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& Space Administration, National Institutes Of
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Safety & Health**

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MASTER

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PROJECT ABSTRACTS
for the
FEDERAL INVENTORY OF ENERGY-RELATED BIOMEDICAL
AND ENVIRONMENTAL RESEARCH
FOR FY 1974 AND FY 1975

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VOLUME IV

TENNESSEE VALLEY AUTHORITY
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
NATIONAL INSTITUTES OF HEALTH
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

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Prepared by

DIVISION OF BIOMEDICAL AND ENVIRONMENTAL RESEARCH
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

for

THE ASSISTANT ADMINISTRATOR FOR ENVIRONMENT AND SAFETY
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

INVENTORY OF ENERGY-RELATED
BIOMEDICAL AND ENVIRONMENTAL RESEARCH
FY 1974 AND 1975

VOLUME IV

FEDERAL AGENCIES (EXCEPT ERDA/DBER AND EPA)

CONTENTS

	<u>Page</u>
<u>TENNESSEE VALLEY AUTHORITY</u>	1
Characterization, Measurement, and Monitoring	3
Environmental Transport Processes	13
Ecological Effects: Air/Terrestrial	31
Ecological Effects: Freshwater	45
Integrated Assessment	63
<u>NATIONAL AERONAUTICS AND SPACE ADMINISTRATION</u>	75
Characterization, Measurement, and Monitoring	77
Health Effects	83
Integrated Assessment	87
<u>NATIONAL INSTITUTES OF HEALTH</u>	97
Characterization, Measurement, and Monitoring	99
Environmental Transport Processes	105
Health Effects	109
Integrated Assessment	397
<u>NATIONAL INSTITUTE OF OCCUPATIONAL SAFETY & HEALTH</u>	401
Characterization, Measurement, and Monitoring	405
Health Effects	419
Ecological Effects: Air/Terrestrial	505

TENNESSEE VALLEY AUTHORITY

RESEARCH CATEGORY:

Characterization, Measurement, and Monitoring

CATEGORY:..... POLLUTANT CHARACTERIZATION, MEASUREMENT AND MONITORING

SUBCATEGORY:.....

TECHNOLOGY:..... COAL

SUBTECHNOLOGY:.....

OBJECTIVE:..... Water Monitoring

.....

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PROJECT:

TITLE:..... Isolation and Identification of Water-Borne Pollutants Associated

..... with the Power Industry (Steam-Electric Generation)

.....

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RES. FACILITY:..... TVA

RES. LOCATION:..... Tennessee

INVESTIGATOR(s):.....

SPONSOR(s):..... EPA

..... FY 1975-1977

DURATION:.....

FUNDING:..... Base Program: FY74, \$50,000; FY75, \$50,000; FY 76, \$55,000.

..... Pass-through: FY74, \$0; FY75, \$50,000; FY76, \$55,000.

.....

DESCRIPTION:..... Develop following rapid, quantitative, and/or alternate methods:

1. Acrolein by voltammetry at positive potentials, 2. Cadmium, lead, copper,

..... zinc simultaneously by voltammetry, 3. Compare digestion techniques for

..... suspended and dissolved metals by atomic absorption, 4. Compare total arsenic

..... by voltammetry, atomic absorption, and colorimetry, 5. Asbestos by microscopy,

.....

6. Sulfate by high speed colorimetry with Gem Sac Instrument, 7. Color by

..... visual comparison and spectrophotometry at 36 cm., 8. Automated total

..... phosphorus and Kjeldahl nitrogen, 9. Acrolein and chlorine absorption and

..... aeration, 10. Mercury removal from waste water, 11. Selenium by voltammetry,

..... 12. Total carbon by combustion, 13. Selenium by flameless atomic absorption.

RELATED TECHNOLOGIES:.....

CATEGORY:.....CHARACTERIZATION, MEASUREMENT AND MONITORING.....

SUBCATEGORY:.....
Coal

TECHNOLOGY:.....

SUBTECHNOLOGY:.....
Air Monitoring Instrumentation

OBJECTIVE:.....

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PROJECT:

TITLE:.....Air Quality Instrument Field Comparison of Reliability, Accuracy,
Precision, and Robustness - Coal-fired Power Plants.....

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RES. FACILITY:.....Tennessee Valley Authority
Tennessee Valley

RES. LOCATION:.....

INVESTIGATOR(s):.....

SPONSOR(s):.....TVA.....

DURATION:.....FY 1975 - FY 1977.....

FUNDING:.....\$0, FY 1974 \$35,000, FY 1975 \$35,000, FY 1976.....

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DESCRIPTION:.....To determine the best available instruments and procedures
For measuring and monitoring air pollutants originated from coal-fired
power plants with particular emphasis on sulfur oxides particulate complex.....

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RELATED TECHNOLOGIES:.....

007

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CATEGORY:..... POLLUTANT CHARACTERIZATION, MEASUREMENT, AND MONITORING

SUBCATEGORY:.....
Coal

TECHNOLOGY:.....

SUBTECHNOLOGY:.... Direct Combustion

Remote Instrumentation-Regional Characterization

OBJECTIVE:.....
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.....

PROJECT:

TITLE:..... Remote Sensing of SO₂ Effect on Vegetation

.....
.....

RES. FACILITY:..... Tennessee Valley Authority

Alabama

RES. LOCATION:.....

INVESTIGATOR(s):.....

SPONSOR(s):... Environmental Protection Agency

DURATION:.. FY. 1975 through 1979

FUNDING:..... Pass-through Program: FY 1975, \$100,000; FY 1976, \$110,000

.....

DESCRIPTION:..... Testing, refinement, and development of remote sensing

instrumentation and techniques for monitoring the visible effects of SO₂

emissions from fossil-fueled electric generating stations on terrestrial

vegetation. NASA will collaborate with TVA in the project. Low and high

altitude color, color infrared, multi-spectral scanning, and perhaps other

types of imagery and ground-truth data will be obtained for effects on

soybeans and mixed Southern pine-deciduous hardwood timber stands in the

vicinities of the Shawnee and Widows Creek Steam Plants, respectively, for

both visual and automated interpretations.

RELATED TECHNOLOGIES:.....

.....

CATEGORY:.....CHARACTERIZATION, MEASUREMENT AND MONITORING.....

SUBCATEGORY:.....
Nuclear

TECHNOLOGY:.....

SUBTECHNOLOGY:.....
Quality Assurance

OBJECTIVE:.....

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PROJECT:

TITLE:.....Development and Evaluation of an Integrated Approach to the Optimization
.....of Nuclear Facility Radiological Surveillance Programs.
.....

.....

RES. FACILITY:.....Tennessee Valley Authority

Tennessee Valley Region

RES. LOCATION:.....

INVESTIGATOR(s):.....Tennessee Valley Authority; Environmental Protection Agency,

SPONSOR(s):.....Office of Energy Research (pass-through funds only)

DURATION:.....Ongoing; pass-through - FY 75 to FY 79.

FUNDING:.....Base Program - \$190,000, FY 74; \$185,000, FY 75; \$170,000, FY 76.

.....Pass-through - \$0 FY 74; \$135,000, FY 75; \$135,000, FY 76.

DESCRIPTION:.....To develop and maintain an interlaboratory quality assurance
.....program for radiation monitoring laboratories, including the development of
.....uniform quality assurance procedures; to provide radiation monitoring
.....guidelines and protocols covering network and sample design and quality
.....control requirements.
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RELATED TECHNOLOGIES:.....

RESEARCH CATEGORY:

Environmental Transport Processes

CATEGORY: ENVIRONMENTAL TRANSPORT PROCESS

SUBCATEGORY:

TECHNOLOGY: COAL

SUBTECHNOLOGY:

OBJECTIVE: To develop and validate procedures for predicting the atmospheric transport and dilution of pollutants in complex terrain and coastal areas of large isolated plumes, and to scales beyond 100 kilometers.

PROJECT: Environmental Transport - Pilot and Demonstration Scale Line - Limestone and Ammonia Scrubbing Processes

TITLE:

RES. FACILITY: Tennessee Valley Authority

RES. LOCATION: Tennessee Valley

INVESTIGATOR(s):

SPONSOR(s): TVA - PASS-THROUGH

DURATION: FY 1975 - FY 1977

FUNDING: \$0 FY 74
\$25,000 FY 75
\$25,000 FY 76

DESCRIPTION:

.....To determine by field testing the best available instruments and sampling techniques for studying the atmospheric chemistry of wet scrubber plumes and to determine most important species and parameters for future studies of wet plumes from full-sized plants.

RELATED TECHNOLOGIES:

CATEGORY: ENVIRONMENTAL TRANSPORT PROCESSES

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To develop and validate procedures for predicting the atmospheric transport and dilution of pollutants in complex terrain and coastal areas of large isolated plumes, and to scales beyond 100 kilometers.

PROJECT:

TITLE: Regional Atmospheric Transport of Coal-Fired Power Plant Emissions

RES. FACILITY: Tennessee Valley Authority

RES. LOCATION: Tennessee Valley

INVESTIGATOR(s):

SPONSOR(s): TVA - PASS-TAVVASH

DURATION: FY 1975 - FY 1980

FUNDING: \$0 FY 74

\$75,000 FY 75

\$75,000 FY 76

DESCRIPTION: To develop a model to elucidate the mechanisms of long range transport (up to 1000 km) of power plant emissions and to determine if emissions of sulfur oxides particulates complex (SPC) from one area will, by combination of transport and transformation, affect the SPC levels of another area.

RELATED TECHNOLOGIES:

CATEGORY: ENVIRONMENTAL TRANSPORT

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To develop and validate procedures predicting the removal of pollutants by precipitation and in dry weather over various types of terrain and resuspension of pollutants.

PROJECT:

TITLE: Simulation of Thermal Dispersion and Fluid Mechanics at Critical Locations in Streams and Reservoirs

RES. FACILITY: Tennessee Valley Authority

RES. LOCATION: Tennessee Valley

INVESTIGATOR(s):

SPONSOR(s): TVA — *Pass-through*

DURATION: Continuing

FUNDING: F 75- \$35,000; F 76- \$70,000. (EPA - Pass-through)

DESCRIPTION: To extend and verify a theoretical computer model of thermal effluents from power generating plants. Such effluents are generally three-dimensional and turbulent. The computer model which will be utilized is a unique three-dimensional unsteady finite difference technique.

RELATED TECHNOLOGIES:

CATEGORY: ENVIRONMENTAL TRANSPORT PROCESSES

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine if, how, and by how much cooling systems and pollutants from energy activities modify the weather or climate including visibility modification.

PROJECT:

Precipitation Modification at Coal-Fired Plants

TITLE:

RES. FACILITY: Tennessee Valley Authority

RES. LOCATION: Tennessee Valley Region

INVESTIGATOR(s):

SPONSOR(s): Environmental Research and Development Agency

DURATION: FY 1976-1977

FUNDING: FY 76, \$20,000

DESCRIPTION: ...To evaluate the spatial extent and temporal variability of precipitation modification attributable to coal-fired plant operations in the Tennessee Valley. Existing historical precipitation data will be analyzed to quantify the extent of the modification with the objective of assessing the impact upon the local environment and the implications to the operation of the many cooling towers under construction and being planned.

RELATED TECHNOLOGIES:

MATRIX: Environmental Transport Processes

OBJECTIVE: 3

TECHNOLOGY: 1

TITLE: Precipitation Modification at Coal-Fired Plants

RESEARCH INSTITUTION: Tennessee Valley Authority

ADDRESS: Hydraulic Data Branch, 350 Evans Building, Knoxville, Tennessee 37902

SPONSOR: Energy Research and Development Agency

FUNDING: \$35,000 FY 1977 Supplement; Base program \$0

DURATION: 18 months; July 1976 - December 1977

DESCRIPTION: To evaluate the spatial extent and temporal variability of precipitation modification attributable to coal-fired plant operations in the Tennessee Valley. Existing historical precipitation data will be analyzed to quantify the extent of the modification with the objective of assessing the impact upon the local environment and the implications to the operation of the many cooling towers under construction and being planned. TVA maintains a network of some 400 raingages at an annual cost of \$57,000. These funds are not claimed as part of the base program but this study would not be possible without this network.

LOCATION: Tennessee Valley region

CATEGORY: ENVIRONMENTAL TRANSPORT PROCESSES

SUBCATEGORY:

TECHNOLOGY: COAL

SUBTECHNOLOGY:

OBJECTIVE:...To develop and validate procedures for predicting the physical and chemical transformations of pollutants in the atmosphere from energy activities.

PROJECT:

Full-Scale Atmospheric Interaction Studies

TITLE:

RES. FACILITY: Tennessee Valley Authority

RES. LOCATION: Tennessee Valley

INVESTIGATOR(s):

SPONSOR(s): TVA

DURATION: July 1974 - June 1980

FUNDING: \$0, FY 74

Pass-through \$150,000 FY 75

Pass-through \$150,000 FY 76

DESCRIPTION: To gain an understanding of chemical transformations and develop

capability for predicting concentrations of primary and secondary

pollutants from power plant emissions through development of a

kinetic model, and for evaluating health and environmental impacts of these emissions.

RELATED TECHNOLOGIES:

CATEGORY: ENVIRONMENTAL TRANSPORT PROCESSES

SUBCATEGORY:

TECHNOLOGY: Nuclear

SUBTECHNOLOGY:

OBJECTIVE: To determine in the hydrosphere the origin, load, transport pathways,
transfer rates and fate of pollutants arising from energy activities.

PROJECT:

TITLE: Evaluation and Improvement of Models Used for Radiological Impact
Assessment of Gaseous Releases from Nuclear Facilities.

RES. FACILITY: Tennessee Valley Authority

RES. LOCATION: Tennessee Valley Region

INVESTIGATOR(s):

SPONSOR(s): Tennessee Valley Authority; Environmental Protection Agency.

DURATION: FY 75 - FY 79

FUNDING: Base Program - \$40,000, FY 74; \$55,000, FY 75; \$70,000, FY 76

Supplemental - \$0, FY 74; \$50,000, FY 75; \$50,000, FY 76

DESCRIPTION: To provide bases for and develop refined dispersion and

dosimetry models used for the radiological impact assessment of gaseous
effluent releases from nuclear facilities.

RELATED TECHNOLOGIES:

CATEGORY:.....ENVIRONMENTAL TRANSPORT PROCESSES.....

SUBCATEGORY:.....
Nuclear

TECHNOLOGY:.....

SUBTECHNOLOGY:.....

OBJECTIVE:.....To develop analytical, numerical, predictive models of the
distribution and dynamics of energy-related pollutants in the
hydrosphere.
.....

PROJECT:

TITLE:.....

RES. FACILITY:.....TVA, Engineering Laboratory, Division of Water Control Planning

RES. LOCATION:.....Tennessee

INVESTIGATOR(s):.....

SPONSOR(s):.....Environmental Protection Agency (PASS-THRU)
FY 1975 - FY 1977

DURATION:.....

FUNDING:.....\$35,000, FY 75, \$70,000, FY 76.

DESCRIPTION:...To develop computer models for analyzing thermal effluents
from power generating plants and to verify the models by comparing predicted
results with data from field and laboratory studies.
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RELATED TECHNOLOGIES:.....COAL

MATRIX: Environmental Transport Processes

OBJECTIVE: 8

TECHNOLOGY: 1

TITLE: To Develop a Predictive Model of the Impact of Fly-Ash Ponds and
Landfills from Scrubbers on the Ground-Water Resource

RESEARCH INSTITUTION: Tennessee Valley Authority

ADDRESS: Hydraulic Data Branch, 350 Evans Building, Knoxville, Tennessee 37902

SPONSOR: Energy Research and Development Agency

FUNDING: \$75,000 FY 1976

DURATION: 1976 - 1978

DESCRIPTION: To evaluate the suitability of existing ground-water models and develop the most promising to be used in evaluating the fate of leachate of fly-ash pond and limestone scrubber landfills. Two levels of models will be pursued--a planning model suitable for use at proposed facilities and a detailed version suitable for studies of the impact of existing facilities on the soil and ground-water resource.

LOCATION: Tennessee

CATEGORY: ENVIRONMENTAL TRANSPORT PROCESSES

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine in the soil zone the transport pathways, rates and fates of pollutants from energy activities.

PROJECT:

TITLE: Assessment of Water Quality Effects from Power Operations

RES. FACILITY: Tennessee Valley Authority

RES. LOCATION: Tennessee Valley

INVESTIGATOR(s):

SPONSOR(s): Environmental Research and Development Agency
FY 1975 - 1985

DURATION:

FUNDING: \$50,000, FY 1974; \$50,000, FY 1975; \$100,000, FY 1976.

DESCRIPTION: To model the complex water movements in the TVA river system and pathways of quality constituents and residuals and their impact in water quality in rivers and reservoirs including the effects of hydro and thermal power operations.

RELATED TECHNOLOGIES: Nuclear, Hydro

CATEGORY: ENVIRONMENTAL TRANSPORT PROCESSES

SUBCATEGORY:

TECHNOLOGY: COAL

SUBTECHNOLOGY:

OBJECTIVE: Other, please specify (SEE TITLE)

PROJECT:

TITLE: To develop a predictive model of the Impact of Fly-Ash Ponds and
Landfills from Scrubbers on the Ground-Water Resource

RES. FACILITY: Tennessee Valley Authority

RES. LOCATION: Tennessee

INVESTIGATOR(s):

Environmental Research and Development Agency

SPONSOR(s):

FY 1976 - 1978

DURATION:

\$75,000, FY 1976

DESCRIPTION: To evaluate the suitability of existing ground-water models

and develop the most promising to be used in evaluating the fate of leachate

of fly-ash pond and limestone scrubber landfills. Two levels of models will

be pursued--a planning model suitable for use at proposed facilities and a

detailed version suitable for studies of the impact of existing facilities on

the soil and ground-water resource.

RELATED TECHNOLOGIES:

RESEARCH CATEGORY:

Ecological Effects:

Air/Terrestrial

ECOLOGICAL EFFECTS

CATEGORY:.....
AIR/TERRESTRIAL
SUBCATEGORY:.....
TECHNOLOGY:..... Nuclear
SUBTECHNOLOGY:.....
OBJECTIVE: To develop baseline information for use in evaluating the potential... effects of energy technologies including conservation on terrestrial ecosystems....

PROJECT:
TITLE:..... Nuclear Plant Site Evaluation

Tennessee Valley Authority
RES. FACILITY:.....
Tennessee Valley Region
RES. LOCATION:.....

INVESTIGATOR(s):.....

SPONSOR(s) :... Tennessee Valley Authority

DURATION:..... Continuing

FUNDING:..... \$105,000, FY74; \$180,000, F^y75; \$100,000, FY76.

DESCRIPTION: To develop baseline data at proposed nuclear plant sites to evaluate the potential effect of the proposed plant upon the terrestrial and aquatic ecosystems.

CATEGORY:..... ECOLOGICAL EFFECTS:.....

SUBCATEGORY:..... AIR/TERRESTRIAL.....

TECHNOLOGY:..... Coal.....

SUBTECHNOLOGY:..... Direct-Combustion.....

OBJECTIVE:..... To develop baseline information for use in evaluating the potential effects of energy technologies, including conservation in terrestrial ecosystem.

PROJECT:

TITLE:..... Dose-Response Relationships for Effects of Fossilfueled Power Plant Species, Communities, and Ecosystem.

RES. FACILITY:..... Tennessee Valley Authority.....

RES. LOCATION:..... Alabama.....

INVESTIGATOR(s):.....

SPONSOR(s):..... Environmental Protection Agency, Office of Energy Research 1974 through 1979

DURATION:.....

FUNDING:..... Base Program - FY 74, \$30,000; FY 75, \$35,000; FY 76, \$40,000 Pass-through - FY 75, \$30,000; FY 76, \$40,000.

DESCRIPTION:..... Existing dose-response data for SO₂, NO₂, and combinations of these and other pollutants will be analyzed and summarized. Plans for completing baseline information and for consolidation and coupling of information storage, retrieval, and analysis systems with those of other Federal agencies will be developed.

RELATED TECHNOLOGIES:.....

ECCOLOGICAL EFFECTS:
CATEGORY:.....

AIR/TERRESTRIAL
SUBCATEGORY:.....

NUCLEAR
TECHNOLOGY:.....

SUBTECHNOLOGY:.....

(1) To determine the fate and effects of energy-related pollutants on
OBJECTIVE:.....

terrestrial ecosystems and to evaluate ways to minimize these effects and (2) to

determine the immediate and long-term non-pollutant effects of energy technologies,

including conservation on terrestrial ecosystems and the evaluation of ways to

PROJECT: minimize these effects.

TITLE: ~~Rate and Effects of Atmospheric Emissions from Cooling Systems on~~.....

~~Terrestrial Habitats~~.....

RES. FACILITY: Tennessee Valley Authority.....

RES. LOCATION: Alabama and Tennessee.....

INVESTIGATOR(s):.....

⁴ Environmental Protection Agency,
SPONSOR(s):.....

Fy 1975 through 1979
DURATION:.....

Pass-through: FY 1975 \$75,000; FY 1976, \$90,000
FUNDING:.....

DESCRIPTION: This investigation is aimed at identifying and characterizing
the effects of atmospheric releases from mechanical and natural draft cooling

towers. Measurements include (1) wet and dry deposition of toxic chemicals, their

accumulation in and effects on soil and vegetation, (2) impacts of moisture on

growth and/or yield of selected crop and timber species and incidence of disease,

and (3) climatological changes.

Coal
RELATED TECHNOLOGIES:.....

CATEGORY:..... ECOLOGICAL EFFECTS:.....

SUBCATEGORY:..... AIR/TERRESTRIAL.....

TECHNOLOGY:..... Coal.....

SUBTECHNOLOGY:..... Direct-Combustion.....

OBJECTIVE:..... To determine the fate and effects of energy-related pollutants on terrestrial ecosystems and to evaluate ways to minimize these effects.....

PROJECT:

TITLE:Transfer, Fate, and Effects of SO_x, NO_x, and Acid Precipitation on a Terrestrial Ecosystem Representative of the Tennessee Valley Region.....

RES. FACILITY:..... Tennessee Valley Authority.....

RES. LOCATION:..... Alabama and Tennessee.....

INVESTIGATOR(s):.....

SPONSOR(s):... Environmental Protection Agency, Office Of Energy Research

DURATION:..FY.. 1968 through 1979.....

FUNDING:..... Base Program: FY74, \$65,000; FY75, \$75,000; FY76, \$80,000.....

..... Pass-through: FY75, \$195,000, FY76, \$215,000.....

DESCRIPTION:... Characterization and quantification of the transfer, fate, and effects of SO_x, NO_x, and acid precipitation on a terrestrial ecosystem. Field studies include investigations of wet and dry deposition of pollutants cycling and effects; laboratory studies of SO_x and NO_x movement in soils and controlled exposure studies of fate and effects of acid rain on vegetation and soil microbes.....

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RELATED TECHNOLOGIES:.....

CATEGORY:..... ECOLOGICAL EFFECTS:.....

SUBCATEGORY:..... AIR/TERRESTRIAL.....

Coal

TECHNOLOGY:.....

Direct-Combustion

SUBTECHNOLOGY:.....

To determine the fate and effects of energy-related pollutants

OBJECTIVE:.....

on terrestrial ecosystems and to evaluate ways to minimize these

.....

effects.

.....

PROJECT:

TITLE: Beneficial Effects of SO₂ Emissions from Coal-Fired Power Plants

on Crop and Forest Species

.....

Tennessee Valley Authority

RES. FACILITY:.....

Alabama and Tennessee

RES. LOCATION:.....

INVESTIGATOR(s):.....

SPONSOR(s):.. Environmental Protection Agency, Office of Energy Research

DURATION:.. FY 1975 through 1979

FUNDING:..... Pass-through: Program: FY75, \$50,000; FY76, \$60,000.

.....

DESCRIPTION: This study follows up on a report that indicated the wood

density of SO₂-resistant white pine growing in the vicinity of two coal-fired

power plants increased after the plants began operations, while growth rates

remained the same or increased. Density of wood and growth of white, loblolly,

Virginia, and short-leaf pines growing in the vicinities of two large coal-fired

power plants will be investigated. A second part of the total study will involve

the evaluation of economic benefits of sulfur deposition from the atmosphere

on crop and forest species.

.....

RELATED TECHNOLOGIES:.....

CATEGORY:..... ECOLOGICAL EFFECTS:.....

SUBCATEGORY:..... AIR/TERRESTRIAL.....

TECHNOLOGY:..... Coal.....

SUBTECHNOLOGY:..... Direct-Combustion.....

OBJECTIVE:..... To determine the fate and effects of energy-related pollutants on
..... terrestrial ecosystems and to evaluate ways to minimize these effects.
.....

PROJECT:

TITLE:..... Dose-Response Kinetics for Effects of Atmospheric Emissions from
..... Coal-Fired Power Plants on Soybeans and Other Crop and Forest Species
..... of Economic Importance in the Southeastern U.S.
.....

RES. FACILITY:..... Tennessee Valley Authority
..... Alabama

RES. LOCATION:.....

INVESTIGATOR(s):.....

SPONSOR(s):..... Environmental Protection Agency, Office of Energy Research

DURATION:..... 1974 through 1979

FUNDING:..... Base Program: FY74, \$10,000; FY75, \$35,000; FY76, \$40,000
..... Pass-through: FY75, \$45,000; FY76, \$60,000

DESCRIPTION:..... Acute and chronic controlled exposure studies of the effects
..... of SO₂, NO₂, O₃, and combinations of these pollutants on the growth and/or
..... yield of soybeans, cotton, wheat, and Virginia pine grown and exposed under
..... several environmental regimes. Responses measured include visible injury,
..... growth, yield, respiration, and photosynthesis.
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RELATED TECHNOLOGIES:.....

ECOLOGICAL EFFECTS
CATEGORY:.....
AIR/TERRESTRIAL
SUBCATEGORY:.....
TECHNOLOGY:..Coal.....
SUBTECHNOLOGY:..Direct Combustion.....
OBJECTIVE:....To determine the fate and effects of energy related pollutants on..
..terrestrial ecosystems and evaluate ways to minimize these effects..
.....

PROJECT:

TITLE:.....Field Plot and Filtered/Unfiltered Field Exposure Chamber Studies
.....of the Effects of Coal-Fired Power Plant Emissions on Crop and
.....Forest Species of Economic Importance in Southeastern U. S.
.....

Tennessee Valley Authority
RES. FACILITY:.....
Alabama

RES. LOCATION:.....

INVESTIGATOR(s):.....

SPONSOR(s):....Environmental Protection Agency, Office of Energy Research..

DURATION:.....FY 1971 through 1979.....

FUNDING:.....Base Program: FY74, \$20,000; FY75, \$30,000; FY76, \$37,000.....

.....Pass-through: FY75, \$170,000; FY76, \$87,000.....

DESCRIPTION:.....These studies are aimed at characterizing under field conditions
.....the relationships of pollution/dose and effects on foliar appearance, growth and
.....yield of selected crop and forest species (including soybeans, wheat, cotton and
.....Virginia pines). Both field plot and field exposure chambers are being utilized
.....in the studies.
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RELATED TECHNOLOGIES:.....

ECOLOGICAL EFFECTS

CATEGORY:.....

AIR/TERRESTRIAL

SUBCATEGORY:.....

Coal

TECHNOLOGY:.....

SUBTECHNOLOGY:.....

OBJECTIVE:..... Determine the immediate and long-term non-pollutant effects

of energy technology including conservation on terrestrial ecosystems

and evaluate ways to minimize these effects.

PROJECT:

TITLE:..... Evaluation of three methods of surface mining and reclamation

.....

.....

RES. FACILITY:..... TVA, USDI (Bureau of Mines), USDA (U.S. Forest Service)

RES. LOCATION:..... Kentucky

INVESTIGATOR(s):.....

USDI (Bureau of Mines)

SPONSOR(s):.....

FY 1975-1977

DURATION:.....

FY 1974 - none; FY 1975 - none; FY 1976 - (TVA \$600,000)

FUNDING:.....

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DESCRIPTION:... To measure environmental effects of surface mining, make

economic evaluations of three mining methods, and demonstrate techniques of

mining and reclamation where spoil is returned to the approximate original

contour.

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RELATED TECHNOLOGIES:.....

ECOLOGICAL EFFECTS

CATEGORY:.....

AIR/TERRESTRIAL

SUBCATEGORY:.....

TECHNOLOGY:.....Coal.....

SUBTECHNOLOGY:.....

OBJECTIVE: To determine the immediate and long-term non-pollutant effects of

energy technology including conservation on terrestrial ecosystems

and evaluate ways to minimize these effects.

PROJECT:

Strip mine Reclamation Demonstration

TITLE:.....

RES. FACILITY: TVA.....

RES. LOCATION: Tennessee, Alabama, Kentucky, and Virginia.....

INVESTIGATOR(s):.....

SPONSOR(s): TVA.....

DURATION: Continuing.....

FUNDING: FY 1974 - \$80,000; FY 1975 - \$340,000;

FY 1976 - \$400,000.

DESCRIPTION: To develop and evaluate mining and reclamation technology;

develop a program for orphan mine reclamation; stream rehabilitation through

reclamation of surface and abandoned deep mines.

RELATED TECHNOLOGIES:.....

RESEARCH CATEGORY:

Ecological Effects:

Freshwater

ECOLOGICAL EFFECTS

CATEGORY:.....

SUBCATEGORY:..... FRESHWATER

TECHNOLOGY:..... Coal

SUBTECHNOLOGY:.....

OBJECTIVE:... Develop baseline information for use in evaluating potential

effects of energy technologies including conservation on freshwater

resources and ecosystems (high priority)

PROJECT:

TITLE:..... Information Systems Development

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RES. FACILITY: ~~Tennessee Valley Authority~~

RES. LOCATION: ~~Tennessee Valley~~

INVESTIGATOR(s):.....

SPONSOR(s):... Environmental Protection Agency

DURATION:..... FY 1975-1979

FUNDING:..... FY 1975, \$65,000; FY 1976, \$65,000.

.....

DESCRIPTION:... The research will be an extension and intensification of

field and laboratory work now in progress at several TVA steam electric stations.

It will involve securing more exhaustive data on certain benthic faunal species

populations for computerized ecosystem modeling. The studies will provide data

on metabolic rates, fecundity, natality, mortality, growth rates, and other

production-related factors in relation to known thermal regimes.

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RELATED TECHNOLOGIES:..... Nuclear

CATEGORY:..ECOLOGICAL EFFECTS.....

SUBCATEGORY: FRESHWATER.....

TECHNOLOGY:..Hydro.....

SUBTECHNOLOGY:.....

OBJECTIVE: Develop baseline information for use in evaluating potential effects
of energy technologies including conservation on freshwater resources
and ecosystems (high priority).....

PROJECT:

TITLE:..... Evaluation of a Digital Hydrologic Gage Interrogation System

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RES. FACILITY: ~~Tennessee Valley Authority~~.....

RES. LOCATION: ~~Tennessee Valley Region~~.....

INVESTIGATOR(s):.....

SPONSOR(s):...TVA.....

DURATION:..... Continuing

FUNDING:..... FY74, \$27,000; FY75, \$38,000; FY76, \$41,000.

.....

DESCRIPTION: To evaluate an experimental test gaging system, currently being
developed to provide rainfall and streamflow data automatically at specified
intervals and/or upon demand. Both the quantity and the quality of data
collected will be evaluated with respect to the system's utility in operating
the Tennessee Valley System of reservoirs.

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RELATED TECHNOLOGIES:.....

ECOLOGICAL EFFECTS

CATEGORY:.....

FRESHWATER

SUBCATEGORY:.....

Coal

TECHNOLOGY:.....

SUBTECHNOLOGY:.....

OBJECTIVE:..Develop baseline information for use in evaluating potential effects
..of energy technologies in freshwater resources and ecosystems.
.....

PROJECT:

TITLE:.. EPA 316 (a) (b) fisheries investigations
.....
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TVA

RES. FACILITY:.....

Tennessee, Alabama, and Kentucky

RES. LOCATION:.....

INVESTIGATOR(s):.....

SPONSOR(s): TVA.....

DURATION:.. FY 1974-1980.....

FUNDING:.. FY74, \$61,916; FY75, \$895,000; FY76, \$1,009,000.
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DESCRIPTION: Fisheries investigations planning and analysis related to EPA
requirements to comply with Section 316 (a) (b) of the Water Quality Control
Act
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RELATED TECHNOLOGIES:.....

ECOLOGICAL EFFECTS

CATEGORY:.....

FRESHWATER

SUBCATEGORY:.....

TECHNOLOGY:..... Nuclear

SUBTECHNOLOGY:.....

OBJECTIVE: Develop baseline information for use in evaluating potential effects

of energy technologies in freshwater resources and ecosystems.

PROJECT:

TITLE: Fishery baseline and monitoring studies at TVA nuclear plant sites

TVA

RES. FACILITY:.....

RES. LOCATION: Tennessee and Alabama

INVESTIGATOR(s):.....

SPONSOR(s): TVA

DURATION: Continuing

FUNDING: FY74, \$200,000; FY75, \$175,000; FY76, \$225,000.

DESCRIPTION: Continuing aquatic investigations at TVA nuclear plants

before and during construction and operation for impact assessment

purposes.

RELATED TECHNOLOGIES:.....

ECOLOGICAL EFFECTS

CATEGORY:.....
FRESHWATER

SUBCATEGORY:.....

TECHNOLOGY:.....Coal.....

SUBTECHNOLOGY:.....

OBJECTIVE:.....Determine the immediate and long-term effects and biological
fate of energy-related pollutants on freshwater resources and
ecosystems and evaluate ways to minimize these effects (high priority).....

PROJECT:

TITLE:.....Biomonitoring, Mollusks and Others
.....
.....Tennessee Valley Authority

RES. FACILITY:.....

RES. LOCATION:.....

INVESTIGATOR(s):.....

SPONSOR(s):....EPA.....

DURATION:.....FY 1975-1979.....

FUNDING:.....FY75, \$72,000; FY76, \$72,000.
.....

DESCRIPTION:.....The use of aquatic mollusks and other aquatic invertebrates
will be evaluated for use as selective biomonitors. The use of such organisms
as biomonitors is presently limited by lack of baseline data and by lack of
data on rates of bioaccumulation and decay in relation to variables such as
temperature and water quality. The studies will provide basic field and
laboratory information to more accurately determine significance and use of
aquatic biomonitors in relation to steam electric stations.
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RELATED TECHNOLOGIES:.....Nuclear.....

ECOLOGICAL EFFECTS

CATEGORY:.....
FRESHWATER

SUBCATEGORY:.....

TECHNOLOGY:.....Coal.....

SUBTECHNOLOGY:.....

OBJECTIVE: Determine the immediate and long-term effects and biological fate
of energy-related pollutants on freshwater resources and ecosystems
and evaluate ways to minimize these effects (high priority).

PROJECT:
TITLE: Biochemical Methodology, Aquatic Thermal Impacts

RES. FACILITY: Tennessee Valley Authority

RES. LOCATION: Tennessee Valley

INVESTIGATOR(s):.....

SPONSOR(s): EPA

DURATION: FY 1975-1979

FUNDING: FY75, \$60,000; FY76, \$60,000

DESCRIPTION: The study reports will describe chemical diagnostic techniques
for assessing environmental stress on selected macrobenthic organisms and
aquatic macrophytes. Diagnostic techniques will include, but will not be
limited to, the analysis of body fluids, tissues, or products.

Nuclear

RELATED TECHNOLOGIES:.....

ECOLOGICAL EFFECTS

CATEGORY:.....

SUBCATEGORY:..... FRESHWATER

TECHNOLOGY:..... Coal

SUBTECHNOLOGY:.....

OBJECTIVE: Determine the immediate and long-term effects and biological fate
of energy-related pollutant on freshwater resources and ecosystems
and evaluate ways to minimize these effects (high priority).

PROJECT:

TITLE: Strip Mine Water Quality Investigations with Emphasis on
Toxic Substances.

RES. FACILITY: Tennessee Valley Authority

RES. LOCATION: Tennessee Valley

INVESTIGATOR(s):.....

SPONSOR(s): EPA

DURATION: New program - continuing dependent upon FY76 funding.

FUNDING: Base -- FY75, \$0; FY76, \$0.
EPA Pass-through -- FY75, \$200,000; FY76, \$200,000.

DESCRIPTION: To conduct studies to investigate formation rates of inorganic
chemical elements in strip mine spoil areas; to investigate the mechanisms by
which inorganics enter and are transported in waterways; and to assess the
existive impacts on recovery rates of biological organisms following
reclamation.

RELATED TECHNOLOGIES:.....

ECOLOGICAL EFFECTS:

CATEGORY:.....

FRESHWATER

SUBCATEGORY:.....

TECHNOLOGY:..... Coal Hydro

SUBTECHNOLOGY:.....

OBJECTIVE: Determine the immediate and long-term effects and biological fate

of energy-related pollutants on freshwater resources and ecosystems

and evaluate ways to minimize these effects (high priority).

PROJECT:

Recreation of Reservoir Releases

TITLE:.....

RES. FACILITY: Tennessee Valley Authority

RES. LOCATION: Tennessee

INVESTIGATOR(s):.....

SPONSOR(s): TVA

DURATION: Continuing

FUNDING: Base: FY74, \$290,000; FY75, \$180,000; FY76, \$70,000.

DESCRIPTION: To document and evaluate the adverse effects of releasing from
TVA hydro plants water of low or zero dissolved oxygen content and to evaluate
the benefits that could be realized if the releases were reoxygenated to a
suitable level.

RELATED TECHNOLOGIES:.....

ECOLOGICAL EFFECTS

CATEGORY:.....

FRESHWATER

SUBCATEGORY:.....

Nuclear

TECHNOLOGY:.....

SUBTECHNOLOGY:.....

OBJECTIVE: Determine the immediate and long-term effects and biological fate
of energy-related pollutants on freshwater resources and ecosystems
and evaluate ways to minimize these effects.

PROJECT:

TITLE: Operation of Biothermal Research Facilities

RES. FACILITY: TVA, EPA

RES. LOCATION: Alabama

INVESTIGATOR(s):.....

SPONSOR(s): TVA, EPA

DURATION: FY 1974-1980

FUNDING: FY74, \$47,777; FY75, \$100,000; FY76, \$250,000.

DESCRIPTION: Colonization, water chemistry, and temperature studies at
Browns Ferry Nuclear Plant.

RELATED TECHNOLOGIES:.....

ECOLOGICAL EFFECTS

CATEGORY:.....

FRESHWATER

SUBCATEGORY:.....

TECHNOLOGY:.....Coal.....

SUBTECHNOLOGY:.....

OBJECTIVE:..Determine the immediate and long-term non-pollutant effects of

energy technologies including conservation on freshwater resources

and ecosystems and evaluate ways to minimize these effects (high priority).

PROJECT:

TITLE:.....Evaluate Water Intakes, Zooplankton Entrainment

RES. FACILITY:.....Tennessee Valley Authority

RES. LOCATION:.....Tennessee Valley

INVESTIGATOR(s):.....

SPONSOR(s):...EPA.....

DURATION:.....FY 1975-1980

FUNDING:.....FY75, \$77,000; FY76, \$77,000

DESCRIPTION: The studies will compare selected intake designs to determine
the ones most effective in preventing the entrainment of zooplankton, and
presumably other planktonic forms, in the condenser cooling water systems
of several representative steam electric stations.

RELATED TECHNOLOGIES:.....Nuclear.....061.....

RESEARCH CATEGORY

Integrated Assessment

INTEGRATED ASSESSMENT

CATEGORY:.....

SUBCATEGORY:.....
Coal

TECHNOLOGY:.....

SUBTECHNOLOGY:.....

OBJECTIVE: To manage and integrate research information on environmental control
and effects of energy technology systems.
.....

PROJECT:

TITLE: Develop Economic Projection Modeling Capability Necessary to Drive
Modular Energy and Environmental System Planning Models to a
Multicounty (Economic Area) Level.
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RES. FACILITY: TVA
Tennessee Valley

RES. LOCATION:.....

INVESTIGATOR(s):.....

SPONSOR(s): EPA.....

DURATION: FY 1975-1980.....

FUNDING: FY75, \$62,000; FY76, \$68,200.
.....

DESCRIPTION: The objectives are to expand TVA's existing Regional Economic
Simulation Model for use in (1) assessing an area's sensitivity to various
national parameters; (2) evaluating the impacts on population, labor force,
employment, etc., of an incremental expansion to the energy generating
system and (3) providing the macroeconomic data base at a multicounty
level that is necessary for rigorous site specific analyses. The output
will be an operational model with an appropriate computer program and
documentation. It will also include a demonstration of the use of the
model for a typical multicounty area. A final report will be provided
describing and summarizing the above.
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RELATED TECHNOLOGIES: Nuclear.....

INTEGRATED ASSESSMENT

CATEGORY:.....

SUBCATEGORY:.....

Coal

TECHNOLOGY:.....

SUBTECHNOLOGY:.....

OBJECTIVE:..To manage and integrate research information on environmental

control and effects of energy technology systems.

PROJECT:

TITLE:..Electric Power System Operation and Expansion Environmental

Residual Output Model

TVA

RES. FACILITY:.....

Tennessee Valley

RES. LOCATION:.....

INVESTIGATOR(s):.....

SPONSOR(s):..EPA.....

DURATION:....FY 1975-1980.....

FUNDING:....FY75, \$60,000; FY76, \$66,000.....

DESCRIPTION:..Output will consist of reports, computer programs with

documentation, a demonstration of the programs, and consultation as

required. The model will be developed in conjunction with an d in

parallel to the development of the TVA Power System Integrated Planning

Model. The model will include the capability to predict the residual

output of a power system on a plant-by-plant basis. It will provide

inputs for detailed dispersion models for evaluating expansion policies

of a power system. The model may also be used independently of the TVA

Power System Integrated Planning Model.

RELATED TECHNOLOGIES:..Nuclear.....

INTEGRATED ASSESSMENT
CATEGORY:.....
SUBCATEGORY:.....
TECHNOLOGY: Coal.....
SUBTECHNOLOGY:.....
OBJECTIVE: To manage and integrate research information on environmental control
and effects of energy technology systems.....
.....

PROJECT:

TITLE: Develop and Demonstrate Applications of Computer Graphics to
Site-Specific and Regional Integrated Environmental Assessment of
Mixed Nuclear, Coal-Based, and Hydroelectric Energy Systems.
.....

TVA
RES. FACILITY:.....
Tennessee Valley
RES. LOCATION:.....

INVESTIGATOR(s):.....

SPONSOR(s): EPA.....

DURATION: FY 1975-1980.....

