environmental Quality
AUTHOR: y
PUBLISHER: National Technical Information Service U.S. Dept. of Commerc

SOURCE: Accomplishments in Technology Transfer
SOURCE DATE: April 1990 (In Press)

SOURCE PAGE: 53-55
LABORATORY: Solar Energy Research Institute
AFFILIATION: Technology Transfer Contact, SERI
CONTACT: H. Dana Moran
PHONE: 303-231-7115
TECHNOLOGY: Compact Vacuum Insulation

TECH. CLASS 1:	TECH. CLASS 2:
TECH. CLASS 3:	TECH. CLASS 4:
APPLICATION 1:	APPLICATION 2:
APPLICATION 3:	APPLICATION 4:
LIFE CYCLE 1:	LIFE CYCLE 2:
LIFE CYCLE 3:	LIFE CYCLE 4:
FUNCTION 1:	FUNCTION 2:
FUNCTION 3:	FUNCTION 4:
PERFORM 1:	PERFORM 2:
PERFORM 3:	PERFORM 4:
READINESS 1:	READINESS 2:
READINESS 3:	

DESCRIPTION
Compact vacuum insulation is made by encasing a vacuum with a metal envelope not unlike the design of a thermos. Regularly spaced glass or ceramic spacers inside the envelope keep it from collapsing. The insulating value of compace vacuum insulation is further enhanced with low-emissivity coatings on the inside surface that minimize radiant heat transfer. Compact vacuum insulation adapts well to a broad range of temperatures from extremely cold to nearly 500 degrees Celsius. Compact vacuum insulation does not incorporate chlorofluorocarbons. In addition, compact vacuum insulation is projected to be up to 20 times as energy efficient in the same thickness as insulation materials now in use.

TECHNOLOGY USES
Compact vacuum insulation has many applications beyond the refrigerator and freezer industry. These applications include transport thermal envelopes of cooled or heated trucks, trains, and planes. Other suitable applications include processes that involve maintaining extreme

temperatures, transportation of liquids and gasses through pipes in district heating systems, industrial process plants and equipment, and chilled computer circuits and components. Compact vacuum insulation could meet many needs in the buildings industry as well.

COMMENTS

SERI researchers have fabricated and tested the first test panels of compact vacuum insulation. The insulation value for the first prototypes, which were 0.2-inch thick, was R-5 (equivalent to R-25 per inch). Further development of this concept is expected to result in a 0.1-inch-thick panel with an insulation value of R-15 (equivalent to R-150 per inch). SERI plans collaborative efforts with major U.S. appliance manufacturers to install the improved versions in full-scale test refrigerators.

OTA SUMMARY

RECORD NUMBER: 49.01

TITLE: Real-Time Analysis of Acid Rain Particulates: Inf
frared Aerosol Analyzer
AUTHOR:
PUBLISHER:

SOURCE:
SOURCE DATE:

SOURCE PAGE: 15
LABORATORY: Argonne National Laboratory
AFFILIATION: CMT-205 Argonne National Laboratory
CONTACT: Stan Johnson
PHONE: 312-972-7542
TECHNOLOGY: Infrared Aerosol Analyzer

TECH. CLASS 1:	TECH. CLASS 2:
TECH. CLASS 3:	TECH. CLASS 4:
APPLICATION 1:	APPLICATION 2:
APPLICATION 3:	APPLICATION 4:
LIFE CYCLE 1:	LIFE CYCLE 2:
LIFE CYCLE 3:	LIFE CYCLE 4:
FUNCTION 1:	FUNCTION 2:
FUNCTION 3:	FUNCTION 4:
PERFORM 1:	PERFORM 2:
PERFORM 3:	PERFORM 4:
READINESS 1:	READINESS 2:
READINESS 3:	

DESCRIPTION
Argonne National Laboratory has developed a highly sensitive infrared aerosol analyzer (IAA) that can provide real-time chemical analysis of the ambient aerosol particles. This semiportable instrument divides the particulate matter into three different size fractions (coarse, fine, and ultra-fine) and analyzes each size fraction separately. Size fractionation and separation of the amvient aerosol is especially important to prevent interaction among particles after collection. The coarse fraction contains basic crustal materials. Thie fine fraction contains basic crustal materials. The fine fraction contains the bulk of the acidic materials, if any are present. The ultra-fine particles are the very fresh, newly formed aerosol which, under certain conditions, can contain a high concentration of sulfuric acid.

TECHNOLOGY USES
The U.S. Environmental Protection Agency is considering establishing and ambient standard for permissible levels of acidic aerosol; the IAA could

provide essential data for developing such a standard. A simplified, less expensive version of the IAA could see widespread use for routine monitoring of ambient aerosol. The IAA may also find use in industry for monitoring human exposure for health effects of for process monitoring and control.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 50.01

TITLE: Turning Refuse into Fuel: Binder-Enhanced Refuse--Derived Fuel Pellets
AUTHOR:
PUBLISHER:

SOURCE:
SOURCE DATE:

SOURCE PAGE: 14
LABORATORY: Argonne National Laboratory
AFFILIATION: EPD-362 Argonne National Laboratory
CONTACT: Oscar Ohlsson
PHONE: 312-972-5593
TECHNOLOGY: Refuse-Derived Fuel Pellets

TECH. CLASS 1:	TECH. CLASS 2:
TECH. CLASS 3:	TECH. CLASS 4:
APPLICATION 1:	APPLICATION 2:
APPLICATION 3:	APPLICATION 4:
LIFE CYCLE 1:	LIFE CYCLE 2:
LIFE CYCLE 3:	LIFE CYCLE 4:
FUNCTION 1:	FUNCTION 2:
FUNCTION 3:	FUNCTION 4:
PERFORM 1:	PERFORM 2:
PERFORM 3:	PERFORM 4:
READINESS 1:	READINESS 2:
READINESS 3:	

DESCRIPTION
Argonne National Laboratory (ANL) and the University of North Texas (UNT) have developed and improved method for turning refuse into an environmentally safe and economical fuel. In this mehtod recyclable metals, glass, and some plastics are separated from the refuse. The remaining (combustible) fraction is combined with a calcium hydroxide binding additive and formed into cylinderical pellets. The pellets are hard and odorless, cand be stored for up to three years without biological or chemical degradation, and, due to their increased bulk density, are more durable and can be more easily transported than other types of wast-derived pellet fuels. Other benfits include signigicant reductions of sulfur oxides and nitrogen oxides in the fuel gases and the trapping of the chlorine combustion products that are formed from the remaining plastics in the refuse. This make the pelletized binder-enhanced refuse-derived fuel (b-dRDF) part of the environmental solution, rather than part of the problem. Feasibility has been demonstrated in the laboratory and in a pilot-plant test conducted by ANL, UNT, and the U.S. Department of the Navy

at Jacksonville, Florida. A collaborative effort has begun between ANL, the U.S. Department of Energy, the British Department of Energy, and the U.K. Warren Spring Laboratory to fabricate and test the pellets. A patent is pending. The patent will be jointly owned by UNT and ARCH Development Corporation, acting on behalf of ARCH and UNT will jointly license the technique.