FUNDING: FY75, \$150,000; FY76, \$165,000.
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DESCRIPTION: The outputs are demonstration of and reports on the application
of computer graphics to environmental analysis of single and combined
nuclear, fossil, and hydroelectric energy systems. This will include
but not be limited to operation with large data bases covering a broad
range of planning variables: Limited-area spatial data bases with
topography, land cover, ownership, constrained areas (endangered species,
karst geology, etc.), biological data, and air and water quality data.
Multi media residual impact models and control technology cost models will
be driven by a multiplant electric power system simulation model, which
is in turn driven by a socioeconomic (including demand forecasting)
.....

model, to provide rapid intelligence for planning, siting, and operating
RELATED TECHNOLOGIES: a regional energy system.....
Nuclear, hydro

CATEGORY:..... Integrated assessment

SUBCATEGORY:.....

TECHNOLOGY:..... Nuclear

SUBTECHNOLOGY:.....

OBJECTIVE:..... To estimate social, economic and cultural consequences of
the environmental effects of alternative energy production and
pollution control technologies.
.....

PROJECT:

TITLE:..... Development of a Regional (Multicounty) Land Use Planning Technique
for Evaluating Potential Energy Generation Sites
.....

RES. FACILITY:..... Tennessee Valley Authority

RES. LOCATION:.....

INVESTIGATOR(s):.....

SPONSOR(s):..... TVA, Division of Navigation Development and Regional Studies

DURATION:..... FY74 to Indefinite

FUNDING:..... Base Program - FY74, \$20,000; FY75, \$20,000; FY76, \$25,000
..... Pass-Through -EPA - FY 74, \$0, FY75, \$30,000, FY76, \$30,000.
.....

DESCRIPTION:..... A system for analyzing and displaying land use/land cover
and land capability information will be developed to enable the evaluation
of potential energy generating sites in terms of their physical and
socioeconomic impact on the surrounding communities and counties. In addition
to basic environmental support capability, the system will identify potential
community infrastructure impacts which must be assessed in the various
safety and environmental analyses.
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RELATED TECHNOLOGIES:..... Nuclear

CATEGORY:..... Integrated Assessment

SUBCATEGORY:.....

TECHNOLOGY:..... Nuclear

SUBTECHNOLOGY:.....

OBJECTIVE:..... To assess the direct and indirect environmental consequences
..... of energy production and control alternatives (whether similar or
..... different in all regions).

PROJECT:

TITLE:..... Tennessee Valley Region Year 2000 Study

.....
..... Tennessee Valley Authority, Hanford Engineering Development
RES. FACILITY: Laboratory, Holifield National Laboratory, Nuclear Regulatory
Commission, National Oceanic and Atmospheric Administration
RES. LOCATION:..... Tennessee Valley Region

INVESTIGATOR(s):.....

SPONSOR(s):..... Tennessee Valley Authority, Energy Research and Development Adminis.

DURATION:..... FY 71-76

FUNDING:..... Base Program (TVA) - FY74, \$20,000; FY75, \$2,000; FY76 \$2,000
..... Pass-Through - FY74, \$0; FY75, \$0; FY76, \$0.

DESCRIPTION:..... To comprehensively appraise the potential radiological
..... impact on the population of the Tennessee and Cumberland River Valley
..... Region from the operation of nuclear facilities in the year 2000.
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RELATED TECHNOLOGIES:..... Nuclear

CATEGORY:.....Integrated Assessment.....

SUBCATEGORY:.....

TECHNOLOGY:.....Hydro.....

SUBTECHNOLOGY:.....

OBJECTIVE:.....Evaluate the impact of airborne pollutants on materials.....

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PROJECT:

TITLE:.....Optimal Scheduling of Releases from a Large Reservoir System in.....

.....Daily Operations.....

.....

RES. FACILITY:.....Tennessee Valley Authority.....

RES. LOCATION:.....Tennessee Valley.....

INVESTIGATOR(s):.....

SPONSOR(s):.....Tennessee Valley Authority.....

DURATION:.....FY 76-78.....

FUNDING:.....FY 76 \$10,000.....

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DESCRIPTION:.....The application of dynamic programming techniques to assist.....

.....in developing optimum power generation with the TVA system of reservoirs.....

.....through real-time determination of optimum releases from individual units of.....

.....the system. Emphasis will be placed on determining schedule changes needed.....

.....to respond to changing conditions throughout the system during daily operations,.....

.....such as heavy rainfall, loss of one or more energy-producing units, sharply.....

.....increased need for electricity, etc. Such short-term optimal scheduling will.....

.....be derived with due consideration given to constraints imposed by water control.....

.....priorities, by reservoir operation guide curves, and by longer term optimal.....

.....scheduling requirements.....

.....

RELATED TECHNOLOGIES:.....

RESEARCH CATEGORY:

Characterization, Measurement, and Monitoring

CATEGORY:Characterization, Measurement and Monitoring.....

SUBCATEGORY:

TECHNOLOGY:Multi-Technology.....

SUBTECHNOLOGY:

OBJECTIVE:Remote Monitoring.....

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PROJECT:

TITLE:Remote Sensing Applied to Energy Resources.....

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RES. FACILITY:

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S):

DURATION:

FUNDING:Total Earth Resources Survey Funding.....

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DESCRIPTION:Multiple projects are involved in the energy-related remote
sensing activity. Their combined objective is to create the capability to
apply relevant data and imagery from the LANDSAT and SKYLAB missions to locate
new energy sources; monitor the development and environmental effects of
existing sources; and to further develop the capabilities of space sensing
for energy-related application.

.....On-going investigations using LANDSAT imagery are continuing
to involve petroleum exploration in Oklahoma and Texas; study of the petroleum
potential of Northern Alaska; and correlation of data on deep mine and
strip mine rock falls, and monitoring of strip mines and land reclamation

RELATED TECHNOLOGIES:in Indiana.

CATEGORY:Characterization, Measurement and Monitoring.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE:Remote Monitoring.....

PROJECT:

TITLE:Remote Sensing of Smokestack Pollution.....

RES. FACILITY:Langley Research Center.....

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S):NASA.....

DURATION:FY 75.....

FUNDING:

DESCRIPTION:Determination of the feasibility of using optical
techniques to remotely monitor stack plumes from fixed plant installations
which are considered to be major contributors to gaseous and particulate
air pollution.....

RELATED TECHNOLOGIES:Oil and Gas.....

CATEGORY:Characterization, Measurement and Monitoring.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE:Air Monitoring Instrumentation.....

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PROJECT:

TITLE:Air Pollution Source Identification.....

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RES. FACILITY: .. NASA Lewis Research Center.....

RES. LOCATION: .. City of Cleveland.....

INVESTIGATOR(S):

SPONSOR(S): NASA, City of Cleveland (Division of Air Pollution Control).....

DURATION: FY 75.....

FUNDING:

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DESCRIPTION: Develop source identification techniques for trace elements
..... (lead, beryllium, etc.) and compounds (asbestos, benzopyrene)
..... in the air which create physiological hazard.
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RELATED TECHNOLOGIES: Oil and Gas.....

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RESEARCH CATEGORY:

Health Effects

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term exposure of normal, susceptible
and stressed population groups to different levels and combinations of
biologically active agents associated with energy technologies.

PROJECT:

TITLE: Coal Extraction Technology

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RES. FACILITY: .. Marshall Space Flight Center, Jet Propulsion Laboratory ..

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S): NASA, DOI - Bureau of Mines

DURATION: FY 75

FUNDING:

DESCRIPTION: Development of automated mining systems for longwall
..... mining.

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RELATED TECHNOLOGIES:

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RESEARCH CATEGORY

Integrated Assessment

CATEGORY:Integrated Assessment.....
SUBCATEGORY:
TECHNOLOGY:Hydroelectric.....
SUBTECHNOLOGY:
OBJECTIVE:To manage and integrate research information on environmental
.....control and effects of energy technology systems,.....
.....

PROJECT:

TITLE:Systems Analysis of Hydroelectric Powerplant Water Management
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RES. FACILITY: ..Jet Propulsion Laboratory.....

RES. LOCATION: ..Pasadena California.....

INVESTIGATOR(S):

SPONSOR(S):

DURATION:

FUNDING::.....

DESCRIPTION:The project will identify, assess, and compare the various
.....aerospace techniques, technologies and information systems that could aid
.....the management of water resources for hydroelectric powerplants. To accomplish
.....this phase, a model of hydroelectric powerplant operation will be established
.....and models of appropriate information systems derived from aerospace
.....technology will be developed.
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RELATED TECHNOLOGIES:

CATEGORY: Integrated Assessment

SUBCATEGORY:

TECHNOLOGY: Geothermal

SUBTECHNOLOGY:

OBJECTIVE: To manage and integrate research information on environmental
..... control and effects of energy technology systems.
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PROJECT:

TITLE: Geothermal Energy Program Definition Project

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RES. FACILITY: Jet Propulsion Laboratory

RES. LOCATION: Pasadena, California

INVESTIGATOR(S):

SPONSOR(S): ERDA

DURATION: FY 75

FUNDING:

DESCRIPTION: Development of an integrated National plan which invites
..... cognizant Federal agencies, industry, universities and
..... non-profit organizations in a dedicated effort to achieve
..... effective utilization of geothermal energy resources.
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RELATED TECHNOLOGIES:

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CATEGORY: Integrated Assessment
SUBCATEGORY:
TECHNOLOGY: Nuclear
SUBTECHNOLOGY:
OBJECTIVE: To evaluate cost/risk/benefit trade-off of energy production
..... and pollution control alternatives
.....

PROJECT:

TITLE: Hazardous Waste Disposal in Space
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.....

RES. FACILITY: NASA AMES RESEARCH CENTER

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S):

DURATION: FY 75

FUNDING:

DESCRIPTION: Technology assessment of the disposal of nuclear waste
..... using space transportation systems
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RELATED TECHNOLOGIES:
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CATEGORY:Integrated Assessment.....

SUBCATEGORY:

TECHNOLOGY:Conservation.....

SUBTECHNOLOGY:

OBJECTIVE:To evaluate cost/risk/benefit trade-off of energy production
.....and pollution control alternatives.....
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PROJECT:

TITLE:Modular Integrated Utility System (MIUS).....
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RES. FACILITY:NASA Johnson Space Center/ The Boeing Co.....

RES. LOCATION:Seattle, Washington.....

INVESTIGATOR(S):

SPONSOR(S):HUD.....

DURATION:FY 75.....

FUNDING:

DESCRIPTION:The MIUS Program is devoted to the development and
.....demonstration of the technical, economic and institutional advantages
.....of integrating the systems for providing all or several of the utility
.....services for a community (electric power generation, heating and cooling,
.....potable water liquid waste treatment and solid waste management).
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RELATED TECHNOLOGIES:

CATEGORY: Integrated Assessment

SUBCATEGORY:

TECHNOLOGY: Conservation

SUBTECHNOLOGY:

OBJECTIVE: To evaluate cost/risk/ benefit trade-off of energy production
 and pollution control technologies

PROJECT:

TITLE: Integrated Utility Systems Technology

RES. FACILITY: NASA Johnson Space Center

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S): HUD, NASA

DURATION: FY 75

FUNDING: \$1,080,000 (Estimated 50% of total of \$1,080,000
 applicable to environmental concerns)

DESCRIPTION: Extension of HUD Modular Integrated Utility System (MIUS).
 Investigating several promising processes that fulfill various utility
 functions including power generation, heating and air conditioning, liquid
 waste treatment and solid waste management. Looking for advances in the
 state-of-the-art.

RELATED TECHNOLOGIES:

CATEGORY: Integrated Assessment

SUBCATEGORY:

TECHNOLOGY: Oil and Gas

SUBTECHNOLOGY:

OBJECTIVE: Evaluation of alternative approaches to implementing
energy development, prevention of environmental damage and further studies
.....

PROJECT:

TITLE: Liquefied Natural Gas Safety

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RES. FACILITY: NASA Kennedy Space Center, Lewis Research Center, Ames
Research Center

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S): NASA, New York City Fire Dept.

DURATION: FY 75

FUNDING:

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DESCRIPTION: Develop a LNG safety manual. Develop a risk management
system for all phases of design, construction of LNG and other similarly
technologically advanced facilities. Develop a computer model of LNG
spills in water.
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RELATED TECHNOLOGIES:

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RESEARCH CATEGORY:

Characterization, Measurement, and Monitoring

CATEGORY: CHARACTERIZATION, MEASUREMENT AND MONITORING

SUBCATEGORY:

TECHNOLOGY: Multi-Technology

SUBTECHNOLOGY:

OBJECTIVE: Health Effects Instrumentation

PROJECT:

TITLE: Clinical Porphyrin Analysis by Phosphorescence Spectroscopy

RES. FACILITY: Colorado State Univ.

RES. LOCATION: Fort Collins, CO

INVESTIGATOR(S): D.K. Lavallee

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY75 \$65,432 (50% energy related)

DESCRIPTION: By use of phosphorescence spectroscopy and chemical
modifications, a clinically acceptable method of determining porphyrin concentrations in
blood, urine, and other materials can be developed. Aims are: 1) To increase sensitivity
and selectivity of porphyrin and metalloporphyrin analysis over present methods. 2) To
Determine the usefulness of metal probes in biological systems. 3) To develop a method
with minimum interference from other materials commonly found in biological samples, and
thus eliminating need for rigorous separation procedures. 4) To investigate the potential
usefulness of a combination of simple separation procedures with luminescence measurements
of porphyrins.

RELATED TECHNOLOGIES:

CATEGORY: CHARACTERIZATION, MEASUREMENT AND MONITORING

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: Health Effects Instrumentation

PROJECT:

TITLE: Characterization of Organoarsenic Compounds in Nature

RES. FACILITY: Texas A & M Research Foundation

RES. LOCATION: College Station, Texas

INVESTIGATOR(S): K.V. Irgolic

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY75 \$71,379 (100 % energy related)

DESCRIPTION: The objective of this research is to isolate and identify
..... chemical species containing arsenic, as they occur in living organisms.
..... Initially, algae and crayfish will be used as the experimental organisms
..... from which arsenic compounds will be isolated. As knowledge concerning the
..... chemical nature of the arsenic species is acquired, it will become feasible to
..... extend this study to include higher animals.
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..... Shale
RELATED TECHNOLOGIES:

CATEGORY: CHARACTERIZATION: MEASUREMENT AND MONITORING

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: (Other) Evaluate the Toxicity of Atmospheric Particulates.

PROJECT:

TITLE: Size/Chemical Measurements of Atmospheric Particles

RES. FACILITY: Univ.. of Rochester

RES. LOCATION: Rochester, N.Y.

INVESTIGATOR(S): B.E. Dahneke

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY75 \$83,606 (100% energy related)

DESCRIPTION: The object of this research is to measure the detailed size-chemical nature of atmospheric particulates. This data is desired to evaluate the toxicity of atmospheric particulates which depends on both their inhalability (aerodynamic size) and their chemical composition. The data will be obtained in an aerosol beam device.

..... Oil and Gas

RELATED TECHNOLOGIES:

RESEARCH CATEGORY:

Environmental Transport Processes

CATEGORY: ENVIRONMENTAL TRANSPORT PROCESSES
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To determine in the hydrosphere the origin, load, transport pathways, transfer rates and fate of pollutants arising from energy activities.
PROJECT:
TITLE: Toxicology of Environmental Chemicals
RES. FACILITY: Oregon State University
RES. LOCATION: Corvallis, Oregon
INVESTIGATOR(S): V. Freed
SPONSOR(S): NIH/DHEW
DURATION: 2 year
FUNDING: FY75 \$162,400 (100% energy related)
DESCRIPTION: The primary objective of the proposal is to assess the hazard to human health represented by selected chemicals distributed in the environment. This involves two secondary objectives: (1) Definition of the frequency, extent and route of human exposure to such chemicals.
(2) The biological response produced by these chemicals must be determined or reliably projected for exposure levels which might be found in the environment.
RELATED TECHNOLOGIES:

RESEARCH CATEGORY:

Health Effects

CATEGORY:Health Effects.....
SUBCATEGORY:
TECHNOLOGY:Multi-TECHNOLOGY.....
SUBTECHNOLOGY:
OBJECTIVE:To identify hazardous agents associated with energy.....
.....technologies.....
.....

PROJECT:

TITLE: The Interaction of Water-Soluble Substrates with Water-
..... Insoluble Enzymes in Aqueous Media
.....

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, N. C.

INVESTIGATOR(S): G.E.R. Hook, J. R. Bend, J. R. Fouts

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 74 \$37,839 (25% energy related)
.....

DESCRIPTION: Most foreign compounds which are acted on by the microsomal
..... mixed-function oxidase system are soluble to only a limited extent in
..... water at physiological pH. The interactions of water-insoluble substrates
..... with these enzymes have been studied extensively in vitro, but generally
..... only with the aid of solubilizing agents designed to bring the substrate
..... into aqueous solution. Often the effects of the solubilizing agent on the
..... enzyme system under study have been completely ignored. The initial objec-
..... tives of this study were to 1) investigate the effects of a number of
..... currently popular solubilizing and suspending agents on liver microsomal
..... electron transport as related to the hydroxylation of biphenyl, 2) if possible

RELATED TECHNOLOGIES:
..... find a solubilizing or suspending agent which was itself a noneffector of
..... microsomal electron transport, and 3) investigate the interaction of water-
..... insoluble substrates with microsomes structurally modified by such membrane
..... modifiers as detergents.

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To identify hazardous agents associated with energy
..... technologies.

PROJECT:

TITLE: Chemically Induced Heritable Chromosome Defects

RES. FACILITY: Institue for Medical Research

RES. LOCATION: Camden, N.J.

INVESTIGATOR(S): R. Miller

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY 75 \$104,843 (100% energy related)

DESCRIPTION: The objective of this proposal is to utilize the recently
developed "Giemsa-trypsin" chromosome banding procedure for enhanced
resolution and characterization of chemically induced chromosome aberrations
in the newborn offspring of experimental rats and mice.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To identify hazardous agents associated with energy
technologies.

PROJECT:

TITLE: Photosensitivity: Environmental and Other Factors

RES. FACILITY: Columbia University

RES. LOCATION: N.Y., N.Y.

INVESTIGATOR(S): L. Harber

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY 74 \$106,573 FY 75 \$104,374
(50% energy related) (20% energy related)

DESCRIPTION: The broad objectives of the proposed project are to define
more precisely the mechanisms of action of these adverse photoresponses as
well as the influence of environmental factors and the biologic differences
between individuals which affect adverse cutaneous photosensitivity
reactions following exposure to environmental chemicals and light. The
development of an experimental laboratory animal model for study of these
reactions is a highly desirable goal in order to determine the specific
role of light in the production of photosensitivity by "simple" chemical
compounds to aid in development and assessment of photoprotective topical
and systemic agents.

RELATED TECHNOLOGIES:

CATEGORY: HEALTH EFFECTS
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To identify hazardous agents associated with energy technologies.
.....
.....

PROJECT:

TITLE: Drug and Chemically induced Chromosomal Observations.
.....
.....

RES. FACILITY: Cornell Univ.

RES. LOCATION: N.Y., -N.Y.

INVESTIGATOR(S): Z. Harsanyi

SPONSOR(S): NIH/DHEW

DURATION: 2 year

FUNDING: FY74 \$36,726 (100% energy related)

..... FY75 \$38,515 (33% energy related)

DESCRIPTION: We propose to utilize a sensitive, genertic system for the
..... screening and analysis of chromosomal aberrations, particularly translocations
..... and nondisjunction, induced by drugs, food additives, and environmental
..... pollutants. Treatment of quiescent or mitotically dividing conidia of
..... Aspergillus nidulans is to be followed by selection for aberrations and
..... subsequent characterization of the aberrations.
.....
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.....
.....

RELATED TECHNOLOGIES:
.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi-Technology

SUBTECHNOLOGY:

OBJECTIVE: ... To develop more sensitive and rapid biological methods to
 evaluate dose and damage to man.

PROJECT:

TITLE: .. Development of a Spot Test System in Neurospora crassa

RES. FACILITY: . National Institute of Environmental Health Sciences

RES. LOCATION: . Research Triangle Park, North Carolina

INVESTIGATOR(S): Tong-man Ong

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: . FY '74 FY '75 \$60,000 (100% energy related)

DESCRIPTION: . Development of a spot test system will provide a simple,
 economical and quick system in eukaryotes for the detection and evaluation
 of the mutagenic activity of chemical agents in the human environment.
 Such development of a spot test system involves two steps. The first step
 is to establish the optimal test conditions in Neurospora crassa and the
 second step is to find the tester strains which can best detect several
 different types of genetic alterations. We have established optimal
 conditions for the spot test and have selected 8 strains from hundreds of
 mutants as preliminary tester strains. The mutagenicity of MNNG, ICR-170, ...

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi-Technology

SUBTECHNOLOGY:

OBJECTIVE: ... To develop more sensitive and rapid biological methods to
 evaluate dose and damage to man.

PROJECT:

TITLE: ... Development of a Spot Test System in Neurospora crassa

RES. FACILITY: .. National Institute of Environmental Health Sciences

RES. LOCATION: .. Research Triangle Park, North Carolina

INVESTIGATOR(S): ... Tong-man Ong

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: .. FY '74 FY '75 \$31,000 (100% energy related)

DESCRIPTION: .. Development of a spot test system will provide a simple, ...
 .. economical and quick system in eukaryotes for the detection and evaluation
 .. of the mutagenic activity of chemical agents in the human environment. ...
 .. Such development of a spot test system will involve two steps. The first
 .. step will be establishing the optimal test conditions in Neurospora crassa
 .. and the second step will be finding the tester strains which can best
 .. detect several different type of genetic alterations.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi-Technology

SUBTECHNOLOGY:

OBJECTIVE: ..To develop more sensitive and rapid biological methods to.....
 ..evaluate dose and damage to man.....

PROJECT:

TITLE: .. Electrophoretic Mobility Mutation Analysis in Mammals

.....

RES. FACILITY: .. National Institute of Environmental Health

RES. LOCATION: .. Research Triangle Park, North Carolina

INVESTIGATOR(S): L. R. Valcovic

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY '74 \$164,228 FY '75 \$132,000 (100% energy related)

.....

DESCRIPTION: The study of specific enzyme mutations using electrophoresis
 has the capability of detecting mutations that result in either a non-
 functional protein or a functional protein with altered electrical charge.
 Our objective is to develop a single mammalian test system that will detect
 both electrophoretic mobility (EPM) and inactive enzyme (IAE) mutations in
 the same loci. Two inbred mouse strains which differ with response to nine
 enzyme loci have been selected for this system. Adult males of each strain
 were treated with gamma radiation and mated to unirradiated females of the
 other strain to produce F₁ hybrid offspring. Tissue samples are obtained...

RELATED TECHNOLOGIES:

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi-Technology

SUBTECHNOLOGY:

OBJECTIVE: .. To develop more sensitive and rapid biological methods to evaluate
dose and damage to man.
.....
.....

PROJECT:

TITLE: .. Development of Pharmacokinetic Models"

.....

.....

RES. FACILITY: .. National Institute of Environmental Health Sciences

RES. LOCATION: .. Research Triangle Park, North Carolina

INVESTIGATOR(S): .. M. W. Anderson

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: .. FY '74.. \$74,490..... FY '75..... (25% energy related)

.....

DESCRIPTION: .. An isolated perfused lung system was developed so that initial
rates of uptake and efflux of accumulated chemicals could be investigated.
Using this system, detailed models for the dynamic interaction between the
lung and several basic amines have been developed. Efflux studies show that
..... several types of binding sites are responsible for the accumulation of the
exogenous amines by the lung. These studies also showed that if the amine
is allowed to accumulate, then some of it cannot be effluxed. This non-
effluxable component of accumulated methadone or imipramine is being pursued
.....
in more detail. Mathematical models are being developed which will allow...

RELATED TECHNOLOGIES:

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi-Technology

SUBTECHNOLOGY:

OBJECTIVE: .. To develop more sensitive and rapid biological methods to

..... evaluate dose and damage to man.

.....

PROJECT:

TITLE: .. Nonparametric Tests in Biometry

.....

.....

RES. FACILITY: .. National Institute of Environmental Health Sciences

RES. LOCATION: .. Research Triangle Park, North Carolina

INVESTIGATOR(S): .. K. S. Crump

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: .. FY '74 FY '75 \$12,000. (100% energy related

.....

DESCRIPTION: .. A nonparametric test for interaction between two treatments

..... which had been previously reported in the literature was found to be

..... seriously affected by the presence of first-order effects in the data. A

..... modification of the test was developed that mitigated this difficulty.

..... The modified test was shown by a Monte-Carlo study to behave quite favorably

..... relative to other nonparametric tests for interaction.

.....

.....

.....

RELATED TECHNOLOGIES:

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi-Technology

SUBTECHNOLOGY:

OBJECTIVE: .To develop more sensitive and rapid biological methods to evaluate
dose and damage to man.
.....

PROJECT:

TITLE: .Detection of Point Mutations in Somatic Cells
.....
.....

RES. FACILITY: .National Institutes of Environmental Health Sciences

RES. LOCATION: ..Research Triangle Park, North Carolina

INVESTIGATOR(S):P. E. Nute

SPONSOR(S):

DURATION:

FUNDING: FY '74 \$59,000 FY '75 \$82,000 (100% related energy)
.....

DESCRIPTION: The purpose of this investigation is to develop a simple system
to measure point mutations in human somatic cells, and use this system to
investigate human populations with respect to normal and environmental
induced somatic cell mutation rates. Antisera to fetal hemoglobin and
specifically to each of the two types of human fetal hemoglobin will be
prepared and labelled with different fluorescent dyes. The antisera will
be used to detect rare human red cells containing either one or the other
types of fetal hemoglobin. These rare mutant cells are due to deletion of
the gene for the type of fetal hemoglobin not present. The frequency of red
cells containing both types of fetal hemoglobin will also be determined.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi-Technology

SUBTECHNOLOGY:

OBJECTIVE: .. To develop more sensitive and rapid biological methods to

..... evaluate dose and damage to man.

.....

PROJECT:

TITLE: .. Environmental Mutagen Information Center

.....

.....

RES. FACILITY: .. National Institute of Environmental Health Sciences

RES. LOCATION: .. Research Triangle Park, North Carolina

INVESTIGATOR(S): .. J. S. Wasson

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: .. FY '74 \$125,000 (40% energy related) FY '75 \$43,000 (100% energy related)

.....

DESCRIPTION: .. The mission of the Environmental Mutagen Information Center

..... (EMIC) is to collect, organize, and disseminate chemical mutagenesis

..... information. Information contained in this unique file may either report

..... on the testing of chemical in one of the many available mutagenic assay

..... systems or contain pertinent data which can be used in understanding the

..... known or suspected mutagenic activity of environmental chemical agents. ...

..... The information collected for this data base is to be processed and

..... distributed to the scientific community.

..... EMIC's data file at the end of March 1974 contained 12,000 bibliographic...

RELATED TECHNOLOGIES:

.....

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Multi-Technology
SUBTECHNOLOGY:
OBJECTIVE: To develop more sensitive and rapid biological methods to
 evaluate dose and damage to man.

PROJECT:
 TITLE: Genetic Tests to Characterize Specific Locus Mutants in
 Neurospora crassa

 RES. FACILITY: National Institute of Environmental Health Sciences
 RES. LOCATION: Research Triangle Park, North Carolina
 INVESTIGATOR(S): L. R. Chang
 SPONSOR(S): NIH/HEW
 DURATION:
 FUNDING: FY '74 \$68,800 FY '75 \$68,000 (100% energy related)

 DESCRIPTION: The primary objective of this contract is the genetic
 characterization of presumptive adenine-3 (ad-3) mutants of Neurospora
crassa derived from experiments at the Institute from forward-mutation
 experiments with various environmental chemicals as well as various
 chemical carcinogens.
 Stock cultures of presumptive ad-3 mutants have been characterized by a
 series of heterokaryon tests with various standard tester sets which
 determine the genotypes of mutants, complementation pattern of ad-3B
 mutants showing allelic complementation and also distinguishes point

RELATED TECHNOLOGIES:

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Multi-Technology
SUBTECHNOLOGY:
OBJECTIVE: To develop more sensitive and rapid biological methods to
 evaluate dose and damage to man.

PROJECT:
TITLE: Development of a New Mouse Strain to Maximize Sensitivity of a ...
 Point Mutation Assay

RES. FACILITY: National Institute of Environmental Health Sciences
RES. LOCATION: Research Triangle Park, North Carolina
INVESTIGATOR(S): T. H. Roderick
SPONSOR(S): NIH/HEW
DURATION:
FUNDING: FY '74 \$17,000 FY -75 \$34,000 (100% energy related)

DESCRIPTION: A specific locus mutation system has been developed for mice.
 In this system it is possible to detect mutations in nine isozyme loci.
 The efficiency for detection of mutations in such a system increases with
 the number of isozyme loci which can be screened per mouse. Among the
 various inbred mouse strains, there are several enzyme polymorphisms. The
 mouse strain C57BL/6J is of a different origin than most other common mouse
 strains. This difference can be increased by incorporating other known
 enzyme polymorphisms into this strain. Crosses of the various strains
 (each to C57BL/6J) have begun. The F₁'s will be back crossed in order to...

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi-Technology

SUBTECHNOLOGY:

OBJECTIVE: .To develop more sensitive and rapid biological methods to.....
 .evaluate dose and damage to man.....

PROJECT:

TITLE: .Development of a System for Detecting Lethal Mutations in Mice.....

RES. FACILITY: .National Institute of Environmental Health Sciences

RES. LOCATION: .Research Triangle Park, North Carolina

INVESTIGATOR(S): ...T. H. Raderick

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: ..FY -74...\$25,000..... FY -75...\$27,000... (100% energy related)

DESCRIPTION: .Inversions are induced by irradiation and/or chemical agents
 .in the chromosomes of mice. Bearers of inversions are detected by.....
 .analysis of anaphase bridges in individual males. It is intended to.....
 .establish strains of animals carrying marked inversions for the purpose.....
 .of detecting induction of recessive lethal mutations by environmental.....
 .agents in a manner comparable to that existing in Drosophila melanogaster.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects.....

SUBCATEGORY:

TECHNOLOGY: Multi-Technology.....

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods ..
 to evaluate dose and damage to man.

PROJECT:

TITLE: The Comparison and Evaluation of Mutagenic Test Systems ..
 for Mass Screening Systems ..

RES. FACILITY: National Institute of Environmental Health Sciences ..

RES. LOCATION: Research Triangle Park, N.C.

INVESTIGATOR(S): L. D. Claxton ..

SPONSOR(S): NIH/HEW ..

DURATION:

FUNDING: FY 75 \$52,000 (100% energy related) ..

.....

DESCRIPTION: The purpose of this is to scientifically compare and ..
 evaluate presently available mutagenic test systems to determine the feasibil-
 ity of their use in mass screening programs. Some of the techniques and ..
 data evaluation methods will be computerized . The study will determine ..
 the feasibility of extrapolating the results from one mutagenic test system ..
 to another and aid in the risk estimations for man.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi - Technology

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods
..... to evaluate dose and damage to man.

PROJECT:

TITLE: Testing for Ordered Alternatives with Increased Sample
..... Size for the Control

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, N. C.

INVESTIGATOR(S): G. R. Chase

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 74 \$23,274 (100% energy related)

DESCRIPTION: Research has been conducted to produce statistical tests
..... that have greater power than those currently in the literature for assessing
..... a dose-response relationship when the control sample size is larger than
..... that employed at the various dose levels. The theory for the case of an
..... infinite sample size for the control for Bartholomew's tests has been
..... developed. Using these results, a very good approximation for intermediate
..... sample sizes supported by exact and Monte Carlo results has been found.
..... Tables for critical values have been compiled.

RELATED TECHNOLOGIES:

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Multi-Technology.....

SUBTECHNOLOGY:

OBJECTIVE:To develop more sensitive and rapid biological methods.....

.....to evaluate dose and damage to man.....

.....

PROJECT:

TITLE:Mathematical Models for Estimating Mutation Rates in.....

.....Cell Populations.....

.....

RES. FACILITY: ..National Institute of Environmental Health Sciences.....

RES. LOCATION: ..Research Triangle Park, N. C.

INVESTIGATOR(S): D. G. Hoel.....

SPONSOR(S):NIH/HEW.....

DURATION:

FUNDING:FY 74 \$4,645..... (100% energy related)

.....

DESCRIPTION:Research was undertaken to construct probabilistic models

.....for describing the number of mutant cells in a cell colony as a function

.....of time, and to develop estimates of cell mutation rates for the various

.....models while taking into account experimental laboratory procedures. Both

.....Markovian and various types of deterministic growth were assumed for mutant

.....and non-mutant cells. Mutants were assumed to be generated as a Poisson

.....process. From these assumptions, the number of mutant and non-mutant

.....cells may be expressed as functions of time. Methods for estimating the

.....cell mutation rate have been developed based on the models for cell growth.

.....These estimates take into account laboratory procedures for periodic

RELATED TECHNOLOGIES:

.....sampling of the cell cultures. Also, the effects of phenotypic delay have

.....been studied and methods for adjusting the mutation rate estimates have

.....been developed.

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi - Technology

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods
to evaluate dose and damage to man.
.....

PROJECT:

TITLE: Detection of Gene Duplications in Escherichia coli
and Salmonella typhimurium
.....

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, North Carolina

INVESTIGATOR(S): D. S. Straus

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 74 \$14,463 (100% energy related)

DESCRIPTION: Although some mutagens are known to induce deletions in
bacteria, little is known about the effect of mutagens on the frequency
of other genetic events arising from aberrant recombination. This project
has been directed toward a study of the effect of mutagens in inducing
duplications in the glyS region of the E. coli and S. typhimurium
chromosomes.
.....

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi- Technology

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods
 to evaluate dose and damage to man.

PROJECT:

TITLE: Detection of Chemical Mutagens with Salmonella typhimurium

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, North Carolina

INVESTIGATOR(S): D. S. Straus

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 74 \$10,328 (100% energy related)

DESCRIPTION: The general objective of this project is to work on
 further refinements in the Salmonella typhimurium reverse mutation system
 developed by Ames, Hartman and coworkers.

 The reverse mutation system is also being used to study
 the mutagenic activity of some specific compounds of environmental and
 pharmacological interest.

RELATED TECHNOLOGIES:

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Multi-Technology.....

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods

.....to evaluate dose and damage to man.....

.....

PROJECT:

TITLE:Development of a Screening System for Mitotic Recombination

.....and Gene Conversion in Yeast in the Absence and Presence

.....of Metabolic Activation.....

RES. FACILITY: ..National Institute of Environmental Health Sciences.....

RES. LOCATION: ..Research Triangle Park, North Carolina.....

INVESTIGATOR(S): M. M. Shahin.....

SPONSOR(S):NIH/HEW.....

DURATION:

FUNDING:FY 74 \$24,808..... (100% energy related)

.....

DESCRIPTION: The purpose of the present project is to develop a screening system for the detection of mitotic recombination and mitotic gene conversion in yeast in the absence and presence of metabolic activation. Both events of recombination can lead to homozygosity of the recessive genes in diploid heterozygotes and their occurrence in man might lead to cancer or to other serious diseases. In the present study, a number of compounds including the antischistosomal agents hycanthone, lucanthone and SQ 18,506 as well as the antimicrobial food additive furylfuramide were tested and found to be genetically active in the mitotic recombination system. Further, when hycanthone was tested, the type of genetic alterations in D5 cells and the sensitivity of D4 and D5 cells to inactivation were found to be pH dependent. This is not the case, when SQ 18,506 was tested in both systems, although SQ 18,506 is generally more active in the induction of MR and MGC than hycanthone.

122
RELATED TECHNOLOGIES:

CATEGORY: Health Effects.....

SUBCATEGORY:

TECHNOLOGY: Multi-Technology.....

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods..

..... to evaluate dose and damage to man,.....

.....

PROJECT:

TITLE: The Use of Mammalian Somatic Cells in the Detection of..

..... Mutational Events.....

.....

RES. FACILITY: .. National Institute of Environmental Health Sciences.....

RES. LOCATION: .. Research Triangle Park, N. C.

INVESTIGATOR(S): H. V. Malling.....

SPONSOR(S): NIH/HEW.....

DURATION:

FUNDING: FY 74 \$29,851 (100% energy related).....

.....

DESCRIPTION: There is a need to develop methods by which the frequency of somatic mutations at several genetic loci in experimental animals can be measured. A somatic mutational system would provide the following advantages: 1) mutational rates for man could possibly be determined with the use of human cell samples, 2) immunologic reactions common to other systems could be avoided, 3) chronic studies of compounds could be initiated, and 4) fewer animals would be needed for mammalian mutagenesis studies. A survey for an enzyme or protein not normally located in adult somatic cells is the basis for this type of test. For example, fetal hemoglobin is not normally found in adult erythrocytes; however, careful staining with an established technique does demonstrate a few positively stained cells in the adult animal. Although work is preliminary, it has been demonstrated that one can histologically locate the rare stained cell or cells that indicate a mutational event.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi - Technology

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods
..... to evaluate dose and damage to man.
.....

PROJECT:

TITLE: The Development of a Mutation Detection System Based
..... Upon New Drug Resistant Mutants in a Neurospora Heterokaryon
.....

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, North Carolina

INVESTIGATOR(S): G. R. Hoffmann

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 74 \$37,306 (100% energy related)
.....

DESCRIPTION: The major objective of this investigation is to develop
..... a new system for the detection of forward mutations in a heterokaryon of
..... Neurospora crassa. Since the method is based upon new mutants which are
..... resistant to the effects of 8-azaguanine-resistant strains.
.....

..... In addition to a description of aza-3 mutants, we have
..... shown that in the proper selective medium, mutants resistant to azaguanine
..... can be detected in a heterokaryon carrying the recessive aza-3 marker. An
..... increased frequency of mutants was detected following treatment of conidia
..... either with x-rays, ultraviolet light, ethylmethanesulfonate, or the
..... acridine mustard ICR-170. Studies now in progress include a more refined

RELATED TECHNOLOGIES: genetic mapping of azaguanine-resistant mutants and the improvement of
..... selection conditions for the detection of azaguanine-resistant mutants
in the heterokaryon.

CATEGORY: Health Effects.....

SUBCATEGORY:

TECHNOLOGY: Multi-Technology.....

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods..

..... to evaluate dose and damage to man.....

.....

PROJECT:

TITLE: Safety Testing and Analysis of Environmental Compounds..

..... for Muagenic Effect

.....

RES. FACILITY: ... National Institute of Environmental Health Sciences

RES. LOCATION: .. Research Triangle Park, N. C.

INVESTIGATOR(S): D. Clive

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 75 \$44,458 (100% energy related)

.....

DESCRIPTION: The rapid increase in both variety and quantity of environmental mutagens is intimately associated with attempts to "better living through chemistry". By identifying specific compounds as mutagens it is hoped that a more cautious approach to their use will minimize the increased frequency of serious genetic disorder. We have developed an in vitro mutagen assay system utilizing thymidine kinase heterozygote (TK⁺/-) L5178Y mouse lymphoma cells, which respond quite sensitively to treatment with known mutagens. Two classes of chemical mutagens (alkylating agents and hycanthone analogs) are currently being assayed in this system for the purpose of determining structure-activity relationships. These two classes of compounds represent mutagens of two distinct mechanisms of action (i.e., covalent alkylations of the DNA resulting primarily in base-pair alterations; and non-covalent intercalation into the DNA leading to spatial distensions of the base-pair sequences and ultimate frameshift mutations).

RELATED TECHNOLOGIES:135.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Mult+ Technology

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods
..... to evaluate dose and damage to man.

PROJECT:

TITLE: Mutational Assay Systems Utilizing Mammalian Cells

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, North Carolina

INVESTIGATOR(S): D. Clive

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 74 \$88,871 (100% energy related)

DESCRIPTION: Because of their large numbers, relatively short generation
..... times, biological relevance to mammalian genetics and ease of handling,
..... mammalian cells grown in suspension culture offer a highly sensitive
..... system for assaying the mutagenicity of environmental agents. Elucidation
..... of the mechanism by which such mutagenic agents exert their effects in
..... mammalian cells cannot be accomplished by the sole use of the simple
..... forward mutation assay system which we have developed. What is required
..... is a combination of mutagenic and biochemical studies and the development
..... of mutant strains possessing high specificity in their responses to various
..... mutagen classes. It is the objective of this project to develop mutant

RELATED TECHNOLOGIES: stocks and assess various genetic loci for their utility in effecting...
..... these aims.

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi-Technology

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods

..... to evaluate dose and damage to man.

.....

PROJECT:

TITLE: Genetic Variability in Sensitivity of Lymphocytes to

..... Physical Mutagens

.....

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, N. C.

INVESTIGATOR(S): C. H. Langley

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 74 \$32,971 (100% energy related)

.....
DESCRIPTION: The objective of this research is the development of an in
vitro assay of sensitivity to environmental mutagens. This assay can then
.....
be utilized to identify genetic variability in the sensitivity of individuals.
.....
Simple mutagenicity assays are not available. Therefore, cell killing
.....
effects of various mutagens will be examined since cytotoxicity often
.....
parallels mutagenicity in highly sensitive strains. The cell killing
.....
kinetics of several physical mutagens will be investigated in cultured mouse
.....
lymphocytes as a preliminary effort. Mouse strains will be used that have
.....
known differences in sensitivity to whole-body irradiation.
.....

RELATED TECHNOLOGIES:

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi-Technology

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods
 to evaluate dose and damage to man.

PROJECT:

TITLE: The Study of Toxic Effects of Environmental Chemicals on
 Spermatogenesis

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, N. C.

INVESTIGATOR(S): P. Lee

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 74 \$119,472 (20% energy related)

.....

DESCRIPTION: The objectives of this study are 1) to investigate
 unscheduled DNA synthesis in mouse spermatogenic cells as a possible new
 predictive test for screening environmental mutagens using in vitro
 and in vivo techniques; 2) to study synthesis and structure of messenger
 RNA in rat spermatogenic cells; 3) to define enzyme development during
 spermatogenesis and attempt to develop useful "marker enzymes" to
 indicate normal cellular differentiation and toxic effects using velocity
 sedimentation cell separation and serial mating; and 4) to investigate
 the nature of the blood-testis barrier and determine the role of this
 permeability barrier in the penetration of various environmental chemicals
RELATED TECHNOLOGIES: to testicular fluid.

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi-Technology

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods
to evaluate dose and damage to man.

PROJECT:

TITLE: Use of Male Germinal Tissue in the Detection of Mutational
Events

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, N.C.

INVESTIGATOR(S): H. V. Malling

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 75 \$52,000 (100% energy related)

DESCRIPTION: The technique of histochemical staining is being used
to develop a system by which the frequency of point mutation in germinal
tissue can be measured. The main advantages of such a system is that
(a) would cut down the number of animals used in mammalian mutagenic
studies (b) would allow us to do chronic studies and (c) readily available
germ cell samples would be obtained from the human population.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects.....

SUBCATEGORY:

TECHNOLOGY: Multi -Technology

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods
..... to evaluate dose and damage to man.