TECHNOLOGY USES

COMMENTS

Licensing information available from:

David Eiholf
ARCH Development Corporation
The University of Chicago
Chicago, Illinois 60637
or
Dr. Mark Elder
University of North Texas
Denton, Texas (817-565-3940)

OTA SUMMARY

RECORD NUMBER: 51.01

TITLE: Producing Latex Forms of Conducting Polymers: Con
nductive Latexes
AUTHOR:
PUBLISHER:

SOURCE:
SOURCE DATE:

SOURCE PAGE: 5
LABORATORY: Los Alamos National Laboratory
AFFILIATION: Los Alamos National Laboratory
CONTACT: Dr. Mahmoud Aldissi
PHONE: 505-667-1326
TECHNOLOGY: Conductive Latexes

TECH. CLASS 1:	TECH. CLASS 2:
TECH. CLASS 3:	TECH. CLASS 4:
APPLICATION 1:	APPLICATION 2:
APPLICATION 3:	APPLICATION 4:
LIFE CYCLE 1:	LIFE CYCLE 2:
LIFE CYCLE 3:	LIFE CYCLE 4:
FUNCTION 1:	FUNCTION 2:
FUNCTION 3:	FUNCTION 4:
PERFORM 1:	PERFORM 2:
PERFORM 3:	PERFORM 4:
READINESS 1:	READINESS 2:
READINESS 3:	

DESCRIPTION
New materials obtained at Los Alamos consist of colloidal ispersions or latex forms of the electrically conducting polymers polypyrrole and polyaniline. Conductivities of 1 to 2 (cm) are obtained in the solid state for films of polyaniline and polypyrrole latexes. Both polymeric systems are environmentally stable and can withstand heat up to 150 degrees Celsius.

The conductive latexes produced at Los Alamos are the first of their kind. Although only polyprrole and polyaniline have been used in this pioneering work, other conducting polymers can be used, with the same method, to obtain latex forms.

TECHNOLOGY USES
The list of applications for the conductive latex materials produced at Los Alamos is unlimited, ranging from corrosion control of metal components for transportation vessels to de-icing of airplane wings or radar dishes to

shielding against electromagnetic interferences.

A patent is pending for polyaniline colloids; for aqueous polypyrrole colloids; and for nonaqueous polypyrrole colloids.

COMMENTS

OTA SUMMARY

RECORD NUMBER: 52.01

TITLE: Putting Brakes on Accidents

AUTHOR:
PUBLISHER: National Technical Information Service U.S. Dept. of Commerc

SOURCE: Accomplishments in Technology Transfer
SOURCE DATE: April 1990 (In Press)

SOURCE PAGE: 122
LABORATORY: Brookhaven Northwest Laboratories
AFFILIATION: Technology Transfer Contact, BNL
CONTACT: William Marcuse
PHONE: 516-282-2103
TECHNOLOGY: Health and Safety Database

TECH. CLASS 1:	TECH. CLASS 2:
TECH. CLASS 3:	TECH. CLASS 4:
APPLICATION 1:	APPLICATION 2:
APPLICATION 3:	APPLICATION 4:
LIFE CYCLE 1:	LIFE CYCLE 2:
LIFE CYCLE 3:	LIFE CYCLE 4:
FUNCTION 1:	FUNCTION 2:
FUNCTION 3:	FUNCTION 4:
PERFORM 1:	PERFORM 2:
PERFORM 3:	PERFORM 4:
READINESS 1:	READINESS 2:
READINESS 3:	

DESCRIPTION
Since 1985, BNL has been engaged in a major study of occupational injuries within DOE and its contractor-operated facilities, such as BNL. For this large population a microcosm of U.S. industry, all causes of injury are being examined for patterns through time as well as across job categories. The intent is to identify problems so that management can make system-wide policy decisions, such as where to spend money to reduce risk of injury or its consequences.

Because information is collected and interpredted differently among DOE contractors, BNL has introduced a standardized coding system of cause and type of injury, based on internationally accepted procedures. The study also incorporates a method of measuring severity of anatomical damage, based on modifications to a widely accepted scaling procedure that quantifies damage from the most minor injuries to those that are life-threatening or untreatable.

From its studies, BNL plans to generate a data base, the first of its kind. It will identify areas in need of attention, which then can be ranked in order of priority. A few areas will be selected for pilot intervention programs. If effective, these pilot programs will be implemented throughout DOE.

TECHNOLOGY USES

This could be the beginning of perhaps the broadest injury control program in any heterogeneous organization in the country.

COMMENTS

This revolutionary approach to acciden and injury assessment and evaluation has caught the attention of several Fortune 500 companies. They view its implementation as a potential cost-saving technique by reducing lost time, medical premiums, and compensation payments related to injuries in the work place.

OTA SUMMARY

RECORD NUMBER: 53.01

TITLE: Characterizing Radiation for Workers

AUTHOR:
PUBLISHER: National Technical Information Service U.S. Dept. of Commerc

SOURCE: Accomplishments in Technology Transfer
SOURCE DATE: April 1990 (In Press)

SOURCE PAGE: 99-100
LABORATORY: Pacific Northwest Laboratories
AFFILIATION: Technology Transfer Contact, PNL
CONTACT: Marvin Clement
PHONE: 509-375-2789
TECHNOLOGY: Portable Field Spectrometer System

TECH. CLASS 1:	TECH. CLASS 2:
TECH. CLASS 3:	TECH. CLASS 4:
APPLICATION 1:	APPLICATION 2:
APPLICATION 3:	APPLICATION 4:
LIFE CYCLE 1:	LIFE CYCLE 2:
LIFE CYCLE 3:	LIFE CYCLE 4:
FUNCTION 1:	FUNCTION 2:
FUNCTION 3:	FUNCTION 4:
PERFORM 1:	PERFORM 2:
PERFORM 3:	PERFORM 4:
READINESS 1:	READINESS 2:
READINESS 3:	

DESCRIPTION
The portable field spectrometer system developed at PNL includes detectors which detect both neutron and photon radiation, electronic equipment to amplify and store the data, and a laptop computer for quick data analysis.

The spectrometer system is designed to be used with tissue-equivalent proportional counters, with helium-3 neutron spectrometers, with multisphere (or Bonnersphere) spectrometers, and with liquid scintillator spectrometers. With the addition of special software, it can also be used for gamma spectrum measurements. The portable system is designed so that four measurements can be conducted simultaneously.