PROJECT:

TITLE: Application of Bone Marrow Cell Culture and Cell Separation
..... Techniques to the Study of the Hematologic Effects
..... of Environmental Agents

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, N. C.

INVESTIGATOR(S): J. B. Weissberg

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 75 \$44,000 (50% energy related)

DESCRIPTION: The aim of these studies has been the development of in vitro techniques for the investigation of the effects of environmental agents upon hematopoiesis. A tissue culture system that allows sustained proliferation and differentiation of bone marrow cells has been developed for the purpose of (1) identifying agents that are toxic to the marrow, (2) evaluating the role of metabolism in the action of various toxins, and (3) elucidating mechanisms of toxicity. The separation of bone marrow cells into morphologically homogeneous cell populations has been sought as an adjunct to the study of hematopoietic cells in culture. Successful isolation of individual cell types will facilitate the identification of cell-specific
RELATED TECHNOLOGIES: effects of environmental toxins and permit cell-cycle kinetic studies of bone marrow cells.

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi-Technology

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods
..... to evaluate dose and damage to man.
.....

PROJECT:

TITLE: The Heat-Stability of Enzymes: An Approach to Measuring
..... point Mutations in the Mouse

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, N. C.

INVESTIGATOR(S): Jean-Claude Mareschal

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 75 \$36,000 (100% energy related)

.....
DESCRIPTION: The heat-stability properties of enzymes are being used
..... to develop a point mutation system for use in mammalian organisms. The
..... enzymes are examined spectrophotometrically and heat-stability curves are
..... plotted. Several important differences between enzymes from different
..... inbred strains of mice have been found. The findings of this study will
..... be expanded and will then be used to search for mutant offspring of chemically
..... treated parents.
.....
.....

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi-Technology

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods to
 evaluate dose and damage to man.

PROJECT:

TITLE: Non-parametric Tests in Biometry

.....

.....

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, North Carolina

INVESTIGATOR(S): K. M. Patel

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY '74 \$46,546 FY '75

..... (50% energy related)

DESCRIPTION: To develop a generalized Friedman test for comparing several
 treatment in a randomized block design when responses are subject to
 arbitrary right censorship.
 To develop, along the lines of Govindarajulu (1968), a distribution-free
 or nonparametric confidence ellipsoid (based on two independent random
 samples of multidimensional responses) for comparing two treatments.

.....

.....

.....

RELATED TECHNOLOGIES:

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods
to evaluate dose and damage to man.

PROJECT:

TITLE: Surface Active Lipoprotein in Fetal Primate Lungs

RES. FACILITY: University of Washington School of Medicine

RES. LOCATION: Seattle, Washington

INVESTIGATOR(S): John Butler

SPONSOR(S): NIH/DHEW

DURATION: 3 years

FUNDING: FY '74 \$298,665; FY '75 \$355,020

..... (5% energy related)

DESCRIPTION: Supplemental funds are requested to set up a radioimmuno-
assay for surface active material in primate lung. This method has been
recently described by King and Clements; the principal investigator working
with them has developed the antibody necessary for the assay in fetal monkey
lung, tracheal and amniotic fluid. The assay will be used to measure the
appearance and concentration of surface active lipoprotein in monkey fetuses
of known gestational age. Prematurity and surface active lipoprotein defic-
iency is believed to be a cause of respiratory distress syndrome of infancy.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods
to evaluate dose and damage to man.

PROJECT:

TITLE: Pulmonary Disease Research Center

.....

.....

RES. FACILITY: University of California

RES. LOCATION: San Francisco, Calif.

INVESTIGATOR(S): Julius H. Comroe

SPONSOR(S): NIH/DHEW

DURATION: 3 years

FUNDING: FY '74 \$ 619,714; FY '75 \$798,342
(100% energy related)

DESCRIPTION: The proposed study is designed to extend our understanding
of the normal and abnormal physiology for fluid and protein balance in the
lungs of experimental animals and man. We intend to increase our preparation
or chronic, instrumented sheep to study chronic (days and weeks) elevations
of pulmonary microvascular pressures and alterations in pulmonary microvascular
leakiness to fluid and proteins. We will extend our preliminary computer
model of lung transvascular exchange mechanisms to account for newly obtained
experimental data. Based on current results and theory, we will test a new
non-invasive, non-destructive, quantifiable method for studying transvascular
fluid and protein flow and storage in the lungs. The method will make use of

RELATED TECHNOLOGIES: external detection of the rate of radioactive tracer protein accumulation
in the lung's interstitium.

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: . To develop more sensitive and rapid biological methods to
 evaluate dose and damage to man.

PROJECT:

TITLE: . Studies of Pharmacokinetic Functions of the Lung.

RES. FACILITY: . National Institute of Environmental Health Sciences

RES. LOCATION: . Research Triangle Park, North Carolina

INVESTIGATOR(S): . M. W. Anderson, et al

SPONSOR(S): . NIH/HEW

DURATION:

FUNDING: . FY '74 FY '75 \$52,000 (25% energy related)

DESCRIPTION: . The removal and modification of 5-HT and the prostaglandins
 from the circulation by the lung has also been studied in detail. From
 this investigation the existence of a transport system in lung tissue for
 the removal of some prostaglandins has been established. Examination of
 the effects that other chemicals which accumulate in the lung have on these
 inactivation systems as well as the effects of exposure to various environ-
 mental pollutants (O₃, NO₂, SO₂, etc.) is being prepared.

RELATED TECHNOLOGIES: . Shale oil

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: . To develop more sensitive and rapid biological methods to
 . evaluate dose and damage to man.
 .
 .

PROJECT:

TITLE: . Studies on the Mechanisms of Accumulation of Drugs and Pollutants
 . in the Lung:.. Investigation of the Transport of Substances from
 . Pulmonary Circulation and Inhaled Air into Lung Tissue and of....

RES. FACILITY: . National Institute of Environmental Health Sciences

RES. LOCATION: . Research Triangle Park, North Carolina

INVESTIGATOR(S): . T. E. Eling

SPONSOR(S): . NIH/HEW

DURATION:

FUNDING: . FY '74 \$133,628..... FY '75 \$80,000 (25% energy related)
 .
 .

DESCRIPTION: Part I:.. "Studies on the Mechanisms of Accumulation and
 Metabolism of Chemicals and Pollutants by the Lung"
 Study the processes and mechanisms for uptake and accumulation of basic
 chemicals (e.g., amines) in lung tissue. Assess the role of the lung in
 the disposition of chemicals and develop pharmacokinetic models for
 disposition of chemicals in the lung.
Part II: "Studies on the Uptake and Metabolism of Endogenous Substances
 by the Lung"
 To study the uptake and metabolism of endogenous substances, such as.....

RELATED TECHNOLOGIES: . shale ~~oil~~, oil and gas

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods
 to evaluate dose and damage to man.

PROJECT:

TITLE: Use of a Liver Microsome Activating System for the
 Detection of Mutagenic/ Effects of Chemical Carcinogens
 in Neurospora crassa

RES. FACILITY: .. National Institute of Environmental Health Sciences

RES. LOCATION: .. Research Triangle Park, North Carolina

INVESTIGATOR(S): .. P. K. Matzinger

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 74 \$8,269 (100% energy related)

.....

DESCRIPTION: The existence of chemical compounds which are activated
 in animal or human liver to highly mutagenic and carcinogenic metabolites
 create a need for systems where such chemicals can be tested. It should
 be possible to establish an in vitro microsome activation technique with
 Neurospora crassa as detector organism. In this organism the use of a
 special ad-3 forward-mutation system makes it possible to evaluate the
 mutation frequency. Furthermore, it should be possible to get further
 information about the relationship between mutagenesis and carcinogenesis.

.....

RELATED TECHNOLOGIES: Oil and Gas

.....

CATEGORY: Health Effect

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods
to evaluate dose and damage to man.

PROJECT:

TITLE: Automation of Dynamic Lung Resistance Measurement

.....

.....

RES. FACILITY: University of Southern California

RES. LOCATION: Los Angeles, Calif.

INVESTIGATOR(S): Stanley M. Yamashiro

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY '74 \$24,600; FY '75 \$16,706

..... (50% energy related)

DESCRIPTION: This research is directed toward the development of an
automated system for on-line measurement of airway resistance to air flow
.....
using the forced airflow perturbation technique for measuring frequency
.....
dependent resistance but utilizing a novel method of "resonance cancellation"
.....
using a phase sensitive automatic control loop to eliminate the time consuming
.....
data reduction normally required

..... Oil and Gas

RELATED TECHNOLOGIES:

.....

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE:To develop more sensitive and rapid biological methods
.....to evaluate dose and damage to man.....
.....

PROJECT:

TITLE:Antitrypsin in Lung Disease From Air Pollution.....
.....
.....

RES. FACILITY:University of California.....

RES. LOCATION:California.....

INVESTIGATOR(S):Grant G. Slater.....

SPONSOR(S):NIH/DHEW.....

DURATION:1 year.....

FUNDING:F '75 \$32,928 (50% energy related).....
.....

DESCRIPTION:Evaluate a new electrophoretic method for determining
.....phenotypes of alpha-antitrypsin. Evaluate applicability of this new tech-
.....nique and a standard Serum-Trypsin-Inhibitor-Capacity method for screening
.....large populations.....
.....
.....
.....
.....

RELATED TECHNOLOGIES:Oil and Gas.....
.....

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods to
..... evaluate dose and damage to man.
.....

PROJECT:

TITLE: Environmental Factors Related to Chromosome Damage

RES. FACILITY: Albany Medical College

RES. LOCATION: Albany, N.Y.

INVESTIGATOR(S): E.B. Hook

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY75 \$30,814 (50% energy related)

DESCRIPTION: The goals of this study are 1) to determine what environmental factors are associated with "somatic mutations" as manifested in chromosome breakage and other evidence of chromosome damage which occurs in those with evidence of embryotoxicity and 2) to investigate the feasibility of a new method of evaluation of chromatid interchanges (using Hoechst 33258 binding)

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods
 to evaluate dose and damage to man.

PROJECT:

TITLE: Induction of Genetic Damage by Chemical Mutagens

.....

RES. FACILITY: University of Leiden

RES. LOCATION: Leiden, Netherlands

INVESTIGATOR(S): F. Sobels

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY 74 \$95,200 (100% energy related)

DESCRIPTION: It is proposed to undertake a systematic study of the
 frequencies with which different categories of genetic damage are induced
 in a variety of different germ cell stages by representatives of various
 different groups of chemical mutagens under different modifying conditions,
 such as storage, chronic application, or chemical mutagens under different
 modifying conditions, such as storage, chronic application, or chemical
 co-treatment. The outcome of such an investigation will be of value to
 decide whether results based on one easily detectable class of genetic
 damage, as dominant lethals, have more general validity. In addition,
 it is proposed to include tests to screen for the ability of the chemicals

RELATED TECHNOLOGIES: to induce small deletions, non-disjunction, and recombination. It is hoped
 that the data collected will expose and identify problems which need to
 be studied in depth in mammalian systems.

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods
..... to evaluate dose and damage to man.
.....

PROJECT:

TITLE: Cadmium Toxicity : Effects on the Immune System

RES. FACILITY: University of Alabama

RES. LOCATION: Birmingham, Alabama

INVESTIGATOR(S): R. Wolcott

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY 74 \$36,520 FY 75 \$43,594
..... (100% energy related)

DESCRIPTION: The purpose of these studies is to elucidate the effects
..... of the toxic heavy metal cadmium on the biosynthesis and metabolism of
..... antibodies. The studies will be directed toward the generation of data
..... that are relevant to human toxicology.
.....
..... Tests will be performed to determine the effect of
..... cadmium on 1) development of immunocompetent cells, 2) lymphocyte response
..... to antigen, 3) lymphocyte response to non-specific stimuli, and 4) anti-
..... body synthesis. These studies are intended to provide fundamental information
..... useful in establishing safe levels of environmental pollution by cadmium, and
..... in developing sensitive screening tests for diagnosing early subclinical
.....

RELATED TECHNOLOGIES: cadmium toxicity.....

HEALTH EFFECTS

CATEGORY:

SUBCATEGORY:
Coal

TECHNOLOGY:

SUBTECHNOLOGY: To develop more sensitive and rapid biological methods to

OBJECTIVE:
..... evaluate dose and damage to man.
.....

PROJECT:

TITLE: Response of Alveolar Macrophages to Inhaled Particles
.....
.....

RES. FACILITY: Harvard Univ.

RES. LOCATION: Boston, Massachusetts

INVESTIGATOR(S): J.. Brain

SPONSOR(S): NIH/DHEW

DURATION: 2 year

FUNDING: FY74 \$104,170 FY75 \$103,234 (100% energy related)

DESCRIPTION: We propose (1) to investigate the origin and differentiation
..... of alveolar macrophages. Using the techniques of histo-chemistry,
..... autoradiography, and organ culture, we hope to trace the movement of
..... macrophages into and/or through the interstitium and to document their
..... differentiation, 2) to investigate the consequences of particle ingestion by
..... alveolar macrophages. Whether particle ingestion leads to activation of
..... hydrolytic enzymes and to extracellular enzyme release will be investigated
..... as will the migratory behavior of particle-containing macrophages, 3) to
..... investigate the importance of competitive phenomena following particle
..... challenge using both in vivo and in vitro test systems.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods
to evaluate dose and damage to man.
.....

PROJECT:

TITLE: Quantitative Genetic Study of Environmental Mutagens
.....
.....

RES. FACILITY: Louisiana State University

RES. LOCATION: Baton Rouge, Louisiana

INVESTIGATOR(S): W. Lee

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY 74 \$61, 811 FY 75 \$58,236
(100% energy related)

DESCRIPTION: To evaluate the genetic hazard of chemicals in our environ-
ment and understand their mode of action it its necessary to place chemical
mutagenesis on a quantitative basis in a eukaryote organism that can be
thoroughly analyzed genetically. Ethyl methanesulfonate (EMS) was selected
as the mutagen for developing a model test system because of its known
mutagenic effectiveness and its simple chemical structure. To place the
dosage of EMS on a quantitative basis total alkylation of DNA in Drosophila
malanogaster spermatozoa is measured on a per sperm cell basis and then
further divided into alkylation at specific sites such as the 7 position of
guanine. This dosimetry will then permit the construction of dosage response
RELATED TECHNOLOGIES:
curves with the dose in terms of alkylation and the response in terms of the
extensive mutational spectrum developed with Drosophil.

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Conservation

SUBTECHNOLOGY: Increased Efficiency

OBJECTIVE: .. To develop more sensitive and rapid biological methods to
..... evaluate dose and damage to man.
.....

PROJECT:

TITLE: .. Measurement of Energy Absorption from Microwave Fields

RES. FACILITY: .. National Institute of Environmental Health Sciences

RES. LOCATION: .. Research Triangle Park, North Carolina

INVESTIGATOR(S): .. P. J. Walsh

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: .. FY '74 \$23,367 FY '75 \$48,000 (100% energy related)

DESCRIPTION: .. Microwaves are absorbed in a spherical shell of dielectric
..... material enclosing a dry gas or a spherical shell of dry gas enclosing
..... the absorbing dielectric. The response of the system is recorded with a
..... pressure transducer attached to the dry gas volume.
.....
.....
.....
.....

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Conservation

SUBTECHNOLOGY: Increased Efficiency

OBJECTIVE: . To develop more sensitive and rapid biological methods to
 evaluate dose and damage to man.
 ,

PROJECT:

TITLE: . Microwave Exposure System and Microwave Dosimetry

RES. FACILITY: .. National Institute of Environmental Health Sciences

RES. LOCATION: . Research Triangle Park, North Carolina

INVESTIGATOR(S): D. I. McRee

SPONSOR(S):

DURATION:

FUNDING: FY '74 \$18,693 FY '75 \$8,000 (100% energy related)

DESCRIPTION: The objectives of this project are to develop a microwave exposure system for biological material which has a well-defined, uniform field characteristic, to study the mechanisms of interaction of microwave radiation with matter, and to develop dosimetric relationships for energy absorption. Techniques using thermistors, liquid crystal probes, infrared microscope and other type detectors will be evaluated as they become available.

RELATED TECHNOLOGIES:

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Conservation

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods to
 evaluate dose and damage to man.

PROJECT:

TITLE: .. Variable Frequency Microwave Exposure System

.....

RES. FACILITY: .. National Institute of Environmental Health Sciences

RES. LOCATION: .. Research Triangle Park, North Carolina

INVESTIGATOR(S): .. D. I. McRee

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY '74 \$9,347 FY '75 \$8,000 (100% energy related)

.....

DESCRIPTION: The objective of this project is to design, build, and
 calibrate a variable frequency microwave exposure system for biological
material.

..... Specifications were written for the desired system. A field uniformity at
 the specimen of 90 percent over a 4 inch diameter circle, a continuous
 frequency variation in the range of 1 to 10 GHz, and a power level range
 at the specimen of 0.010 to 10 mW/cm² are specified. The electromagnetic
 radiation produced by the system can be either continuous wave fields
 or modulated fields.

RELATED TECHNOLOGIES:

.....

Prepared for the Science Information Exchange.
Not for publication or publication reference.

U. S. Department of
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
NOTICE OF RESEARCH PROJECT

PROJECT NO. (DO NOT USE THIS SPACE)

NIH

TITLE OF PROJECT

Computer In Vivo Detection of Mutations in Somatic and Germinal Cells

GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED ON THE PROJECT.

PROJECT OFFICER: H. V. Malling, Head, Biochemical Genetics Section, Environmental
Mutagenesis Branch

NAME AND ADDRESS OF APPLICANT INSTITUTION

NIHS, P. O. Box 12233, Research Triangle Park, North Carolina 27709

SUMMARY OF PROPOSED WORK - (200 words or less - Omit Confidential data.)

In the Science Information Exchange summaries of work in progress are exchanged with government and private agencies supporting research in the bio-sciences and are forwarded to investigators who request such information. Your summary is to be used for these purposes.

(a) Somatic mutations in vivo

The purpose of this investigation is to develop methods by which the frequency of somatic point mutations at several genetic loci in experimental animals and human beings can be measured. Because blood is a readily available source of somatic cells that have a high turnover rate, we will initially attempt our studies with the use of blood. Methods based on differential staining of mutated and non-mutated cells will be developed. Antibodies flagged with fluorescent moieties will be produced to identify cells containing aberrant mutant proteins.

This system will utilize automatic detection of variant cells by a cytograph and the data will be stored and analyzed with the computer.

(b) Point mutations in male germinal tissue

The purpose of this investigation is to develop methods by which point mutations can be detected directly on spermatogonia, spermatid and sperm. The mutant cells will be detected by differential histochemical stains. Several enzyme systems will be employed, some common for somatic cells and the germinal tissue, some specific for the sperm.

Detection of aberrant sperm cells will involve the use of an automatic scanning microscope which will be hooked into the computer.

PROFESSIONAL SCHOOL (medical, dental, etc.) WITH WHICH THIS PROJECT SHOULD BE IDENTIFIED

SIGNATURE OF PRINCIPAL INVESTIGATOR

DATE

H. V. Malling

8/21/75

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SUPPORTING AGENCY

METHOD OF SUPPORT (Check one)

☐ Agency Staff
(Intramural)

☐ Negotiated
Contract

☐ Special
Project Grant

☐ Research
Grant

☐ Other
(Specify)

FUNDS OBLIGATED CURRENT F.Y.

NUMBER OF FUTURE YEARS TENTATIVELY ASSURED
BEYOND CURRENT FISCAL YEAR

BEGINNING DATE

ESTIMATED
COMPLETION DATE

Prepared for the Science Information Exchange.

Not for publication or publication reference.

U. S. Department of
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

NOTICE OF RESEARCH PROJECT

PROJECT NO. (DO NOT USE THIS SPACE)

TITLE OF PROJECT

Amplification of Point Mutation System: Characterization of Mouse Esterases by Isoelectric Focusing

GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED ON THE PROJECT.

CONTRACTOR'S PROJECT DIRECTOR: Dr. Robert Allen, Medical University of South Carolina, Charleston, South Carolina

PROJECT OFFICER (NIEHS): Dr. L. R. Valcovic, Acting Assistant Chief, Environmental Mutagenesis Branch

NAME AND ADDRESS OF APPLICANT INSTITUTION

NIEHS, P. O. Box 12233, Research Triangle Park, North Carolina 27709

SUMMARY OF PROPOSED WORK - (200 words or less - Omit Confidential data.)

In the Science Information Exchange summaries of work in progress are exchanged with government and private agencies supporting research in the bio-sciences and are forwarded to investigators who request such information. Your summary is to be used for these purposes.

The research seeks to characterize esterases of C57BL/6J and DBA/2J mice with gel isoelectric focusing. Esterases from plasma, red blood cells and kidney of both strains as well as the F₁ interstrain hybrid shall be subjected to two-dimensional analysis. Discontinuous gel zymograms of these enzymes have been described previously and hence this technique will be used for the first dimension separation. Subsequently, isoelectric focusing will then be conducted using thin slab acrylamide gels. Various pH ranges will be employed in order to determine the isoelectric point of each esterase band.

Since the projected use of this technique involves screening large number of mice, this contract should entail a sufficiently large sample to place a reliable confident interval for the isoelectric point of each esterase band.

ERR 1.7 (1983)

\$ 50,000

PROFESSIONAL SCHOOL (medical, dental, etc.) WITH WHICH THIS PROJECT SHOULD BE IDENTIFIED

SIGNATURE OF PRINCIPAL INVESTIGATOR

DATE

L.R. Valcovic

8/21/75

DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY

SUPPORTING AGENCY

METHOD OF SUPPORT (Check one)

☐ Agency Staff (Intramural)

☐ Negotiated Contract

☐ Special Project Grant

☐ Research Grant

☐ Other (Specify)

FUNDS OBLIGATED CURRENT F.Y.

NUMBER OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT FISCAL YEAR

BEGINNING DATE

ESTIMATED COMPLETION DATE

160

Prepared for the Science Information Exchange.

Not for publication or publication reference.

U. S. Department of
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

NOTICE OF RESEARCH PROJECT

PROJECT NO. (DO NOT USE THIS SPACE)

TITLE OF PROJECT

Detection of Point Mutations in Somatic Cells

GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED ON THE PROJECT.

CONTRACTOR'S PROJECT DIRECTOR: Dr. Peter E. Nute, University of Washington, Seattle
Washington

PROJECT OFFICER (NIEHS): Dr. H. V. Malling, Geneticist, Biochemical Genetics Section,
Environmental Mutagenesis Branch

NAME AND ADDRESS OF APPLICANT INSTITUTION

NIEHS, P. O. Box 12233, Research Triangle Park, North Carolina 27709

SUMMARY OF PROPOSED WORK - (200 words or less - Omit Confidential data.)

In the Science Information Exchange summaries of work in progress are exchanged with government and private agencies supporting research in the bio-sciences and are forwarded to investigators who request such information. Your summary is to be used for these purposes.

The purpose of this investigation is to develop a simple system to measure point mutations in readily accessible human somatic cells. Antibodies to each of two types of fetal hemoglobin will be produced and used to search for individual mutant cells within a population of cells. Some monospecific antibodies to variant human hemoglobins have been acquired and purified. These antibodies will be used in developing tests for detecting a human mutation rate.

ERR-1.9 (283)

\$ 82,000

PROFESSIONAL SCHOOL (medical, dental, etc.) WITH WHICH THIS PROJECT SHOULD BE IDENTIFIED

SIGNATURE OF PRINCIPAL INVESTIGATOR

DATE

H. V. Malling

8/21/75

DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY

SUPPORTING AGENCY

METHOD OF SUPPORT (Check one)

☐ Agency Staff
(Intramural)

☐ Negotiated
Contract

☐ Special
Project Grant

☐ Research
Grant

☐ Other
(Specify)

FUNDS OBLIGATED CURRENT F.Y.

NUMBER OF FUTURE YEARS TENTATIVELY ASSURED
BEYOND CURRENT FISCAL YEAR

BEGINNING DATE

ESTIMATED
COMPLETION DATE

Prepared for the Science Information Exchange.
Not for publication or publication reference.

U. S. Department of
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
NOTICE OF RESEARCH PROJECT

PROJECT NO. (DO NOT USE THIS SPACE)

TITLE OF PROJECT

Development of a System for Detecting Lethal Mutations in Mice

GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED ON THE PROJECT.

Contractor's Project Director: Thomas H. Roderick, Ph.D., The Jackson Laboratory, Bar Harbor, Maine

Project Officer (NIEHS): William Sheridan, Ph.D., Mammalian Genetics & Cytogenetics Section, Environmental Mutagenesis Branch

NAME AND ADDRESS OF APPLICANT INSTITUTION

National Institute of Environmental Health Sciences
P. O. Box 12233, Research Triangle Park, North Carolina 27709

SUMMARY OF PROPOSED WORK - (200 words or less - Omit Confidential data.)

In the Science Information Exchange summaries of work in progress are exchanged with government and private agencies supporting research in the bio-sciences and are forwarded to investigators who request such information. Your summary is to be used for these purposes.

Inversions are induced by irradiation and/or chemical agents in the chromosomes of mice. Bearers of inversions are detected by analysis of anaphase bridges in individual males. It is intended to establish strains of animals carrying marked inversions for the purpose detecting induction of recessive lethal mutations by environmental agents in a manner comparable to that existing in Drosophila melanogaster.

ER2-1.4 (2B3)
\$ 69,000-

PROFESSIONAL SCHOOL (medical, dental, etc.) WITH WHICH THIS PROJECT SHOULD BE IDENTIFIED	SIGNATURE OF PRINCIPAL INVESTIGATOR	DATE
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DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY

PORTING AGENCY

METHOD OF SUPPORT (Check one)

☐ Agency Staff (Intramural) ☐ Negotiated Contract ☐ Special Project Grant ☐ Research Grant ☐ Other (Specify)

FUNDS OBLIGATED CURRENT F.Y.

NUMBER OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT FISCAL YEAR

162 BEGINNING DATE

ESTIMATED COMPLETION DATE

Prepared for the Science Information Exchange.

Not for publication or publication reference.

U. S. Department of
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
NOTICE OF RESEARCH PROJECT

PROJECT NO. (DO NOT USE THIS SPACE)

TITLE OF PROJECT

Development of a New Mouse Strain to Maximize Sensitivity of a Point Mutation Assay

GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED ON THE PROJECT.

Contractor's Project Director: Thomas H. Roderick, Ph.D., The Jackson Laboratory

Project Officer (NIEHS): Lawrence R. Valcovic, Ph.D., Staff Fellow, Biochemical Genetics Section, Environmental Mutagenesis Branch

NAME AND ADDRESS OF APPLICANT INSTITUTION

National Institute of Environmental Health Sciences
P.O. Box 12233, Research Triangle Park, North Carolina 27709

SUMMARY OF PROPOSED WORK - (200 words or less - Omit Confidential data.)

In the Science Information Exchange summaries of work in progress are exchanged with government and private agencies supporting research in the bio-sciences and are forwarded to investigators who request such information. Your summary is to be used for these purposes.

A specific locus mutation system has been developed for mice. In this system it is possible to detect mutations in nine isozyme loci. The efficiency for detection of mutations in such a system increases with the number of isozyme loci which can be screened per mouse. Among the various inbred mouse strains, there are several enzyme polymorphisms. The mouse strain C57BL/6J is of a different origin than most other common mouse strains. This difference can be increased by incorporating other known enzyme polymorphisms into this strain. Crosses of the various strains (each to C57BL/6J) have begun. The F₁'s will be backcrossed in order to obtain a homozygous strain, to C57BL/6J. Three generations of backcrossing to C57BL/6J have been completed for most of the enzymes.

ERR - 1.5 (2B3)
\$ 39,000

PROFESSIONAL SCHOOL (medical, dental, etc.) WITH WHICH THIS PROJECT SHOULD BE IDENTIFIED

SIGNATURE OF PRINCIPAL INVESTIGATOR

DATE

DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY

SUPPORTING AGENCY

METHOD OF SUPPORT (Check one)

☐ Agency Staff (Intramural)

☐ Negotiated Contract

☐ Special Project Grant

☐ Research Grant

☐ Other (Specify)

FUNDS OBLIGATED CURRENT F.Y.

NUMBER OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT FISCAL YEAR

BEGINNING DATE

ESTIMATED COMPLETION DATE

Prepared for the Science Information Exchange.

Not for publication or publication reference.

U. S. Department of
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

NOTICE OF RESEARCH PROJECT

PROJECT NO. (DO NOT USE THIS SPACE)

TITLE OF PROJECT

Development of a Polygenic Assay for Induced Point Mutations in Mice

GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED ON THE PROJECT.

Contractor's Project Officer: John W. Crenshaw, Jr., Ph.D., Georgia Institute of Technology

Project Officer (NIEHS): Eugene R. Soares, Ph.D., Staff Fellow, Mammalian Genetics and Cytogenetics Section, Environmental Mutagenesis Branch

NAME AND ADDRESS OF APPLICANT INSTITUTION

National Institute of Environmental Health Sciences
P.O. Box 12233, Research Triangle Park, North Carolina 27709

SUMMARY OF PROPOSED WORK - (200 words or less - Omit Confidential data.)

In the Science Information Exchange summaries of work in progress are exchanged with government and private agencies supporting research in the bio-sciences and are forwarded to investigators who request such information. Your summary is to be used for these purposes.

This research will be designed to develop an understanding of the mutagenic effects of compounds as measured by mean and variance changes in polygenic characters. This system should be designed such that four or more easily measured polygenic traits will be tested. Inbred strains such as DBA/2 and C57BL/6 are to be used in this study. Use of such strains will allow for comparisons of results from this investigation with those of experiments now being conducted at NIEHS. It will be necessary to: (a) test the effects of chemicals of known mutagenicity, which have differing effects at various stages of germ cell production such as mitomycin-C, TEM and MMS, (b) test all stages of germ cell (spermatogenesis) production, (c) develop dose-response curves for the compounds used, (d) develop a design such that genetic effects in both F₁ and F₂ progeny may be ascertained, and (e) include in the design provisions for incorporation and coordination of this system with cytological assays for chromosomal aberrations.

ERR-1.8(283)
\$ 70,000

PROFESSIONAL SCHOOL (medical, dental, etc.) WITH WHICH THIS PROJECT SHOULD BE IDENTIFIED

SIGNATURE OF PRINCIPAL INVESTIGATOR

DATE

DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY

SUPPORTING AGENCY

METHOD OF SUPPORT (Check one)

☐ Agency Staff (Intramural)

☐ Negotiated Contract

☐ Special Project Grant

☐ Research Grant

☐ Other (Specify)

FUNDS OBLIGATED CURRENT F.Y.

NUMBER OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT FISCAL YEAR

104

BEGINNING DATE

ESTIMATED COMPLETION DATE

Prepared for the Science Information Exchange.

Not for publication or publication reference.

U. S. Department of
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
NOTICE OF RESEARCH PROJECT

PROJECT NO. (DO NOT USE THIS SPACE)

TITLE OF PROJECT

Development of Faster, More Efficient and Less Costly Methods for Determining Teratogenic Changes

GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED ON THE PROJECT.

Contractors's Project Director: Dr. Franklin M. Johnson, Research Triangle Institute

Project Officer (NIEHS): R. E. Staples, Ph.D., Research Physiologist, Environmental Toxicology Branch

NAME AND ADDRESS OF APPLICANT INSTITUTION

National Institute of Environmental Health Sciences
P.O. Box 12233, Research Triangle Park, North Carolina 27709

SUMMARY OF PROPOSED WORK - (200 words or less - Omit Confidential data.)

In the Science Information Exchange summaries of work in progress are exchanged with government and private agencies supporting research in the bio-sciences and are forwarded to investigators who request such information. Your summary is to be used for these purposes.

Mouse and rabbit embryos will be exposed to gaseous coal by products such as SO_x and NO_x during culture in the preimplantation period, and, to sulfur- and nitrogen-containing compounds by intrauterine injection during the postimplantation period of gestation. Subsequent effects on the developmental process will be compared to those noted after exposure to the same test agents by inhalation.

ERR - 1.11 (2B3)

\$ 50,000 ✓

PROFESSIONAL SCHOOL (medical, dental, etc.) WITH WHICH THIS PROJECT SHOULD BE IDENTIFIED	SIGNATURE OF PRINCIPAL INVESTIGATOR	DATE
DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY		
SUPPORTING AGENCY		
METHOD OF SUPPORT (Check one)		
☒ Agency Staff (Intramural)	☐ Negotiated Contract	☐ Special Project Grant
☐ Research Grant	☐ Other (Specify)	
FUNDS OBLIGATED CURRENT F.Y.	NUMBER OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT FISCAL YEAR	BEGINNING DATE
		ESTIMATED COMPLETION DATE

SECTION 1

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

LEAVE BLANK

RESEARCH OBJECTIVES

PROJECT NUMBER

IR01 ES CR 01293-01

NAME AND ADDRESS OF APPLICANT ORGANIZATION

College of Physicians & Surgeons of Columbia University, Department of Pediatrics
630 West 168th Street, New York, N. Y. 10032

NAME, SOCIAL SECURITY NUMBER, OFFICIAL TITLE, AND DEPARTMENT OF ALL PROFESSIONAL PERSONNEL ENGAGED ON PROJECT, BEGINNING WITH PRINCIPAL INVESTIGATOR

Arthur D. Bloom, [REDACTED], Professor, Departments of Pediatrics and of Human Genetics and Development

Herbert S. Rosenkranz, [REDACTED], Professor, Department of Microbiology

William T. Speck, [REDACTED], Instructor, Dept. of Pediatrics; Attending Physician, Babies

Sherie L. Morrison, [REDACTED], Assistant Professor, Dept. of Microbiology Hospital

Barbara Travis, [REDACTED], Research Associate, Dept. of Human Genetics & Development

Bezalel Gutter, [REDACTED], Research Associate, Dept. of Microbiology

TITLE OF PROJECT

Mutagenesis in Cultured Lymphocytes

USE THIS SPACE TO ABSTRACT YOUR PROPOSED RESEARCH. OUTLINE OBJECTIVES AND METHODS. UNDERSCORE THE KEY WORDS (NOT TO EXCEED 10) IN YOUR ABSTRACT.

This project involves the development of mammalian lymphoid culture systems to test for the mutagenicity of environmental agents. Compounds which are known mutagens (such as alkylating agents, and frameshift mutagens) will be tested in human and lymphoid cell lines for the induction of mutations at the hypoxanthine-guanine phosphoribosyl transferase and the argininosuccinic acid synthetase loci, and in murine lymphoid cells for the induction of altered immunoglobulin. The induction of chromosomal breakage in these cell lines will be studied using the G and H banding techniques. In addition, the research will utilize bacterial test systems to determine the relationship between mutagenicity in simpler organisms and in more complex, differentiated mammalian cells.

E722-1:13(283)

\$ 178,000 ✓

LEAVE BLANK

SECTION 1	
DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE PUBLIC HEALTH SERVICE	LEAVE BLANK
RESEARCH OBJECTIVES	PROJECT NUMBER 1 R01 ES 01287-01

NAME AND ADDRESS OF APPLICANT ORGANIZATION

The University of Texas System Cancer Center, M. D. Anderson Hospital & Tumor Institute
Houston, Texas 77025

NAME, SOCIAL SECURITY NUMBER, OFFICIAL TITLE, AND DEPARTMENT OF ALL PROFESSIONAL PERSONNEL ENGAGED ON PROJECT, BEGINNING WITH PRINCIPAL INVESTIGATOR

Michael J. Siciliano, Department of Biology, M. D. Anderson Hospital & Tumor Institute,
Principal Investigator, Assistant Professor and Assistant Biologist. [REDACTED]

Ronald M. Humphrey, Department of Physics, M. D. Anderson Hospital & Tumor Institute,
Co-Investigator, Chief Section of Cellular Studies, Dept. of Physics. [REDACTED]

T. C. Hsu, Department of Biology, M. D. Anderson Hospital & Tumor Institute, Co-
Investigator, Chief Section of Cell Biology. [REDACTED]

TITLE OF PROJECT

MULTIPLE LOCI SCREEN FOR MUTATIONS IN MAMMALIAN CELLS

USE THIS SPACE TO ABSTRACT YOUR PROPOSED RESEARCH. OUTLINE OBJECTIVES AND METHODS. UNDERSCORE THE KEY WORDS (NOT TO EXCEED 10% IN YOUR ABSTRACT).

It is our intention to develop a new system for testing the mutagenic potential of various environmental agents on mammalian somatic cells. The basis of the procedure is to expose cells to mutagen and plate out single cell clones. Clonal isolates, after being grown up to 40×10^6 cells, are then screened for electrophoretic variation of the products of over 40 genetic loci. Where a clonal variant is detected, it is isolated and its heritability determined by subcloning and subsequent electrophoresis. The procedure avoids many of the problems associated with the detection on selective systems of recessive mutations (auxotrophic, drug resistant, and temperature sensitive) in diploid mammalian cells since electrophoretic mutations are co-dominant. Lack of enrichment for mutants by selection is also compensated for by the increased probability of obtaining an electrophoretic shift in a protein as the result of a single nucleotide substitution in its gene as opposed to the complete loss of function by such an event and, the study of the products of a large number of loci. Additional attributes of the procedure are that: each variant may be associated with a specific genetic locus, mutations in a wide range of genetic loci may be studied, the system requires no change in the medium limiting the cause of any observed variation to intracellular events, and mutations in both structural genes as well as those affecting gene expression can be specifically detected.

Our preliminary studies using Chinese hamster ovary cells (CHO) have revealed that we can electrophoretically characterize the products of 51 structural enzyme loci and detect variants at both structural and control loci. We wish to continue these studies in order to optimize various parameters of the procedure -- dosage of mutagen, time of cloning and stage of the cell cycle for mutagen treatment -- and to use the system to study mutation frequencies under a variety of conditions.

LEAVE BLANK

ERR - 1.14 (-2 B3)

120,000

SECTION 1		LEAVE BLANK
NOT FOR PUBLICATION OR PUBLICATION REFERENCE	DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE PUBLIC HEALTH SERVICE RESEARCH OBJECTIVES	PROJECT NUMBER 1R01 ES 01231-01

NAME AND ADDRESS OF APPLICANT ORGANIZATION

Stanford Research Institute, 333 Ravenswood Avenue, Menlo Park, California 94025

NAME, SOCIAL SECURITY NUMBER, OFFICIAL TITLE, AND DEPARTMENT OF ALL PROFESSIONAL PERSONNEL ENGAGED ON PROJECT, BEGINNING WITH PRINCIPAL INVESTIGATOR

A. D. Mitchell (██████████) Principal Investigator, Cell Biologist, Biomedical Research Department
 K. Stefos (██████████) Postdoctoral Fellow in Cell Biology, Biomedical Research Department
 M. V. McMacken (██████████) Biochemist, Biomedical Research Department

TITLE OF PROJECT

Development of DNA Repair for Monitoring Human Health

USE THIS SPACE TO ABSTRACT YOUR PROPOSED RESEARCH. OUTLINE OBJECTIVES AND METHODS. UNDERSCORE THE KEY WORDS (NOT TO EXCEED 101 IN YOUR ABSTRACT).

The nation's response to the needs for energy self-sufficiency could increase the number of hazardous agents that are released into man's daily environment. Efficient and economical systems are needed to predict human susceptibility to hazardous agents and to monitor human populations for adverse genetic effects which may be caused by unforeseen mutagens. There is a high probability that these needs could be met by further development of DNA repair synthesis. The utility of the present in vitro DNA repair synthesis tests can be enhanced by developing in vivo DNA repair synthesis to measure organ and tissue specificities of responses to hazardous agents and by using these same tissues as the sources of metabolic activation enzymes for in vitro DNA repair synthesis assays. The significance of DNA repair synthesis will be further enhanced by examinations of DNA repair in prematurely condensed chromosomes and by correlations of the extent of DNA repair with measurements of cytogenetic aberrations, with mutagenesis of mammalian cells, and with carcinogenesis as measured by cell transformation.

ERR-1.15 (232)

\$ 60,000

LEAVE BLANK

Prepared for the Science Information Exchange.

Not for publication or publication reference.

U. S. Department of
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

NOTICE OF RESEARCH PROJECT

PROJECT NO. (DO NOT USE THIS SPACE)

TITLE OF PROJECT

Physiological Mechanism of Transport, Accumulation and Excretion of Metals in Marine Organisms and Mammals

GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED ON THE PROJECT.

Bruce A. Fowler, Ph.D., Senior Staff Fellow, Environmental Toxicology Branch, NIEHS
(Principal Investigator)
David W. Engel, Ph.D., Fishery Biologist, NMFS, Beaufort, NC
Ford A. Cross, Ph.D., Oceanographer, NMFS, Beaufort, NC (Project Director)

NAME AND ADDRESS OF APPLICANT INSTITUTION

National Institute of Environmental Health Sciences
P.O. Box 12233, Research Triangle Park, NC 27709

SUMMARY OF PROPOSED WORK - (200 words or less - Omit Confidential data.)

In the Science Information Exchange summaries of work in progress are exchanged with government and private agencies supporting research in the bio-sciences and are forwarded to investigators who request such information. Your summary is to be used for these purposes.

The proposed study would have the following objectives:

1. Examine the potential of marine organisms as models or predictive early indicators of human toxicity to environmental agents through comparative marine-mammalian toxicity testing programs.
2. Evaluate the potential of marine organisms as major vectors of toxic environmental agents.
3. Evaluate comparative pharmacokinetic properties of marine species regarding their ability to store, metabolize, and excrete environmental pollutants such as heavy metals.

The basic experimental approach would involve exposing marine shellfish to low concentrations of arsenic, cadmium, or copper and then comparing the physiological, biochemical, and cellular responses of these organisms with those already defined in mammals. Tissues from treated marine animals would then be lyophilized and incorporated into purified diets of laboratory animals at NIEHS. The pharmacokinetics and toxicity of the metals to these animals would then be compared to equivalent concentrations administered in drinking water. Tissue concentrations of elements in both shellfish and treated laboratory animals will be determined by proton-induced x-ray emission analysis.

ERR - 8.1 (2A1a, 2A3b, 2B3b,
\$ 90,000 ✓ 2B3c)

PROFESSIONAL SCHOOL (medical, dental, etc.) WITH WHICH THIS PROJECT SHOULD BE IDENTIFIED

NIEHS

SIGNATURE OF PRINCIPAL INVESTIGATOR

Bruce A. Fowler

DATE

8/22/75

DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY

SUPPORTING AGENCY

METHOD OF SUPPORT (Check one)

☐ Agency Staff (intramural)

☐ Negotiated Contract

☐ Special Project Grant

☐ Research Grant

☐ Other (Specify)

FUNDS OBLIGATED CURRENT F.Y.

NUMBER OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT FISCAL YEAR

BEGINNING DATE

ESTIMATED COMPLETION DATE

Prepared for the Science Information Exchange.

Not for publication or publication reference.

U. S. Department of
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

NOTICE OF RESEARCH PROJECT

PROJECT NO. (DO NOT USE THIS SPACE)

1. TITLE OF PROJECT

Accumulation, Distribution, Metabolism, and Excretion of Individual Aliphatic and Aromatic Hydrocarbon Isomers Present in Crude Oil in Warm and Cold Marine Species

2. GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED ON THE PROJECT.

John R. Bend, Ph.D., Head, Section on Marine Pharmacology and Biomedicine, Pharmacology Branch (Principal Investigator)

Margaret O. James, Ph.D., Section on Marine Pharmacology and Biomedicine, Pharmacology Branch

3. NAME AND ADDRESS OF APPLICANT INSTITUTION

National Institute of Environmental Health Sciences
P.O. Box 12233, Research Triangle Park, N.C. 27709

4. SUMMARY OF PROPOSED WORK - (200 words or less - Omit Confidential data.)

In the Science Information Exchange summaries of work in progress are exchanged with government and private agencies supporting research in the bio-sciences and are forwarded to investigators who request such information. Your summary is to be used for these purposes.

The in vitro metabolism of selected hydrocarbons, which are constituents of crude or refined petroleum products, will be studied in marine species indigenous to Florida for comparison to our earlier work with marine species. Special attention will focus on the polycyclic aromatic hydrocarbons, several of which are associated with chemical carcinogenesis and mutagenesis. The enzyme systems responsible for epoxide detoxication will also be studied (in vitro) in hepatic and extrahepatic tissues of marine species from Florida and Maine. The effects of preexposure of marine animals to chemical pollutants associated with petroleum on the subsequent uptake, distribution, metabolism (in vivo and in vitro) and excretion of selected hydrocarbons including octane, benzene and benzo(a)pyrene will also be monitored.

ERR-8.2 (2A1a, 2A3b, 2B3b, 2B3c)

\$ 70,000 : ✓

PROFESSIONAL SCHOOL (medical, dental, etc.) WITH WHICH THIS PROJECT SHOULD BE IDENTIFIED

SIGNATURE OF PRINCIPAL INVESTIGATOR

DATE

John R. Bend

8.18.75

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SUPPORTING AGENCY

5. KIND OF SUPPORT (Check one)

☐

Agency Staff
(Intramural)

☐

Negotiated
Contract

☐

Special
Project Grant

☐

Research
Grant

☐

Other
(Specify)

FUNDS OBLIGATED CURRENT F.Y.

NUMBER OF FUTURE YEARS TENTATIVELY ASSURED
BEYOND CURRENT FISCAL YEAR

BEGINNING DATE

ESTIMATED
COMPLETION DATE

170

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Nuclear

SUBTECHNOLOGY:

OBJECTIVE: To determine the metabolism and fate of hazardous agents
..... associated with energy technologies.
.....

PROJECT:

TITLE: Toxicity of Organic Fluoro Compounds Fluoroacetate

RES. FACILITY: Univ. of Rochester

RES. LOCATION: Rochester, N.Y.

INVESTIGATOR(S): F. Smith

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY75 \$42,916 (10% energy related)

.....
DESCRIPTION: The proposed research is intended to investigate the in vivo
..... stability of the carbon fluorine bond as it occurs in various organic fluoro
..... compounds. Emphasis will be placed on a study of aliphatic fluoro compounds.
.....
..... The extent to which fluoroacetate given in the drinking water is defluorinated
..... by rats will be assayed. The question of whether this defluorination takes
..... place through the agency of microsome enzymes or through enzymes of the
..... intestinal flora, will be explored. The distribution of fluoride between
..... organic and inorganic forms in the bone, blood and urine will be investigated.
.....
..... Finally, the course of development of the biochemical and morphological effects
..... of fluoroacetate on the testes and the kidney will be determined, as will the

RELATED TECHNOLOGIES:
..... course of recovery from these effects.
.....

Coal

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Geothermal

SUBTECHNOLOGY:

OBJECTIVE: To determine the metabolism and fate of hazardous agents
..... associated with energy technologies.
.....

PROJECT:

TITLE: Metabolism of Heavy Metal Cations

RES. FACILITY: University of Massachusetts

RES. LOCATION: Amherst, Mass.

INVESTIGATOR(S): A. Reiner

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: f FY 74 \$23,583 (100% energy related)

DESCRIPTION: The objective is to investigate the interactions of toxic
..... cations with bacteria, including the means of entry of the cations, the
..... nature of their inhibitory action, their ultimate fate and the nature of
..... mutant bacteria with increased resistance to metals.. The metabolism....
..... of mercury, cadmium and silver cations by the bacterium Escherichia coli
..... will be studied.....

RELATED TECHNOLOGIES: Shale

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Geothermal
SUBTECHNOLOGY:
OBJECTIVE: To determine the metabolism and fate of hazardous agents
..... associated with energy technologies.
.....
PROJECT:
TITLE: Methylmercury Detoxification in Marine Mammals
.....
.....
RES. FACILITY: Oregon State University
RES. LOCATION: Cornellis, Oregon
INVESTIGATOR(S): D. Buhler
SPONSOR(S): NIH/DHEW
DURATION: 2 years
FUNDING: FY 74 \$29,302 FY 75 \$31,595
..... (100% energy related)
.....
DESCRIPTION: We will investigate the biotransformation of orally
administered methylmercury to inorganic mercury in the California sea lion.
.....
In vitro studies of various tissues from sea lions and other marine mammals
.....
will be made to describe the bio-pathway by which such detoxification
.....
occurs. This demethylation process may be the reason that these species
.....
are able to cope with a high natural intake of methylmercury, which is
.....
concentrated in their prey species. Differences in the tissue distribution
.....
of inorganic and organic mercury in the sea lion suggest that these may be
.....
associated with a metal-binding protein, such as metallothionein, which
.....
may be active in the storage and/or transport of mercury within the animal.
Isolation and characterization of mercury-binding proteins will be carried
.....
RELATED TECHNOLOGIES: out in an effort to determine their physiological...
..... significance.
.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Geothermal

SUBTECHNOLOGY:

OBJECTIVE: To determine the metabolism and fate of hazardous agents
..... associated with energy technologies.

PROJECT:

TITLE: Determination of Lead Levels in Saliva

RES. FACILITY: Hohnemann Medical College

RES. LOCATION: Philadelphia, Pa.

INVESTIGATOR(S): G. DiGregoria

SPONSOR(S): NIH/DHEW

DURATION: 1 year.

FUNDING: FY 75 \$4,800 (100% energy related)

DESCRIPTION: The proposed research involves the utilization of saliva
..... as a biologic fluid for the detection of asymptomatic lead poisoning.
..... Rat parotid gland and submaxillary gland secretions, as well as blood will
..... be analyzed for the detection and quantitation of the lead levels
..... following the intravenous injection of lead acetate solutions. The saliva
..... and blood of children between the ages of one and five years who are
..... known to have, or are suspected of having lead poisoning will be qualitatively
..... and quantitatively analyzed for lead.

RELATED TECHNOLOGIES:

Coal

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Other (Food)

SUBTECHNOLOGY:

OBJECTIVE: To determine the metabolism and fate of hazardous agents
..... associated with energy technologies.

PROJECT:

TITLE: Center in Environmental Toxicology

RES. FACILITY: Vanderbilt Univ. School of Medicine

RES. LOCATION: Nashville, Tennessee

INVESTIGATOR(S): R. Neal

SPONSOR(S): NIH/DHEW

DURATION: 2 year

FUNDING: FY74 \$43,288 FY75 \$108,180 (100% energy related)

.....
DESCRIPTION: The mission of the unit has been to initiate and coordinate
..... research of investigators in the areas of toxicology of food chemicals,
..... naturally occurring toxicants in foods, inorganic substances, mycotoxins
..... and incidental chemicals in food such as residues from agricultural chemicals
..... or those from packaging materials. The emphasis is on a metabolic approach
..... to Toxicology transport or hormone systems, the mechanism of metabolism of
..... these substances and the mode of absorption and storage.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects.....
SUBCATEGORY:
TECHNOLOGY: Multi-Technology.....
SUBTECHNOLOGY:
OBJECTIVE: To determine the metabolism and fate of hazardous agents
..... associated with energy technologies.....
.....
PROJECT:
TITLE: Pharmacokinetics.....
.....
.....
RES. FACILITY: National Institute of Health.....
RES. LOCATION: Bethesda, Md.....
INVESTIGATOR(S): R.L. Dedrick.....
SPONSOR(S): NIH/HEW.....
DURATION:
FUNDING: FY '75 \$100,000 (25% energy related).....
.....
DESCRIPTION: Improve and extend mathematical models for the distribu-
..... tion and disposition of drugs, environmental contaminants and endogenous
..... metabolites in animals and man to:
.....
..... 1) Account for species differences in drug distribution.
.....
..... 2) Provide rational bases for extrapolation of toxicity
..... from animals to man.
.....
..... 3) In conjunction with pharmacodynamics, provide a basis
..... for optimization of cancer chemotherapy and chronic hemodialysis.
.....
..... 4) Enable rational transfer of in vitro thermodynamic
..... and kinetic data to in vivo cases.
RELATED TECHNOLOGIES:
..... 5) Predict effective dose schedules of anti-cancer
..... drugs in individual patients.

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi - Technology

SUBTECHNOLOGY:

OBJECTIVE: To determine the metabolism and fate of hazardous agents
..... associated with energy technologies.

PROJECT:

TITLE: Transport of Xenobiotics by Blood and Its Constituents

RES. FACILITY: National Institute of Environmental Sciences

RES. LOCATION: Research Triangle Park, N. C.

INVESTIGATOR(S): E. B. Matthews

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 74 \$25,237 (20% ENERGY RESEARCH)

.....
DESCRIPTION: Ninety-five percent of an intravenous dose of pentachloro-
..... biphenyl was distributed throughout the major organs and tissues within 5
..... min. after administration... Initially, most of this material was associated
..... with the red blood cells, however, within 10 min. after administration
..... most of the pentachlorobiphenyl remaining in the blood was associated
..... with the albumin fraction of plasma. In vitro experiments have shown a
..... number of chlorinated hydrocarbons to be closely associated with the
..... lipoprotein fraction of plasma.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Multi
SUBTECHNOLOGY:
OBJECTIVE: To determine the metabolism and fate of hazardous agents
..... associated with energy technologies.
.....
.....
PROJECT:
.....
TITLE: Pharmacokinetics of Chlorinated Xenobiotics
.....
.....
.....
RES. FACILITY: National Institute of Environmental Health Sciences
.....
RES. LOCATION: Research Triangle Park, N. C.
.....
INVESTIGATOR(S): H. B. Matthews
.....
SPONSOR(S): NIH/HEW
.....
DURATION:
..... FY 74 \$63,076 (20% energy related)
FUNDING:
.....
.....
DESCRIPTION: Selected isomers of the polychlorinated biphenyls are
..... being used to study the pharmacokinetics of chlorinated xenobiotics.
.....
..... Distribution and excretion studies have been conducted using several of
..... the isomers and the results are being subjected to computer analysis. Each
..... of the compounds was found to be rapidly distributed throughout the body.
.....
..... At early time points the muscle and liver served as the major storage sites,
..... whereas at later time points the fat and skin became the major storage
..... sites. The distribution of each of the isomers followed a similar pattern
..... except that the time scale shortened with decreasing degree of chlorination.
.....
.....
RELATED TECHNOLOGIES:
.....
.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi-Technology

SUBTECHNOLOGY:

OBJECTIVE: . To determine the metabolism and fate of hazardous agents
 associated with energy technologies.

PROJECT:

TITLE: . Detection of Human Somatic Mutation

RES. FACILITY: . National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, North Carolina

INVESTIGATOR(S): H. E. Sutton

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY '74 \$5,000 FY '75 (100% energy related)

DESCRIPTION: . This exploratory work was used to determine if an elution ..
 method for fetal hemoglobin could be used as a somatic mutation system for ..
 human populations. After studying different parameters by modifications ..
 of the Betke-Kleihauer technique, it was decided that a wide variety of ..
 factors other than mutation can cause a general rise in fetal hemoglobin ..
 levels. This work demonstrates that a variant must not occur without ..
 mutation, must be a positive variant, and must be a technique usable by ..
 most technicians.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi-Technology

SUBTECHNOLOGY:

OBJECTIVE: To determine the metabolism and fate of hazardous agents
 associated with energy technologies.

PROJECT:

TITLE: Environmental Contaminants: Uptake, Distribution, Metabolism,
 Excretion, and Sites of Storage in Selected Marine Species

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, North Carolina

INVESTIGATOR(S): J. R. Bend, et. al.

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY '74 \$37,839 FY '75 \$12,000 (20% energy related)

DESCRIPTION: The objectives of this study are (1) to measure in vivo
 the uptake, distribution, metabolism and excretion of single, purified
 radiolabeled environmental contaminants, such as certain polychlorinated
 biphenyl (PCB) isomers, in selected marine species, and (2) to identify
 the subcellular site(s) of storage of lipophilic chlorinated environmental
 pollutants in liver and lungs of the rat.

RELATED TECHNOLOGIES:

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: .. To determine the metabolism and fate of hazardous agents
 associated with energy technologies.

PROJECT:

TITLE: .. Mutagenicity and Mutagenic Specificity of Environmental Mutagens
 in Neurospora crassa

RES. FACILITY: .. National Institute of Environmental Health Sciences

RES. LOCATION: .. Research Triangle Park, North Carolina

INVESTIGATOR(S): .. Tong-man Ong

SPONSOR(S):

DURATION:

FUNDING: FY '74 FY '75 \$64,000 (50% energy related)

DESCRIPTION: Many synthetic nitrofurans and related compounds are being
 used as chemotherapeutic agents on antibacterial food additives. Our
 previous studies with nitrofurans have shown that a chemotherapeutic
 agent, a good additive and an antichistosomal agent are mutagenic in
 Neurospora crassa. Our studies also show that a NO₂ group at the C5
 position and a particular side chain at the C2 position are necessary for
 the mutagenic activity of nitrofurans. It would be of interest to
 determine whether other chemotherapeutic agents are mutagenic in
 N. crassa, to verify function-structure relationship of nitrofurans and...

RELATED TECHNOLOGIES:

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: . To determine the metabolism and fate of hazardous agents
 associated with energy technologies.

PROJECT:

TITLE: . Enzymes Metabolizing Chemicals:.. Chemical and Physiological.....
 Effectors of these Systems

RES. FACILITY: . National Institute of Environmental Health Sciences

RES. LOCATION: . Research Triangle Park, North Carolina

INVESTIGATOR(S): . . T. R. Devereux

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: . FY '74 . \$63,032 FY '75 \$32,000 (50% energy related)

.....

DESCRIPTION: . This effort is directed towards understanding how various
 chemicals (pollutants, steroids, etc.) and physiological changes (age,
 pregnancy, nutrition, disease) affect the way xenobiotics are metabolized
 by the body. Using N-demethylation, N-hydroxylation and N-oxidation as
 model systems, detoxication and possible toxication-metabolic pathways of
 the same substance are compared. Present efforts are devoted to studies
 on activities of these enzymic pathways in liver and lung microsome of
 pregnant rabbits as compared to non-pregnant rabbits and to rabbits which
 have been treated with certain steroids. Mechanisms of metal ion effects
 on the pulmonary N-oxidase system are also under investigation.

RELATED TECHNOLOGIES: oil and gas

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the metabolism and fate of hazardous agents
 associated with energy technologies.

PROJECT:

TITLE: Trace Elements in Biological Materials

.....

RES. FACILITY: National Institute of Health

RES. LOCATION: Bethesda, Md.

INVESTIGATOR(S): André LeRoy

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 75 \$80,000 (30% energy related)

.....

DESCRIPTION: Enhance analysis and identification of metal complexes
 in biological materials. Improve analytical methods with detection limits
 on the order of nanograms to picogram in milligram samples. Emphasize
 analysis of Platinum, gallium, calcium and magnesium compounds as they
 relate to diagnosis and chemotherapy. Platinum group metals may become
 environmental trace contaminants of considerable significance with the
 use of catalytic devices for control of exhaust emissions from combustion
 sources. Other trace elements may also become important pollutants.

.....

RELATED TECHNOLOGIES: Geothermal

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the metabolism and fate of hazardous agents
 associated with energy technologies.

PROJECT:

TITLE: Behavior of Aerosol Particles in Internal Flows

RES. FACILITY: Syracuse University

RES. LOCATION: Syracuse, N.Y.

INVESTIGATOR(S): Chin-sen Wang

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY '74 \$57,930 (25% energy related)

.....

DESCRIPTION: Our long term goal is to develop mathematical models
 for the dispersion and the deposition of inhaled particles in the upper
 respiratory tract. Such theoretical models will have application in estimat-
 ing local rates of particle deposition in the lungs. This, in turn, will
 better our understanding of the health effects of Particulate air pollutants.
 Furthermore, the mathematical lung models will have application in studies
 of pulmonary functions and inhalation therapy.

.....

..... Oil and Gas

RELATED TECHNOLOGIES:

.....

CATEGORY: Health Effects.....
SUBCATEGORY:
TECHNOLOGY: Coal.....
SUBTECHNOLOGY:
OBJECTIVE: To determine the metabolism and fate of hazardous agents
associated with energy technologies.....
.....

PROJECT:

TITLE: Biomedical and Behavioral Effects of Carbon Monoxide
.....
.....
RES. FACILITY: University of North Carolina.....
RES. LOCATION: Chapel Hill N. C.....
INVESTIGATOR(S): Augustus T. Miller Jr.....
SPONSOR(S): NIH/DHEW.....
DURATION: 2 years.....
FUNDING: FY '74 \$24,274 (100% energy related).....
.....

DESCRIPTION: The effects of acute and chronic exposure of albino
rats to low levels of carbon monoxide will be re-examined with modern
techniques not available to early investigators, especially those for
the measurement of intracellular oxygen tension and pH, and cell energetics.
The objectives of the project are (1) to evaluate the significance of erythro-
cyte 2,3 DPG concentration changes for oxygen transport in the blood during
carbon monoxide exposure, (2) to correlate tissue oxygen tensions calculated
from venous and gas pocket oxygen tensions with those obtained from tissue
oxygen electrode measurements and tissue biochemical changes during carbon
monoxide exposure, (3) to compare acclimation to carbon monoxide with
RELATED TECHNOLOGIES:
acclimation to hypoxia, and (4) to establish threshold levels of HbCO
associated with impairment of neurophysiological and behavioral functions.

Oil and Gas

CATEGORY: Health Effects.....

SUBCATEGORY:

TECHNOLOGY: Coal.....

SUBTECHNOLOGY:

OBJECTIVE: To determine the metabolism and fate of hazardous agents
..... associated with energy technologies.
.....

PROJECT:

TITLE: Regional Deposition of Inhaled Particles in Man
.....
.....

RES. FACILITY: New York University Medical Center

RES. LOCATION: New York, New York

INVESTIGATOR(S): M. Lippmann

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY 74 \$67,100 FY 75 \$75,662
..... (100% energy related)

DESCRIPTION: The purpose of this study is to provide detailed information
..... on regional particle deposition in the human respiratory tract, and to
..... determine the effects of particle size, respiratory parameters, route of
..... entry, and constitutional variables on the deposition efficiency at the
..... various deposition sites.
.....
.....
.....
.....

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the metabolism and fate of hazardous agents
 associated with energy technologies.

PROJECT:

TITLE: Retention of Aerosols in Laboratory Animals

RES. FACILITY: University of Chicago

RES. LOCATION: Chicago, Illinois

INVESTIGATOR(S): J. Hutchens

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY 74 \$64,072 FY 75 \$72,681
 (100% energy related)

DESCRIPTION: The retention of aerosol particles (10 μ to submicron
 effective diameters) in the respiratory tracts of laboratory animals will
 be studied. Measurements will be made of casts of the entire tracts
 (nose through lung). Toxicological and microscopic studies will be mad
 in an attempt to test the predictions of retention resulting from the calcu-
 lations. Total retentions and regional retentions (nose, upper respiratory,
 and respiratory regions) will be studied. Retained doses by inhalation
 will be compared to doses by other routes, e.g., injection or ingestion.
 Locus and extent of retention in the laboratory animals will be compared
 with that expected in man as a function of aerosol particle size. Particle

RELATED TECHNOLOGIES: sizes will be measured. Calculations of impaction, settling and diffusion
 will be made.

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the metabolism and fate of hazardous agents
..... associated with energy technologies.

PROJECT:

TITLE: Metallothionein in Physiology and Toxicology

RES. FACILITY: University of Oklahoma

RES. LOCATION: Oklahoma City, Oklahoma

INVESTIGATOR(S): R. Coleman

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY 75 \$66,213 (100% energy related)

DESCRIPTION: This research is planned to study the metabolic interrelation-
ships between three toxic environmental pollutants: cadmium, mercury and
lead, along with two essential trace metals, zinc and copper. In the
organism all five trace metals can bind to metallothionein, which in turn is
synthesized in response to cadmium challenge. The physiological importance
of metallothionein will be elucidated; primary emphasis will be given to
investigate the probable role of metallothionein in the detoxification
of cadmium, mercury, and lead. Exposure to cadmium is suspected as an
important factor in the causation of essential hypertension in experimental
animals as well as in human population. This concept will be tested in rats
RELATED TECHNOLOGIES: and efforts will be made to investigate the possible
involvement of metallothionein in the etiology of hypertension.

CATEGORY: .. HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: .. Coal

SUBTECHNOLOGY:

OBJECTIVE: .. To determine the metabolism and fate of hazardous agents
associated with energy technologies.

PROJECT:

TITLE: .. Abnormal Trace Metals In Chronic Disease

RES. FACILITY: .. Dartmouth Medical School

RES. LOCATION: .. Hanover, New Hampshire

INVESTIGATOR(S): .. H. Schroeder

SPONSOR(S): .. NIH/DHEW

DURATION: .. 2 year

FUNDING: .. FY74 \$98,310 FY75 \$75,037 (100% energy related)

DESCRIPTION: .. The objectives of the project are to ascertain the innate
toxicities of environmental trace element contaminants as expressed by chronic
diseases, including cardiovascular diseases, and to study interactions of trace
elements at cellular and metabolic levels in terms of biological antagonisms or
synergisms. Innate toxicity of abnormal trace elements in food, water and air
will be evaluated. Blood and urine from living animals will be analyzed for
changes in organic constituents, whole animals and organs will be analyzed for
trace elements and tissues fractionated into biochemical and subcellular
fractions to ascertain concentrations of the trace elements fed. Alternations
in activity of specific metalloenzymes will be evaluated, as well as metal

RELATED TECHNOLOGIES: .. displacements on nucleic acids.

CATEGORY: HEALTH EFFECTS.....
SUBCATEGORY:
TECHNOLOGY: .. Coal.....
SUBTECHNOLOGY:
OBJECTIVE: To determine the metabolism and fate of hazardous agents associated
..... with energy technologies.....
.....

PROJECT:

TITLE: The enzymatic Degradation of aromatic Compounds.....
.....
.....

RES. FACILITY: Univ. of Minnesota.....
RES. LOCATION: St. Paul, Minnesota.....
INVESTIGATOR(S): S. Dagley.....
SPONSOR(S): NIH/DHEW.....
DURATION: 2 year.....
FUNDING: FY74 \$43,621 FY75 \$46,505 (50% energy related).....

.....
DESCRIPTION: We have identified all intermediates formed in the microbial
..... degradation of catechols by meta-fission, and studies of the purified enzymes
..... will be continued. The evidence for two types of meta-pyrocatechase will be
..... examined. Alkyl-substituted phenols were found to be metabolized through
..... alkylgentisic acids. These enzymes, will be purified and their modes of
..... action studied. The enzymic degradation of halogen-substituted gentisates and
..... phenylagentates will be studied. The hydroxylation of p-hydroxyphenylacetic a
..... acid will be investigated. Studies of the enzymes that degrade tropic acid
..... and tropine will be completed. We have isolated soil organisms that grow with
..... biphenylmethane and other compounds containing two free benzene rings. We
RELATED TECHNOLOGIES:
..... shall investigate the enzymology of the pathways used in their degradation,
..... and they types of derepression involved when at least two separate catabolic
..... sequences are employed by the same organism.

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the metabolism and fate of hazardous agents
associated with energy technologies.

PROJECT:

TITLE: Toxicant Action of Ozone in Mammalian Tissues

RES. FACILITY: Univ. of Minnesota

RES. LOCATION: Austin, Minnesota

INVESTIGATOR(S): O. Prinett

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY75 \$24,256 (100% of energy related)

DESCRIPTION: The objective of this project is to delineate the toxic action of ozone as an air pollutant in animal tissues, particularly its mode of action in the destruction of vitamin E and other essential metabolites, promotion of lipid peroxidation and effects on lipid metabolism and biochemical processes in liver. The hypothesis is advanced that initial ozonides that are formed as precursors to stable ozonides in the reaction of ozone with unsaturated compounds are responsible for the destruction of essential metabolites including vitamin E in mammalian tissues. Destruction of biological antioxidants in this manner is believed to be responsible for lipid peroxidation which is an associated effect of ozone toxicity.

RELATED TECHNOLOGIES: Oil and Gas

CATEGORY:HEALTH EFFECTS.....
SUBCATEGORY:
TECHNOLOGY: ...Coal.....
SUBTECHNOLOGY:
OBJECTIVE:To determine the metabolism and fate of hazardous agents associated
..... with energy technologies.....
.....
PROJECT:
 TITLE: A Morphobiochemical Study of Mercury Encephalopathy
.....
.....
 RES. FACILITY: Univ. of California
 RES. LOCATION: Los Angeles, California
 INVESTIGATOR(S): M. Verity
 SPONSOR(S): NIH/DHEW
 DURATION: 1 year
 FUNDING: FY75 \$32,823 (100% energy related)
.....
 DESCRIPTION: The primary aim of our research program is the elucidation
..... of the molecular biochemical defect(s) and accompanying changes in morphology
..... occurring in the central nervous system after experimental intoxication with
..... organic mercurial compounds. The propose to characterize the cation/anion
..... translocation system across the energy conserving mitochondrial membrane by
..... the use of ion sensitive electrodes, correlate changes in synaptosome
..... respiration with protein synthesis as a function of ionic species, ionophoretic
..... antibiotics, and inhibition of mitochondrial function, and evaluate the role
..... of the other partial reactions. Correlative electron microscopic studies of
..... the cerebellum will be undertaken.
RELATED TECHNOLOGIES:
..... Geothermal

CATEGORY: HEALTH EFFECTS
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To determine the metabolism and fate of hazardous agents
associated with energy technologies.

PROJECT:

TITLE: The Biochemistry of Arsenate
RES. FACILITY: Univ. of Michigan
RES. LOCATION: Ann Arbor Michigan
INVESTIGATOR(S): L.. Nooden
SPONSOR(S): NIH/DHEW
DURATION: 1 year
FUNDING: FY74 \$22,548 (50% energy related)

DESCRIPTION: Our objective is to learn more about the metabolism and mechanism
of action of arsenate. Although the study will deal mainly with corn seedlings
and tomato plants, much of the information obtained should be applicable to
animals. This study, aimed principally at the ability of arsenate to substitute
for phosphate, will explore several aspects of the biochemistry of arsenate.

1. The metabolism of ^{74}AS -arsenate in plants. Is ^{74}AS -arsenate reduced to arsenite, bound
to acid-insoluble macromolecules or bound to lipids? Does arsenate or a derivative accumulate
in one of these fractions or in some particular organ of a plant? What is the nature of
insoluble material bound to the ^{74}AS -and the linkage with ^{74}AS ? The effects of arsenate on
nucleic acids. Is it incorporated into DNA or RNA, does it affect DNA or RNA synthesis and

RELATED TECHNOLOGIES:
is it mutagenic? The ability of plants to accumulate arsenate from the
environment. Is its uptake by roots active and does it proceed via the
pathway for phosphate uptake?

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the metabolism and fate of hazardous agents
 associated with energy technologies,

PROJECT:

TITLE: Upper Respiratory Tract Clearance

RES. FACILITY: University of Pittsburgh

RES. LOCATION: Pittsburgh, Pa.

INVESTIGATOR(S): J. Watson

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY 74 \$47,797 FY 75 \$48,605

..... (100% energy related)

DESCRIPTION: We have techniques for measuring: 1) the tracheobronchial
 clearance rates of particles from the lungs, 2) the numbers of pulmonary
 macrophages leaving the lungs, and 4) the functional role of pulmonary
 macrophages in transporting particles from the lungs to the oropharynx.
 These methods provide in vivo data in the rat without requiring surgery on
 the pulmonary system.

..... Our objectives are to characterize these parameters and

..... their interrelationships under various conditions of stress to the

..... pulmonary system to achieve an understanding of the basic physiological and

..... homeostatic mechanisms which apply to the clearance of particulates from the

RELATED TECHNOLOGIES: lungs and to use this data in the appraisal of the hazard of respirable dusts
 and air pollutants in man.

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE:To determine the metabolism and fate of hazardous agents
.....associated with energy technologies.....

PROJECT:

TITLE:Experimental Emphysema: Analysis of Mechanisms.....

RES. FACILITY:St. Luke's Hospital.....

RES. LOCATION:Cleveland, Ohio.....

INVESTIGATOR(S):J. Kleinerman.....

SPONSOR(S):NIH/DHEW.....

DURATION:2 years.....

FUNDING:FY 74 \$49,892 FY 75 \$50,322.....

.....(100% energy related).....

DESCRIPTION: The purpose of this research proposal is to evaluate the existing experimental animal models of pulmonary emphysema with respect to the **hypothesis** of proteolytic antiproteolytic imbalance as the mechanism for production of pulmonary tissue destruction and emphysema. The papain model will be analyzed by first developing a dose-response relationship. The effects of variation in dosage of papain will be evaluated for their potential in producing quantitatively determined emphysema. Elastase will be similarly studied. The combined effects of prolonged Nitrogen Dioxide (NO₂) inhalation and papain aerosol exposures will be studied in cats, and physiologic tests performed in an attempt to separate the components which contribute to the physiologically determined airways obstruction. The (NO₂) exposures will be studied at intervals. We will attempt to produce increases and decreases in circulating or tissue antitryptic materials and evaluate the effect on the papain elastase or on (NO₂) induced lesions. The effect of decreasing the circulating leukocytes by drugs such as busulfan on the production of experimental papain emphysema will be studied.

RELATED TECHNOLOGIES:198.....

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the metabolism and fate of hazardous agents
associated with energy technologies.

PROJECT:

TITLE: Comparative Environmental Toxicology

RES. FACILITY: Albany Medical College

RES. LOCATION: Albany, N.Y.

INVESTIGATOR(S): L. Goldberg

SPONSOR(S): NIH/DHEW

DURATION: 2 year

FUNDING: FY74 \$52,466 FY75 \$49,800 (100% energy related)

DESCRIPTION: Studies on comparative environmental toxicology and research
effort into areas of interactions between environmental chemicals. The
primary aims of this program will be the study of comparative toxicology
as a means of prediction of safety to man. The study of interactions is
aimed at eliciting subtle and unsuspected effects that may have great
practical importance in determining the response of the organism when it is
exposed simultaneously or contemporaneously to a plethora of environmental
pollutants.

RELATED TECHNOLOGIES:

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the metabolism and fate of hazardous agents associated
..... with energy technologies.

PROJECT:

TITLE: Center for Environmental Management

.....

RES. FACILITY: Oregon State Univ.

RES. LOCATION: Corvallis, Oregon

INVESTIGATOR(S): V. Freed

SPONSOR(S): NIH/DHEW

DURATION: 2 year

FUNDING: FY74 \$222,184 FY75 \$272,756 (100% energy related)

DESCRIPTION: The proposal emphasizes the role of the Center in research
..... and training in a coordinated effort on the environmental health aspects of
..... microchemical pollutants. Attention will be given (1) the identification
..... and inventorying the various environmental chemicals (2) study of the
..... dynamics of distribution and (3) their biological effects, mode of action
..... and metabolism. The objectives of the program are:

RELATED TECHNOLOGIES:

.....

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Coal
~~Coal~~

SUBTECHNOLOGY:

OBJECTIVE: To determine the metabolism and fate of hazardous agents associated
 with energy technologies.

PROJECT:

TITLE: Analysis of Carbon Monoxide in Blood

RES. FACILITY: Kansas State Univ.

RES. LOCATION: Manhattan, Kansas

INVESTIGATOR(S): J. Lambert

SPONSOR(S): NIH/DHEW

DURATION: 2 year

FUNDING: FY74 \$13,372 FY75 \$13,751 (100% energy related)

DESCRIPTION: The principal objective of this proposed research is to study of a
 a reaction sequence which serves as a new colorimetric method for carbon monoxide in
 blood and other tissues. The method appears to be selective for carbon monoxide.
 The response is linear and the precision of measurements is good. The sequence of
 reactions takes place in approximately neutral solution and produces a soluble colored
 compound for spectrophotometric determination. Studies to improve the method and
 make it suitable for routine manual and automated analysis will include the nature
 of the carbon monoxide-palladium(II) reaction, the selection of comparing ligands
 for iron(III) and iron(II) to facilitate the ligand exchange reaction, and a
 continuing search for more effective catalysts.

RELATED TECHNOLOGIES:
 Oil and Gas

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the metabolism and fate of hazardous agents
 associated with energy technologies.

PROJECT:

TITLE: Permeation Mechanism of Gases from the Lung into the
 Bolldstream (The Bimolecular-Lipid Membrane - Toxic
 Gases)

RES. FACILITY: Clarkson College of Technology

RES. LOCATION: Potsdam, New York

INVESTIGATOR(S): H.H.G. Jellinck

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY '74 \$28,565; FY '75 \$26,049
 (100% energy related)

DESCRIPTION: The research proposed here is concerned with the mechanism
 of permeation of toxic gaseous impurities (e.g., NO₂, SO, O₃ and others)
 in air from the lung into the bloodstream. Particular attention will be
 directed to adverse effects these contaminants may have on lung permeation
 capacity, structural changes in the cell walls and on the mechanism of
 permeation in general. The bimolecular lipid membrane, BIM, will be taken
 as model for cell membranes or cell walls. The BIM is recognized as an
 universal model for human cell membranes, whose properties closely resemble
 those of natural membranes.

RELATED TECHNOLOGIES: Oil and Gas

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the metabolism and fate of hazardous agents
..... associated with energy technologies.
.....

PROJECT:

TITLE: Factors Influencing Deposition of Inhaled Particles

RES. FACILITY: Harvard University

RES. LOCATION: Boston, Mass.

INVESTIGATOR(S): J. Brain

SPONSOR(S): NLM/DHEW

DURATION: 1 year

FUNDING: FY 75 \$59,211

DESCRIPTION: The overall objective is to define more precisely how
..... various factors affect the patterns of particle deposition which occur
..... during inhalation. Specifically we propose 1) to investigate how gravity
..... and pleural pressure gradients influence alveolar deposition. We also plan
..... 2) to investigate how the various breathing patterns influence the distribu-
..... tion of particle deposition. Finally, we plan 3) to investigate species
..... differences in regard to aerosol deposition and to attempt to apply
..... principles of scaling to our experimental data with the goal of developing
..... predictive powers.
.....

RELATED TECHNOLOGIES:

.....
Shale

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the metabolism and fate of hazardous agents
..... associated with energy technologies.

PROJECT:

TITLE: Kinetics of Uptake and Excretion of Vapors in Men

RES. FACILITY: University of Miami

RES. LOCATION: Coral Gables, Fla.

INVESTIGATOR(S): D. Holaday

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: Fy 75 \$25,114 (20% energy related)

DESCRIPTION: The overall objective of the research is to define the
..... kinetics of uptake, distribution, metabolism, and excretion of inhaled
..... lipid soluble vapors in man, by a set of differential equations, using
..... predictable constants. The physical, chemical, and biological constants
..... needed will be determined by simple experiments. Solution of the equations
..... will be facilitated by a program for large digital computer. To verify
..... the pharmacokinetic model, the experimental conditions of suitable published
..... studies in men will be simulated, and their results compared with the
..... calculated data. Further verification will be done by animal experiments.

RELATED TECHNOLOGIES: Shale, Oil and Gas

CATEGORY: HEALTH EFFECTS.....

SUBCATEGORY:

TECHNOLOGY: .. Conservation.....

SUBTECHNOLOGY:

OBJECTIVE: To determine the metabolism and fate of hazardous agents
..... associated with energy technologies.....
.....

PROJECT:

TITLE: Asbestos Air Pollution: Extent, Resistance, Effects.....
.....
.....

RES. FACILITY: Mount Sinai School of Medicine.....

RES. LOCATION: N.Y., N.Y.....

INVESTIGATOR(S): W..Nicholson.....

SPONSOR(S): NIH/DHEW.....

DURATION: 1 year.....

FUNDING: FY75 \$133,311 (100% energy related).....

.....
DESCRIPTION: It is our intention to obtain information concerning asbestos
..... air pollution that would help bridge the gap between appropriate measurements
..... of such pollution and the human health effects. One characteristic of asbestos
..... makes this feasible the mineral fiber tends to be virtually indestructible and
..... can be uniquely identified both in environmental circumstances and in lung
..... tissue. Techniques to accomplish this quantitatively and with accuracy have
..... been developed in recent years.
.....
.....
.....

RELATED TECHNOLOGIES:

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Conservation.....

SUBTECHNOLOGY:

OBJECTIVE:To determine the metabolism and fate of hazardous agents
.....associated with energy technologies.....

PROJECT:

TITLE:Asbestos and Cancer.....

RES. FACILITY:University of Chicago.....

RES. LOCATION:Chicago, Illinois.....

INVESTIGATOR(S):M. Warnock.....

SPONSOR(S):NIH/DHEW.....

DURATION:1 year.....

FUNDING:FY 75 \$21,612 (100% energy related).....

DESCRIPTION:In a preliminary study, we have found large numbers of
.....asbestos bodies more frequently in our lung cancer patients than in a
.....control population without lung cancer. This occurs in cases where asbestos
.....bodies are easily overlooked on routine histologic sections. We now propose
.....to confirm this finding by quantitating the number of asbestos fibers in
.....the lungs of more patients with and without lung cancer in a population with
.....low asbestos exposure. It is hoped that quantitative criteria of
....."significant" exposure to asbestos can be determined, and the magnitude of
.....the problem of increasing evidence of asbestos in the environment clarified.....

RELATED TECHNOLOGIES:

CATEGORY: HEALTH EFFECTS

SUBCATEGORY: Oil and Gas

TECHNOLOGY:

SUBTECHNOLOGY:

OBJECTIVE: To determine the metabolism and fate of hazardous agents associated with energy technologies.

PROJECT:

TITLE: Enzymatic Oxygen Fixation into Aromatic Hydrocarbons

RES. FACILITY: Univ. of Texas

RES. LOCATION: Austin, Texas

INVESTIGATOR(S): D. Gibson

SPONSOR(S): NIH/DHEW

DURATION: 2 year

FUNDING: FY74 \$27,968 FY75 \$31,524 (50% energy related)

DESCRIPTION: The objectives of this research project are to elucidate the mechanisms of oxygen fixation into aromatic hydrocarbons and to define some parameters of biodegradability that relate to the effects of substituents on the benzene nucleus. Pseudomonas putida grows on toluene as sole source of carbon. This reaction will be investigated in two ways: 1) The enzyme will be purified and the mechanisms of substrate-oxygen-enzyme interaction determined. 2) The enzyme is known to oxidize azulene, a model substrate in which electron densities at different positions of the ring are known. Identification and characterization of the products formed by the enzyme will be determined. An unidentified Pseudomonas species oxidizes

RELATED TECHNOLOGIES: naphthalene. This enzyme-catalyzed reaction will be investigated in an analogous manner to that described above for toluene.

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Spale

SUBTECHNOLOGY:

OBJECTIVE: To determine the metabolism and fate of hazardous agents
..... associated with energ technologies.

PROJECT:

TITLE: Cadmium Induced Prolongation of Drug Action

RES. FACILITY: Purdue University

RES. LOCATION: West Lafayette, Indiana

INVESTIGATOR(S): T. Miya

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY 74 \$47,388 ⁷⁵ FY 74 \$48,422

(100% energy related)

DESCRIPTION: The proposal has as its prime objective the investigation
..... of the toxicity of cadmium (Cd) with special reference to Cd exposure and
..... the potential hazards of its interactions with therapeutic agents.
..... Preliminary studies indicate that Cd prolongs drug effects by inhibiting
..... metabolic as well as other factors. The project specifically addresses
..... itself to delineating 1) role of metabolism and 2) role of non-metabolic
..... factors in the drug effect prolongation phenomenon. Additionally, the
..... protective effect of small doses of Cd on subsequent doses of Cd will
..... be explored.

RELATED TECHNOLOGIES:

Solar

Prepared for the Science Information Exchange.

Not for publication or publication reference.

U. S. Department of
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

NOTICE OF RESEARCH PROJECT

PROJECT NO. (DO NOT USE THIS SPACE)

LE OF PROJECT

ERR 2.1 Metabolism and disposition of selected radiolabelled hydrocarbons and some of their chemically reactive epoxides by the isolated, perfused rabbit lung and by solubilized, re-constituted pulmonary biotransformation systems

GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED ON THE PROJECT.

J. R. Bend, Ph.D., Visiting Associate, Pharmacology Branch
R. M. Philpot, Ph.D., Senior Staff Fellow, Pharmacology Branch

NAME AND ADDRESS OF APPLICANT INSTITUTION

National Institute of Environmental Health Sciences, P O Box 12233, Res Tri Park, NC 27709

SUMMARY OF PROPOSED WORK - (200 words or less - Omit Confidential data.)

In the Science Information Exchange summaries of work in progress are exchanged with government and private agencies supporting research in the bio-sciences and are forwarded to investigators who request such information. Your summary is to be used for these purposes.

The metabolism of pure, radiolabelled unsaturated hydrocarbons of different types (aliphatic, alicyclic and polycyclic aromatic) and of their epoxides will be studied in the isolated, perfused rabbit lung and in the isolated, perfused rat liver. Major metabolites will be identified and quantitated; the relative importance of epoxide hydrolase and glutathione S-epoxidetransferases as deactivation pathways for the chemically-reactive epoxides will be assessed. Covalent binding, if present, will be quantitated in both liver and lung homogenates. The effect of glutathione depletion on this covalent binding will also be measured.