TECHNOLOGY USES
For example, the system might be applicable to measurements of radionuclides in the environment, for all work locations where radiation must be characterized, for nuclear materials assays, and for radioactive wast assays.

COMMENTS

PNL's system is about four times smaller than existing systems and significantly lighter. Setup of the portable system is also much simpler. The time required for analysis of data has been reduced from hours or days to a few minutes. Furthermore, cost of the PNL system is approximately 60 percent of the cost of existing systems.

OTA SUMMARY

RECORD NUMBER: 54.01

TITLE: Potential Quality Improvement for Aircraft Engine Component
AUTHOR:
PUBLISHER: National Technical Information Service U.S. Dept. of Commerc

SOURCE: Accomplishments in Technology Transfer
SOURCE DATE: April 1990 (In Press)

SOURCE PAGE: 98-99
LABORATORY: Idaho National Engineering Laboratory
AFFILIATION: Technology Transfer Contact, INEL
CONTACT: Richard O. Holman
PHONE: 208-526-2893
TECHNOLOGY: Analytical/Instrumentation Method for Inert Gases in Alloy

TECH. CLASS 1:	TECH. CLASS 2:
TECH. CLASS 3:	TECH. CLASS 4:
APPLICATION 1:	APPLICATION 2:
APPLICATION 3:	APPLICATION 4:
LIFE CYCLE 1:	LIFE CYCLE 2:
LIFE CYCLE 3:	LIFE CYCLE 4:
FUNCTION 1:	FUNCTION 2:
FUNCTION 3:	FUNCTION 4:
PERFORM 1:	PERFORM 2:
PERFORM 3:	PERFORM 4:
READINESS 1:	READINESS 2:
READINESS 3:	

DESCRIPTION
The Analytical/Instrumentation Method for Inert Gases in Alloy Powders (AIMIGAP) is a simple, versatile vacuum fusion method for measuring the amount of gas trapped in atomized pwoders.

AIMIGAP works through a vacuum fusion technique. Samples are melted in a high-vacuum system of known volume, and the released gas is passed through a fixed pinhole leak and measured for quantity with a quadrupole mass spectrometer. The sensitivity of the system for both argon and helium in samples of about 0.15 grams is 0.05 atomic parts per million. Samples as small as 0.015 grams can be examined because AIMIGAP uses an electron multiplier. It is sensitive and economical enough to be useful for both research and for process/quality control applications.

TECHNOLOGY USES
Some commercial production facilities are considering using AIMIGAP for process monitoring and quality control of atomized powders used for jet

engine components. Additional future applications include uses for products processed in protective (inert gas) environments that might allow the gases to be trapped and influence the properties of the products. Examples include spray forming, plasma spraying, and sputter deposition.

COMMENTS

AIMIGAP is smaller and more portable than the more expensive and bulkier research grade spectrometers that have been used previously. In addition, costs are lower per test (estimated at about $100) and the system can be constructed from readily available equipment, resulting in an in-house testing capability for organizations involved in the development and production of alloy powders.

OTA SUMMARY

RECORD NUMBER: 55.01

TITLE: High-Resolution Images of Underground Features

AUTHOR:
PUBLISHER: National Technical Information Service U.S. Dept. of Commerc

SOURCE: Accomplishments in Technology Tranfer
SOURCE DATE: April 1990 (In Press)

SOURCE PAGE: 84
LABORATORY: Oak Ridge National Laboratory
AFFILIATION: Technology Transfer Center, ORNL
CONTACT: Don Jared
PHONE: 615-574-4192
TECHNOLOGY: GDT 3200 High-Resolution Imaging of Underground Features

TECH. CLASS 1:		TECH. CLASS 2:
TECH. CLASS 3:		TECH. CLASS 4:
APPLICATION 1:		APPLICATION 2:
APPLICATION 3:		APPLICATION 4:
LIFE CYCLE 1:		LIFE CYCLE 2:
LIFE CYCLE 3:		LIFE CYCLE 4:
FUNCTION 1:	All	FUNCTION 2:
FUNCTION 3:		FUNCTION 4:
PERFORM 1:		PERFORM 2:
PERFORM 3:		PERFORM 4:
READINESS 1:		READINESS 2:
READINESS 3:		

DESCRIPTION
The primary function of GDT 3200, as the device is known, is to provide high-resolution images of subsurface vaiations in the speed of sound as it passes through dirrerent materials.

The imaging method employs the theory of inverse wave propagation. Acoustic energy is transmitted to an array of receivers located in shallow borehole. The GDT 3200 uses a commercially available seismic wave source, a specially packaged hydrophone array, and state-of-the-art microprocessors and software to produce real-time images.

TECHNOLOGY USES
The product was developed for use at hazardouse waste sites. it was designed to locate and identify buried wastes for efficient site cleanup and to detect leaks from surface and buried waste storage units. It can also be used for geotechnial studies in large-scale construction projects, and in archaelogical and paleontological explorations. It has potential

for locating abandoned mine shafts or shallow deposits of minerals. This technique can be used to locate and identify such naturally occurring and manmade features as rocks, mineral deposits, evaluated soil moisture content, buried pipes, drums, and other subsurface features as small as on foot long. Another potential future application is petroleum exploration.

COMMENTS

Cost: The product cost is comparable to other commercially available products, but the technique offers unique capabilities.

Collaborators: DOE with support from the U.S. Department of the Army.

OTA SUMMARY

RECORD NUMBER: 56.01

TITLE: Increasing Collection Efficiency in Spectioscopy:
MHP Barrel Elipsoid Infrared Inspection Accessor
AUTHOR:
PUBLISHER: Technology Transfer Center, Argonne National Lab, Argonne, I

SOURCE: Technology for U.S. Industry
SOURCE DATE: September 1989

SOURCE PAGE: 2
LABORATORY: Oak Ridge National Laboratory
AFFILIATION: Development Division, Oak Ridge V-12 Plant
CONTACT: G. Louis Powell
PHONE: 615-574-1717
TECHNOLOGY: MHP-1 Barrel Elipsoisoid Inspection Accessory

TECH. CLASS 1:	TECH. CLASS 2:
TECH. CLASS 3:	TECH. CLASS 4:
APPLICATION 1:	APPLICATION 2:
APPLICATION 3:	APPLICATION 4:
LIFE CYCLE 1:	LIFE CYCLE 2:
LIFE CYCLE 3:	LIFE CYCLE 4:
FUNCTION 1:	FUNCTION 2:
FUNCTION 3:	FUNCTION 4:
PERFORM 1:	PERFORM 2:
PERFORM 3:	PERFORM 4:
READINESS 1:	READINESS 2:
READINESS 3:	

DESCRIPTION
The MHP-1 Barrel Elipsoral Inspection Accessory extends the analytical capabilities of diffuse reflectance and emission infrared spectroscopy to the manufacturing environment. With this accessory, a collimated beam is tranferred several meters down a 2 in. diameter pyrex glass tube, and focused by a parabolic mirror mounted within the barrel. Because the barrel elipsoid does no extend as far as the sample location focal point, there are no limits to sample size.

TECHNOLOGY USES
As a diagnostic tool, the device adds a new dimension to monitoring of manufactured items and R&D activities for which real-time monitoring chemical composition is important. Applications include monitoring the ageing of adhesives and plastics, determining the moisture and content of plastics and ceramics, impurities in ceramics, contamination of solid surfaces, and analysis of these films.

OTA SUMMARY

RECORD NUMBER: 57.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: Terry M. Levinson
PHONE: 202-896-1478
TECHNOLOGY: Holographic Window Films

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Construct.	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Public Lights	FUNCTION 2:	Buildings
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Effic.	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Field Test	READINESS 2:	
READINESS 3:			

DESCRIPTION
Development of film for the top 3 feet of windows in commercial buildings to bring in natural light deep into interior spaces and to reduce lighting and cooling needs.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 57.02

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: Terry M. Levinson
PHONE: 202-586-1478
TECHNOLOGY: Holographic Window Films

TECH. CLASS 1:	TECH. CLASS 2:
TECH. CLASS 3:	TECH. CLASS 4:
APPLICATION 1:	APPLICATION 2:
APPLICATION 3:	APPLICATION 4:
LIFE CYCLE 1:	LIFE CYCLE 2:
LIFE CYCLE 3:	LIFE CYCLE 4:
FUNCTION 1:	FUNCTION 2:
FUNCTION 3:	FUNCTION 4:
PERFORM 1:	PERFORM 2:
PERFORM 3:	PERFORM 4:
READINESS 1:	READINESS 2:
READINESS 3:	

DESCRIPTION
Development of film for the top 3 feet of windows in commercial buildings to bring in natural light deep into interior spaces and to reduce lighting and cooling needs.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 58.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: SAM TAGORE
PHONE: 202-586-9210
TECHNOLOGY: Roof Surface Treatment Guidelines

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	Mat'l & Chem.
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
A manual for roof consultants, designers and contractors that provides specific information on the roof thermal performance impact of changes in surface reflectance and surface mass.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 59.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: Laura Duncan
PHONE: 202-586-1660
TECHNOLOGY: Solid-state Ballasts for Fluorescent Lighting

TECH. CLASS 1:	Mech. & Elec.	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Equip.	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Electric	FUNCTION 2:	Public Lights
FUNCTION 3:	Buildings	FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
High-frequency solid-state ballasts.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 60.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: C
LABORATORY:
AFFILIATION: Renewables Program Office
CONTACT: Mary-Margaret Jenior
PHONE: 202-586-2998
TECHNOLOGY: Passive Solar Design Strategies

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Renewable	FUNCTION 2:	Buildings
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Simplified guidelines and calculation procedures for passive solar residential buildings.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 61.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE:)
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: Donna M. Hawkins
PHONE: 202-586-1660
TECHNOLOGY: Flame Retention Head Oil Burner

TECH. CLASS 1:	Mech. & Elec.	TECH. CLASS 2:
TECH. CLASS 3:		TECH. CLASS 4:
APPLICATION 1:	Machinery	APPLICATION 2:
APPLICATION 3:		APPLICATION 4:
LIFE CYCLE 1:	Construct.	LIFE CYCLE 2: O & M
LIFE CYCLE 3:		LIFE CYCLE 4:
FUNCTION 1:	Liquid fuel	FUNCTION 2:
FUNCTION 3:		FUNCTION 4:
PERFORM 1:	Cost of O&M	PERFORM 2:
PERFORM 3:		PERFORM 4:
READINESS 1:	Field Test	READINESS 2:
READINESS 3:		

DESCRIPTION
Fuel oil burner technology for residential oil-burning heating systems.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 62.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: Donna M. Hawkins
PHONE: 202-586-1660
TECHNOLOGY: DOE-2

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Computer simulation program used to evaluate the energy performance of buildings.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 63.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: Donna M. Hawkins
PHONE: 202-586-1660
TECHNOLOGY: Low-Emissivity Coatings for Windows

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	Construct.
LIFE CYCLE 3:	O & M	LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Insulating window coating which minimizes the transfer of long-wave radiation between glazing elements.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 64.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: Sarah Kirchen
PHONE: 202-586-9104
TECHNOLOGY: Residential Conservation Service

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Policy & Needs	LIFE CYCLE 2:	Plan. & Budget
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Required large electric and gas utilities to offer their residential customers an energy analysis system for commercial and residential buildings.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 65.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: Dean DeVine
PHONE: 202-586-5772
TECHNOLOGY: A Simplified Energy Analysis Method (ASEAM)

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Plan. & Budget	LIFE CYCLE 2:	Design
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
State-of-the-art microcomputer software program, ASEAM, designed to provide users with a simplified energy analysis system for commercial and residential buildings.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 66.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Renewables Program Office
CONTACT: M.M. Jenior
PHONE: 202-586-2998
TECHNOLOGY: Active Solar Heating System Design Manual

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Equip.	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Renewable	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Design procedures for large-scale active solar water systems.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 67.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Renewables Program Office
CONTACT: M. M. Jenior
PHONE: 202-586-2998
TECHNOLOGY: Non-Residential Experimental Buildings Program

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Renewable	FUNCTION 2:	Buildings
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
Passive solar technologies in commercial and institutional buildings.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 68.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: Mary-Margaret Jenior
PHONE: 202-586-2998
TECHNOLOGY: Denver Metro

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Renewable	FUNCTION 2:	Buildings
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
Early passive solar application to residences.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 69.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: Donna Hawkins
PHONE: 202-586-9389
TECHNOLOGY: Heat Pump Water Heater

TECH. CLASS 1:	Mech. & Elec.	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Machinery	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Thermal	FUNCTION 2:	Buildings
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Field Test	READINESS 2:	
READINESS 3:			

DESCRIPTION
The HPWH pumps heat from the air into a water tank using a compressor, evaporator, expansion valve, refrigerant, and control system.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 70.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: Donna Hawkins
PHONE: 202-586-1660
TECHNOLOGY: Trace Gas Testing of Air Infiltration

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Field Test	READINESS 2:	
READINESS 3:			

DESCRIPTION
Gas-charged device that emits PFT into the air, combined with an absorbing sampler.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 71.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: Donna Hawkins
PHONE: 202-586-1660
TECHNOLOGY: CIRA (Computerized Instrumented Residential Audit)