ERR-2.1 (3A1)

\$ 66,000 ✓

PROFESSIONAL SCHOOL (medical, dental, etc.) WITH WHICH THIS PROJECT SHOULD BE IDENTIFIED	SIGNATURE OF PRINCIPAL INVESTIGATOR <i>John R. Bend</i>	DATE 8.18.75
DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY		
SUPPORTING AGENCY		
METHOD OF SUPPORT (Check one)		
☐ Agency Staff (Intramural)	☐ Negotiated Contract	☐ Special Project Grant
☐ Research Grant	☐ Other (Specify)	
FUNDS OBLIGATED CURRENT F.Y.	NUMBER OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT FISCAL YEAR 211	BEGINNING DATE ESTIMATED COMPLETION DATE

Prepared for the Science Information Exchange.
Not for publication or publication reference.

U. S. Department of
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
NOTICE OF RESEARCH PROJECT

PROJECT NO. (DO NOT USE THIS SPACE)

TITLE OF PROJECT

2.2 and ERR 6: Environmental Teratology Information Center (ETIC)

GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED ON THE PROJECT.

Robert E. Staples, Ph.D., Research Physiologist, Environmental Toxicology Branch
Interagency Agreement, Oak Ridge National Laboratories (Contact: John S. Wassom)

AND ADDRESS OF APPLICANT INSTITUTION

National Institute of Environmental Health Sciences, P O Box 12233, Res Tri Park, NC 27709

SUMMARY OF PROPOSED WORK - (200 words or less - Omit Confidential data.)

In the Science Information Exchange summaries of work in progress are exchanged with government and private agencies supporting research in the bio-sciences and are forwarded to investigators who request such information. Your summary is to be used for these purposes.

NIEHS is establishing a computerized information system for teratology to meet the need of government agencies and scientists-at-large for knowledge of the teratogenic potential of environmental components. Data on warmblooded animals judged to be useful for determining the teratogenic potential of environmental factors will be extracted in tabular form. Information will be collected from published and unpublished studies, whether the result is positive or negative. On-going studies will also be included.

ERR-2.9 (3A1 and 4D1)
\$ 300,000

ERR-2.9

3A1 - \$150,000

4D1 - \$150,000

PROFESSIONAL SCHOOL (medical, dental, etc.) WITH WHICH THIS PROJECT SHOULD BE IDENTIFIED

SIGNATURE OF PRINCIPAL INVESTIGATOR

Robert E. Staples

DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY

SUPPORTING AGENCY

METHOD OF SUPPORT (Check one)

☐ Agency Staff (in-house)

☐ Negotiated Contract

☐ Special Project Grant

☐ Research Grant

FUNDS OBLIGATED CURRENT F.Y.

NUMBER OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT FISCAL YEAR

BEGINNING

212

SECTION 1

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

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RESEARCH OBJECTIVES

PROJECT NUMBER

IR01ES 01151-01A1

NAME AND ADDRESS OF APPLICANT ORGANIZATION

The University of North Carolina at Chapel Hill, Chapel Hill, North Carolina 27514

NAME, SOCIAL SECURITY NUMBER, OFFICIAL TITLE, AND DEPARTMENT OF ALL PROFESSIONAL PERSONNEL ENGAGED ON PROJECT, BEGINNING WITH PRINCIPAL INVESTIGATOR

Lorcan A. O'Tuama, M.D., [REDACTED], Ass't. Prof. of Medicine (Neurology) and Pediatrics
and Research Scientist, Biological Sciences Research Center
John T. Gatzky, Ph.D., [REDACTED], Assoc. Prof. of Pharmacology
C.S. Kim, [REDACTED], Graduate Assistant, Pharmacology

TITLE OF PROJECT

Regulation of Neural Distribution of Lead

USE THIS SPACE TO ABSTRACT YOUR PROPOSED RESEARCH. OUTLINE OBJECTIVES AND METHODS. UNDERSCORE THE KEY WORDS (NOT TO EXCEED 10) IN YOUR ABSTRACT.

Factors regulating the entry and distribution of inorganic lead in the nervous system will be studied under control and selected abnormal conditions. In the guinea pig, in vivo CSF perfusion will quantitate the disappearance rate of ^{210}Pb and ^{45}Ca across the blood-CSF barrier. The uptake of ^{210}Pb and ^{45}Ca across the blood-brain barrier will be measured by an indicator dilution technique. These measurements will be correlated with levels of lead and calcium attained in brain, meninges, choroid plexus and ependyma. These indices will be determined for control animals and for animals acutely lead-poisoned. The affinity of the neural tissues for lead and calcium in the absence of an intact barrier will be assessed by measuring in vitro uptake and release of ^{210}Pb and ^{45}Ca . This will be determined under control conditions; after inhibition of general, oxidative and glycolytic metabolism; after changes in medium electrolyte composition and after exposure to reagents that act as ligands. An effort will be made to distinguish solute accumulation due to binding within neural tissue from that due to movement across the tissue using excised bullfrog choroid plexus and meninges which can be mounted as "polar" membranes, allowing direct measurement of transepithelial flux. This parameter will be studied in control and acutely poisoned frogs and contrasted with the results of in vitro uptake and release experiments in the same species. The behavior of ^{109}Cd , a non-neurotoxic metal, will also be observed in several of the above experimental situations, so as to suggest patterns of uptake and distribution that are not correlated with neurotoxicity. These studies will (a) establish how the disordered flow of lead across neural barriers that we have noted in lead encephalopathy contributes to its pathogenesis; (b) allow development of predictive tests for neural toxicity of potential toxins and pollutants by testing their effects on barrier function.

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ERR-2.7 (3A1)

\$ 59,000 ✓

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE PUBLIC HEALTH SERVICE	LEAVE BLANK ✓
RESEARCH OBJECTIVES	PROJECT NUMBER 1R01 ES 01288-01
NAME AND ADDRESS OF APPLICANT ORGANIZATION	

The University of South Dakota, Vermillion, South Dakota 57069

NAME, SOCIAL SECURITY NUMBER, OFFICIAL TITLE, AND DEPARTMENT OF ALL PROFESSIONAL PERSONNEL ENGAGED ON PROJECT, BEGINNING WITH PRINCIPAL INVESTIGATOR

Frank O. Brady, [REDACTED]
Assistant Professor
Department of Biochemistry

TITLE OF PROJECT

Function of Metallothionein in Heavy Metal Metabolism

USE THIS SPACE TO ABSTRACT YOUR PROPOSED RESEARCH. OUTLINE OBJECTIVES AND METHODS. UNDERSCORE THE KEY WORDS (NOT TO EXCEED 10) IN YOUR ABSTRACT.

The low molecular weight, cysteine rich protein, metallothionein will be studied under a variety of conditions in order to elucidate its function in heavy metal metabolism. Its involvement in the mechanisms of incorporation, metabolism, deposition and turnover of hazardous toxic metals, which are becoming increasingly prevalent in the environment as byproducts associated with various energy related technologies, will be elucidated. Specifically, the focus of these studies will be on the mechanisms of action and sites of localization and transfer of heavy metals in perfused rat lungs, and possibly livers and kidneys, (both *in vivo* and *ex vivo*) and in rats (both adults and neonates). The heavy metals of interest in this study are zinc, copper, cadmium, mercury, nickel, and thallium. Initially, these will be studied individually as a preliminary to more important experiments which will involve the study of interactions of two or more of these metals, e.g., a situation which is more likely to occur under environmental conditions. The goal of these studies is to establish whether metallothionein is functioning in detoxification of toxic heavy metals or has another role in the normal metabolism of essential heavy metals, the presence of toxic heavy metals serving to interfere with these normal processes.

ERA-2.8 (3A1)
\$ 73,000

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Not for publication or publication reference.

U. S. Department of
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
NOTICE OF RESEARCH PROJECT

PROJECT NO. (DO NOT USE THIS SPACE)

TITLE OF PROJECT

Respirable forms of volatile chemical and particulate reaction products

GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED ON THE PROJECT.

Otto G. Raabe, Ph.D., Head, Aerosol Physics Department (Contractor's Project Director)
Hsu Chi Yeh, Ph.D., Aerosol Physics Department
George Newton, Aerosol Physics Department
Phillip J. Walsh, Ph.D., Physicist, Environmental Biophysics Branch (Co-Project Officer, NIE)
Robert T. Drew, Ph.D., Supervisory Physical Scientist, Pharmacology Branch (Co-Project Officer, NIEHS)

NAME AND ADDRESS OF APPLICANT INSTITUTION

Inhalation Toxicology Research Institute, 5200 Gibson Boulevard, S.E.
Albuquerque, New Mexico

SUMMARY OF PROPOSED WORK - (200 words or less - Omit Confidential data.)

In the Science Information Exchange summaries of work in progress are exchanged with government and private agencies supporting research in the bio-sciences and are forwarded to investigators who request such information. Your summary is to be used for these purposes.

Summary of proposed work:

1. Study of gaseous chemical behavior and gas-particle interactions
2. Evaluation of standardized chemical-particle forms with respect to respiratory tract deposition
3. Deposition studies in physical models
4. Deposition studies in animals

ERR-3.2 (383)

\$ 100,000 ✓

PROFESSIONAL SCHOOL (medical, dental, etc.) WITH WHICH THIS PROJECT SHOULD BE IDENTIFIED	SIGNATURE OF PRINCIPAL INVESTIGATOR <i>Phillip J. Walsh</i>	DATE 8/20/75
DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY		
SUPPORTING AGENCY		
METHOD OF SUPPORT (Check one)		
☐ Agency Staff (Intramural)	☐ Negotiated Contract	☐ Special Project Grant
☐ Research Grant	☐ Other (Specify)	
FUNDS OBLIGATED CURRENT F.Y.	NUMBER OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT FISCAL YEAR 215	BEGINNING DATE
		ESTIMATED COMPLETION DATE

SECTION 1		PRI FAILED B WEL DE 12/11 12/11
DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE PUBLIC HEALTH SERVICE		
RESEARCH OBJECTIVES		

PROJECT NUMBER
2 R01 ES00927-04

NAME AND ADDRESS OF APPLICANT ORGANIZATION

Harvard School of Public Health
665 Huntington Avenue, Boston, Mass. 02115

NAME, SOCIAL SECURITY NUMBER, OFFICIAL TITLE, AND DEPARTMENT OF ALL PROFESSIONAL PERSONNEL ENGAGED ON PROJECT, BEGINNING WITH PRINCIPAL INVESTIGATOR

Mary O. Amdur	[REDACTED]	Assoc. Professor of Toxicology	Dept. of Physiology
Dwight W. Underhill	[REDACTED]	Assist. Professor of Environ. Health Engineering	Dept. of Physiology

TITLE OF PROJECT

Factor Affecting Irritant Potency of Gases and Aerosols

USE THIS SPACE TO ABSTRACT YOUR PROPOSED RESEARCH. OUTLINE OBJECTIVES AND METHODS. UNDERSCORE THE KEY WORDS (NOT TO EXCEED 101 IN YOUR ABSTRACT).

We propose to examine the joint toxic action of sulfur dioxide and ozone. Concentrations used will be in the range of 0.2 - 0.8 ppm of each gas. They will be combined in equal concentration as well as in varying ratios. The criteria of irritant response will be alterations in the respiratory mechanics of guinea pigs. The response to the combination will be compared to previously observed changes produced by sulfuric acid. We also plan to study the uptake of sulfur dioxide by wetted wall tubes with and without the addition of aerosols. We plan to study the solubility and reactivity of sulfur dioxide in solutions of various salts which have been shown to potentiate the biological response.

ERR-3.2 (3B3)
\$ 68,000 ✓

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CATEGORY: Health Effects.....
SUBCATEGORY:
TECHNOLOGY: Nuclear.....
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies...

PROJECT:

TITLE: Tritium Damaged Mammalian Cells In Vitro.....
.....
.....

RES. FACILITY: University of California.....

RES. LOCATION: Berkeley, Calif.....

INVESTIGATOR(S): H.J. Barki.....

SPONSOR(S):

DURATION: FY 1973-75.....

FUNDING: FY 74 \$37,214 FY 75 \$37,981.....
..... (100% energy related).....

DESCRIPTION: Mouse leukemic cells (L5178Y), Chinese hamster lung cells (V79-S171), and SV-40 virus transformed hamster cells will be labelled with tritiated precursors of DNA and/or RNA after these cells have been synchronized by selective mitotic cell detachment or by blocking with hydroxurea. These cells will then be frozen to -196° centigrade and damage induced by tritium disintegrations. After various periods of time the cells will be thawed out and the reproductive ability of the cells measured by standard methods. The efficiency of cellular inactivation will be compared for damage accumulated in various subcellular regions.....

RELATED TECHNOLOGIES:
.....

CATEGORY: Health Effects.....

SUBCATEGORY:

TECHNOLOGY: Nuclear.....

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies..

PROJECT:

TITLE: Disability, Retirement & Death As Measures of Cancer.....

.....

.....

RES. FACILITY: University of Pittsburgh, School of Public Health.....

RES. LOCATION: Pittsburgh, Penn......

INVESTIGATOR(S): Dr. T.E. Mancuso.....

SPONSOR(S): NIH/HEW.....

DURATION: FY 1974-75.....

FUNDING: FY 74 \$175,541 FY 75 \$125,553.....

..... (100% energy related).....

DESCRIPTION: The method is a longitudinal follow-up of cohorts of employees of ABC contractors working at Hanford (35,000) for whom there are detailed radiation and environmental exposure data, and their identified siblings (20,000) who never worked at Hanford and presumably have no exposure to occupational radiation as out-of-plant controls.

.....

..... The present observation period for Hanford employees and their identified siblings begins in 1943 when recruitment for Hanford employees began and ends 9/30/72 when the Social Security files would be searched to determine those employees and identified siblings who had died in the intervening years.

RELATED TECHNOLOGIES:

.....

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Nuclear.....

SUBTECHNOLOGY:

OBJECTIVE: .To evaluate the short term and long term hazards of exposure of
normal, susceptible and stressed population groups to different
levels and combinations of biologically active agents associated
with energy technologies.

PROJECT:

TITLE: .Uranium Mining.- Health Hazards Associated with Radon Daughters.

RES. FACILITY: .National Institute of Environmental Health Sciences.....

RES. LOCATION: .Research Triangle Park, North Carolina.....

INVESTIGATOR(S):W. F. Bale.....

SPONSOR(S):NIH/HEW.....

DURATION:

FUNDING: FY '74. \$45,000.....FY '75.....(100% energy related)*

DESCRIPTION: .Project A - exposed dogs and rats to radon and radon daughters
on room air nuclei. The magnitude and intensity of exposure versus early
histopathological effects are important initially.
Project B-1 studied the bone and tissue distribution of ^{210}Pb as well as
excretion of ^{210}Pb and ^{210}Po using dogs exposed in Project A.
Project B-2 measured the transport time of ^{212}Pb from human lungs.
Project C - characterized the radon daughter carrying aerosols used in
the above studies.
Project D - developed new techniques for the measurement of ^{210}Po and ^{210}Pb
in urine.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Nuclear

SUBTECHNOLOGY:

OBJECTIVE: . To evaluate the short term and long term hazards of exposure of
 normal, susceptible and stressed population groups to different
 levels and combinations of biologically active agents associated
 with energy technologies.

PROJECT:

TITLE: . Study of the Combined Effects of Smoking and Inhalation of
 Uranium Ore Dusts, Radon Daughters and Diesel Oil Exhaust Fumes
 in Hamsters and Dogs

RES. FACILITY: ... National Institute of Environmental Health Sciences

RES. LOCATION: ... Research Triangle Park, North Carolina

INVESTIGATOR(S): J. R. Park

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY '74 \$325,000 FY '75 (100% energy related)

.....

DESCRIPTION: As a major part of an integrated research program on the
 effects of exposure to radon daughters on the development of lung cancer
 in uranium miners, the following animal studies were initiated:
 1. Groups of hamsters were exposed to the following combinations: a. radon
 daughters on room air nuclei; b. radon daughters and carnotite ore dust;
 c. diesel engine exhaust alone; d. diesel exhaust fumes, radon daughters
 and ore dust; e. carnotite ore dust.
 After being exposed to predetermined cumulative dosage levels, the animals
 were maintained for life for the observation of pathological changes,

RELATED TECHNOLOGIES:

.....

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Nuclear

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: The Biologic Effects of Environmental Radiation

RES. FACILITY: Temple Union School of Medicine

RES. LOCATION: Philadelphia, PA

INVESTIGATOR(S): P. Forbes

SPONSOR(S): NIH/DHEW

DURATION: 2 year

FUNDING: FY74 \$40,069 FY75 \$48,000 (100% energy related)

DESCRIPTION: This program will comprise a coordinated research effort on the The Biologic Effects of Environmental Radiation, particularly of ultraviolet and visible light, with emphasis on effects on the skin. The separate projects will be supervised by individual investigators of senior scientific stature.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Nuclear
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of
normal, susceptible and stressed population groups to different levels and
combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Pathogenesis of Pulmonary Berylliosis
.....
.....

RES. FACILITY: Wayne State University

RES. LOCATION: Detroit, Michigan

INVESTIGATOR(S): A. Reeves

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY 74 \$58,875 FY 75 \$63,470

(100% energy related)

DESCRIPTION: Guinea pigs with various conditioning treatments will be
exposed to the inhalation of BeSO₄ aerosol. The conditioning treatments
will include induction of hypersensitivity; passive transfer of hypersensitivity
; induction of hyporeactivity; induction of anergy; and desensitization.
Appropriate controls will be included. The pulmonary response after inhalation
of BeSO₄ will be compared and correlated with the prevailing degree of
hypersensitivity. Sensitized and normal lymphocytes will be compared.
Deposition and clearance levels of beryllium in the lungs of the several
animals will be studied. This research is expected to clarify the nature of
the immunologic component in the etiology of pulmonary berylliosis, and to

RELATED TECHNOLOGIES:
suggest means by which the development of this disease could be inhibited.
.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Nuclear

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: A Study of the Immunologic Aspects of Beryllium Lung Disease

.....

RES. FACILITY: Cleveland Clinic Foundation

RES. LOCATION: Cleveland, OHIO

INVESTIGATOR(S): Sharad D. Deodhar

SPONSOR(S): NIH/DHEW

DURATION: 3 years

FUNDING: FY '74 \$34,675; FY '75 \$35,909

..... (100% energy related)

DESCRIPTION: In the proposed project, we wish to further explore the .. cellular immune mechanisms, both on a clinical and experimental level, .. The clinical studies will include frequent in vitro studies on patients' .. lymphocytes for correlation with clinical state, exploration of reactions .. with various proteins (serum, skin and lung) complexed with Be ions, and .. an annual study of workers (about 600) at the Brush Beryllium Co. in ... Ohio with the in vitro tests to determine the incidence and significance .. of positive reactions, .. The experimental studies should include attempts .. to produce the disease in either inbred guinea pigs or rats by intratracheal

RELATED TECHNOLOGIES:

.....

CATEGORY:

SUBCATEGORY:

TECHNOLOGY:

SUBTECHNOLOGY:

OBJECTIVE:

.....

.....

PROJECT:

TITLE: A Study of the Immunologic Aspects of Beryllium

..... Lung Disease

.....

RES. FACILITY:

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S):

DURATION:

FUNDING:

.....

DESCRIPTION: injections of Be salts, similar in vitro studies on
..... lymphocytes, study of the effect of suppressing cellular immunity and of
..... passive transfer of sensitized lymphocytes. These studies should yield
..... valuable information towards a better understanding of this important
..... occupational disease.
.....

.....

.....

.....

.....

RELATED TECHNOLOGIES:

.....

CATEGORY: Health Effects
 SUBCATEGORY:
 TECHNOLOGY: Nuclear
 SUBTECHNOLOGY:
 OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal,
 susceptible and stressed population groups to different levels and combina-
 tions of biologically active agents associated with energy technologies.
 PROJECT:
 TITLE: Study influence of Exposure to Uranium Mine Tailings

 RES. FACILITY: The Children's Hospital
 RES. LOCATION: Denver, Colorado
 INVESTIGATOR(S): Dr. C.P. Holton
 SPONSOR(S): NIH/HEW
 DURATION: FY 1973-75
 FUNDING: FY 74 \$286,077 FY 75 \$246,537
 (100% energy related)
 DESCRIPTION: The Oncology Center staffed by a multidisciplinary team
 for gathering data is doing clinical research and application of new know-
 ledge gained to medical education for early detection and improved patient
 care. To define extent of neoplastic disease in this geographic setting
 and in the individual patient by application of new methodology. To innovate
 new and better methods of supportive care for the pediatric cancer research
 patient and to explore new methods of rehabilitation. Continuation of
 basic and clinical research joint projects by planning joint protocols,
 conferences and evaluation of results, in order to improve childhood cancer
 control. To assist in future planning for an all
 encompassing comprehensive cancer center for children and adults in the
 Rocky Mountain Region.

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Nuclear

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of
normal, susceptible and stressed population groups to different levels and combin-
ations of biologically active agents associated with energy technologies.

PROJECT:

M
TITLE: Morphogenesis of Lung Cancer

.....

.....

RES. FACILITY: ... St. Mary's Hospital

RES. LOCATION:

INVESTIGATOR(S): Dr. Geno Saccomanno

SPONSOR(S): NIH/HEW

DURATION: FY 1972-75

FUNDING: FY 74 \$126,000 FY 75 \$38,000

..... (100% energy related)

DESCRIPTION: The objective of this contract is to learn about the
morphogenesis of human lung cancer by sputum cytological analysis, with
the correlation of cytology and histology of lung cancer. In 1973, 2,252
sputum samples from uranium miners were collected, slides prepared, reported,
and filed. Five new cases of carcinoma have been identified. Nineteen
cancer of the lung deaths occurred among the uranium miner population.
Twenty-six autopsies were performed, and these will be studied to collaborate
cytological findings. Identification of early stages in the morphogenesis of
human lung cancer and the determination of the characteristics of this high
risk population are of vital importance. Experimental study applicable to
RELATED TECHNOLOGIES: these goals in the hamster model is similarly relevant.

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Nuclear.....

SUBTECHNOLOGY:

OBJECTIVE:To evaluate the short term and long term hazards of exposure
of normal, susceptible and stressed population groups to different levels and
combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE:Comparative Carcinogenicity of Tritium.....

RES. FACILITY:University of Chicago.....

RES. LOCATION:Chicago, Ill.....

INVESTIGATOR(S):DJ Mewissen.....

SPONSOR(S):NIH/HEW.....

DURATION:FY 1973-75.....

FUNDING:FY 74 \$145,510 FY 75 \$18,788.....

.....(100% energy related).....

DESCRIPTION:Administration of tritium in the form of tritiated thymidine,
within a dose range of .3 to 1.5 μ Ci/g, in newborn C57 Black Mice has
proved to increase the overall incidence of tumors, particularly lymphosarcomas
over the entire lifespan. The proposed research is intended to investigate
a possible carcinogenic effect of tritiated precursors of RNA and proteins,
namely tritiated uridine and leucine. On the other hand, we found an
average residual activity of 20-50 pCi/g. at the time of death (up to
1,200 days) in mice treated at birth with tritiated thymidine at the dose
levels cited. Determination of discrimination factors for tritium in these
fractions and comparison with the amounts of activity incorporated from

RELATED TECHNOLOGIES:tritiated precursors might shed some light on the carcinogenic process
(if any) from such tritiated precursors and from tritiated water.

CATEGORY:Health Effects.....
SUBCATEGORY:
TECHNOLOGY:Geothermal.....
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of
normal, susceptible and stressed population groups to different levels and
combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE:Physiopathologic Effects of Lead in Pigs (RG).....
.....
.....

RES. FACILITY:Iowa State University.....

RES. LOCATION:Ames, Iowa.....

INVESTIGATOR(S):W. Buck.....

SPONSOR(S):NIH/DHEW.....

DURATION:1 year.....

FUNDING:FY 74 \$47,251 (100% energy related).....

.....
DESCRIPTION: A three-fold objective of this research is to determine
.....
.....1) the dose relationship of lead to physiopathologic effects in pigs, a
.....
.....species physiologically similar to man, 2) the influence of subclinical lead
.....
.....exposure on resistance to infectious agents, and 3) the mechanism for lead
.....
.....mediated suppression of resistance to infectious agents.
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RELATED TECHNOLOGIES: Coal.....
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CATEGORY:Health Effects.....
SUBCATEGORY:
TECHNOLOGY:Geothermal.....
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.....

PROJECT:

TITLE:Metallic Mercury as an Environmental Hazard.....
.....
.....

RES. FACILITY:University of Rochester.....

RES. LOCATION:Rochester, M.Y.....

INVESTIGATOR(S):T. Clarkson.....

SPONSOR(S):NIH/DHEW.....

DURATION:2 years.....

FUNDING:FY 74 \$179,867FY 75 \$179,800.....

.....(100% energy related).....

DESCRIPTION:Extension of our studies to related forms of mercury is a necessary development of the present program on methylmercury. The hazard to human health cannot be estimated without considering additive and synergistic effects of multiple exposures to different forms of mercury viz. daily exposures to phenylmercury in contraceptive and cosmetic preparations and occupational exposure to metallic vapor.....
.....
.....
.....

RELATED TECHNOLOGIES:
.....

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Geothermal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of
 normal, susceptible and stressed population groups to different
 levels and combinations of biologically active agents associated
 with energy technologies.

PROJECT:

TITLE: Methyl Mercury Teratogenesis

RES. FACILITY: Univ. of Washington School of Medicine

RES. LOCATION: Seattle, Washington

INVESTIGATOR(S): N. Mottet

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY74 \$40,910 (100% energy related)

DESCRIPTION: The purpose of these experiments is to define the dose range,
 pattern of anomalies relative to dose and the embryogenic period of suscep-
 tibility. The investigation is designed to uncover deleterious effects on
 the fetus at the level of human "subclinical" exposure as well as at higher
 dosage levels. There is reason to suspect that spironolactones will protect
 the fetus from the toxic effects of methyl mercury. Their protective effects
 will be tested.

..... Shale

RELATED TECHNOLOGIES:

CATEGORY: HEALTH EFFECTS
SUBCATEGORY:
TECHNOLOGY: Geothermal
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of
..... normal, susceptible and stressed population groups to different
..... levels and combinations of biologically active agents associated
..... with energy technologies.
PROJECT:
TITLE: Teratogenic Effects of Heavy Metals
.....
.....
RES. FACILITY: Dartmouth College
RES. LOCATION: Hanover, New Hampshire
INVESTIGATOR(S): V. Ferm
SPONSOR(S): NIH/DHEW
DURATION: 2 year
FUNDING: FY74 \$57,242 FY75 \$62,338 (100% energy related)
.....
DESCRIPTION: This research program will study the effect of biologically
..... non-essential heavy metals on mammalian embryonic development. Certain of
..... these metals (lead, cadmium, arsenic, indium) already are known to exert
..... teratogenic effect on the developing hamster embryo. We plan to investigate
..... these effects by four different approaches. First, we shall investigate the
..... teratogenic potential of mercury compounds. Second will be an attempt to
..... detect by electron microscopy small concentrations of teratogenic heavy metals
..... within early placental and embryonic . Thirdly we shall make comparative
..... studies on limb bud malformations induced by acetazolamide. Finally we shall
..... investigate the effects of teratogenic heavy metals on mammalian embryo tissue
RELATED TECHNOLOGIES:
..... and orcan cultures and endeavor to relate these effects to those seen in the
..... cells of the embryo in -vivo

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Geothermal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of
 normal, susceptible and stressed population groups to different
 levels and combinations of biologically active agents associated
 with energy technologies.

PROJECT:

 Lasting Effects of Prenatal Low Dose Methylmercury

TITLE:

RES. FACILITY: Univ. of Minnesota

RES. LOCATION: Minneapolis, Minnesota

INVESTIGATOR(S): S. Sparber

 NIH/DHEW

SPONSOR(S):

 2 year

DURATION:

FUNDING: FY74 \$43,241 FY75 \$29,957 (100% energy related)

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DESCRIPTION: We propose to study the subtle effects, if produced, by low
 doses of methylmercury administered acutely, at different stages of develop-
 ment, as well as chronically. We hope to determine if critical periods
 exist for neurochemical, behavioral, and/or ultrastructural alterations as a
 consequence of exposure to methylmercury during development. In addition, an
 attempt will be made to determine if prevention, reversal or attenuation of
 these effects can be accomplished with the use of heavy metal antidotes.
 Finally we propose to determine, by appropriate dose-response relationship
 studies, the dose or concentration of methylmercury that is compatible with
 normal development.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Geothermal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Function of Lead in Tumorigenesis

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RES. FACILITY: West Virginia University

RES. LOCATION: Morgantown, W. Va.

INVESTIGATOR(S): B. Kirk

SPONSOR(S): NIE/DHEW

DURATION: 2 years

FUNDING: FY 74 \$16,780 FY 75 \$19,312

..... (100% energy related)

DESCRIPTION: In this project, the effect of lead on the progress of leukemia L1210 cells and Moloney sarcoma virus- induced tumors will be determined. Progress of these tumors in lead-treated mice will be compared with tumor progress in control animals. In addition, the immune response of animals with progressing and regressing tumors will be assayed. Particular attention will be given to the development of cytotoxic antibody, enhancing antibody, and cellular immunity in treated and control groups.

..... Shale

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Geothermal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of
normal, susceptible and stressed population groups to different levels and
combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Effect of Toxic Metals on Specific Brain Structures

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RES. FACILITY: University of Cincinnati

RES. LOCATION: Cincinnati, Ohio

INVESTIGATOR(S): W. Niklowitz

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY 74 \$40,833 (100% energy related)

DESCRIPTION: The proposed study will correlate the light microscopic
cytology and electron microscopic substructure with cyto-and histochemical
observations of the CNS after intoxication with metal compounds. It will
emphasize specific brain areas which are considered to be of special
importance, and provide a basic understanding of structural manifestation of
metal poisoning before, during, and after clinical manifestation of intoxi-
cation. The study also proposes to determine the time sequence of the
earliest cytomorphological and cytochemical changes (lesions) as they may be
related to functional and metabolic disorders of the CNS.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Geothermal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of
normal, susceptible and stressed population groups to different levels and
combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Diagnosis and Therapy of Chronic Childhood Plumbism

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RES. FACILITY: University Hospital

RES. LOCATION: Boston, Mass.

INVESTIGATOR(S): R. Feldman

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY 74 \$23,959 FY 75 \$23,146

..... (100% energy related)

DESCRIPTION: The proposed project will include: a) Studies of peroneal
motor nerve conduction in well documented cases of lead intoxication to verify
the trends suggested by the preliminary observations. Radial and ulnar
motor nerve studies as well as determination of sensory evoked potentials
in the peripheral nerves may provide additional clinical data to corroborate
the experimental lead neuropathy studies of Schlaepfer (1969) (25) and
Fullerton (23). b) Careful correlation of nerve conduction values with a
more accurate determination of exposure time; estimated by arrested bone
growth, if present, analysis of lead in measured segments of hair,
amount of lead excreted in urine per actual dose per weight of EDTA; and
RELATED TECHNOLOGIES: serial recording of CV.

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Geothermal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Effects of Lead on Fetal and Neonatal Development

RES. FACILITY: Univ. of Wisconsin

RES. LOCATION: Madison, Wisconsin

INVESTIGATOR(S): R.E. Bowman

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY75 \$133,347 (100% energy related)

DESCRIPTION: The major objective of the proposed research is to determine the residual effects of low level lead exposure on the fetal and infant rhesus monkey. Pregnant rhesus monkeys will be fed low levels of lead throughout gestation and their infants evaluated biologically and behaviorally during infancy, adolescence, and early adulthood.

RELATED TECHNOLOGIES: Coal, Oil and Gas

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Geothermal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of
normal, susceptible and stressed population groups to different levels
and combinations of biologically active agents associated with energy
technologies.

PROJECT:

TITLE: Effects of Lead on Renal Maturation in Young Animals

RES. FACILITY: University of Cincinnati

RES. LOCATION: Cincinnati, Ohio

INVESTIGATOR(S): D. Johnson

SPONSOR(S): NIH/DHEW

DURATION: year

FUNDING: f FY 75 \$50,791 (100% energy related)

DESCRIPTION: This grant proposal is concerned primarily with the
extent of renal damage induced in young animals by the ingestion of lead
diets. We are particularly interested in the effects of lead on the
maturation of renal function in the newborn dog. Maturation of glomerular
function, tubular function, and renal hemodynamics will be assessed.
Another area to be investigated will be the effects of lead exposure during
early development on renal function in adult rats. Finally, blood and
kidney levels of lead will be correlated with renal dysfunction as determined
from the above experiments.

RELATED TECHNOLOGIES: Coal

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of
normal, susceptible and stressed population groups to different levels
and combinations of biologically active agents associated with energy
technologies.

PROJECT:

TITLE: Role of Air Pollutants in Airborne Infection

RES. FACILITY: University of Texas

RES. LOCATION: Dallas, Texas

INVESTIGATOR(S): P. Southern

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY 74 \$29,155 FY 75 \$34,435

(100% energy related)

DESCRIPTION: 1. To study the effects of nitrogen dioxide, carbon
monoxide and lead oxides on handling aerosols of Diplococcus pneumoniae,
Hemophilus influenzae and Pseudomonas aeruginosa by young male rats. This
will include a study of in vivo pulmonary bactericidal capacity and non-
viable particle clearance.

2. To study in vitro alveolar macrophage function in this
model.

3. To study effects on pulmonary surfactant activity in
this model system.

These studies should provide a more rational basis for assigning a
RELATED TECHNOLOGIES:
quantitative role to effects of air pollutants in lowering resistance to
airborne infection.

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of
normal, susceptible and stressed population groups to different levels and
combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Pathogenic Mechanisms of Pulmonary Disease in the
..... Systemic Connective Tissue Diseases (SCTD)
.....

RES. FACILITY: University of Vermont

RES. LOCATION: Burlington, Vermont

INVESTIGATOR(S): D.S. Newcombe

SPONSOR(S): NIH/DHEW

DURATION: 3 years

FUNDING: FY '74 \$197,761; FY '75 \$365,269
..... (10% energy related)
.....

DESCRIPTION: We propose: 1) to investigate the effect of certain
immune components (rheumatoid factor, antigen-antibody complexes, etc)
..... associated with SCTD on lung injury by means of their influence on human
..... alveolar macrophage phagocytosis and lysosomal enzyme release and on
..... fibrogenesis, as assayed by prolyl hydroxylase activity of bronchial lavage
..... concentrates; (2) to investigate immune damage to lung tissue in animal
..... models using light and electron microscopy, in addition to other techniques;
..... 3) to evaluate hyperviscosity as a factor in the pulmonary disease; and
..... 4) to correlate these mechanisms of tissue injury to clinical, radiographic,
..... and physiologic function characteristics (including ¹³³Xenon scanning)

RELATED TECHNOLOGIES:
..... of patients with SCTD and pulmonary manifestations, and to evaluate the
..... effect of therapy on these mechanisms.

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: University of Texas Center for Lung Research in Dallas

RES. FACILITY: University of Texas Health and Science Center

RES. LOCATION: Dallas, Texas

INVESTIGATOR(S): S. L. Said

SPONSOR(S): NIH/DHEW

DURATION: 3 years

FUNDING: FY '74 \$428,089; FY '75 \$480,129

..... (5% energy related)

DESCRIPTION: 1) the isolation, chemical and biological characterization of new vasoactive polypeptides from lung and intestine, and the possible use of some of these peptides as bronchodilators;

..... 2) cellular localization of angiotensin-converting enzyme;

..... 3) measurements of aspects of pulmonary permeability in some experimental conditions associated with lung damage;

..... 4) evaluation of Bacterial colonization and virulence factors in the pathogenesis of chronic obstructive airway disease;

..... 5) use of animal models to determine the dependence of diaphragmatic work on O₂ delivery

RELATED TECHNOLOGIES: .. work on O₂ delivery

..... 6) the evaluation of psychological factors in chronic obstructive lung disease; and 7) improved methods for the early detection of pulmonary embolism.

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Effects of Pollutants in Chronic Airway Obstruction

RES. FACILITY: Rancho Los Amigos Hospital

RES. LOCATION: Downey, Calif.

INVESTIGATOR(S): J.D. Hackney

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY '74 \$69,250 (25% energy related)

DESCRIPTION: Develop and evaluate instrumentation for closing volume, flow volume, cough. Epidemiological survey of smokers and non smokers. Retrospective and predictive studies: genetic factors (ATI), pulmonary function, psychological evaluation of former smokers.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal,
 susceptible and stressed population groups to diffeent levels and combinations
 of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Study of Pulmonary Function in Non-Smokers

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.....

RES. FACILITY: Johns Hopkins University

RES. LOCATION: Baltimore, Maryland

INVESTIGATOR(S): Harold

..... NIH/DHEW

SPONSOR(S):

..... 3 years

DURATION:

FUNDING: FY '74 \$250,921; FY '75 \$240,212

..... (5% energy related)

.....

DESCRIPTION: The proposed study is a longitudinal follow up of 578 male
 non-smokers, initially evaluated in 1965 by respiratory symptom questionnaires
 and tests of forced expiration. After one additional year of data collection,
 the results of an 8-year prospective observation will be availabel to evaluate
 the probability of a detectible latent stage in obstructive pulmonary disease.
 The methods of study will include: 1) tracing subjects for complete
 ascertainment of the population which was tested in 1965; 2) interviewing
 subjects with NHLI respiratory questionnaire; 3) ascertaining peak flow/
 spirometry by NHLI criteria; and, 4) describing the spirograms of both the
 current and 1965 studies in terms of exponential functions relating time,
RELATED TECHNOLOGIES: flow and volume.

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Multi
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal,
susceptible and stressed population groups to different levels and combinations
of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Alveolar Biology
.....
.....

RES. FACILITY: Albert Einstein College of Medicine

RES. LOCATION: Bronx, New York

INVESTIGATOR(S): Emile M. Scarpell

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY '74 \$402,631; FY '75 \$334,136

..... (15% energy related)

DESCRIPTION: Our goal is to study the alveolus from the perspective
of four scientific disciplines (chemistry, cell biology, morphology and physiolo-
gy) and thus to define its development and maturation, its adaptation to
air breathing, its normal condition in situ, and its condition in selected
abnormal states.

..... The subjects of this research range from animals to human
and from the developing fetus to the adult. The range of materials is from
subcellular particles to the intact organism. The focus is the alveolus,
normal and abnormal.

RELATED TECHNOLOGIES:
.....

CATEGORY: Health Effects.....
SUBCATEGORY:
TECHNOLOGY: Multi.....
SUBTECHNOLOGY:
OBJECTIVE: ..To evaluate the short term and long term hazards of exposure of normal,
susceptible and stressed population groups to different levels and combina-
tions of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Cardiorespiratory Performance and Environmental Factors

RES. FACILITY: Research Foundation of State University of New York

RES. LOCATION: Albany, New York

INVESTIGATOR(S): L.E. Farhi

SPONSOR(S): NIH/DHEW

DURATION: 3 years

FUNDING: FY '74 \$229,162; FY '75 \$239,774

..... (5% energy related)
DESCRIPTION: This application describes an on-going program in respira-
tory and cardiovascular performance, with emphasis on the effects of changes
in environmental factors such as ambient pressure, temperature, inspired
gas composition and pressure, and submergence and gravity. This research
will be conducted in a specially designed laboratory which when completed
later this year will include a human centrifuge, a submergence basin, a
running track and a high pressure chamber rated to 170 atm. The interrelated
projects are grouped in three sections: pulmonary physiology, cardiovascular
studies, and blood-tissue gas exchange.

RELATED TECHNOLOGIES:

CATEGORY:Health Effects.....
SUBCATEGORY:
TECHNOLOGY:Multi.....
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal,
susceptible and stressed population groups to different levels and combinations
of biologically active agents associated with energy technologies.....

PROJECT:

TITLE: Cardiovascular, Pulmonary and Behavioral Studies
.....
.....

RES. FACILITY: John Hopkins University

RES. LOCATION: Baltimore, Maryland

INVESTIGATOR(S): Solbert Permutt

SPONSOR(S): NIH/DEEW

DURATION: 3 years

FUNDING: FY '74 \$328,321; FY '75 \$ 346,429
..... (15% energy related)

DESCRIPTION: We are exploring a number of problems in the basic
..... physiology of respiration and circulation in the hope of developing new
..... concepts that will be useful in clinical medicine. The program consists
..... of seven broad areas: 1) physiological effects of hypoxia; comparison of
..... hypoxic hypoxia and carbon monoxide hypoxia; 2) Studies on the relations
..... between respiratory mechanics and the circulation; 3) pulmonary mechanics;
..... 4) control of respiration; 5) gas transport in lung, placenta and solid
..... tissue; 6) studies of specific circulations: pulmonary circulation, coronary
..... circulation, cerebral circulation, and role of systemic vascular bed in
..... control of venous return; 7) regulation of systemic, pulmonary and coronary

RELATED TECHNOLOGIES:
..... circulation in awake and active dogs.

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Multi
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal
susceptible and stressed population groups to different levels and combinations
of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Stadardized Measurement of Colsing Volume
.....
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RES. FACILITY: Oregon University Medical School

RES. LOCATION: Portland Oregon

INVESTIGATOR(S): B. B. Rose

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY '74 \$ 105,920 (25% energy related)

DESCRIPTION: Evaluate variables in closing volume determinations;
determine effect of smoking, dust, respiratory infection (virology).
Pulmonary function in smokers; determine reversibility of pathology on
cessation of smoking.
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RELATED TECHNOLOGIES:
.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi -Technology

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Low Dose Risk Estimation from Experimental Carcinogenesis

.....

.....

RES. FACILITY: Bational Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, N. C.

INVESTIGATOR(S): D. G. Hoel, K.S. Crump, C. H. Langley

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 75 \$48,000 (100% energy related)

DESCRIPTION: Various possible models of carcinogenesis were analyzed with respect to low dose kinetics. The importance of background carcinogenesis upon the shape of the dose response curve at low dose was evaluated. It was found that if carcinogenesis by an external agent is considered to be augmenting an already ongoing spontaneous process then the response will be linear at low dose. Measures of the degree of linearity were obtained for multistage models of carcinogenesis and t'e log normal distribution.

..... These considerations led to the investigation of optimal experimental designs for the purpose of setting acceptable levels of environmental carcinogens. The problems of selecting the experimental dose
RELATED TECHNOLOGIES: and the number of experimental animals were given particular attention.

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Multi-Technology
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of
normal, susceptible and stressed population groups to different levels and
combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Effects of Dietary Deficiency on Sensitivity to Mutation
..... Induction
.....

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, N.C.