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Machinery	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Software program for residential building audits.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 72.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: SAM TAGORE
PHONE: 202-586-9210
TECHNOLOGY: Moisture Measurement Methodology

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	Mat'l & Chem.
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Development of reliable practices for measuring moisture concentration in roof systems.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 73.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: Donna Hawkins
PHONE: 202-586-1660
TECHNOLOGY: Radiant Barriers

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Double reflective aluminum foil placed over attic insulations.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 74.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: SAM TAGORE
PHONE: 202-586-9210
TECHNOLOGY: Roof Research Center--A National User Facility

TECH. CLASS 1:	Measurement	TECH. CLASS 2:
TECH. CLASS 3:		TECH. CLASS 4:
APPLICATION 1:	Energy	APPLICATION 2:Mat'l & Chem.
APPLICATION 3:		APPLICATION 4:
LIFE CYCLE 1:	Design	LIFE CYCLE 2:
LIFE CYCLE 3:		LIFE CYCLE 4:
FUNCTION 1:	Buildings	FUNCTION 2:
FUNCTION 3:		FUNCTION 4:
PERFORM 1:	Value	PERFORM 2:
PERFORM 3:		PERFORM 4:
READINESS 1:	Ready	READINESS 2:
READINESS 3:		

DESCRIPTION
A collection of measurement and analysis capabilities available to the industry for solution of roof problems--including both thermal performance and durability problems.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 75.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: Donna Hawkins
PHONE: 202-586-9389
TECHNOLOGY: Dielectric Coating for Lighting Fixtures

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Equip.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Public Lights	FUNCTION 2:	Buildings
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Optical interference coating which enhances the reflectivity of anodized aluminum sheeting in light fixtures.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 76.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: Donna Hawkins
PHONE: 202-586-1660
TECHNOLOGY: Hot-Box Method to Test Heat Transfer

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Method to measure the ability of a wall to transfer heat and temperature variations.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 77.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: SAM TAGORE
PHONE: 202-586-9210
TECHNOLOGY: Large Scale Climate Simulator (LSCS)

TECH. CLASS 1:	Measurement	TECH. CLASS 2:
TECH. CLASS 3:		TECH. CLASS 4:
APPLICATION 1:	Energy	APPLICATION 2:Mat'l & Chem.
APPLICATION 3:		APPLICATION 4:
LIFE CYCLE 1:	Design	LIFE CYCLE 2:
LIFE CYCLE 3:		LIFE CYCLE 4:
FUNCTION 1:	Buildings	FUNCTION 2:
FUNCTION 3:		FUNCTION 4:
PERFORM 1:	Value	PERFORM 2:
PERFORM 3:		PERFORM 4:
READINESS 1:	Ready	READINESS 2:
READINESS 3:		

DESCRIPTION
This is a climate chamber in which roofs can be tested for thermal performance and service life under various simulated and accelerated indoor/outdoor environmental conditions. This is a DOE facility available to private sector and non-DOE groups.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 78.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: Anne Marie Zerega
PHONE: 202-586-8014
TECHNOLOGY: Fuel-Cell Battery Hybrid Development

TECH. CLASS 1:	Mech. & Elec.	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Machinery	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	Construct.
LIFE CYCLE 3:	O & M	LIFE CYCLE 4:	
FUNCTION 1:	Vehicle	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
Development of a methanol fueled, phosphoric acid fuel cell/battery propulsion system for a small urban bus (25-29 ft.)

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 79.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: SAM TAGORE
PHONE: 202-586-9210
TECHNOLOGY: Field Thermal Performance Methodology

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
A methodology for determining the thermal performance of roofs in the field. The methodology is based on observation, review of design drawings, a non-destructive moisture survey, and field cuts.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 80.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: Anne Marie Zerega
PHONE: 202-586-8014
TECHNOLOGY: AFUP--Alternative Fuels Utilization Program

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Machinery	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Biomass	FUNCTION 2:	Vehicle
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Stimulating use of non-hydrocarbon fuels for highway vehicle systems. Includes alcohol fuels, reformulated fuels, new hydrocarbons, and compressed natural gas.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 81.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: S. J. TAYLOR
PHONE: 202-586-9214
TECHNOLOGY: Moisture Guidelines for Residence

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	Mat'l & Chem.
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	Construct.
LIFE CYCLE 3:	O & M	LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Development of construction practices and novel materials that provide effective moisture control in building wall systems.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 82.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Renewables Program Office
CONTACT: Ancona
PHONE: 202-586-1776
TECHNOLOGY: Small Wind Turbine Development

TECH. CLASS 1:	Mech. & Elec.	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Machinery	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Renewable	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
DOE sponsored the design and development of wind turbines in sizes from 2 to 40kw. Thirteen different configurations were developed for farm, home, industrial and wind farm applications. Several designs resulted in commercial machines.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 83.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Renewables Program Office
CONTACT: Mark O'Neill
PHONE: 214-456-0900
TECHNOLOGY: Fresnel Lens Photovoltaic Concentrator Design Innovations

TECH. CLASS 1:	Photon	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Equip.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Renewable	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
High-concentration photovoltaic module utilizing ENTECH's crossed fresnel lenses and high efficiency solar cells with ENTECH's prismatic cell cover.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 84.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Renewables Program Office
CONTACT:
PHONE: 301-982-1292
TECHNOLOGY: Biomass Thermochemical Conversion

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	Mat'l & Chem.
APPLICATION 3:	Residuals	APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Biomass	FUNCTION 2:	Waste Mgt.
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Field Test	READINESS 2:	
READINESS 3:			

DESCRIPTION
Pulsed enhanced heated thermochemical reactor for energy recovery from renewable sources such as biomass, municiple and industrial waste, agricultural waste.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 85.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Defense Programs Program Office
CONTACT: Richard Peavy
PHONE: 301-353-2545
TECHNOLOGY: Sensor Layout Expert (SENLEX)

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Equip.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Safety	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Safety	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Expert system for the design for perimeter security system.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 86.01

TITLE:

AUTHOR: Duane Deonigi
PUBLISHER: Pacific Northwest Laboratory

SOURCE: DOE Program Office Tech. Transfer Survey
SOURCE DATE: In Print

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: R. Carrigan
PHONE: FTS-370-3333
TECHNOLOGY: Building Lighting Control System

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Equip.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Provides local and computer programmable control for large-scale fluorescent lighting systems originally designed to be controlled by switching on a large area basis.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 87.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: JEAN J. BOULIN
PHONE: 202-586-9444
TECHNOLOGY: HVAC/Lighting Interactions

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Equip.	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Use recently updated regression factors, computer program and experimental data on the thermal and lighting effects of the interactions between lighting fixtures and lamps and the HVAC system for developing improved interface designs and integration.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 88.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: ICS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: JEAN J. BOULIN
PHONE: 202-586-9444
TECHNOLOGY: Small Office Building Handbook

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Coal	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Guidelines on energy-saving strategies for the design of small office buildings (50,000 sq. ft. or less).