INVESTIGATOR(S): W. Sheridan

SPONSOR(S): NIH/HEW

DURATION: 5 1/2 yrs

FUNDING: FY 75 \$52,000 (energy related)

DESCRIPTION: It is the purpose to determine whether or not diets
deficient in essential vitamins will change the status of experimental animals
(mice) so that there is a change in their sensitivity to the induction of
genetic effects by known chemical mutagens. The present study concerns
the effects of Vitamin D deficiency as measured in the dominant lethal
test and in the translocation test.
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RELATED TECHNOLOGIES:
.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi-Technology

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of
 normal, susceptible and stressed population groups to different levels
 and combinations of biologically active agents associated with energy technologie

PROJECT:

TITLE: Effect of Environmental Components on Mammalian Ontogenesis
 After Parental Exposure

 National Institute of Environmental Health Sciences
 RES. FACILITY:
 Research Triangle Park, N. C.
 RES. LOCATION:
 R.E. STAPLES, F.D. ANDREW, S.N. BAKSI, C.A. KIMMEL, R. MOURER
 INVESTIGATOR(S): L.A. MOUSTAFA
 NIH/HEW
 SPONSOR(S):
 DURATION:
 FUNDING: FY 74 \$237,791 (10% energy related)

DESCRIPTION: The objective of this study is to determine the develop-
 mental toxicity and teratogenic potential of single or combined environ-
 mental components in mammals by application of the agents (a) to the dam
 and (b) by local application to the developing conceptus in vivo .

RELATED TECHNOLOGIES:

.....

CATEGORY: Health Effects
SUBCATEGORY:
Multi - Technology
TECHNOLOGY:
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of
normal, susceptible and stressed population groups to different levels
.....
and combinations of biologically active agents associated with energy technology
.....
PROJECT:
TITLE: Comparative Sensitivities of Different Mouse Strains
.....
to Mutagenic Agents
.....
.....
RES. FACILITY: National Institute of Environmental Health Sciences
RES. LOCATION: ... Research Triangle Park, North Carolina
INVESTIGATOR(S): W. Sheridan
SPONSOR(S): NIH/HEW
DURATION:
FUNDING: FY 74 \$64,948 (100% energy related)
.....
DESCRIPTION: Irradiation studies have shown that there are strain
.....
differences in mice in susceptibility to genetic damage. These differences
.....
are assessed to be genetically determined. We are investigating to what
.....
extent genetically caused differences in sensitivity pertain even to other
.....
mutagenic agents. We wish to determine if the relative level of sensitivity
.....
of a defined genome to mutation induction is constant for all agents or
.....
variable depending on the mutagen used. In order to accrue a battery of
.....
test strains showing distinct levels of sensitivity ranging from high to
.....
low, we are challenging adult male mice with a known potent mutagen, EMS,
.....
and mating them in dominant lethal tests. They will subsequently be
.....
RELATED TECHNOLOGIES:
subjected to tests with other known or suspected mutagenic agents.
.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi- Technology

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of .
 normal, susceptible and stressed population groups to different levels and
 combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Probability Models and Competing Risks in the Study of ..
 Mortality Data

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, N. C.

INVESTIGATOR(S): D. G. Hoel

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 74 \$18,268 (100% energy related)

DESCRIPTION: Probabilistic models are being studied for describing the
 occurrences of particular diseases in a competing risk framework. Specific
 parametric models are being considered for low-dose extrapolation. Particular
 attention is being given to all model assumptions since models which are
 essentially equivalent in the experimental range may lead to significantly
 different results at low dose levels. These methods will be incorporated
 into the policy of setting "safe-levels" of environmental contaminants.

RELATED TECHNOLOGIES:

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Multi-Technology.....

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of...
normal, susceptible and stressed population groups to different levels and
combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: A Comprehensive Field and Laboratory Research Program on
..... the Etiology and Epidemiology of Human Cancer
.....

RES. FACILITY: Southern California School of Medicine

RES. LOCATION: Los Angeles, Calif.

INVESTIGATOR(S): Dr. M.B. Gardner, Dr. R.M. McAllister, Dr. B.E. Henderson

SPONSOR(S): NIM/HEW

DURATION: FY 1968-75

FUNDING: FY 74 \$2,450,000 FY 75 \$2,562,000

..... (7% energy related)

DESCRIPTION: To mount a multifaceted, highly interrelated program
..... designed to determine the roles of viruses, physical and chemical carcinogens,
..... and other factors in the etiology of human and animal cancer in a natural
..... urban ecology. These studies are carried out at USC School of Medicine
..... and at Childrens Hospital of Los Angeles. Viral Studies: Human, Pet and
..... feral animal cancer and fetal materials are under intensive study for RNA
..... tumor virus expression, utilizing all the modern in vitro as well as in vivo
..... test systems. Epidemiological Studies: This program is providing,
..... through hospital record surveys and community questionnaire surveys, up-to-
..... date information of the natural occurrence of human cancer as it may be

RELATED TECHNOLOGIES:
..... influenced by genetic, viral, ^{NZB} viruses.
.....

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Multi-Technology
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of
normal, susceptible and stressed population groups to different levels and
combinations of biologically active agents associated with energy technologies.

PROJECT:
TITLE: Mutagenicity and Mutagenic Specificity of Chemical Carcin-
ogens in UV-sensitive Strains of Neurospora crassa
.....
RES. FACILITY: National Institute of Environmental Sciences
RES. LOCATION: Research Triangle Park, N. C.
INVESTIGATOR(S): Hirokazu Inoue
SPONSOR(S): NIH/HEW
DURATION:
FUNDING: FY 75 \$48,000 (100% energy related)

DESCRIPTION: Many studies, in bacteria as well as in other microbial
organisms, have shown that some of the repair-deficient strains are more
mutable than the wild-type. In studies with the ad-3 test system of
Neurospora crassa, Dr. de Serres and his coworkers showed that the repair-
deficient strains, upr-1 and uvs-2, are more mutable than wild type after UV
or x-ray irradiation. It also has been shown by de Serres that the spectra
of genetic alterations caused by UV in repair-deficient strains are different
from that caused by UV in the wild type. It is of interest, therefore, to
study and compare the mutagenic sensitivity of repair-deficient and wild-type
strains to various chemical carcinogens and to compare the spectra of
RELATED TECHNOLOGIES: genetic alterations caused by the carcinogenic agents in the UV-sensitive
strains and the wild-type strain.

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi-Technology

SUBTECHNOLOGY:

OBJECTIVE: .. To evaluate the short term and long term hazards of exposure of
 normal, susceptible and stressed population groups to different
 levels and combinations of biologically active agents associated
 with energy technologies.

PROJECT:

TITLE: .. Statistical Methodology and Modeling in the Analysis of Teratology
 .. Data.....

RES. FACILITY: ... National Institute of Environmental Health Sciences

RES. LOCATION: ... Research Triangle Park, North Carolina

INVESTIGATOR(S): J. K. Haseman

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY '74 \$13,959 FY '75 \$32,000 (100% energy related)

DESCRIPTION: Computer programs are being written for the processing of
 .. data from several different types of teratology studies. Statistical
 .. sub-routines are being developed to calculate summary statistics, to
 .. determine the significance of treatment-control differences and to
 .. examine overall dose-response relationships. Many segments of the overall
 .. program are already operational and being used to facilitate routine data
 .. processing.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects.....

SUBCATEGORY:

TECHNOLOGY: Multi-Technology.....

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of
 normal, susceptible and stressed population groups to different
 levels and combinations of biologically active agents associated
 with energy technologies.

PROJECT:

TITLE: ... Theoretical Basis of Dose-Response Relationships.....

RES. FACILITY: National Institute of Environmental Health Sciences.....

RES. LOCATION: Research Triangle Park, North Carolina.....

INVESTIGATOR(S): P. J. Walsh.....

SPONSOR(S): NIH/HEW.....

DURATION:

FUNDING: FY '74 \$46,735..... FY '75 \$60,000 (100% energy related)

DESCRIPTION: Theoretical models already developed are being used to.....
 focus experimental work at the cellular level. A primary goal is to.....
 develop the relationships between cell killing and cell alteration as a.....
 guide for the nature of dose-response relationships under low dose, low.....
 dose rate conditions.

RELATED TECHNOLOGIES:

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of
normal, susceptible and stressed population groups to different levels
and combinations of biologically active agents associated with energy
technologies.

PROJECT:

TITLE: Species Differences in Stimulation of Toxication-Detoxication
Systems by Environmental Components. A Comparative Study of the Biochemical
Properties of Xenobiotic-Metabolizing Enzymes in Liver and Intestine of Rabbit

RES. FACILITY: ..National Institute of Environmental Health Sciences.....

RES. LOCATION: ..Research Triangle Park, N. C.

INVESTIGATOR(S): R. S. CHhabra

SPONSOR(S):NIH/HEW.....

DURATION:

FUNDING:FY 74 \$50,388 (20% energy related).....

.....
DESCRIPTION: The effects of various physiological, genetic and environmental
factors on the enzymes metabolizing xenobiotics in various tissues is
under investigation. The current projects under study are 1) hormonal
regulation of induction of hepatic xenobiotic metabolizing enzymes by
insecticides and polycyclic hydrocarbons in rats and mice; 2) sex differences
in xenobiotic metabolism by extrahepatic tissues in the rat; and 3)
comparison of mixed-function oxidases in liver and intestine of rabbit.
.....

.....
RELATED TECHNOLOGIES: Oil and Gas, Shale Oil

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of

 normal, susceptible and stressed population groups to different levels and

 combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Changes in Mammalian Pulmonary Function Produced by Inhaled

 Environmental Agents

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, N. C.

INVESTIGATOR(S): J. J. O'Neil
 NIH/HEW

SPONSOR(S):

DURATION:

FUNDING: FY 75 \$20,000 (100% energy related)

.....

DESCRIPTION: Techniques are being developed to measure changes in the

 pulmonary function of small mammals after inhalation exposure to oxidant

 gases and pulmonary irritants. These changes are being correlated with

 data from cardiovascular and histological investigations.

RELATED TECHNOLOGIES: Oil and Gas

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Determinants of Fatal Skin Tumors U.S. 1950-67

.....

.....

RES. FACILITY: University of Washington, School of Public Health and Medicine

RES. LOCATION: Seattle, Washington

INVESTIGATOR(S): J.A.H. Lee

SPONSOR(S): NIH/HEW

DURATION: FY 1973-75

FUNDING: FY 74 \$21,658 (33% energy related)

DESCRIPTION: Total death rated from skin tumors are rising in young adults, die to a real increase in the incidence of malignant melanoma. This change is probably due to greater exposure of poorly pigmented people to sunlight. The long term objective is to develop means of identifying those at risk, so that they can receive specific advice, while the majority of the population can be rationally reassured. The establishment of the behavior of groups is an essential preliminary to the development of sufficient knowledge for application to individuals. The relationships between exposure and melanoma and other tumors are complicated, and current theoretical ideas do not provide satisfactory explanations of experience. The analysis of this

RELATED TECHNOLOGIES: large body of data will enable theoretical schemes to be modified.

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of
normal, susceptible and stressed population groups to different levels and
combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: UV Photocarcinogenesis
.....
.....

RES. FACILITY: Temple University, Health Science Center

RES. LOCATION:

INVESTIGATOR(S): Drs. P.D. Forbes, R. E. Davies, D. Berger, F. Urbach

SPONSOR(S): NIH/HEW

DURATION: FY 1974-75

FUNDING: FY 74 \$166,000 FY 75 \$148,000
..... (100% energy related)

DESCRIPTION: This project will yield scientific data relevant to the
broad field of cancer biology and in addition provide data of immediate
concern to the National Cancer Institute, to the Department of Transportation's
Climatic Impact Assessment Program, to NASA, and to other agencies concerned
with inadvertant modification of stratospheric ozone. Assessment of the
contribution of various wavebands of ultraviolet light to changes in the
skin will play an important part in the understanding of naturally-occurring
light induced alterations.

RELATED TECHNOLOGIES: Nuclear

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE:Specialized Center of Research in Environmental Lung Tissue.....

RES. FACILITY:Rancho Los Amigos Hospital Inc.....

RES. LOCATION:Downey, Calif.....

INVESTIGATOR(S):Jack D. Hackney.....

SPONSOR(S):NIH/DHEW.....

DURATION:3 years.....

FUNDING:FY '74 \$278,131; FY '75 \$335,328
.....(100% energy related).....

DESCRIPTION:At Rancho Los Amigos Hospital-USC, the SCOR in Environmental Lung Disease is a multi-disciplinary approach to the study of biological dose-effects of inhaled oxidant pollutants especially in relation to human lung disease. The research programs are designed around an existing unique environmental control and stress testing laboratory which serves as a Central Core Facility for both animal and human studies.....

RELATED TECHNOLOGIES:Oil and Gas.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.....

PROJECT:

TITLE: Air Pollutants, Lung Physiology and Lung Biochemistry

RES. FACILITY: John B. Pierce Foundation Laboratory

RES. LOCATION: New Haven, Conn.

INVESTIGATOR(S): James S. Douglas

SPONSOR(S): NIH/DHEW

DURATION: 3 years

FUNDING: FY '74 \$20,259; FY '75 \$1,515 (100% energy related)

DESCRIPTION: To study the effects of air pollutants and pharmacological agents on lungs and airways in animals; To test the hypothesis that pollutants and other chemical stimuli possess bronchoconstrictor or vasoconstrictor or vasoconstrictor activity because of their ability to stimulate the synthesis and release of prostaglandins from lung tissue;; and to gather information on the effects of chemical stimuli in vitro on the enzymes involved in prostaglandin synthesis and metabolism, namely phospholipase A₂, prostaglandin synthetase and prostaglandin 15-dehydrogenase. The relationship of inflammatory responses and edema to prostaglandin in release will be assessed.

RELATED TECHNOLOGIES: Oil and Gas

CATEGORY:Health.Effects.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of
normal, susceptible and stressed population groups to different levels and
combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE:Carbon Monoxide: Chronic Effects On the Heart.....

RES. FACILITY:University of Illinois.....

RES. LOCATION:Chicago, Illinois.....

INVESTIGATOR(S):David G. Penney.....

SPONSOR(S):NIH/DHEW.....

DURATION:1 year.....

FUNDING:FY '74 \$30,647 (100% energy related).....

DESCRIPTION:The studies outlined in this proposal should provide
information on the changes which come about in the normal myocardium as a
result of prolonged exposure to CO and add to our understanding of the range
of adaptive/pathological responses which occur in the heart when presented
with chronic stress. They should also provide information basic to the
design of future studies dealing with possible interaction of CO effects
with various cardiac and respiratory problems (i.e. coronary artery disease,
congestive heart failure, emphysema, etc.).

RELATED TECHNOLOGIES:Oil and Gas.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal,
susceptible and stressed population groups to different levels and combinations
of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Asthma And Air Pollution In Two Inner City Areas

RES. FACILITY: Columbia University

RES. LOCATION: New York City

INVESTIGATOR(S): Mervyn W. Sussee

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY '74 \$41,676 FY '75 \$56,575

..... (100% energy related)

DESCRIPTION: In this study of the relationship of air pollution ..
... to asthma, we propose to test preliminary results (for four months in ...
... 1970), which indicate that daily visits to emergency rooms for asthma in two
... large hospitals in the Bedford-Stuyvesant area in Brooklyn, are significantly
... correlated with daily levels of sulfur dioxide measured in their vicinity.
... This correlation was not found to hold in Harlem. We propose to enlarge
... our study to cover the full three year period for which we have collected
... data. We further wish to include comparable data from Metropolitan Hospital
... in East Harlem

RELATED TECHNOLOGIES: Oil and Gas

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal,
susceptible and stressed population groups to different levels and combinations
of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Modification of Lung Immune Responses

RES. FACILITY: Medical College of Wisconsin

RES. LOCATION: Milwaukee, Wisconsin

INVESTIGATOR(S): Jordan N. Fink

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY '74 \$7,925 FY '75 \$8,409

..... (50% energy related)

DESCRIPTION: Our previous studies have shown that inhalation of organic
..... materials may lead to sensitization of susceptible individuals with resulting
..... pathologic changes in the lung and impairment of pulmonary function. In
..... the present study we plan to investigate in an animal model whether inhalation
..... of noxious agents, either in gaseous or particulate form, predisposes the
..... lung to a more facile development of the immune responses and associated
..... pulmonary damage following a subsequent challenge with antigenic
..... materials. The effect of the physical nature of the inhaled antigens, ..
..... i.e., liquid or solid, on the type of the immune response in the lung will
..... also be considered.

RELATED TECHNOLOGIES: Shale

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of
normal, susceptible and stressed population groups to different levels and
combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Toxicity of Benzene and Related Compounds

.....

.....

RES. FACILITY: Kansas University Medical Center

RES. LOCATION: Kansas City, Kansas

INVESTIGATOR(S): E. Uyeki

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY 75 \$41,556 (50% energy related)

.....

DESCRIPTION: We propose to study the toxicity of benzene, bromobenzene,
and naphthalene, their arene oxide intermediates, and their metabolites
on the hemopoietic cell renewal system. Our mouse model considers experimental
correlates of stem cells (pool A, CFU), progenitor cells (pool B, CFC),
and functional end-stage cells (pool C, PFC and effector cells). These
intoxicants will be analyzed on a protracted time schedule, using
experimental correlates of the three compartments (integrated studies).

.....

.....

RELATED TECHNOLOGIES:

..... Shale

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT: Air Pollution and Emergency Room Visits

TITLE:

RES. FACILITY: Columbia Univ.. College of Physicians and Surgeons
N.Y., N.Y.

RES. LOCATION:

INVESTIGATOR(S): M.W. Snaser

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY75 \$127,026 (100% energy related)

DESCRIPTION: This study will use Emergency Room records for the surveillance of changes in states of health in relation to changes in air pollution. Changes will be considered in terms of two groupings of time intervals: 1) the short cyclic variations in air pollution over days, weeks and months, 2) the predicted long term decline in levels of air pollution in New York City.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects.....
SUBCATEGORY:
TECHNOLOGY: Coal.....
SUBTECHNOLOGY:
OBJECTIVE: ..To evaluate the short term and long term hazards of exposure of
normal, susceptible and stressed population groups to different levels and
combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Respiratory Tract Irritants: Sensitization.....
.....
.....
RES. FACILITY: University of Pittsburgh.....
RES. LOCATION: Pittsburgh, Pa.....
INVESTIGATOR(S): Y. Alerie.....
SPONSOR(S): NIH/DHEW.....
DURATION: 2 years.....
FUNDING: FY 74 \$86,199 FY 75 \$44,025.....
..... (100% energy related).....
DESCRIPTION: Further development of a technique to evaluate sensory
..... irritation of the upper respiratory tract by airborne chemicals encountered
..... frequently in industrial situations. Quantitative evaluation of species
..... sensitivity (mice, rats, guinea-pigs, rabbits) in short-term exposure with
..... investigation of desensitization following sensory irritation by sulfur
..... dioxide. Evaluation of the development of desensitization with repeated
..... exposure to SO₂ at low concentrations over a prolonged time period.
.....
.....
.....

RELATED TECHNOLOGIES:
.....

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of
normal, susceptible and stressed population groups to different levels and
combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Effect of Low Level Air Pollution on Human Health
.....

RES. FACILITY: Harvard University, School of Public Health

RES. LOCATION: Boston, Massachusetts

INVESTIGATOR(S): B. Ferris

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY 74 \$73,515 FY 75 \$73,911
..... (100% energy related)

DESCRIPTION: The effect of low levels of air pollution on human health
..... will be assessed. In selected cases, detailed tests of pulmonary function
..... will be made. The levels of air pollutants, such as sulfur compounds,
..... suspended particulates, and oxides of nitrogen, will be measured. The
..... results from the questionnaire and tests of pulmonary function will be
..... compared with data collected in the two earlier surveys. Mortality data
..... will also be collected and analyzed with respect to age specific death rates.
..... We noted in 1967 that the change of change of FVC, FEV_{1.0} and peak
..... expiratory flow rates changed in a curvilinear relationship with age. This
..... needs to be verified.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Geothermal
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal,
susceptible and stressed population groups to different levels and combinations
of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Toxicity of Organic Mercury in the Fetus and Newborn
.....
.....

RES. FACILITY: University of Illinois

RES. LOCATION: Chicago, Illinois

INVESTIGATOR(S): W. Reynolds

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY 74 \$53,911 FY 75 \$52,012
..... (100% energy related)

DESCRIPTION: Body burdens of mercury will be estimated from mercury
determinations performed on fluid and tissue samples derived from human
fetuses, newborns, and mothers. Organic mercury will be measured during
chronic and acute administration of methylmercury. The macaque pregnancy
will be used as a model system in which to determine neurotoxic levels and
the extent of tissue retention of mercury for the fetus and neonate.
Possible pathological effects of mercury upon maturation of the cerebellum
and cerebrum will receive close attention. The half-life of methylmercury-
203 will be measured in the adult, the fetal and infant monkey. The extent
of transmission of methylmercury from mother to fetus via the placenta and
RELATED TECHNOLOGIES: from mother to infant monkey by means of suckling will be
assayed. Finally, behavioral development of infant monkeys exposed to
methylmercury in utero or during lactation will be assessed.

Coal

CATEGORY: HEALTH EFFECTS
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of
..... normal, susceptible and stressed population groups to different
..... levels and combinations of biologically active agents associated
..... with energy technologies.
PROJECT:
TITLE: Experimental Lead Encephalopathy
.....
.....
.....
RES. FACILITY: St. Lukes Medical Center
RES. LOCATION: Chicago, IL
INVESTIGATOR(S): R.. Clasen
SPONSOR(S): NIH/DHEW
DURATION: 2 year
FUNDING: FY74 \$18,616 FY75 \$21,910 (100% energy related)
.....
.....
DESCRIPTION: Lead encephalopathy will be produced in the brains of rats and
..... rhesus monkeys by the oral administration of lead. The cerebral edema will
..... be quantitated in the rat. The effects of steroids and intravenous hypertonic
..... urea on this edema will be determined. The effects of chelating agents and
..... vitamin therapy will also be assessed. The brains of both rats and monkeys
..... will be studied. The results will be compared to the human condition. Chronic
..... lesions will be produced in the monkey. These will be studied by light
..... microscopy and correlated with the results of behavioral tests performed both
..... during the period of intoxication and following recovery after the development
..... of neurologic symptoms indicative of acute lead encephalopathy.
RELATED TECHNOLOGIES:
..... Geothermal
.....

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Behavioral effects of Carbon Monoxide Exposure

RES. FACILITY: Univ. of Maryland

RES. LOCATION: College Park, MD

INVESTIGATOR(S): P. McIntire

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY75 \$53,376 (100% energy related)

DESCRIPTION: Carbon monoxide (CO) exposures are being investigated using rats, and monkeys. Comolex schedules of reinforcement produce performance which is deteriorated by CO exposure levels in the 200 to 600 parts per million range. Progressive ratio schedules, multiple fixed ratio-differential reinforcement of a low rate schedules have shown effects. The work proposes to continue investigation into other schedules requiring a time discrimination or an accurate visual discrimination. In the latter case, squirrel monkeys are used.

RELATED TECHNOLOGIES:

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of
..... normal, susceptible and stressed population groups to different
..... levels and combinations of biologically active agents associated
..... with energy technologies.

PROJECT:
TITLE: Interaction of SO₂ and Virus on Respiratory Mucosa

RES. FACILITY: Johns Hopkins Univ.

RES. LOCATION: Baltimore, Maryland

INVESTIGATOR(S): F.. Bang

SPONSOR(S): NIH/DHEW

DURATION: 2 year

FUNDING: FY74 \$66,464 FY75 \$50,694 (100% energy related)

.....
DESCRIPTION: Respiratory disease is a major cause of human death. The nose is
..... the first site of impact of respiratory viruses and toxins, epithelial sloughing
..... its primary response, mucosal regeneration a necessary result. We will study
..... interactions of acute NDV infection and SO₂, and of chronic laryngotracheitis
..... plus SO₂. NDV sharply depresses, SO₂ greatly increases cell multiplication
..... during the first week of exposure, and acute NDV and LTV soften and distort
..... underlying cartilage (our data). Established methods of virology, histopath-
..... ology, histochemistry, autoradiography, fluorescent antibody will be used to
..... study virus-SO₂ interactions on: virus absorption, pathogenesis, spread to
..... lower tract; cell kinetics; chronicity and neoplasia; and cartilage integrity.

RELATED TECHNOLOGIES:

HEALTH EFFECTS

CATEGORY:

SUBCATEGORY:

TECHNOLOGY: .. Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of
 normal, susceptible and stressed population groups to different
 levels and combinations of biologically active agents associated
 with energy technologies.

PROJECT:

TITLE: Chromosome Mutagenesis and Carcinogenic Potentiation

RES. FACILITY: Children's Cancer Research Foundation

RES. LOCATION: Boston, Massachusetts

INVESTIGATOR(S): G.. Yerganian

SPONSOR(S): NIH/DHEW

DURATION: 1 Year

FUNDING: FY75 \$37,749 (100% energy related)

DESCRIPTION: Karyological characteristics of dwarf hamsters, particularly the
 Armenian hamster, facilitate localiation of site-specific chromosome breaks
 and reunions in both immediate and latent mutations. The recently described
 fractional mutations revealed in later generations of "normal" mammalian
 progeny, whose ancestors were exposed to a single dose of a mutagenic agent,
 serves to illustrate an in-depth approach to the problem of mutagenesis in a
 mammalian system. The proposed research program further explores the pheno-
 menon of latent mutations in mammalian systems in order to assess its potential
 value in the assay of environmental mutagenic agents.

RELATED TECHNOLOGIES:

.....

CATEGORY: HEALTH EFFECTS
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of
 normal, susceptible and stressed population groups to different
 levels and combinations of biologically active agents associated
 with energy technologies.
PROJECT:
 TITLE: Chronic and Multigeneration Toxicity of Cadmium

 RES. FACILITY: Albany Medical College
 RES. LOCATION: Albany, N.Y.
 INVESTIGATOR(S): J. Wells
 SPONSOR(S): NIH/DHEW
 DURATION: 1 year
 FUNDING: FY75 \$35,451 (100% energy related)

DESCRIPTION: To study in the rat the consequences of exposure to small
 daily intakes of cadmium, as a salt, during three generations, and in the
 monkey those of exposure of adult animals to small daily intakes of cadmium-
 during three years and of exposure of fetal and infantile monkeys to
 cadmium in placental blood, in maternal milk and in the diet from the time of
 weaning to the end of the study. If hypertension should appear as one of the
 consequences of exposure to cadmium, to analyze as far as possible the
 pathogenesis of this sign of disease. In particular, to determine whether
 hypertension arises primarily from structural changes within the vasculature,
 from chemical changes within the blood (for example, from altered renin
RELATED TECHNOLOGIES: activity) or from other causes.

 Shale, Solar

HEALTH EFFECTS

CATEGORY:

SUBCATEGORY:

TECHNOLOGY: ... Coal

SUBTECHNOLOGY:

OBJECTIVE: ... To evaluate the short term and long term hazards of exposure of
 ... normal, susceptible and stressed population groups to different
 ... levels and combinations of biologically active agents associated
 with energy technologies.

PROJECT: ...

TITLE: ... Ototoxicity of Lead and Mercury

.....

.....

RES. FACILITY: ... Thomas Jefferson Univ.

RES. LOCATION: ... Philadelphia, PA

INVESTIGATOR(S): ... C. Wilpizeski

SPONSOR(S): ... NIH/DHEW

DURATION: ... 2 year

FUNDING: ... FY74 \$36,782 FY75 \$54,620 (100% energy related)

DESCRIPTION: ... The aim of this project is to study the effects of oral
 intake of lead and methyl mercury on auditory and vestibular function in
 juvenile squirrel monkeys. Auditory nerve and brain input-output curves as
 well as visual detection levels (absolute thresholds) will be obtained
 from computer-averaged evoked responses (AER). Vestibular function will be
 assessed using standard clinical techniques by recording positional and
 caloric-induced nystagmus (ENGs) before, during and following the poisoned
 state. After obtaining all functional data, the animals will be sacrificed.
 Temporal bones will be dissected and sections will be prepared for light
 microscopic evaluation of inner ear morphological changes.

RELATED TECHNOLOGIES:

Geothermal

CATEGORY: HEALTH EFFECTS
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of
..... normal, susceptible and stressed population groups to different
..... levels and combinations of biologically active agents associated
..... with energy technologies.
PROJECT:
TITLE: Effects of Heavy Metal Ions on a chemical Synapse
.....
.....
.....
RES. FACILITY: Univ. of Cincinnati
RES. LOCATION: Cincinnati, Ohio
INVESTIGATOR(S): R. Manalis
SPONSOR(S): NIH/DHEW
DURATION: 2 year
FUNDING: FY74 \$10,362 FY75 \$41,042 (100% energy related)
.....
.....
DESCRIPTION: Experiments are proposed for determining the effects of the
..... heavy metal ions on synaptic transmission in the isolated frog sciatic nerve-
..... sartorius muscle preparation. Such studies should improve our understanding
..... of the effects of these toxic metals on the nervous system and provide basic
..... data concerning the role of polyvalent cations in synaptic transmission.
..... Both the presynaptic and postsynaptic effects of these ions will be examined
..... as they are manifested in intracellular microelectrode recording from motor
..... endplates.
.....
.....
..... Geothermal
RELATED TECHNOLOGIES:
.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Carbon Monoxide and Cultured Heart Cells

.....

.....

RES. FACILITY: University of Kansas

RES. LOCATION: Lawrence, Kansas

INVESTIGATOR(S): D. Wenzel

SPONSOR(S): NIH/HEW

DURATION: 1 year

FUNDING: FY 74 \$33,138 (100% energy related)

.....

DESCRIPTION: The objectives of this proposal are to determine the effects and the mechanism(s) of action of carbon monoxide and of hypoxia on the lipid disposition of cells cultured from neonatal rat hearts. Separate cultures of endothelial cells and beating muscle cells will be studied to determine the relative susceptibility of each. Effects to be studied include: lipid synthesis and cholesterol uptake, to be measured by the use of labeled compounds and cytochemistry; and changes in enzymes and respiratory carriers, to evaluate certain potential mechanisms.

.....

.....

..... Shale

RELATED TECHNOLOGIES:

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CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: .. Coal
SUBTECHNOLOGY:
OBJECTIVE: ... To evaluate the short term and long term hazards of exposure
of normal, susceptible and stressed population groups to different levels
and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Chronic Obstructive Lung Disease
.....
.....
RES. FACILITY: Stanford Research Institute
RES. LOCATION: Menlo Park, California
INVESTIGATOR(S): G. Freeman
SPONSOR(S): NIH/DHEW
v DURATION: 2 years
FUNDING: FY 74 \$246,551 FY 75 \$270,900
..... (100% energy related)

DESCRIPTION: The objective is to study the mechanisms involved in the
development of experimental chronic obstructive lung disease (COLD) in the
rat and to relate them to processes in man. Based on the epidemiological
relationship of smoking and smog with COLD, nitrogen-dioxide (NO₂), common
to both and also to silo-filler's disease, was used to induce an insidious,
subacute disease resembling emphysema. This animal model includes small-
airway obstruction, alveolar destruction and retention of sputum. Similar
studies will be conducted using ozone (O₃), and combinations of NO₂ and O₃
under controlled conditions. A bacterium will be superimposed in separate
experiments during the experimental development of COLD in an attempt to
RELATED TECHNOLOGIES:
incorporate a chronic bronchitic aspect into the experimental disease.

CATEGORY: Health Effects.....
SUBCATEGORY:
TECHNOLOGY: Coal.....
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure
of normal, susceptible and stressed population groups to different levels
and combinations of biologically active agents associated with energy technologie

PROJECT:

TITLE: Environmental Quality : Effects on Disease Processes.....
.....
.....

RES. FACILITY: ..Washington University.....

RES. LOCATION: St. Louis, Missouri.....

INVESTIGATOR(S): P. Harcroft.....

SPONSOR(S): NIH/DHEW.....

DURATION: 2 years.....

FUNDING: FY 74 \$125,982 FY 75 \$305,000.....

(100% energy related).....

DESCRIPTION: The purpose is to develop a system for the continuous
exposure of experimental animals to various levels of complex mixtures
of air pollutants for extended periods of time. Since the excess mortality
in human populations exposed to episodic air pollution probably occurs in
individuals with pre-existing disease, animals in which known disease
models are present will be chronically exposed to the simulated polluted
air and compared to animals maintained under the same environmental conditions
except that the air free of known pollutants. Although the primary objective
is to study effects on disease, any adverse effects of air pollution on
relatively healthy animals will also be assessed.

RELATED TECHNOLOGIES:

HEALTH EFFECTS

CATEGORY:
SUBCATEGORY:
 Coal
TECHNOLOGY:
SUBTECHNOLOGY:
 To evaluate the short term and long term hazards of exposure of
OBJECTIVE:
 normal, susceptible and stressed population groups to different

 levels and combinations of biologically active agents associated

 with energy technologies.

PROJECT:

TITLE:
 A Program in Environmental Physiology and Toxicology

RES. FACILITY:
 Johns Hopkins Univ.

RES. LOCATION:
 Baltimore, Maryland

INVESTIGATOR(S):
 R. Riley

SPONSOR(S):
 NIH/DHEW

DURATION:
 1 year

FUNDING:
 FY74 \$595,698 (100% energy related)

DESCRIPTION: The major objective of the program is to pursue a variety
 of investigations related to the maintenance of human health in the face of
 environmental hazards. We shall approach this objective by elucidating
 mechanisms of action on body tissue and will concentrate on studies in the
 following areas where members of the department have greatest competence:
 A) Responses of the respiratory system to airborne agents; B) Physiological
 and behavioral evaluation of carbon monoxide hazard; C) Toxic effects of
 trace metals; D) Synergistic and antagonistic mechanisms responsible for
 changes in toxicity of environmental agents; and E) Cooperative prospective
 study of a human population with reference to the incidence of cerebral vascular
 disease. Because of the wide variety of disciplines required, we shall cooperate
 with other departments and where possible coordinate activities in order to bring
 the full potential of the School of Hygiene and the entire University to bear
 upon problems of the environment.

RELATED TECHNOLOGIES:

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT: Program on Food-Borne Environmental Toxicants

TITLE:

RES. FACILITY: MIT

RES. LOCATION: Cambridge Massachusetts

INVESTIGATOR(S): G. Wogen

SPONSOR(S): NIH/DHEW

DURATION: 2 year

FUNDING: FY74 \$174,239 FY75 \$186,400 (100% energy related)

DESCRIPTION: The proposed program of research deals with a group of chemical agents known or suspected to occur in foods, and a set of biological systems expected to interact with the agents in defined manners. Accomplishment of the major goals would result in contributions to knowledge in problem areas of the chemistry of non-nutritive chemicals in foods, their interactions with cells, and the mechanism by which they produce undesirable effects. Emphasis is also placed on the adaptation and application of such fundamental information to the problems of evaluating the extent to which environmental chemicals pose health risks to man.

RELATED TECHNOLOGIES:

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Conservation

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of
 normal, susceptible and stressed population groups to different
 levels and combinations of biologically active agents associated
 with energy technologies.

PROJECT:
 TITLE: Environmental Agents: Relation to Human Health Effects

 RES. FACILITY: Mount Sinai School of Medicine
 RES. LOCATION: N.Y., N.Y.
 INVESTIGATOR(S): I. Selikoff
 SPONSOR(S): NIH/DHEW
 DURATION: 2 year
 FUNDING: FY74 \$400,159 FY75 \$702,325 (100% energy related)

 DESCRIPTION: The research program will be focused on problems of biolo-
 gical effects of environmental alterations in relation to human health and
 disease. Five major program areas are of interest to us; multiple factor
 etiology, environmental cancer, effects of long-term, low-level exposure to
 environmental agents, including those associated with asbestos, and the
 biological effects of ultramicroscopic inorganic particles. We intend to
 adhere to several methodological perspectives. First, our studies will
 investigate environmental effects in large populations including occupational
 groups. This involves epidemiological emphasis. We also intend to define
 dose-disease response relationships.

RELATED TECHNOLOGIES:

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CATEGORY: HEALTH EFFECTS
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure
..... of normal, susceptible and stressed population groups to different
..... levels and combinations of biologically active agents associated
..... with energy technologies.
PROJECT:
TITLE: Research in the Environmental Health Sciences
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.....
RES. FACILITY: New York Univ. Medical Center
RES. LOCATION: N.Y., N.Y.
INVESTIGATOR(S): N. Nelson
SPONSOR(S): NIH/DHEW
DURATION: 2 year
FUNDING: FY74 \$769,115 FY75 \$823,795 (100% energy related)
.....
DESCRIPTION: The research encompasses laboratory studies on the biochemical
..... mode of action of environmental toxicants, exploratory studies aimed at
..... improving the reliability and efficiency of predictive toxicological tests,
..... improvement of diagnostic procedures for diseases possibly related to
..... environmental factors, epidemiological investigations and field studies on the
..... distribution of pollutants. Interests range from acute to chronic health
..... effects including cancer and the degenerative diseases.
.....
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.....
RELATED TECHNOLOGIES:
.....

HEALTH EFFECTS

CATEGORY:

SUBCATEGORY: Coal

TECHNOLOGY:

SUBTECHNOLOGY: To evaluate the short term and long term hazards of exposure of

OBJECTIVE: normal, susceptible and stressed population groups to different

..... levels and combinations of biologically active agents associated

..... with energy technologies.

PROJECT:

TITLE: Center for the Study of the Human Environment

.....

.....

RES. FACILITY: Univ. of Cincinnati

RES. LOCATION: Cincinnati, Ohio

INVESTIGATOR(S): R. Suskind

SPONSOR(S): NIH/DHEW

DURATION: 2 year

FUNDING: FY74 \$509,252 FY75 \$537,500 (100% energy related).

.....

DESCRIPTION: The major problem areas for which multi-level approaches

..... will be used include: 1) the role of essential trace metals in human health

..... and disease as influenced by environmental factors; 2) Health problems from

..... non-essential toxic metals; 3) Carcinogenic and teratogenic aspects of

..... environmental agents; 4) Pulmonary problems of environmental origin; 5)

..... Cutaneous injury induced by environmental chemicals and/or non-ionizing

..... radiation; 6) Air quality study techniques and analytical methods.

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RELATED TECHNOLOGIES:

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure
..... of normal, susceptible and stressed population groups to
..... different levels and combinations of biologically active
..... agents associated with energy technologies.

PROJECT:
TITLE: Occupational and Environmental Health

RES. FACILITY: Harvard University

RES. LOCATION: Boston, Massachusetts

INVESTIGATOR(S): J. Little

SPONSOR(S): NIH/DHEW

DURATION: 2 year

FUNDING: FY74 \$184,000 FY75 \$357,680 (100% energy related)

DESCRIPTION: This program is concerned with epidemiologic and toxicologic
..... approaches to measurement of biologic effects of physical and chemical factors
..... in the environment, with emphasis on the health of man. The methods used are
..... those of biochemistry, physiology, comparative toxicology and epidemiology.
..... Primary human diseases in these studies are cancer of various sites, chronic n
..... non-tuberculous lung diseases, and congenital defects. Environmental factors
..... under study include a) general air pollution, b) occupational air pollution,
..... such as asbestos, granite dust, firefighting and compounds of concern in
..... chemical industries, c) cigarette smoking d) pesticides, and e) ionizing
..... radiation.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Conservation

SUBTECHNOLOGY: Increased Efficiency

OBJECTIVE: .. To evaluate the short term and long term hazards of exposure of ..
 normal, suceptible and stressed population groups to different ..
 levels and combinations of biologically active agents associated ..
 with energy technologies.

PROJECT:

TITLE: Effects of 2450 MHz CW Microwave Radiation on the Embryonic ..
 Development of Japanese Quail ..

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, North Carolina

INVESTIGATOR(S): P. E. Hamrick and D. I. McRee

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY '74 \$27,928 FY '75 \$32,000 (100% energy related)

.....

DESCRIPTION: The objective of this project is to determine the effects ..
 of 2450 MHz CW microwave radiation on the embryological development of ..
 Japanese quail. Fertilized quail eggs will be exposed to 2450 MHz micro- ..
 wave radiation under carefully controlled temperature and dose conditions. ..
 Parameters such as percent hatching, gross deformities, and blood values ..
 will be used as indications of microwave effects.

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RELATED TECHNOLOGIES:

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CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Conservation

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Human Responses to Thermal Environment

RES. FACILITY: John Pierce Foundation of Conn.

RES. LOCATION: New Haven Connecticut

INVESTIGATOR(S): A. Gagge

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY74 \$173,067 FY75 \$182,000 (100% energy related)

DESCRIPTION: The program covering the principal factors affecting man's physiological and behavioral response to his thermal environment and their implication for his health, consists of six projects: #1 HEAT TRANSFER FROM THE SKIN SURFACE TO THE ENVIRONMENT IN MAN: #2 INTERACTIONS BETWEEN PHYSIOLOGICAL SYSTEMS REGULATING CIRCULATION, RESPIRATION AND BODY TEMPERATURE: #3 PHYSIOLOGICAL AND BEHAVIORAL TEMPERATURE REGULATION IN SUBHUMAN PRIMATES: #4 THERMAL PSYCHOPHYSICS AND HUMAN BEHAVIORAL THERMOREGULATION: #5 THEORETICAL MODELS OF THE PHYSIOLOGICAL AND BEHAVIORAL TEMPERATURE REGULATION AND THE THERMAL ENVIRONMENT: #6 THE THERMAL ENVIRONMENT AND HEALTH.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Conservation

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of
normal, susceptible and stressed population groups to different levels and
combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Womens Physiological Adaptation to Heat Stress

RES. FACILITY: University of Calif.

RES. LOCATION: Santa Barbara, Calif.

INVESTIGATOR(S): B. Drinkwater

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY 74 \$118,584 FY 75 \$103,518
..... (20% energy related)

DESCRIPTION: It is proposed to make cross-sectional studies of the influ-
ence of/on these hormonal balances in women under a variety of combinations
of heat strain, work loads, exercise duration, and levels of physical fitness.
Acclimatization of females to work in the heat, as well as at rest, will be
studied and comparisons made to relate to various phases of the menstrual
cycle, prepubertal, and menopausal states, etc. These studies are designed
to increase our understanding of the differences between men and women
in terms of their functional capacities and adaptative potentials.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Oil and Gas

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Environmental Carcinogenesis

.....

.....

RES. FACILITY: American Health Foundation

RES. LOCATION: New York, N. Y.

INVESTIGATOR(S):

SPONSOR(S): NIH/HEW

DURATION: FY 1973-75

FUNDING: FY 74 \$169,292 FY 75 \$692,790

..... (10% energy related)

DESCRIPTION:Development of multidisciplinary studies in the causative factors of the main human cancers. These include cancer of the lungs, breast, digestive tract and pancreas. Epidemiological data will be collected and these data will form the bases for studies in environmental carcinogenesis, experimental pathology, molecular biology and pharmacology, and nutrition. Such studies are anticipated to lead to better understanding of the causative factors of cancer.

..... Study combustion of fuel, wood, petroleum (gasoline, diesel jet) and its biological effects and relation to cancer causation.

RELATED TECHNOLOGIES: Coal, Shale

.....

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: .. Oil and Gas

SUBTECHNOLOGY:

OBJECTIVE: ... To evaluate the short term and long term hazards of exposure of
... normal, susceptible and stressed population groups to different
... levels and combinations of biologically active agents associated
PROJECT: with energy technologies.

TITLE: ... Automobile Exhaust and Chronic Respiratory Disease

.....

RES. FACILITY: ... Trustees of Health and Hospitals Inc.

RES. LOCATION: ... Boston, Massachusetts

INVESTIGATOR(S): F. Speizer

SPONSOR(S): ... NIH/DHEW

DURATION: ... 1 year

FUNDING: ... FY74 \$53,127 (100% energy related)

.....

DESCRIPTION: Epidemiological investigations into the factors relating to the occurrence and development of chronic non-specific respiratory diseases have, in general, followed a pattern of retrospective point prevalence studies. Increased levels of cigarette smoking and air pollution have been associated with the increased prevalence of chronic respiratory disease. Few prospective studies on the early stages of these diseases have been conducted. Until factors relating to susceptibility to chronic respiratory diseases are understood, it is unlikely that the increasing morbidity and mortality from these diseases can be controlled. To try to relate factors associated with these diseases to the development of disease this study is designed to follow a selected segment of the population over an extended period of time and to record the rate of change of signs and symptoms associated with the development of chronic respiratory disease.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Shale
SUBTECHNOLOGY:
OBJECTIVE: Evaluate the short term and long term hazards of exposure of normal
susceptible and stressed population groups to different levels and combina-
tions of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Benzene Toxicity and Metabolism
.....
.....
RES. FACILITY: Jefferson Medical College
RES. LOCATION: Philadelphia, Pa.
INVESTIGATOR(S): R. Snyder
SPONSOR(S): NIH/DHEW
DURATION: 1 year
FUNDING: FY 74 \$59,305 (50% energy related)

DESCRIPTION: It is our aim to study the biochemical events that lead
to the functional and morphological changes characteristic of benzene toxicity
and to determine how benzene toxicity might be prevented or alleviated. We
will study the metabolic pathway of ¹⁴C-benzene in vitro and in vivo and
quantitate the metabolites produced, locate them in the animal, and determine
to what extent the metabolites are responsible for toxicity. The biochemical
studies will be correlated with evaluations of bone marrow function both
before and during the appearance of bone marrow disfunction. At the earliest
stage of toxicity we intend to look for interaction between benzene and/or
its metabolites with nucleic acids. We will attempt to prevent benzene
RELATED TECHNOLOGIES: toxicity by inhibiting its metabolism and will study the role of nutrition
in resistance to benzene toxicity.

Prepared for the Science Information Exchange.

Not for publication or publication reference.

U. S. Department of
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

NOTICE OF RESEARCH PROJECT

PROJECT NO. (DO NOT USE THIS SPACE)

TITLE OF PROJECT

ERR 4.3 Effects of energy-related pollutants on female reproductive tract function

GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED ON THE PROJECT.

George W. Lucier, Ph.D., Research Chemist, Environmental Toxicology Branch
John A. McLachlan, Ph.D., Research Associate, Environmental Toxicology Branch

NAME AND ADDRESS OF APPLICANT INSTITUTION

National Institute of Environmental Health Sciences, P O Box 12233, Res Tri Park, NC 27709

SUMMARY OF PROPOSED WORK - (200 words or less - Omit Confidential data.)

In the Science Information Exchange summaries of work in progress are exchanged with government and private agencies supporting research in the bio-sciences and are forwarded to investigators who request such information. Your summary is to be used for these purposes.

We are proposing to study the effects of exposure of pregnant animals to energy-related pollutants on male and female reproductive tract function in F₁ offspring. Forced-breeding and serial mating techniques will be used to evaluate fertility. Endocrinology and histopathology parameters will be studied in reproductively abnormal animals. Screening procedures will be done on contract and further mechanistic studies will be attempted in intramural laboratories.

ERR 4.3 (4B2)

\$ 100,000¹

PROFESSIONAL SCHOOL (medical, dental, etc.) WITH WHICH THIS PROJECT SHOULD BE IDENTIFIED	SIGNATURE OF PRINCIPAL INVESTIGATOR <i>George W. Lucier</i>	DATE August 22, 1971
DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY		
SUPPORTING AGENCY		
METHOD OF SUPPORT (Check one)		
☒ Agency Staff (Intramural)	☐ Negotiated Contract	☐ Special Project Grant
☐ Research Grant	☐ Other (Specify)	
FUNDS OBLIGATED CURRENT F.Y.	NUMBER OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT FISCAL YEAR	BEGINNING DATE
		ESTIMATED COMPLETION DATE

Prepared for the Science Information Exchange.

Not for publication or publication reference.

U. S. Department of
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
NOTICE OF RESEARCH PROJECT

PROJECT NO. (DO NOT USE THIS SPACE)

TITLE OF PROJECT

ERR 4.4 Effects of 60 Hz fields on the mammalian central nervous system

GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED ON THE PROJECT.

Donald I. McRee, Ph.D., Mechanical Engineer, Environmental Biophysics Branch
W. Ross Adey, M.D., Professor, Anatomy and Physiology, Director of Space Biological Laboratory, Brain Research Institute, UCLA (Contractor)
S. M. Bawin, Ph.D., Space Biological Laboratory, UCLA (Contractor)
R. Gavalas-Medici, Ph.D., Space Biological Laboratory, UCLA (Contractor)

NAME AND ADDRESS OF APPLICANT INSTITUTION

National Institute of Environmental Health Sciences, P O Box 12233, Res Tri Park, NC 27709

SUMMARY OF PROPOSED WORK - (200 words or less - Omit Confidential data.)

In the Science Information Exchange summaries of work in progress are exchanged with government and private agencies supporting research in the bio-sciences and are forwarded to investigators who request such information. Your summary is to be used for these purposes.

The objective of this research project is to determine the effects of 60 Hz fields from high voltage transmission lines on the central nervous system of mammals.

Specific studies to be accomplished include:

1. Effects on biological rhythms in rats,
2. Effects on conditional behavior in primates,
3. Effects on neuroendocrine mechanisms in rats and primates,
4. Effects on the neurochemistry of brain tissue.

ERR-4.4(482)
\$ 100,000.

PROFESSIONAL SCHOOL (medical, dental, etc.) WITH WHICH THIS PROJECT SHOULD BE IDENTIFIED

SIGNATURE OF PRINCIPAL INVESTIGATOR

DATE

Donald I. McRee

August 22, 1975

DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY

SUPPORTING AGENCY

METHOD OF SUPPORT (Check one)

☐ Agency Staff (Intramural)

☐ Negotiated Contract

☐ Special Project Grant

☐ Research Grant

☐ Other (Specify)

FUNDS OBLIGATED CURRENT F.Y.

NUMBER OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT FISCAL YEAR

BEGINNING DATE

ESTIMATED COMPLETION DATE

Prepared for the Science Information Exchange.

Not for publication or publication reference.

U. S. Department of
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
NOTICE OF RESEARCH PROJECT

PROJECT NO. (DO NOT USE THIS SPACE)

TITLE OF PROJECT

ERR 4.5 Respiratory and cardiovascular functions in pollutant exposed animals

GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED ON THE PROJECT.

R. T. Drew, Ph.D., Supervisory Physical Scientist, Pharmacology Branch
E. W. Van Stee, D.V.M., Physiologist, Pharmacology Branch

NAME AND ADDRESS OF APPLICANT INSTITUTION

National Institute of Environmental Health Sciences, P O Box 12233, Res Tri Park, NC 27709

SUMMARY OF PROPOSED WORK - (200 words or less - Omit Confidential data.)

In the Science Information Exchange summaries of work in progress are exchanged with government and private agencies supporting research in the bio-sciences and are forwarded to investigators who request such information. Your summary is to be used for these purposes.

This project is directed toward the detection of functional changes in the cardiovascular system associated with the inhalation of energy-related pollutants. The function of isolated, perfused rabbit, rat, and guinea pig hearts will be monitored. Animals may be previously exposed to contaminants followed by excision and perfusion of hearts or the hearts may be exposed acutely in vitro. Myocardial mechanical, electrical, and metabolic activity may be monitored concurrently.

ERR 4.5 (4B2)

\$ 97,000

PROFESSIONAL SCHOOL (medical, dental, etc.) WITH WHICH THIS PROJECT SHOULD BE IDENTIFIED

SIGNATURE OF PRINCIPAL INVESTIGATOR

DATE

August 22, 1970

DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY

SUPPORTING AGENCY

METHOD OF SUPPORT (Check one)



Agency Staff
(Intramural)



Negotiated
Contract



Special
Project Grant



Research
Grant



Other
(Specify)

FUNDS OBLIGATED CURRENT F.Y.

NUMBER OF FUTURE YEARS TENTATIVELY ASSURED
BEYOND CURRENT FISCAL YEAR

BEGINNING DATE

ESTIMATED
COMPLETION DATE

Prepared for the Science Information Exchange.
Not for publication or publication reference.

U. S. Department of
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
NOTICE OF RESEARCH PROJECT

PROJECT NO. (DO NOT USE THIS SPACE)

TITLE OF PROJECT

ER .6 Effects of gestational exposure

GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED ON THE PROJECT.

Robert E. Staples, Ph.D., Research Physiologist, Environmental Toxicology Branch
B. A. Schwetz, D.V.M., Ph.D., Dow Chemical Company (Contractor)

NAME AND ADDRESS OF APPLICANT INSTITUTION

National Institute of Environmental Health Sciences, P O Box 12233, Res Tri Park, NC 27709

SUMMARY OF PROPOSED WORK - (200 words or less - Omit Confidential data.)

In the Science Information Exchange summaries of work in progress are exchanged with government and private agencies supporting research in the bio-sciences and are forwarded to investigators who request such information. Your summary is to be used for these purposes.

Pregnant mice and rabbits are being exposed in inhalation chambers to sulfur dioxide, sulfur dioxide plus carbon monoxide or various particulates, and to sulfuric acid aerosol to determine the effect of these pollutants on development of the conceptus. The offspring are examined just before birth for the presence of external and internal structural alterations.

ERR - 4.6 (4B2)

\$ 100,000.

PROFESSIONAL SCHOOL (medical, dental, etc.) WITH WHICH THIS PROJECT SHOULD BE IDENTIFIED	SIGNATURE OF PRINCIPAL INVESTIGATOR <i>Robert E. Staples</i>	DATE August 22, 197
DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY		
SUPPORTING AGENCY		
METHOD OF SUPPORT (Check one)		
☐ Agency Staff (Intramural)	☐ Negotiated Contract	☐ Special Project Grant
☐ Research Grant	☐ Other (Specify)	
FUNDS OBLIGATED CURRENT F.Y.	NUMBER OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT FISCAL YEAR	BEGINNING DATE
		ESTIMATED COMPLETION DATE

SECTION 1

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

LEAVE BLANK

RESEARCH OBJECTIVES

PROJECT NUMBER

1 R01 ES 01256-01

NAME AND ADDRESS OF APPLICANT ORGANIZATION

New York University Medical Center
550 First Avenue, New York, New York 10016

NAME, SOCIAL SECURITY NUMBER, OFFICIAL TITLE, AND DEPARTMENT OF ALL PROFESSIONAL PERSONNEL ENGAGED ON PROJECT, BEGINNING WITH PRINCIPAL INVESTIGATOR

Bernard D. Goldstein, M.D., [REDACTED] Assistant Professor of Environmental Medicine
and Medicine.

Walter Troll, Ph.D., [REDACTED] Professor of Environmental Medicine

Toby Rossman, Ph.D., [REDACTED] Assistant Professor of Environmental Medicine

TITLE OF PROJECT

Arsine Toxicity: A Potential Environmental Hazard

USE THIS SPACE TO ABSTRACT YOUR PROPOSED RESEARCH. OUTLINE OBJECTIVES AND METHODS. UNDERSCORE THE KEY WORDS (NOT TO EXCEED 10) IN YOUR ABSTRACT.

The proposed studies will evaluate the toxicity of arsine, a potential by-product of coal gasification technology, in two experimental systems.

1. Human red cells will be exposed to arsine in vitro in order to determine the mechanism of action of this hemolytic gas. In particular, the possibility that arsine hemolyzes the red cell through production of free radicals or peroxides will be assessed.

2. The possible carcinogenic potential of arsine will be indirectly studied in E. Coli and mammalian tissue culture cell lines by evaluating whether arsine interferes with DNA repair processes as has been observed with its presumed end product arsenite.

In each of these studies the levels of intracellular and extracellular arsenic compounds following arsine exposure will be measured and the results compared with parallel experiments using similar levels of arsenite or, if indicated, arsenate.

BRN-47 (482)
\$ 51,000 ✓

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SECTION 1

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

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RESEARCH OBJECTIVES

PROJECT NUMBER

IR01 ES 01197-01

NAME AND ADDRESS OF APPLICANT ORGANIZATION

Stanford University Stanford, California 94305

NAME, SOCIAL SECURITY NUMBER, OFFICIAL TITLE, AND DEPARTMENT OF ALL PROFESSIONAL PERSONNEL ENGAGED ON PROJECT, BEGINNING WITH PRINCIPAL INVESTIGATOR

S. David Holtzman, M.D., Ph.D.

Assistant Professor, Pediatrics and Neurology
Head, Division of Pediatric Neurology

TITLE OF PROJECT

Lead toxicity and energy metabolism in immature brain

USE THIS SPACE TO ABSTRACT YOUR PROPOSED RESEARCH. OUTLINE OBJECTIVES AND METHODS. UNDERSCORE THE KEY WORDS (NOT TO EXCEED 10) IN YOUR ABSTRACT.

Lead is a ubiquitous toxic pollutant. The most serious manifestation of pediatric lead poisoning is an acute encephalopathy. In addition, the rising burden of environmental lead may be producing significant brain damage, without overt encephalopathy, in young children, in the unborn fetus, and the neonate. Pathologic studies suggest that lead produces edema and capillary changes at a "critical" time in the immature brain of the human and in a rat model of lead encephalopathy. This "critical" period in the rat contains many age-dependent changes in energy metabolism including activities of the electron transport chain (ETC) as described by this investigator and others. Lead does act on the ETC in other tissues. However, there are no studies in immature brain of lead effects on the ETC, a probable basic step in the pathogenesis of lead encephalopathy.

Preliminary results are presented on effects of lead on oxidative phosphorylation in immature rat brain mitochondria. Within 2 days of feeding lead to 2 week old animals, respiration with NAD-linked substrates is uncoupled, reflecting an increased state 4 rate. During the subsequent 2 week pre-encephalitic period of lead feedings, both state 3 and 4 rates become increasingly depressed. Cytochrome oxidase activity shows the same changes. These effects are more significant in cerebellar than in cerebral hemisphere mitochondria. Importantly, these effects of lead occur earlier than previously reported changes in brain fluid, electrolytes, and morphology.

Considering the preliminary results and observations outlined above, investigations are proposed based on these hypotheses: a) the primary effect of lead in developing brain is on energy metabolism; specifically on sites in the ETC; and b) this effect is basic to the toxic effects of lead. Experiments are designed to delineate the sites and mechanisms of action of lead to learn more of the properties of the ETC in immature brain and of the pathogenesis of lead encephalopathy. Younger animals will be studied to delineate potential effects of lead on the brain of the human fetus and neonate.

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ERR-408 (4B2)

\$ 94,000

SECTION 1	
DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE PUBLIC HEALTH SERVICE	LEAVE BLANK
RESEARCH OBJECTIVES	PROJECT NUMBER 1R01 ES 01268-01

NAME AND ADDRESS OF APPLICANT ORGANIZATION

University of California, Department of Chemistry, Davis, California 95616

NAME, SOCIAL SECURITY NUMBER, OFFICIAL TITLE, AND DEPARTMENT OF ALL PROFESSIONAL PERSONNEL ENGAGED ON PROJECT, BEGINNING WITH PRINCIPAL INVESTIGATOR

August H. Maki	[REDACTED]	Professor	Chemistry
Steve Siegel	[REDACTED]	Research Assistant	Chemistry
Tiao-te Co	[REDACTED]	Research Assistant	Chemistry
		Postdoctoral Fellow	Chemistry

TITLE OF PROJECT

Binding of CH_3Hg^+ , an Environmental Hazard, with DNA

USE THIS SPACE TO ABSTRACT YOUR PROPOSED RESEARCH. OUTLINE OBJECTIVES AND METHODS. UNDERSCORE THE KEY WORDS (NOT TO EXCEED 10) IN YOUR ABSTRACT.

We intend to determine the extent to which DNA of chromosomes binds alkyl and aryl mercury in living cells. Also, we wish to obtain information on the molecular level concerning the nature of the complexes. The method to be used is a spectroscopic one, optical detection of magnetic resonance, odmr, by means of which magnetic resonance transitions in photoexcited triplet states are detected optically. A heavy atom effect caused by mercury binding to an aromatic chromophore such as a heterocyclic base of DNA makes the resulting triplet state a highly radiative trap which is especially sensitive to odmr. The odmr method thus selects the mercury-perturbed chromophore which then can be identified by the magnetic resonance frequencies, and other properties of the phosphorescent state. Selectivity by the heavy atom effect is especially good in DNA which normally is not highly luminescent. As a major system for study, we intend to use Allium cepa for which cytological data of chromosomal aberrations of root cells caused by mercurial treatment exists.

LEAVE BLANK

ERR-4, 9 (4B2)

\$ 60,000 ✓

Prepared for the Science Information Exchange.

Not for publication or publication reference.

U. S. Department of
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

NOTICE OF RESEARCH PROJECT

PROJECT NO. (DO NOT USE THIS SPACE)

TITLE OF PROJECT

Electrophoresis of Mouse Tissue: Testing of Offspring After Parental Treatment with Energy Related Pollutants

GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED ON THE PROJECT.

CONTRACTOR'S PROJECT DIRECTOR: Dr. F. M. Johnson, Research Triangle Institute, Research Triangle Park, North Carolina

PROJECT OFFICER (NIEHS): Dr. L. R. Valcovic, Acting Assistant Chief, Environmental Mutagenesis Branch

NAME AND ADDRESS OF APPLICANT INSTITUTION

NIEHS, P. O. Box 12233, Research Triangle Park, North Carolina 27709

SUMMARY OF PROPOSED WORK - (200 words or less - Omit Confidential data.)

In the Science Information Exchange summaries of work in progress are exchanged with government and private agencies supporting research in the bio-sciences and are forwarded to investigators who request such information. Your summary is to be used for these purposes.

The study of specific enzyme mutations using electrophoresis has the capability of detecting mutations that result in either a non-functional protein or a functional protein with altered electrical charge. Our objective is to use a single mammalian test system that will detect both electrophoretic mobility (EPM) and inactive enzyme (IAE) mutations in the same loci. Two inbred mouse strains which differ with respect to nine enzyme loci have been selected for this system. Adult males of each strain were treated with gamma radiation and mated to unirradiated females of the other strain to produce F₁ hybrid offspring. Tissue samples are obtained surgically and electrophoresis is conducted on crude homogenates. This procurement contract will perform the electrophoresis on mouse tissue samples from experiments conducted at NIEHS. The current experiment will provide data on the induction of gene mutations induced by radiation and current plans are to initiate tests using energy related chemicals.

ER2 5.6 (462)

\$ 148,000

PROFESSIONAL SCHOOL (medical, dental, etc.) WITH WHICH THIS PROJECT SHOULD BE IDENTIFIED	SIGNATURE OF PRINCIPAL INVESTIGATOR <i>L. R. Valcovic</i>	DATE <i>8/21/75</i>
DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY		
SUPPORTING AGENCY		
K. KIND OF SUPPORT (Check one)		
☐ Agency Staff (Intramural)	☐ Negotiated Contract	☐ Special Project Grant
☐ Research Grant	☐ Other (Specify)	
FUNDS OBLIGATED CURRENT F.Y.	NUMBER OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT FISCAL YEAR <i>307</i>	BEGINNING DATE
		ESTIMATED COMPLETION DATE

Prepared for the Science Information Exchange.

Not for publication or publication reference.

U. S. Department of
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

NOTICE OF RESEARCH PROJECT

PROJECT NO. (DO NOT USE THIS SPACE)

TITLE OF PROJECT

Compilation and Tabular Abstracting of Literature on Mutagenic Effects of Energy Related Pollutants

GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED ON THE PROJECT.

CONTRACTOR'S PROJECT DIRECTOR: John S. Wassom, Oak Ridge National Laboratory, Oak Ridge, Tennessee

PROJECT OFFICER (NIEHS): Dr. H. V. Malling, Head, Biochemical Genetics Section, Environmental Mutagenesis Branch

NAME AND ADDRESS OF APPLICANT INSTITUTION

NIEHS, P. O. Box 12233, Research Triangle Park, North Carolina 27709

SUMMARY OF PROPOSED WORK - (200 words or less - Omit Confidential data.)

In the Science Information Exchange summaries of work in progress are exchanged with government and private agencies supporting research in the bio-sciences and are forwarded to investigators who request such information. Your summary is to be used for these purposes.

The tasks the Environmental Mutagen Information Center will carry out are to compile the past and present literature on mutagenesis testing of energy related pollutants. This information will then be processed into EMIC's data bank noting bibliographic details, and keywording of chemicals, organisms, and system studied. A special tabular abstract of the papers containing original test data will be made. This table will have the same format as the tabular abstract made for the Food and Drug Administration on a selected series of food additives. In order to make these data easily available, bibliographies containing agent, organism, test object, chemical abstract services (CAS), registry number and a KWIL index will be printed and distributed to interested individuals.

ERR 5.3 (402)

\$ 130,000

PROFESSIONAL SCHOOL (medical, dental, etc.) WITH WHICH THIS PROJECT SHOULD BE IDENTIFIED

SIGNATURE OF PRINCIPAL INVESTIGATOR

DATE

H. V. Malling

8/21/78

DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY

SUPPORTING AGENCY

MOD OF SUPPORT (Check one)

☐ Agency Staff (Intramural)

☐ Negotiated Contract

☐ Special Project Grant

☐ Research Grant

☐ Other (Specify)

FUNDS OBLIGATED CURRENT F.Y.

NUMBER OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT FISCAL YEAR

BEGINNING DATE

ESTIMATED COMPLETION DATE

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Not for publication or publication reference.

U. S. Department of
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

NOTICE OF RESEARCH PROJECT

PROJECT NO. (DO NOT USE THIS SPACE)

1. TITLE OF PROJECT

Chemical and Environmental Mutagen Studies Utilizing the Tradescantia Test System

2. GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED ON THE PROJECT.

Contractor's Project Director: Arnold H. Sparrow, Ph.D., Brookhaven National Laboratory

Project Officer (NIEHS): Frederick J. de Serres, Ph.D., Chief, Environmental Mutagenesis Branch

3. NAME AND ADDRESS OF APPLICANT INSTITUTION

National Institute of Environmental Health Sciences

P.O. Box 12233, Research Triangle Park, North Carolina 27709.

4. SUMMARY OF PROPOSED WORK - (200 words or less - Omit Confidential data.)

In the Science Information Exchange summaries of work in progress are exchanged with government and private agencies supporting research in the bio-sciences and are forwarded to investigators who request such information. Your summary is to be used for these purposes.

The objectives of the proposed research are: (a) to demonstrate the usefulness of and further develop the Tradescantia somatic mutation test system as a quantitative monitor in environments containing known or suspected mutagens; (b) to use special genetic clones of Tradescantia to establish the relative mutagenicity of a limited number of mutagens (primarily in gaseous form), as to magnitude of effect, specificity of action, and possibility of reversion; (c) to look for evidence of genetic repair of DNA injury produced by chemical mutagens and to look for possible threshold levels below which induced mutation rate is negligible; and (d) to determine in greater detail the time and dose response for several loci for one selected gaseous mutagen, comparing these with presently available radiation data and with results observed in animal cells. Two different clones of Tradescantia (Clone 02 and Clone 4430), which are heterozygous for a flower petal color mutation, will be used to develop an assay system for detecting mutagenic activity of airborne environmental chemicals. During the next year, the development of standard conditions of exposure will be continued and the effects of various environmental factors on the level of response determined. Emphasis will be placed on obtaining precise dose-response curves after treatment with different mutagens and to determine whether there is any evidence for thresholds.

ER12 5.1 (402)

\$ 185,000

5. PROFESSIONAL SCHOOL (medical, dental, etc.) WITH WHICH THIS PROJECT SHOULD BE IDENTIFIED

SIGNATURE OF PRINCIPAL INVESTIGATOR

DATE

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6. SUPPORTING AGENCY

7. METHOD OF SUPPORT (Check one)

☐ Agency Staff (Intramural) ☐ Negotiated Contract ☐ Special Project Grant ☐ Research Grant ☐ Other (Specify)

8. FUNDS OBLIGATED CURRENT F.Y.

9. NUMBER OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT FISCAL YEAR

10. BEGINNING DATE

11. ESTIMATED COMPLETION DATE

309

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Not for publication or publication reference.

U. S. Department of
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
NOTICE OF RESEARCH PROJECT

PROJECT NO. (DO NOT USE THIS SPACE)

TITLE OF PROJECT

Development of Statistical Methodology for
Low Dose Extrapolation

Project No.: Z01 ES 41002-01 EBB
Previous Project No.: None

GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED ON THE PROJECT.

H. A. Guess, Ph.D., Staff Fellow, Environmental Biometry Branch (Principal Investigator)
K. S. Crump, Ph.D., Louisiana Tech University (Principal Investigator)

NAME AND ADDRESS OF APPLICANT INSTITUTION

National Institute of Environmental Health Sciences
P. O. Box 12233, Research Triangle Park, NC 27709

SUMMARY OF PROPOSED WORK - (200 words or less - Omit Confidential data.)

In the Science Information Exchange summaries of work in progress are exchanged with government and private agencies supporting research in the bio-sciences and are forwarded to investigators who request such information. Your summary is to be used for these purposes.

A new statistical technique is being developed for obtaining, from experimental data, maximum likelihood estimates of low dose carcinogenic risk. The statistical properties of the technique, such as error estimates, are being investigated.

ERR - 6.1 (401)
\$ 5,000 ✓
0

PROFESSIONAL SCHOOL (medical, dental, etc.) WITH WHICH THIS PROJECT SHOULD BE IDENTIFIED
NIEHS

SIGNATURE OF PRINCIPAL INVESTIGATOR

Harry A. Guess

DATE

8/22/75

DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY

SUPPORTING AGENCY

MODE OF SUPPORT (Check one)

☐ Agency Staff (Intramural) ☐ Negotiated Contract ☐ Special Project Grant ☐ Research Grant ☐ Other (Specify)

FUNDS OBLIGATED CURRENT F.Y.

NUMBER OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT FISCAL YEAR

310

BEGINNING DATE

ESTIMATED COMPLETION DATE

SECTION 1

ECTK

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

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RESEARCH OBJECTIVES

PROJECT NUMBER

9 R01 ES GM 01299-13

NAME AND ADDRESS OF APPLICANT ORGANIZATION

Department of Statistics
367 Evans HallUniversity of California
Berkeley, California 94720

NAME, SOCIAL SECURITY NUMBER, OFFICIAL TITLE, AND DEPARTMENT OF ALL PROFESSIONAL PERSONNEL ENGAGED ON PROJECT, BEGINNING WITH PRINCIPAL INVESTIGATOR

J. Neyman, [REDACTED] Director, Statistical Laboratory, Professor of Statistics
 L. LeCam, [REDACTED] Professor of Statistics
 E. L. Scott, [REDACTED] Professor of Statistics
 F. N. David, [REDACTED] Chairman, Department of Statistics, Professor of Statistics
 H. Lewy, [REDACTED] Professor Emeritus of Mathematics

TITLE OF PROJECT

STATISTICAL STUDIES OF PROBLEMS OF HEALTH AND BIOLOGY

USE THIS SPACE TO ABSTRACT YOUR PROPOSED RESEARCH. OUTLINE OBJECTIVES AND METHODS. UNDERSCORE THE KEY WORDS (NOT TO EXCEED 10) IN YOUR ABSTRACT.

It is intended to work on the development of statistical and probabilistic subdisciplines particularly important in the studies of biology and health problems. Whenever possible, such studies will be conducted in conjunction with substantive biological studies. To facilitate the establishment of the relevant contacts, seminar meetings with substantive speakers will be used, once a week during the academic year and more frequently during summer. Many problems contemplated for the immediate future are suggested by the current energy crisis. The broad, say, ultimate statistical problem connected with this crisis can be stated as follows: given that in a locality a new energy producing plant is to be constructed, with a specified additional environmental pollution, to estimate the consequent changes in the selected parameters of public health. It is proposed to study a number of subproblems of this "ultimate" problem. These include: (i) the use of Markov chains to study "competing risks", (ii) methodology of treating factorial experiments, (iii) construction of stochastic models of biological phenomena like carcinogenesis and mutagenesis. Some relevant mathematical problems will also be studied.

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ERR - 6-12 (401)

\$74,000 ✓

SECTION :		LEAVE BLANK
NOT FOR PUBLICATION OR PUBLICATION REFERENCE	DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE PUBLIC HEALTH SERVICE RESEARCH OBJECTIVES	PROJECT NUMBER 2P01ES 11L00628-05A1
NAME AND ADDRESS OF APPLICANT ORGANIZATION		

University of California, Davis, California

NAME, SOCIAL SECURITY NUMBER, OFFICIAL TITLE, AND DEPARTMENT OF ALL PROFESSIONAL PERSONNEL ENGAGED ON PROJECT, BEGINNING WITH PRINCIPAL INVESTIGATOR

See attached list.

DONALD L. DUNGWORTH et al

TITLE OF PROJECT

Pulmonary Effects of Environmental Oxidant Pollutants

USE THIS SPACE TO ABSTRACT YOUR PROPOSED RESEARCH. OUTLINE OBJECTIVES AND METHODS. UNDERSCORE THE KEY WORDS (NOT TO EXCEED 10) IN YOUR ABSTRACT.

Rats and monkeys will be chronically exposed to oxidant air pollutants, primarily ozone, at concentrations approximating high ambient levels (0.2 - 0.5 ppm). A multidisciplinary group will make integrated biochemical, microbiological, physiological and morphological evaluations of effects. The findings will have relevance to the specific problem of air pollution and to a general understanding of pulmonary patho-biology.

By plotting the relative levels of sensitivity of the various parameters studied and the effects observed, a basis will be provided for making predictions of possible long-term consequences of photochemical smog on man. Comparison of effects in rats and monkeys should provide for more confident extrapolation to man and hence enable the setting of rational air quality criteria.

A primary goal is to test critical hypotheses concerning biochemical, immunological and cellular mechanisms responsible for the deleterious effects of the pollutants. Major pathogenetic and modifying factors of interest are: the role of lipid peroxidation in initiating damage; the induction of antioxidant defense mechanisms by continued exposure and the general phenomenon of adaptation; the sites of impairment in pulmonary alveolar macrophages and components of the immune system in the lung; the sequence and nature of lesions resulting in the development of chronic obstructive lung disease (bronchitis/emphysema) and interstitial fibrosis.

An additional goal is to explore further the potential prophylactic value for human populations of dietary antioxidants such as vitamin E.

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ERR-7.10 E

401 - \$ 170,000.

5A1 - \$ 115,000.

"

HEALTH EFFECTS

CATEGORY:

SUBCATEGORY:
Geothermal

TECHNOLOGY:

SUBTECHNOLOGY:
To determine the processes of damage, repair recovery, protection

OBJECTIVE:
and amelioration in biological systems exposed to hazardous
agents associated with energy technologies.

PROJECT:

TITLE: Biochemistry of Lead Toxicity and its Reversal
.....
.....

RES. FACILITY: Univ. Of South Carolina

RES. LOCATION: Charleston, S.C.

INVESTIGATOR(S): A. Krall

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY75 \$39,327 (100% energy related)

.....

DESCRIPTION: The overall objectives of this research are (1), to determine
the mechanism by which lead feeding alters function of the isolated kidney
mitochondrion, (2), to determine whether mitochondrial function is impaired
in-vivo in the kidney of the lead-fed-rat, (3), to determine whether the two
methods now known for the in-vitro reversal of the effects of lead on the
kidney mitochondria can be utilized to reverse in-vivo lead damage to the
mitochondria and (4), to determine whether magnesium can reverse an already
established PB inhibition of 8-NH2-Levulinic dehydratase and perhaps other
symptomatology of lead poisoning, and (5), to determine whether our control
rat population is now partially lead intoxicated and, if they are, the extent

RELATED TECHNOLOGIES:
of the metabolic effects of that intoxication.

Shale

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Geothermal
SUBTECHNOLOGY:
OBJECTIVE: To determine the processes of damage, repair, recovery, protection and amelioration in biological systems exposed to hazardous agents associated with energy technologies.

PROJECT:

TITLE: Heavy Metals and the Developing Nephron
.....
.....

RES. FACILITY: University of Texas

RES. LOCATION: Dallas, Texas

INVESTIGATOR(S): H. Worther

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY 75 \$28,119 (100% energy related)

.....
DESCRIPTION: The effect of the nephrotoxic metals cadmium, uranium, lead, copper and mercury, on the immature kidney will be evaluated by administering each metal to rats and rabbits at various ages beginning in the newborn period, and analyzing the functional effects and the changes in the enzyme distribution and content and the morphology of the nephron using tubules isolated by microdissection after collagenase treatment.
The studies will be used to compare the effects of each metal on the immature and mature nephron to determine whether the developing nephron is more susceptible than the mature nephron and to correlate such susceptibility with alterations in enzyme activity and morphology of the proximal tubule. The expected higher susceptibility of the immature nephron may allow detection of an effect of heavy metals which would be missed in the mature animal.

RELATED TECHNOLOGIES: Coal 324
.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Geothermal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery,
protection and amelioration in biological systems exposed to hazardous
agents associated with energy technologies.

PROJECT:

TITLE: Biochemical Studies on CNS Teratogenesis Induced by
..... Mercury

RES. FACILITY: Northwestern University

RES. LOCATION: Evanston, Illinois

INVESTIGATOR(S): G. Okita

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY 74 \$54,467 FY 75 \$55,522
..... (100% energy related)

DESCRIPTION: The objectives of the proposed investigation is to obtain
information on the mechanism of congenital brain abnormalities induced by
environmental mercury. More specifically we are interested in investigating
the following problems: 1) the role of brain Na⁺, K-ATPase inhibition as a
possible mechanism of methylmercury (MeHg)-induced CNS teratogenesis and
behavioral abnormalities in newborn and mature animals, and 3) investigate
by in vivo methods other sulfhydryl enzymes known to be inhibited by
mercury to determine their role in fetal and adult neurotoxicity.

..... Coal

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Geothermal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery,
 protection and amelioration in biological systems exposed
 to hazardous agents associated with energy technologies.

PROJECT:

TITLE: Structural Studies in Treatment of Metal Poisoning

RES. FACILITY: University of North Carolina

RES. LOCATION: Chapel Hill, N. C.

INVESTIGATOR(S): D. Hodgson

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY 74 \$30,730 FY 75 \$31,360
 (100% energy related)

DESCRIPTION: The project involves the determination of the crystal
 structures of metal chelates which are relevant to the treatment of metal
 poisoning. Metals studied include those of known high toxicity and which
 people come into routine contact with. Chelating agents involved in the
 project are penicillamine, BAL, and derivatives of EDTA. The purpose of
 these studies is to determine which ligand sites are involved in the
 binding of the chelates to specific metals, and to see which bonds are in
 need of strengthening. This will enable us to propose modification of the
 ligands for application in the treatment of exposure to individual metals,
 and should produce effective antidotes for each of the metals under study.

RELATED TECHNOLOGIES:

.....
 Shale

CATEGORY: HEALTH EFFECTS
SUBCATEGORY:
TECHNOLOGY: Geothermal
SUBTECHNOLOGY:
OBJECTIVE: To determine the processes of damage, repair recovery, protection
..... and amelioration in biological systems exposed to hazardous agents
..... associated with energy technologies.

PROJECT:

TITLE: Toxicology of Mercury at Cellular-Subcellular Levels
.....
.....

RES. FACILITY: Univ. of California - David Campus

RES. LOCATION: Davis, CA

INVESTIGATOR(S): D.W. Gruenwedel

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY75 \$42,055 (100% energy related)

.....
DESCRIPTION: Investigations of the toxicological effects of an organo-
..... mercurial, for instance, methylmercurio hydroxide, on cells and subcellular
..... components. It is hoped that these studies will contribute to a better
..... understanding of the action of certain environmental pollutants at the
..... molecular level.
.....
.....
.....
.....

Coal

RELATED TECHNOLOGIES:
.....

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Geothermal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous agents
associated with energy technologies.

PROJECT:

TITLE: Effect of Lead on the Developing Nervous System

RES. FACILITY: Univ. Wisconsin

RES. LOCATION: Madison, Wisconsin

INVESTIGATOR(S): A. Martin

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY75 \$29,614 (100% energy related)

DESCRIPTION: Single (I.P. or S.C.) injections of lead salts, (acetate or
nitrate), at dosage levels producing a ID50 response will be given pregnant mice at
daily intervals from the 8th to 16th days of gestation. Chick embryos will be treated
with predetermined sublethal doses at daily intervals from the 2nd to 8th days of
incubation. The pathological effects of such treatment on the morphological develop-
ment of vertebrate embryos will be investigated. The quantitative and qualitative
distribution of lead in the developing fetus will be studied by atomic absorption
spectrophotometry and radioautography.

..... Coal

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Geothermal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery,
protection and amelioration in biological systems exposed to hazardous
agents associated with energy technologies.

PROJECT:

TITLE: Low Level Lead Toxicity in Childhood Anemia

.....

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RES. FACILITY: University of Nebraska

RES. LOCATION: Omaha, Nebraska

INVESTIGATOR(S): C. Angle

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY 75 \$44,215 (100% energy related)

.....

DESCRIPTION: The proposed study investigates the health effects of
low level lead relating to a decrease in rbc membrane Na/D ATPase: 1)
decreased rbc; 3) altered osmotic fragility. The correlation of these
health effects with Na/K ATPase will be investigated in the following
groups of 80 urban children, ages 3-14; 20 non-anemic; 20 iron deficient;
20 G-6-PD deficient; 20 with sickle cell trait. It is proposed that the
decrease in rbc Na/K ATPase associated with low level lead is a significant
health effect. In the common nutritional and genetic disorders of the red
cell, the increased environmental exposure to lead may further decrease
red cell survival.

RELATED TECHNOLOGIES:

Coal

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Geothermal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, ...
protection and amelioration in biological systems exposed to hazardous ...
agents associated with energy technologies.

PROJECT:

TITLE: Possible New Antidotes for Mercury Poisoning

RES. FACILITY: Vanderbilt University

RES. LOCATION: Nashville, Tennessee

INVESTIGATOR(S): M. Jones

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY 75 \$86,435 (100% energy related)

DESCRIPTION: The purpose of the proposed research is to exploit
therapeutically the selectivity for mercury of a group of novel chelating
agents, several members of which have already been synthesized in our
laboratories. The ability of these compounds to selectively coordinate
to mercury in inorganic or organic form and to accelerate the excretion of
such mercury will be studied in detail. The long range goal is to obtain
compounds capable of safely decreasing the body burden of mercury in humans
and antagonizing mercury-induced toxicity.

RELATED TECHNOLOGIES: Coal

CATEGORY:Health Effects.....
 SUBCATEGORY:
 TECHNOLOGY:Geothermal.....
 SUBTECHNOLOGY:
 OBJECTIVE: To determine the processes of damage, repair recovery, protection and amelioration in biological systems exposed to hazardous agents associated with energy technologies.

PROJECT:

TITLE:Effect of Toxic Metals on Specific Brain Structures.....

RES. FACILITY:Indiana University.....
 RES. LOCATION:Indianapolis, Indiana.....
 INVESTIGATOR(S):W. Niklowitz.....
 SPONSOR(S):NIH/DHEW.....
 DURATION:1 year.....
 FUNDING:FY 75 \$44,750 (100% energy related).....

DESCRIPTION: The proposed study will correlate the light microscopic cytology and electron microscopic substructure with cyto- and histochemical observations of the CNS after intoxication with metal compounds. It will emphasize specific brain areas which are considered to be of special importance, and provide a basic understanding of structural manifestation of metal poisoning before, during, and after clinical manifestation of intoxication. The study also proposes to determine the time sequence of the earliest cytomorphological and cytochemical changes (lesions) as they may be related to functional and metabolic disorders of the CNS. Although initial experiments will be carried out with single, high doses of lead and mercury compounds, subsequent studies will attempt to determine primary
 RELATED TECHNOLOGIES: specific ultrastructural changes in selected areas of the CNS following single or repeated low-level exposures to toxic metals.

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Geothermal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery,
protection and amelioration in biological systems exposed to hazardous
agents associated with energy technologies.

PROJECT:

TITLE: Design and Development of Chelators for Lead and Mercury
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RES. FACILITY: Indiana University

RES. LOCATION: Indianapolis, Indiana

INVESTIGATOR(S): R. Roesske

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY 75 \$42,010 (100% energy related)

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DESCRIPTION: The goal of the proposed research is to design and synthesize
cyclic sulfur-containing compounds that will be chelating agents for lead
and mercury ions. By model-building in a computer, derivatives of the
enniatin antibiotics, of the "crown ethers" and of cyclohexaamylose will
be examined for their ability to provide the geometry required of a lead
and/or mercury chelator. The most promising compounds will be synthesized
and tested for their ability to chelate lead and mercury and to remove
these ions from biological tissues.

.....

RELATED TECHNOLOGIES:
..... Coal

323

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, protection and
amelioration in biological systems exposed to hazardous agents associated
with energy technologies.....

PROJECT:

TITLE: Response of Lung to Injury

.....

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RES. FACILITY: University of Pennsylvania

RES. LOCATION: Philadelphia, Pa.

INVESTIGATOR(S): Alfred P. Fishman

SPONSOR(S): NIH/DHEW

DURATION: 3 years

FUNDING: FY '74 \$268,073; FY '75 \$353,538

..... (10% energy related)

DESCRIPTION: Metabolism of Lipoproteins by Lung

..... Studies of Lipids and Basement Membrane of Endothelial Cell

..... Immune Response of Pulmonary Lymphocytes to Influenza Virus

..... Immunocompetent Cells of the Lung

..... Molecular Mechanisms of Hyperbaric Oxygen, Carbon
Monoxide, and Ozone or Peroxide Toxicity Evaluated at the Subcellular and
Organ Levels

..... Mitochondrial Respiratory Activity in Fetus and Newborn

.....

RELATED TECHNOLOGIES:

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CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, protection and
amelioration in biological systems exposed to hazardous agents associated
with energy technologies.

PROJECT:

TITLE: Center for the Study of Lung Disease

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RES. FACILITY: Yale University School of Medicine

RES. LOCATION: New Haven, Conn.