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 89.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: RONALD J. FISKUM
PHONE: 202-586-9130
TECHNOLOGY: Desiccant/Hybrid Cooling System

TECH. CLASS 1:	Materials	TECH. CLASS 2:	Mech. & Elec.
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Machinery	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	Prod.
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This project focuses on finding an efficient method of improving the cooling performance of engine-driven heat pumps by using engine waste heat to regenerate desiccant systems.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 90.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: RONALD J. FISKUM
PHONE: 202-586-9130
TECHNOLOGY: Fifteen Ton Braun Linear Engine HP.

TECH. CLASS 1:	Mech. & Elec.	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Machinery	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Prod.	FUNCTION 2:	Thermal
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This project is developing a linear I.C. engine driving a linear refrigeration compressor for commercial applications.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 91.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: S. J. TAYLOR
PHONE: 202-586-9214
TECHNOLOGY: Thermal Bridges Design Catalogue

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	Mat'l & Chem.
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
This catalog provides design information on multi-dimensional heat transfer problems in buildings, this information will help architects avoid condensation points as well as save energy.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 92.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: TERRY STATT
PHONE: 202-586-9130
TECHNOLOGY: Variable-Speed Compressors & Fans

TECH. CLASS 1:	Mech. & Elec.	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Machinery	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Thermal	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This project is assessing variable speed compressors that show promise in reducing energy consumption in refrigeration systems. Work focuses on the use of invertor-driven or permanent magnet electronically/commutated motors to drive the compressor & fan.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 93.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: D. LIM
PHONE: 202-586-9130
TECHNOLOGY: Commercial and Residential Zoning

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Machinery	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This project develops strategies for reduced energy use through zoning by use of advanced radiant and convective zoning practices.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 94.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: D. LIM
PHONE: 202-586-9130
TECHNOLOGY: Fuel-Oil Atomization/Combustion

TECH. CLASS 1:	Mech. & Elec.	TECH. CLASS 2:
TECH. CLASS 3:		TECH. CLASS 4:
APPLICATION 1:	Machinery	APPLICATION 2:
APPLICATION 3:		APPLICATION 4:
LIFE CYCLE 1:	Design	LIFE CYCLE 2:
LIFE CYCLE 3:		LIFE CYCLE 4:
FUNCTION 1:	Liquid fuel	FUNCTION 2:
FUNCTION 3:		FUNCTION 4:
PERFORM 1:	Value	PERFORM 2:
PERFORM 3:		PERFORM 4:
READINESS 1:	Devel.	READINESS 2:
READINESS 3:		

DESCRIPTION
This project is developing an advanced technology atomization process for fuel-oil burners.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 95.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: D. LIM
PHONE: 202-586-9130
TECHNOLOGY: Performance Control Strategies

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Machinery	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Liquid fuel	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This project develops performance control methods to maintain efficiency of oil heating systems.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 96.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: D. LIM
PHONE: 202-586-9130
TECHNOLOGY: Direct Vent Technology

TECH. CLASS 1:	Mech. & Elec.	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Machinery	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Liquid fuel	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This project is developing direct vent technology for high efficiency oil systems.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 97.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 1
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: D. LIM
PHONE: 202-586-9130
TECHNOLOGY: Low-Firing Rate Oil Burner Technology

TECH. CLASS 1:	Mech. & Elec.	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Machinery	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Liquid fuel	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This project is developing burners and oil-fired equipment capable of firing between 0.1-0.5 GPH.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 98.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: JOHN D. RYAN
PHONE: 202-586-9130
TECHNOLOGY: Dynamic Lighting Design

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Equip.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	All	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This activity aims at combing all known energy-efficient lighting technologies and their technical performance characteristics in a systems analysis approach leading to guidelines and principles for energy efficient and effective geometries & controls.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 99.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: C
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: JOHN D. RYAN
PHONE: 202-586-9130
TECHNOLOGY: Electrodeless High-Intensity Discharge Light

TECH. CLASS 1:	Mech. & Elec.	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Equip.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Public Lights	FUNCTION 2:	Buildings
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This project is attempting to develop a low wattage, electrodeless HID lamp. Electrodeless HID lamps permit the use of new light-producing compounds in the discharge that was not possible before because they react with tungsten filament.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 100.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: JOHN D. RYAN
PHONE: 202-586-9130
TECHNOLOGY: Surface Wave Fluoerscent

TECH. CLASS 1:	Mech. & Elec.	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Equip.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Public Lights	FUNCTION 2:	Buildings
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This program is attempting to develop an extremely efficient fluorescent light. This electrodeless lamp would benefit from the combination of reduced losses associated with radiation entrapment and absence of losses caused by elimination of electrodes.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 101.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: JOHN D. RYAN
PHONE: 202-586-9130
TECHNOLOGY: Isotopically-Enriched Fluorescent

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Equip.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Public Lights	FUNCTION 2:	Buildings
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This project studies the improved energy efficiency in fluorescent lamp performance that occurs either by allocating of the isotopic composition of natural mercury by enrichment with mercury (196) or by providing the lamp with dc axial magnetic fields.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 102.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: JOHN D. RYAN
PHONE: 202-586-9130
TECHNOLOGY: Advanced Lighting Controls

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Equip.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Public Lights	FUNCTION 2:	Buildings
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This project develops advanced lighting control systems to adjust indoor lighting conditions to the level of lighting offered from daylight.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 103.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: LINDA DE LACROIX
PHONE: 202-586-1851
TECHNOLOGY: Urban Heat Islands

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Plan. & Budget	LIFE CYCLE 2:	Design
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Parks	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Environ.	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Summer urban heat islands can be reduced by such practices as increasing tree canopy and by changing reflectance of roofs and paving surfaces.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 104.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: PRAKASH B. KUNJEER
PHONE: 202-586-9470
TECHNOLOGY: Down-Hole Heat Exchanger

TECH. CLASS 1:	Mech. & Elec.	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Machinery	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Thermal	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Field Test	READINESS 2:	
READINESS 3:			

DESCRIPTION
A bundle down-hole heat exchanger is used to extract thermal energy from underground sources--such as mine water--where pumping is not feasible. This underground water resource can then be used in conjunction with DHC.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 105.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: PRAKASH B. KUNJEER
PHONE: 202-586-9470
TECHNOLOGY: Acoustic Leak Detector System

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Equip.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Gas	FUNCTION 2:	Liquid fuel
FUNCTION 3:	Water Supply	FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	Safety
PERFORM 3:		PERFORM 4:	
READINESS 1:	Field Test	READINESS 2:	
READINESS 3:			

DESCRIPTION
Fluid leakage is the major source of energy loss in a DHC system. This system will detect, locate and size leaks in underground piping systems.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 106.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: PRAKASH B. KUNJEER
PHONE: 202-586-9470
TECHNOLOGY: Btu Meter

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Equip.	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Thermal	FUNCTION 2:	Buildings
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Field Test	READINESS 2:	
READINESS 3:			

DESCRIPTION
The lack of simple, inexpensive and reliable Btu meters has been a concern of operators and users of DHC. This is a low-cost and accurate meter to measure the energy flow delivered to consumers.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 107.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: PRAKASH B. KUNJEER
PHONE: 202-586-9470
TECHNOLOGY: Advanced Rankine Cycle Heat Pump

TECH. CLASS 1:	Mech. & Elec.	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Machinery	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Thermal	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
Relative to conventional systems, advanced rankine cycle heat pumps can overcome the large temperature lifts that are required in DHC systems at higher coefficients of performance.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 108.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: Conservation Program Office
CONTACT: PRAKASH B. KUNJEER
PHONE: 202-586-9470
TECHNOLOGY: Heat Pump (Quasi Open Cycle)

TECH. CLASS 1:	Mech. & Elec.	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Machinery	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Thermal	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
Technology is required in DHC systems that allow the utilization of large quantities of low-grade heat. QUASI open cycle heat pumps are an alternative to traditional closed cycle heat pumps that use chlorinate fluorocarbons as a working fluid.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 109.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: PRAKASH B. KUNJEER
PHONE: 202-586-9470
TECHNOLOGY: Ice Slurry Evaporator

TECH. CLASS 1:	Mech. & Elec.	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Machinery	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Thermal	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
A key problem with existing vapor-compression chiller evaporator designs is difficulty encountered in removal of ice from the evaporator wall. New evaporators are being designed to produce ice slurries more efficiently.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 110.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: PRAKASH B. KUNJEER
PHONE: 202-586-9470
TECHNOLOGY: Absorption Chiller

TECH. CLASS 1:	Mech. & Elec.	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Machinery	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Thermal	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
Recent research directed at the development of ice slurry district cooling concepts has indicated that existing absorption chillers are not suitable for ice slurry production. Ethylene glycol-water absorption chillers are suitable for making ice slurry.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 111.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: PRAKASH B. KUNJEER
PHONE: 202-586-9470
TECHNOLOGY: Vacuum Steam Radiators

TECH. CLASS 1:	Mech. & Elec.	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Equip.	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Thermal	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
Large numbers of potential DHC users currently rely on loder steam radiators for heat distribution. This activity studies the feasibility of continued utilization of existing steam radiators rather then retrofitting users with new hot water radiators.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 112.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: JONATHAN M. STONE
PHONE: 202-586-9471
TECHNOLOGY: Operating and Maintenance Procedures

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
New procedures developed to save energy by improved operation and maintenance of commercial buildings.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 113.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: JONATHAN M. STONE
PHONE: 202-586-9471
TECHNOLOGY: Multifamily Retrofit Procedures

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
These are procedures developed to allow the best retrofit measure(s) to be selected and adopted, for specific buildings, in specific climatic zones by multifamily building owners or operators.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 114.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: C
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: JONATHAN M. STONE
PHONE: 202-586-9471
TECHNOLOGY: Shared Savings

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Shared savings involve installation of more efficient hardware, improved operation/maintenance practices or a combination of the above by a third party. Third parties are compensated with a portion of the savings that show up in the utility bill.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 115.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: JONATHAN M. STONE
PHONE: 202-586-9471
TECHNOLOGY: Commercial Building Retrofit Procedures

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:	Rehab.	LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
A method to select the best energy conservation measure or series of measures to adopt for a specific commercial building in any climatic zone.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 116.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: JONATHAN M. STONE
PHONE: 202-586-9471
TECHNOLOGY: Radiant Barrier Climatic Guide

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This project is developing a method to determine the applicability and benefits of radiant barriers in various climatic zones.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 117.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: JONATHAN M. STONE
PHONE: 202-586-9471
TECHNOLOGY: Multifamily Audit Handbook

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
This handbook develops an easy to use method of selecting the most cost-effective conservation measure(s) to adopt to improve energy efficiency in multifamily buildings in a variety of climatic conditions.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 118.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: JONATHAN M. STONE
PHONE: 202-586-9471
TECHNOLOGY: Diagnostic Tool Development

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This activity invents, develops and/or tests devices that can be used to measure phenomena that affect building energy use (such as infiltration, temperature, etc.)

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 119.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: JONATHAN M. STONE
PHONE: 202-586-9471
TECHNOLOGY: Diagnostic Protocols and Analysis Methods

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
A collection method that yields a well-defined series of data points that describe a building's energy use. With proper analysis of these data points, the system receives the proper and most cost-effective energy conservation improvements.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 120.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: JONATHAN M. STONE
PHONE: 202-586-9471
TECHNOLOGY: Advanced Duct Sealing Techniques

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This involves procedures to seal existing ducts so that infiltration/exfiltration in air-handling systems is reduced

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 121.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: JONATHAN M. STONE
PHONE: 202-586-9471
TECHNOLOGY: Energy Tracking System

TECH. CLASS 1:	Information	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
This project is developing a methodology and inexpensive measurement devices to collect energy-use information on all aspects of a commercial building's energy patterns.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 122.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: JONATHAN M. STONE
PHONE: 202-586-9471
TECHNOLOGY: Core Commercial Daylighting

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Equip.	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	Public Lights
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This activity develops a simple method that small business owners can use to optimize lighting in their (usually rented) facilities. The method will account for the existing fixtures and assure for compatibility and efficiency.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 123.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: JONATHAN M. STONE
PHONE: 202-586-9471
TECHNOLOGY: Radiant Barrier Modeling

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
This project developed a computer model that can accurately predict air flow through any attic, account for any roof pitch,and is usable in every climatic zone.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 124.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: ROBERT OLIVER
PHONE: 202-586-9446
TECHNOLOGY: Imbedded Heat Flux Transducers

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Thermal	FUNCTION 2:	Buildings
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This activity is developing a heat flux transducer that can be used for in situ heat flow measurement.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 125.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: ROBERT OLIVER
PHONE: 202-586-9446
TECHNOLOGY: Variable R Materials

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This activity studies the energy impacts of variable R value materials.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 126.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: ROBERT OLIVER
PHONE: 202-586-9446
TECHNOLOGY: Switchable E Materials

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This activity studies the energy impacts of materials with switchable emissivity (E) characteristics.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 127.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: ROBERT OLIVER
PHONE: 202-586-9446
TECHNOLOGY: Radiative Heat Transfer

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This activity is developing and validating models describing radiative heat transfer in building materials.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 128.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: ROBERT OLIVER
PHONE: 202-586-9446
TECHNOLOGY: Corrosiveness of Insulation

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	Mat'l & Chem.
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	O & M
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This activity studies how the corrosivity of insulation materials is affected by humidity and moisture.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 129.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: ROBERT OLIVER
PHONE: 202-586-9446
TECHNOLOGY: Aerated Autoclaved Concrete

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	Construct.
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	All	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This activity evaluates the thermal and other characteristics of light-weight autoclaved concrete.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 131.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: S. J. TAYLOR
PHONE: 202-586-9214
TECHNOLOGY: High-R Windows

TECH. CLASS 1:	TECH. CLASS 2:
TECH. CLASS 3:	TECH. CLASS 4:
APPLICATION 1:	APPLICATION 2:
APPLICATION 3:	APPLICATION 4:
LIFE CYCLE 1:	LIFE CYCLE 2:
LIFE CYCLE 3:	LIFE CYCLE 4:
FUNCTION 1:	FUNCTION 2:
FUNCTION 3:	FUNCTION 4:
PERFORM 1:	PERFORM 2:
PERFORM 3:	PERFORM 4:
READINESS 1:	READINESS 2:
READINESS 3:	

DESCRIPTION
This project develops very high-R (over R-10) window subsystems with high transmissivity, low emissivity, which will perform over architectural lifetimes.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 132.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: S. J. TAYLOR
PHONE: 202-586-9214
TECHNOLOGY: Advanced Durable Low-E Coatings

TECH. CLASS 1:	Materials	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Structures	APPLICATION 2:	Energy
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This project develops durable high transmissivity, low-emissivity window coatings (either hard low-E coatings or a protective diamond-like coating to protect very high-performance soft coating).

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 133.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: STEVE SELKOWITZ
PHONE: 415-486-5064
TECHNOLOGY: Superlite

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	Mat'l & Chem.
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
Superlite is a daylighting performance computer tool--predicts interior light levels for different glazing and architectural design options.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 134.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: C
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: S. J. TAYLOR
PHONE: 202-586-9214
TECHNOLOGY: Window 3.1 Computer Program

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	Mat'l & Chem.
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
The window 3.1 computer program is a P.C. program which predicts the thermal performance of windows.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 135.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: STEVE SELKOWITZ
PHONE: 415-486-5064
TECHNOLOGY: Advanced Design Tools

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	Design	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This project develops advanced computer design tools which address the trade off between heating, cooling daylighting and lighting, HVAC sizing, etc. To yield design parameters for window systems. AI technology is used in this project.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 136.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: JOHN M. TALBOTT
PHONE: 202-586-9446
TECHNOLOGY: Multi-Zonal Infiltration and Ventilation Measurement

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Cost of O&M	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Ready	READINESS 2:	
READINESS 3:			

DESCRIPTION
This project has developed equipment to measure air movement into and between various zones (rooms) of a building.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 137.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: JOHN M. TALBOTT
PHONE: 202-586-9446
TECHNOLOGY: Passive Sampler of Volatile Organic Compounds (VOCS)

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	Mat'l & Chem.
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Health	PERFORM 2:	Environ.
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This project has included the development, testing, and evaluation of passive samplers to measure time-averaged indoor air pollutant concentration. VOCs have been identified as playing a role in the "sick building syndrome".

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 138.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: JOHN M. TALBOTT
PHONE: 202-586-9446
TECHNOLOGY: Sick Building Syndrome Protocol

TECH. CLASS 1:	Decision	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	Mat'l & Chem.
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Health	PERFORM 2:	Environ.
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This project is developing a protocol designed to accurately assess buildings receiving air quality complaints which minimize disruption to the building occupants.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 139.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: JOHN M. TALBOTT
PHONE: 202-586-9446
TECHNOLOGY: Advanced Leakage Techniques

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	Mat'l & Chem.
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	
PERFORM 3:		PERFORM 4:	
READINESS 1:	Devel.	READINESS 2:	
READINESS 3:			

DESCRIPTION
This project is developing a pulse technique where leakage characteristics of buildings are determined using acoustical measurements.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 140.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: JOHN M. TALBOTT
PHONE: 202-586-9446
TECHNOLOGY: Advanced Residential Ventilation Systems

TECH. CLASS 1:	Mech. & Elec.	TECH. CLASS 2:
TECH. CLASS 3:		TECH. CLASS 4:
APPLICATION 1:	Energy	APPLICATION 2:
APPLICATION 3:		APPLICATION 4:
LIFE CYCLE 1:	Design	LIFE CYCLE 2:
LIFE CYCLE 3:		LIFE CYCLE 4:
FUNCTION 1:	Buildings	FUNCTION 2:
FUNCTION 3:		FUNCTION 4:
PERFORM 1:	Value	PERFORM 2:
PERFORM 3:		PERFORM 4:
READINESS 1:	Devel.	READINESS 2:
READINESS 3:		

DESCRIPTION
This project is developing a controlled ventilation system, which is integrated with residential heating, water heating and space cooling. This will optimize the use of available energy in ventilation flows.

TECHNOLOGY USES

COMMENTS

OTA SUMMARY

RECORD NUMBER: 141.01

TITLE:

AUTHOR: PACIFIC NORTHWEST LABS
PUBLISHER:

SOURCE: BCS DATABASE
SOURCE DATE: 1989

SOURCE PAGE: 0
LABORATORY:
AFFILIATION: CONSERVATION
CONTACT: JOHN M. TALBOTT
PHONE: 202-586-9446
TECHNOLOGY: Perfluorocarbon Tracer System

TECH. CLASS 1:	Measurement	TECH. CLASS 2:	
TECH. CLASS 3:		TECH. CLASS 4:	
APPLICATION 1:	Energy	APPLICATION 2:	Mat'l & Chem.
APPLICATION 3:		APPLICATION 4:	
LIFE CYCLE 1:	O & M	LIFE CYCLE 2:	
LIFE CYCLE 3:		LIFE CYCLE 4:	
FUNCTION 1:	Buildings	FUNCTION 2:	
FUNCTION 3:		FUNCTION 4:	
PERFORM 1:	Value	PERFORM 2:	Health
PERFORM 3:		PERFORM 4:	
READINESS 1:	Field Test	READINESS 2:	
READINESS 3:			

DESCRIPTION
This equipment represents a passive measurement technique designed to obtain reasonable estimates of infiltration/ventilation in buildings using perfluorocarbon tracer gases.

TECHNOLOGY USES

COMMENTS

END DATE
3-9-93