INVESTIGATOR(S): A. Bouhuys

SPONSOR(S): NIH/DHEW

DURATION: 3 years

FUNDING: FY '74 \$ 321,498; FY '75 \$ 582,859

..... (25% energy related)

DESCRIPTION: The proposed work includes studies on the pathogenesis
... of bronchial asthma, using airway responses in human subjects as well as
... determination of cyclic nucleotides and electrophysiological measurements
... in isolated airway muscle tissue, on diffusing capacity and airway responses
... in healthy persons, on chemical identification of pharmacological agent
... causing byssinosis in textile workers, on biochemical defense mechanisms
... against inhaled pollutants such as ozone and cigarette smoking, and on fetal
... lung maturation,

.....

RELATED TECHNOLOGIES:

.....

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Multi-Technology.....

SUBTECHNOLOGY:

OBJECTIVE:To determine the processes of damage, repair recovery,..
protection and amelioration in biological systems exposed to hazardous...
agents associated with energy technologies.....

PROJECT:

TITLE:Research in Environmental Cancer.....

RES. FACILITY:New York University Medical Center.....

RES. LOCATION:New York, N. Y.....

INVESTIGATOR(S):Dr. N. Nelson.....

SPONSOR(S):NIH/HEW.....

DURATION:FY 1973-75.....

FUNDING:FY 74 \$662,620 FY 75 \$522,742.....

.....(5% energy related).....

DESCRIPTION:The program deals with chemical, physical and biological
factors in the causation of cancer as well as their interaction. The
approaches described cover a wide range and include biochemical studies
of intracellular mechanisms including cell kinetics, the development of
laboratory models for cancer in various organ systems, the development of
mathematical models for cancer induction, and epidemiological studies
on human populations aimed at the identification of causal factors. The
present program involves three elements: 1) expansion of ongoing research,
2) the development of new lines of study within existing Laboratories of
the Institute and 3) development of two new divisions within the Institute, a

RELATED TECHNOLOGIES:Laboratory of Experimental Pathology and a Laboratory of Immunology. Conduct
ecological studies of Hudson River radioactivity from nuclear power reactors.

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Multi -Technology
SUBTECHNOLOGY:
OBJECTIVE: To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous agents associated
with energy technologies.

PROJECT:

TITLE: Intermediary Metabolism of Pulmonary Tissue Studied
..... In Vitro
.....

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, N.C.

INVESTIGATOR(S): J. J. O'Neil

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 75 \$16,000 (33% energy related)

DESCRIPTION: Intermediary metabolism, although generally well character-
ized for most tissues, has not been thoroughly studied for the lung. This
study will define substrate utilization by lung tissue, that is, the
uptake, oxidation, and incorporation of glucose, amino acids, and fatty
acids.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Multi-Technology
SUBTECHNOLOGY:
OBJECTIVE: To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous agents associated
with energy technologies.

PROJECT:
TITLE: Mutagenic Activity of Chemical Carcinogens in Neurospora
..... crassa
.....
RES. FACILITY: National Institute of Environmental Health Sciences
RES. LOCATION: Research Triangle Park, N. C.
INVESTIGATOR(S): Tong-man Ong
SPONSOR(S):
DURATION:
FUNDING: FY 74 \$16,000 (50% energy related)

.....
DESCRIPTION: Recent studies on the mutagenicity of chemical carcinogens
..... in various test systems have shown that there is a positive correlation between
..... mutagenicity and carcinogenicity. Our previous studies with chemical
..... carcinogens in Neurospora crassa not only show a positive correlation, but
..... also indicate that potent chemical carcinogens induce predominantly base-
..... pair substitution mutations. The ad-3 test system of N. crassa is used
..... in these studies.
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RELATED TECHNOLOGIES:
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CATEGORY:Health Effects.....
SUBCATEGORY:
TECHNOLOGY:Multi-Technology.....
SUBTECHNOLOGY:
OBJECTIVE: To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous agents associated
with energy technologies.....

PROJECT:

TITLE:Genetic Effects on Early Mouse Embryos after Mutagenic
.....Treatment of the Parents.....
.....

RES. FACILITY:National Institute of Environmental Health Sciences.....

RES. LOCATION:Research Triangle Park, N. C.

INVESTIGATOR(S):K. Burki.....

SPONSOR(S):NIH/HEW.....

DURATION:

FUNDING:FY 75 \$28,000 (100% energy related).....

.....
DESCRIPTION: The objectives of this study are to investigate the processes
and causes of fetal mortality in the mouse. Therefore, embryos derived
.....
from normal gene cells and embryos derived from germ cells treated with a
.....
known mutagen will be observed in vivo and in vitro development and analyzed
.....
cytogenetically. When fully established the system may permit the detection
.....
of possible mutagenic effects of potential mutagens.
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RELATED TECHNOLOGIES:

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Multi -Technology
SUBTECHNOLOGY:
OBJECTIVE: To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous agents
associated with energy technologies.

PROJECT:

TITLE: Factors Affecting Hepatic Heme Synthesis During Mammalian
Development
.....
RES. FACILITY: National Institute of Environmental Health Sciences
RES. LOCATION: Research Triangle Park, N. C.
INVESTIGATOR(S): J. S. Woods
SPONSOR(S): NIH/HEW
DURATION:
FUNDING: FY 75 \$40,000 (25% energy related)

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DESCRIPTION: The objectives of this study are 1) To elucidate the
mechanisms governing the regulation of hepatic hematopoiesis during mammalian
development, 2) to investigate the mechanisms of alterations in the regulation
of δ -aminolevulinic acid (ALA) synthetase during hepatocarcinogenesis
induced by exogenous agents, 3) to characterize and study the effects
of environmental agents on purified preparations of ALA synthetase from
adult, fetal and neoplastic rat liver, 4) to determine the correlation between
biochemical abnormalities associated with porphyrin overproduction and the
clinical symptoms of porphyria, and 5) to provide a pharmacological and
biochemical basis for predicting human responses to environmental agents.
RELATED TECHNOLOGIES:
which interfere with hepatic heme biosynthesis.

CATEGORY: Health Effects.....
SUBCATEGORY:
TECHNOLOGY: Multi- Technology.....
SUBTECHNOLOGY:
OBJECTIVE: To determine the processes of damage, repair recovery, protection and
amelioration in biological systems exposed to hazardous agents associated
with energy technologies.....

PROJECT:

TITLE: Comparisons of the Effects of Chemical Mutagens on
..... Somatic Cells and Germinal Cells of Mice
.....

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, North Carolina

INVESTIGATOR(S): E. R. Soares

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 74 \$32,481 FY 75 \$24,000
..... (100% energy related)
.....

DESCRIPTION: This project will be designed to explore the feasibility
..... of using somatic cells (i.e., lymphocytes) to screen for chemically induced
..... chromosomal abnormalities. Inclusive in this project is the study of the
..... relative sensitivities to chemical mutagens of germ cells (spermatogonia,
..... spermatocytes, etc.) and lymphocytes.
.....

..... Adult male and female mice will be exposed to a known
..... chemical mutagen (TEM). Following exposure cytological examinations of
..... lymphocytes and testicular sections will be made. Zygotes will also be
..... examined for the presence of chromosome abnormalities or micronuclei.
.....

RELATED TECHNOLOGIES:
.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi - Technology

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous agents associated
with energy technologies.

PROJECT:

TITLE: The Synergistic Effects of Radiation and Chemical
Mutagens of Spermatogonia in Mice

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, N. C.
W. Sheridan

INVESTIGATOR(S): NIH/HEW

SPONSOR(S):

DURATION: FY 75 \$32,481 (100% energy related)

FUNDING:

DESCRIPTION: Investigations using known chemical mutagens have not
demonstrated induction of dominant lethal mutations in mouse spermatogonia.
In irradiation studies, delivering a dose in two fractions increased the
mutation rate, implying that the first fraction caused som stem cells to
enter a more sensitive state by the time of the second fraction. We
are investigating whether pre-treatment with irradiation will sensitize
spermatogonia to induction of mutation by chemical treatment following
the irradiation. Adult male mice were irradiated with 300R of gama rays.
Twenty-four hours later they were given a dose of 200mg/kg EMS and mated
in dominant lethal dissection tests. Post sterile-period results will be
compared with those of groups receiving only irradiation or only chemical
treatment and a control. Samples from all groups will be cytologically
analyzed to determine the rate of induced chromosome aberrations.

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Multi - Technology.....

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous agents associated
with energy technologies.....

PROJECT:

TITLE:Spectrum of Genetic Alterations Caused by Chemical.....
.....Carcinogens in Neurospora crassa.....
.....National Institute of Environmental Health Sciences.....

RES. FACILITY:

RES. LOCATION: Research Triangle Park, North Carolina.....

INVESTIGATOR(S): Tong-man Ong.....

SPONSOR(S): NIH/HEW.....

DURATION:

FUNDING:FY 74 \$8,269.....(50% energy related).....

DESCRIPTION: Many environmental agents and synthetic chemicals are
carcinogenic in man and other mammals. The mechanism by which these agents
cause cancer is not yet understood, however, the somatic mutation theory
is one of the most attractive hypotheses for the origin of neoplasia. Our
previous studies have shown that there is a positive correlation between
carcinogenicity in mammals and mutagenicity in Neurospora crassa among the
carcinogenic compounds tested. It is of interest then to determine whether
chemical carcinogens induce a particular type of genetic alteration in
N. crassa.

RELATED TECHNOLOGIES: The ad-3 test system of N. crassa developed by F. J. de Serres
is used in this study. The ad-3 mutants isolated from forward mutation
experiments are made homokaryotic for the adenine requirement.

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Multi - Technology
SUBTECHNOLOGY:
OBJECTIVE: To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous agents associated
with energy technologies.

PROJECT:

TITLE: Microsomal Mixed-Function Oxidase Systems: Specificity
..... and Function
.....

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, N. C.

INVESTIGATOR(S): R.M. Philpot

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 75 \$80,000 (20% energy related)

.....
DESCRIPTION: The microsomal mixed-function oxidase (MFO) system of
..... mammals exhibits species, sex, and tissue variations. Treatment of animals
..... with various pharmaceutical agents, environmental pollutants, and other
..... exogenous compounds can bring about changes in the MFO system(s). Both
..... stimulation and inhibition of these systems can be elicited, and in some
..... cases this can be accomplished with the same compound. It is not understood
..... if these changes are due to direct effects on the major components of the
..... MFO, to alterations in the membrane environment, or to changes in the
..... concentrations or kinds of endogenous compounds that interact with the MFO.
.....

RELATED TECHNOLOGIES: The objective of this project is to increase our understanding of the factors
..... responsible for the variances noted among mixed-function oxidase systems from
..... different sources. This objective is being pursued via several approaches.

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Multi-Technology
SUBTECHNOLOGY:
OBJECTIVE: . To determine the processes of damage, repair recovery, protection
. and amelioration in biological systems exposed to hazardous
. agents associated with energy technologies.

PROJECT:

TITLE: . In Vitro Xenobiotic Metabolism by Selected Marine Species and ...
. the Effects of Environmental Temperature of Pre-exposure to ...
. Environmental Pollutants on These Biotransformation Reactions ...

RES. FACILITY: . National Institute of Environmental Health Sciences
RES. LOCATION: . Research Triangle Park, North Carolina
INVESTIGATOR(S): . J. R. Bend, et. al.
SPONSOR(S): . NIH/HEW
DURATION:
FUNDING: . FY '74 \$25,194 FY '75 \$20,000 (50% energy related)

DESCRIPTION: (1) To compare hepatic and extrahepatic microsomal xenobiotic
. oxidative metabolism in several vertebrate and invertebrate marine species,
. (2) to characterize the hepatic mixed-function oxidase system of the little
. skate, Raja erinacea, since it possesses relatively high enzyme activity,
. (3) to investigate some xenobiotic conjugating enzymes in marine vertebrates
. and invertebrates, and (4) to study the effects of environmental contaminant
. administration on in vitro xenobiotic mixed-function oxidation and
. conjugation by tissues from marine elasmobranchs and teleosts.

RELATED TECHNOLOGIES:
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CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi-Technology

SUBTECHNOLOGY:

OBJECTIVE: .. To determine the processes of damage, repair recovery, protection
 ..and amelioration in biological systems exposed to hazardous
 ..agents associated with energy technologies.....

PROJECT:

TITLE: .. Mutation-Induction in Repair-Deficient Strains of Neurospora
 .. crassa

.....

RES. FACILITY: .. National Institute of Environmental Health Sciences

RES. LOCATION: .. Research Triangle Park, North Carolina

INVESTIGATOR(S): F. J. de Serres

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: .. FY '74.. \$33,078 FY '75.. \$64,000 (100% energy related)

.....

DESCRIPTION: .. Exploratory experiments of our own have shown that repair-
 .. deficient haploid strains of Neurospora have marked quantitative and
 .. qualitative effects on the induction of point mutations at the ad-3A and
 .. ad-3B loci. The ad-3 test system is unique in that the mutations can be
 .. thoroughly characterized, including a presumptive identification of the
 .. genetic alterations in the point mutations at the molecular level. All
 .. possible effects were found including a strain which is completely
 .. resistant to mutation-induction after UV irradiation. In Neurospora, by
 .. using a two-component heterokaryon, it is possible to mimic a diploid...

RELATED TECHNOLOGIES:

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CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Multi-Technology.....

SUBTECHNOLOGY:

OBJECTIVE: ..To determine the processes of damage, repair recovery, protection
 ..and amelioration in biological systems exposed to hazardous
 ..agents associated with energy technology.....

PROJECT:

TITLE: ..Chemical and Environmental Mutagen Studies Utilizing the.....
 ..Tradescantia Test System.....

RES. FACILITY: ..National Institute of Environmental Health Sciences.....

RES. LOCATION: ..Research Triangle Park, North Carolina.....

INVESTIGATOR(S):A. H. Sparrow.....

SPONSOR(S):NIH/HEW.....

DURATION:

FUNDING: ..FY '74..\$168,000.....FY '75.....(100% energy related)

DESCRIPTION: The objectives of the proposed research are: (a) to demonstrate
 ..the usefulness of and further develop the Tradescantia somatic mutation test
 ..system as a quantitative monitor in environments containing known or
 ..suspected mutagens; (b) to use special genetic clones of Tradescantia to
 ..establish the relative mutagenicity of a limited number of mutagens
 ..(primarily in gaseous form), as to magnitude of effect, specificity of action,
 ..and possibility of reversion; (c) to look for evidence of genetic repair
 ..of DNA injury produced by chemical mutagens and to look for possible
 ..threshold levels below which induced mutation rate is negligible; and....

RELATED TECHNOLOGIES:

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CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair, recovery, protection
 and amelioration in biological systems exposed to hazardous
 agents associated with energy technologies.

PROJECT:

TITLE: An Appraisal of Environmental Exposure to Heavy Metals

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, North Carolina

INVESTIGATOR(S): I. C. Smith

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY '74 \$53,000 FY '75 (50% energy related)

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DESCRIPTION: To explore environmental contamination with specific metals.
 which may be hazardous to health. To search the literature and other
 reports and to seek expert opinions from industry in order to compile these
 data on potential hazards of specific metals. Special emphasis is placed
 on determination of the physical parameters and chemical properties,
 valency, reactivity, etc., as the metal compound makes contact with man.
 The information is to be put together in a document on each of the metals
 of specific interest.

RELATED TECHNOLOGIES: oil and gas, geothermal

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, protection
 and amelioration in biological systems exposed to hazardous
 agents associated with energy technologies.

PROJECT:

TITLE: Fate of Heavy Metals and Heavy Metal Complexes in Soils and Plants

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, North Carolina

INVESTIGATOR(S): R. E. Wildung

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY '74 \$90,000 FY '75 (75% energy related)

DESCRIPTION: The objectives of this contract are to investigate the uptake,
 translocation, metabolism and effects produced by numerous metals including
 silver, arsenic, cadmium, cobalt, chromium, copper, iron, mercury, manganese,
 molybdenum, nickel, lead, antimony, tin, thallium, tungsten, and zinc on
 representative grass and broad-leaved plants grown on treated soils, on
 soil, and on soil microorganisms. These investigations will determine the
 nature of the bond types of chemical forms of the metabolites with specific
 emphasis on the conversion of inorganic metals to organic complexes and the
 extent of this conversion.

RELATED TECHNOLOGIES: oil and gas, geothermal

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: ..To determine the processes of damage, repair, recovery, protection
 and amelioration in biological systems exposed to hazardous
 agents associated with energy technologies.

PROJECT:

TITLE: ..Respiratory Tract Deposition Models, Interagency Agreement

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RES. FACILITY: ..National Institute of Environmental Health Sciences

RES. LOCATION: ..Research Triangle Park, North Carolina

INVESTIGATOR(S): ..O. G. Raabe

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: ..FY '74..\$75,000.....FY '75.....(100% energy related)

.....

DESCRIPTION: ..The major objectives of this research are: 1.) Construction
 of physical models of the respiratory tracts of man and several animal
 species; 2.) Measurement of the deposition of aerosols as small as 0.01 ...
 micron diameter in the models; 3.) Determination of desposition of selected
 particle sizes in animals and in man if practical; 4.) Development of a ...
 theoretical model of deposition in the lung based on the above results; and
 5.) Field evaluation of the physical-theoretical model.

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RELATED TECHNOLOGIES: Shale oil

.....

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE:To determine the processes of damage, repair recovery, protection
.....and amelioration in biological systems exposed to hazardous
.....agents associated with energy technologies.....

PROJECT:

TITLE:Hepatic and Extrahepatic Conjugation and Mixed-Function Oxidation
.....Pathways in Mammals and the Effects of Environmental Contaminants
.....and Other Xenobiotics on the Enzymes Involved.....

RES. FACILITY:National Institute of Environmental Health Sciences.....

RES. LOCATION:Research Triangle Park, North Carolina.....

INVESTIGATOR(S):J. R. Bend, et. al.....

SPONSOR(S):NIH/HEW.....

DURATION:

FUNDING:FY '74..\$78,715.....FY '75..\$92,000 (50% energy related)

.....
DESCRIPTION:The objectives of this study are (1) the characterization of
.....some microsomal, mitochondrial and soluble conjugating and hydrating
.....enzymes of extrahepatic tissues as compared to the liver enzymes, (2) to
.....determine the effects of selected xenobiotics upon these enzymes, (3) to
.....assess the relative importance in vivo of this extrahepatic enzyme activity
.....as compared to the liver, following ingestion or administration of chemicals
.....and drugs (substrates) via various routes including inhalation, (4) to
.....investigate the perinatal development of some conjugating and hydrating
.....enzymes in a few species, and (5) to study the combined effects of several...

RELATED TECHNOLOGIES:shale oil.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: . To determine the processes of damage, repair recovery, protection
 and amelioration in biological systems exposed to hazardous
 agents associated with energy technologies.

PROJECT:

TITLE: . The Effects of Drugs and Chemicals on the Inhalation Toxicity of
 Chemical Solvents

RES. FACILITY: . National Institute of Environmental Health Sciences

RES. LOCATION: . Research Triangle Park, North Carolina

INVESTIGATOR(S): . R. T. Drew

SPONSOR(S): . NIH/HEW

DURATION:

FUNDING: . FY '74 . \$106,880 FY '75 . \$88,000 (75% energy related)

DESCRIPTION: . (1) The objectives of this study are to determine whether..
 animal pretreatment with compounds which modify enzyme levels will alter..
 acute and/or chronic inhalation toxicity of selected solvents; (2) to

..... determine whether pretreatment of animals with solvents by inhalation

..... alters subsequent degradation in lung and liver; (3) to investigate metabolic

..... pathways in the degradation of paraxylene and the effects of pretreatment

..... by known enzyme inducers on these pathways; (4) to identify urinary

..... metabolites for use as biological indicators of paraxylene exposure; (5) to

..... study the effects of phenol on in vitro metabolism of benzene.

RELATED TECHNOLOGIES: shale oil

.....

CATEGORY: Health Effects.....

SUBCATEGORY:

TECHNOLOGY: Coal.....

SUBTECHNOLOGY:

OBJECTIVE: .To determine the processes of damage, repair recovery, protection
 and amelioration in biological systems exposed to hazardous agents
 associated with energy technologies.

PROJECT:

TITLE: .Microsomal Drug and Chemical Metabolizing Enzyme Activity in Skin
 and Its Response to Environmental Agents.....

RES. FACILITY: .. National Institute of Environmental Health Sciences.....

RES. LOCATION: .Research Triangle Park, North Carolina.....

INVESTIGATOR(S): .. R. J. Pohl.....

SPONSOR(S): NIH/HEW.....

DURATION:

FUNDING: FY '74 \$25,194..... FY '75 \$32,000 (20% energy related)

DESCRIPTION: .To isolate microsomal fractions from skin, characterize the
 xenobiotic-metabolizing enzymes associated with those fractions and.....
 elucidate the role of these enzymes in toxic responses of skin to.....
 environmental agents.

RELATED TECHNOLOGIES: oil and gas.....

.....

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE: .To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous
agents associated with energy technologies.....

PROJECT:

TITLE: .Studies on the Transport and Metabolism of Prostaglandins (PG)...
in Lung.....

RES. FACILITY: .National Institute of Environmental Health Sciences.....

RES. LOCATION: .Research Triangle Park, North Carolina.....

INVESTIGATOR(S):T. Eling.....

SPONSOR(S):NIH/HEW.....

DURATION:

FUNDING: FY '74.....FY '75 \$28,000 (20% energy related)

.....

DESCRIPTION: To elucidate the mechanisms for the transport of PG's across
cell membranes. To determine the effects of this transport system of
various anti-inflammatory agents and exposures of animals to pollutants.
To relate alteration in this PG transport system to physiological effects
of PG's and to pathological effects of pollutants on the lung.

RELATED TECHNOLOGIES:shale oil.....

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: .. To determine the processes of damage, repair recovery, protection
..... and amelioration in biological systems exposed to hazardous
..... agents associated with energy technologies.

PROJECT:

TITLE: Prostaglandin Biosynthesis and Metabolism by Lungs... Effect of
..... Pollutants on this System.

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, North Carolina

INVESTIGATOR(S): T. Eling

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY '74 \$31,560 FY '75 \$12,000 (50% energy related)

.....
DESCRIPTION: This project is directed toward obtaining a better understand-
..... ing of lung function. The primary objective is to investigate the bio-
..... synthesis and metabolism of prostaglandins by the lung and to relate changes
..... in steady-state concentrations in the various prostaglandins to biological
..... effects. In addition, the effects of various environmental agents (SO₂,
..... O₃, pesticides, etc.) on the ability of the lung to synthesize and degrade
..... prostaglandins will be investigated. An attempt will be made to correlate
..... the biological effect of pollutants and modulation of prostaglandin levels
..... in lung.

RELATED TECHNOLOGIES: shale oil

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous agents
associated with energy technologies.

PROJECT:
The Morphologic and Biochemical Effects of Toxic Metals
TITLE:

.....

.....

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, N.C.

INVESTIGATOR(S): B. A. Fowler

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 75 \$144,000 (100% energy related)

.....

DESCRIPTION: 1) To define the ultrastructural and biochemical effects
of toxic metals and other environmental toxicants on mammalian and marine
invertebrate tissues, and 2) to correlate these observations with tissue
levels and physiological alterations in blood and viscera.
.....
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.....

RELATED TECHNOLOGIES: Oil and Gas, Geothermal

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous agents
associated with energy technologies.

PROJECT:

TITLE: The Morphologic Effects of Heavy Metals

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.....

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, N.C.

INVESTIGATOR(S): B. A. Fowler

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 74 \$98,008 (75% energy related)

.....

DESCRIPTION: The objectives of this study are to define the ultra-
structural effects of heavy metals and other environmental toxicants on
mammalian and marine invertebrate tissues, and 2) to correlate these
observations with tissue levels and biochemical alterations in blood and
viscera.

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RELATED TECHNOLOGIES: Shale Oil, Geothermal

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CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous agents associated
with energy technologies.

PROJECT:
TITLE: Metabolism of Sulfur Dioxide: Characterization and Modifi-
cation of the Metabolic Pathway
.....
RES. FACILITY: National Institute of Environmental Health Sciences
RES. LOCATION: Research Triangle Park, N. C.
INVESTIGATOR(S): H. J. Cohen
SPONSOR(S): NIH/HEW
DURATION:
FUNDING: FY 74 \$9,484 (100% energy related)

.....
DESCRIPTION: This is an effort to understand and possible manipulate
one mechanism by which animals detoxify a common air pollutant, sulfur
dioxide. Studies seek to characterize the enzyme, sulfite oxidase, which
metabolizes sulfur dioxide to sulfate, and to determine what factors,
both environmental and experimental, serve to control the activities of
this enzyme system.
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.....

RELATED TECHNOLOGIES: Shale Oil
.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous agents associated
with energy technologies.

PROJECT:

TITLE: Biosynthesis and Degradation of Lung Surfactant Phospholipids
.....
.....

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, N. C.

INVESTIGATOR(S): R. P. DiAugustine

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 74 \$66,194 (10% energy related)

.....

DESCRIPTION: The lung surfactant system is vital in maintaining alveolar
stability. This stability is thought to be conferred, for the most part,
.....
by dipalmitoylphosphatidylcholine, which is secreted to the acellular
.....
alveolar lining layer of the lung. The overall objectives of this project
.....
are to investigate the cellular source of surfactant phospholipid in the
.....
rabbit lung. Special attention was given at the outset of this project
.....
to the isolation and study of the rabbit lung concentric laminar organelles
.....
(CLO) located in the type II cell of the lung epithelium.
.....

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RELATED TECHNOLOGIES: Shale Oil, Geothermal

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous agents associated
with energy technologies.

PROJECT:

TITLE: Influence of Inhaled Environmental Agents on Mammalian
Pulmonary Mechanics

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, N. C.

INVESTIGATOR(S): R.P. Roth, R. T. Drew

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 74 \$21,900 (50% energy related)

DESCRIPTION: Pulmonary function studies will be conducted utilizing
standard and newly-devised physiological techniques to assess the effects
of chronic and acute inhalation exposures to irritants, oxidants, solvents,
and propellants on the intact rabbit. These findings will be correlated
with data from cardiovascular, biochemical and histological investigations.
The respiratory physiologic data derived from these studies will be compared
with similar data derived from the isolated perfused rabbit lung to assess
the usefulness of such a test model.

RELATED TECHNOLOGIES: Shale Oil

CATEGORY:Health Effects.....
SUBCATEGORY:
TECHNOLOGY:Coal.....
SUBTECHNOLOGY:
OBJECTIVE: To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous agents associated
with energy technologies.....

PROJECT:

TITLE: Interaction of Aromatic Polycyclic Hydrocarbons with
..... Macromolecules
.....

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, N. C.

INVESTIGATOR(S): P. Voytek

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 75 \$32,000 (50% energy related)

DESCRIPTION: To study the interactions of polycyclic aromatic carcino-
gens with nucleic acids and certain enzymes involved in DNA synthesis.
.....
Attempts will be made to isolate and identify carcinogen-bound adducts
.....
of DNA and to study further their metabolism, toxicity, influence on
.....
cellular replication, and possible interference with DNA synthesis processes.
.....
"In vitro" effects of activated polycyclic aromatic carcinogens on DNA
.....
polymerase activity will also be studied.
.....
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RELATED TECHNOLOGIES: Oil and Gas, Shale Oil
.....
.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous agents
associated with energy technologies.

PROJECT:

TITLE: Interaction of Complexing Agents with Heavy Metals and
Effects on Teratogenicity

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, N. C.

INVESTIGATOR(S): C. A. Kimmel

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 74 \$72,880 (50% energy related)

DESCRIPTION: The objective of this study is to investigate metal
chelation as a mechanism of teratogenic action by using various known
chelators and studying their interactions with essential and toxic heavy
metals.

RELATED TECHNOLOGIES: Shale Oil, Geothermal

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous agents associated
with energy technologies.

PROJECT:

TITLE: The Composition and Origins of the Acellular Lining Layer
..... of the Lung
.....

RES. FACILITY: National Institute of Environmental Health Sciences
.....

RES. LOCATION: Research Triangle Park, N.C.
.....

INVESTIGATOR(S): G. E. R. Hook, R. P. Di Augustine, R. Mirel
.....

SPONSOR(S): Nih/Hew
.....

DURATION:
.....

FUNDING: FY 75 \$44,000 (25% energy related)
.....

DESCRIPTION: Numerous chemical analyses of the acellular lung lining
layer have been made and there is little doubt concerning the identity of the
surfactant material obligatory for normal lung function. However, the
acellular layer is also a barrier to the environment and consequently may
be one of the first sites subject to attack by inhaled toxic agents. Unfor-
tunately, apart from its lipid composition very little is known about the
acellular lining layer.

..... The objectives of this investigation are (1) to determine
the enzymatic and protein composition of the lung lining, (2) to determine
the origin of these activities, and (3) to investigate compositional variations

RELATED TECHNOLOGIES:
..... of the lining under the influence of drugs, diseases and airborne pollutants.
.....

CATEGORY:Health Studies.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE:To determine the processes of damage, repair recovery,
protection and amelioration in biological systems exposed to hazardous
agents associated with energy technologies.....

PROJECT:

TITLE:Study of Factors Affecting Toxication-Detoxication of
.....Xenobiotics in Various Tissues, Especially Intestine.....

RES. FACILITY:National Institute of Environmental Health Sciences.....

RES. LOCATION:Research Triangle Park, N. C.

INVESTIGATOR(S):R. S. Chhabra, J. M. Tredger.....

SPONSOR(S):NIH/HEW.....

DURATION:

FUNDING:FY 75 \$80,000 (33% energy related).....

.....
DESCRIPTION: The main objectives of this research are to study the effects of various factors such as physiological (age, sex, nutrition, hormones), genetic (species, strain) and environmental (insecticides, carcinogenic polycyclic hydrocarbons) on the enzymes metabolizing xenobiotically in various tissues, especially intestine. The current projects under study concern 1) hormonal regulation of xenobiotic-metabolizing enzymes in various species and strains of laboratory animals, 2) study of xenobiotic-metabolizing enzyme systems in rabbit small intestine and the comparison with similar systems in liver -- effect of environmental pollutants on those systems, and 3) genetic regulation of induction of xenobiotic-metabolizing enzymes in various strains of mice.

RELATED TECHNOLOGIES:Shale Oil, Oil and Gas.....

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous agents associated
with energy technologies.

PROJECT:

TITLE: The Arylhydroxylases of Lung
.....
.....

RES. FACILITY: National Institute of Environmental Health Sciences

RES. LOCATION: Research Triangle Park, N.C.

INVESTIGATOR(S): C. Harper, R. T. Drew, G. E. R. Hook

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY 74 \$8,225 (70% energy related)

.....
DESCRIPTION: The arylhydroxylases of lung have been investigated using
..... a number of simple aromatic compounds as substrates. Because some of these
..... compounds (e.g., halogenated benzenes) are known to cause liver necrosis,
..... their effects on the lung after inhalation will be investigated morphologically
..... as well as enzymically. So far, results suggest that on a specific activity
..... basis lung microsomes have certain arylhydroxylase levels which are at
..... least as high as in liver microsomes (benzene and biphenyl hydroxylase).
.....

.....
..... Shale Oil
RELATED TECHNOLOGIES:

CATEGORY:Health Effects.....
SUBCATEGORY:
TECHNOLOGY:Coal.....
SUBTECHNOLOGY:
OBJECTIVE: To determine the processes of damage, repair, recovery, protection and
amelioration in biological systems exposed to hazardous agents associated
with energy technologies,.....

PROJECT:

TITLE:Studies of the Etiology of Experimental Emphysema.....
.....
.....

RES. FACILITY:Albert Einstein Medical Center.....

RES. LOCATION:Philadelphia, Pa.

INVESTIGATOR(S):George Weinbaum.....

SPONSOR(S):NIH/DHEW.....

DURATION:2 years.....

FUNDING:FY '74 \$157,625 (15% energy related).....

.....
DESCRIPTION:The etiology of human pulmonary emphysema remains
.....unknown. In recent studies in our laboratory we have been able to induce
.....emphysematous lesions in the dog using aerosolized homogenates of dog or
.....human polymorphonuclear leukocytes or dog alveolar macrophages. This
.....proposal includes experiments which will isolate, purify and characterize
.....the factor or factors involved in the production of the observed lesions
.....in animals.
.....
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.....

RELATED TECHNOLOGIES:Oil and Gas.....
.....

CATEGORY: Health Effects.....

SUBCATEGORY:

TECHNOLOGY: Coal.....

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, protection and
amelioration in biological systems exposed to hazardous agents associated with
energy technologies.....

PROJECT:

TITLE: Factors Affecting the Growth and Function of the Lung
.....
.....

RES. FACILITY: Dartmouth College.....

RES. LOCATION: Hanover, New Hampshire.....

INVESTIGATOR(S): Donald Bartlett Jr.....

SPONSOR(S): NIH/DHEW.....

DURATION: 2 years.....

FUNDING: FY '74 \$12,595
..... (25% energy related).....

DESCRIPTION: The lungs of young rats, raised under a variety of
..... conditions and treatments, will be assessed quantitatively by morphometric
..... and cytokinetic techniques to determine whether a chalene mechanism reg-
..... ulates juvenile and/or post-pneumonectomy lung growth in vivo. The mechanism
..... by which chronic hypoxia stimulates alveolar proliferation will be explored
..... using carbon monoxide exposure and animals without peripheral chemoreceptors.
..... In further experiments, the possible influence of low and high O₂ pressure
..... on post-pneumonectomy lung enlargement will be studied. Finallyk the effects
..... of chronic exposure to low concentrations of ozone will be studied, with
..... particular reference to effects on the elastic properties of the lung and
RELATED TECHNOLOGIES:

CATEGORY:
SUBCATEGORY:
TECHNOLOGY:
SUBTECHNOLOGY:
OBJECTIVE:
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PROJECT:

Factors Affecting the Growth and Function of the Lung

TITLE:
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RES. FACILITY:

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S):

DURATION:

FUNDING:

DESCRIPTION: to changes in ultrastructure as seen by electron microscopy.

The lung's elastic behavior will be studied by defining static pressure-
volume curves in degassed, excised lungs during inflation and deflation with
saline and with air.
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.....
.....
.....
.....

RELATED TECHNOLOGIES: **Oil and Gas**
.....

CATEGORY: **Health Effects**

SUBCATEGORY:

TECHNOLOGY: **Coal**

SUBTECHNOLOGY:

OBJECTIVE: **To determine the processes of damage, repair recovery, protection and amelioration in biological systems exposed to hazardous agents associated with energy technologies.**

PROJECT:

TITLE: **Studies in the Metabolism of Pulmonary Surfactant**

.....

.....

RES. FACILITY: **Albany Medical College**

RES. LOCATION: **Albany, N.Y.**

INVESTIGATOR(S): **John A. Belint**

SPONSOR(S): **NIH/DHEW**

DURATION: **3 years**

FUNDING: **FY '74 \$ 58,575; FY '75 \$58,194**

..... **(50% energy related)**

DESCRIPTION: **Pulmonary surfactant is essential for maintenance of normal lung mechanics. The investigations planned under this proposal have the following aims: 1) To define more precisely both quantitatively and qualitatively the pathways involved in the biosynthesis of lung surfactant lecithin. 2) Studies will be undertaken in control and essential fatty acid (EFA) deficient rats. 3) The role of surfactant in the defense mechanisms of the lung will be evaluated by studies in control and EFA deficient rats exposed to cigarette smoke, nitrogen oxides, sulfur dioxides, ozone and graded particles. In these rats measurements of surfactant**

RELATED TECHNOLOGIES:

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CATEGORY:

SUBCATEGORY:

TECHNOLOGY:

SUBTECHNOLOGY:

OBJECTIVE:

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PROJECT:

TITLE: **Studies in the Metabolism of Pulmonary Surfactant**
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RES. FACILITY:

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S):

DURATION:

FUNDING:

.....

DESCRIPTION: turnover, and composition, will be correlated with
 histologic findings and determinations of particle clearance rates where
 appropriate.
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RELATED TECHNOLOGIES: **Oil and Gas**
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.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, protection

 and amelioration in biological systems exposed to hazardous agents associated

 with energy technologies.

PROJECT:

TITLE: BIO-Organic Chemistry of Ozone, NO₂ and Tobacco Smoke

.....

.....

RES. FACILITY: Louisiana State University

RES. LOCATION: Baton Rouge, Louisiana

INVESTIGATOR(S): William A. Pryor

SPONSOR(S): NIH/DHEW

..... 2 years

DURATION:

FUNDING: FY '74 \$46,392; FY '75 \$49,657

..... (75% energy related)

DESCRIPTION: We propose a study of the reactions of the airborne pollu-
 .. tants: .. ozone, nitrogen dioxide, and cigarette smoke with lipids and
 .. biological membranes... All these materials contain free radicals and/or
 .. initiate oxidation reactions in polyunsaturated fatty acids (PUFA), lipids
 .. and membranes, and it is likely that radicals and these autoxidation
 .. reactions play a key role in the biological damage produced by these toxic
 .. pollutants... Nevertheless, there has been very little study of the chemistry
 .. of these important pathological processes.

RELATED TECHNOLOGIES: .. Oil and Gas

.....

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To determine the processes of damage, repair recovery, protection and
amelioration in biological systems exposed to hazardous agents associated
with energy technologies.
.....
PROJECT:
TITLE: Inflammatory Hormones in Chronic Lung Disease
.....
.....
RES. FACILITY: Duke University Medical Center
RES. LOCATION: Durham, North Carolina
INVESTIGATOR(S): Daniel B. Mennel
SPONSOR(S): NIH/DHEW
DURATION: 2 years
FUNDING: FY '74 \$38,586; FY '75 \$33,000
..... (25% energy related)
.....
DESCRIPTION: These studies will provide quantitative estimates ...
... of the extent and duration of the release of inflammatory hormones by the
... lung on inhalation exposure, ... They will provide insight into the role of the
... lung in both the release and destruction of these mediators of inflammatory
... response. ... These studies may lead to a better understanding of the potential
... role of inflammation in inhalation toxicology in man.
.....
.....
.....
RELATED TECHNOLOGIES: .. Oil and Gas
.....

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous agents associated
with energy technologies.

PROJECT:

TITLE: Mechanism of Antioxidant Protection in the Lungs
.....

RES. FACILITY: Regents of the University of California

RES. LOCATION: Davis, Calif.

INVESTIGATOR(S): Ching K. Chow

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY '75 \$30,000 (50% energy related)

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DESCRIPTION: The objective of this proposal is to study intrinsic
lung antioxidant protective systems, particularly following perturbations
.....
occurring as a result of gaseous oxidant exposure. The glutathione peroxidase
.....
system, which is responsible for tissue protection against toxic lipid
.....
peroxides, appears to be augmented in lung tissue in response to chronic
.....
oxidant exposure. It is therefore important to evaluate the nature and
.....
specificity of the response, particularly its possible role in the devel-
.....
opment of lung tolerance to oxidant stress.
.....

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RELATED TECHNOLOGIES: Oil and Gas
.....

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, protection and
amelioration in biological systems exposed to hazardous agents associated
with energy technologies.....

PROJECT:

TITLE:Lung Metalloenzymes: Regulation by Metals and Gases.....

RES. FACILITY:University of South Dakota.....

RES. LOCATION:Vermillion, South Dakota.....

INVESTIGATOR(S):Frank O. Frady.....

SPONSOR(S):NIH/DHEW.....

DURATION:1 year.....

FUNDING:FY '75 \$29,925 (100% energy related).....

DESCRIPTION:The development, biosynthesis and degradation, saturation
and assembly, and regulation of catalytic efficiency of rat lung metallo-
enzymes will be studied in vivo and in vitro. The role of the respective
metal cofactors in regulation of and involvement in these processes will be
elucidated. The mechanism by which environmental toxic metals, such as
cadmium, tungsten, vanadium, and zinc, interfere with and disrupt these
processes will be examined. In addition the effects of different environ-
mental gases, on these processes for metalloenzymes will be examined.
The effects of environmental toxic metals on metalloenzymes will be deter-
mined in two ways: by dietary administration of these metals, and by inhala-
RELATED TECHNOLOGIES:tion of aerosol dispersed metals. Finally, by growing newborn and adult rats

CATEGORY:

SUBCATEGORY:

TECHNOLOGY:

SUBTECHNOLOGY:

OBJECTIVE:

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.....

PROJECT:

TITLE: Lung Metalloenzymes: Regulation by Metals and Gases

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.....

RES. FACILITY:

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S):

DURATION:

FUNDING:

.....
DESCRIPTION: in a gas tight chamber, the effects of environmental gases

..... on the metalloenzymes involved in their metabolism can be monitored.

..... Development of metalloenzymes will be observed by following the appearance

..... of enzymic activity as a function of the age of the rat. Biosynthesis and

..... degradation will be studied. Maturation and assembly will be studied in

..... vitro monitoring formation of apoenzyme from subunits and holoenzyme from

..... apoenzyme and metal cofactor. Regulation of catalytic efficiency will be

..... observed using toxic metals as inhibitors and antagonists and gases as

..... inhibitors.

RELATED TECHNOLOGIES:

.....

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous agents associate
with energy technologies.....

PROJECT:

TITLE:Covert Cellular and Subcellular Damage of Lung.....

RES. FACILITY: University of Southern California School of Medicine.....

RES. LOCATION:Los Angeles, Calif.....

INVESTIGATOR(S):Russell P. Sherwin.....

SPONSOR(S):NIH/DHEW.....

DURATION:1 year.....

FUNDING:FY '75 \$66,826 (50% energy related).....

DESCRIPTION:The cells of the normal lung are continuously subject
to damage requiring defense and repair activities. High levels of stress
and strain on the cells may overload the defense and repair mechanisms and
lead to a type of damage ("pre-lesion") which predisposes to overt pathology.
The immediate goal is to define cell damage in the absence of overt pathologic
lesions, to include common denominators and specific pathways that can lead
to "early lesions" of emphysematous, fibrosing and other lung diseases.
The ultimate purpose is to assist in the earlier detection, the better treat-
ment and improved prevention of the major lung diseases through the identifi-
cation of principal target cells and their fundamental, subcellular injuries.

RELATED TECHNOLOGIES:

The recognition of particularly vulnerable cells will also be of value in
the establishment of air quality standards.

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE:To determine the processes of damage, repair, recovery,
 protection and amelioration in biological systems exposed to hazardous agents
 associated with energy technologies.....

PROJECT:

TITLE: The Basis of Oxygen Tolerance and Toxicity

.....

.....

RES. FACILITY: Duke University Medical Center

RES. LOCATION: Durham, North Carolina

INVESTIGATOR(S): Irwin Fridovich

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY '75 \$51,073 (10% energy related)

.....

DESCRIPTION: We suppose that the toxicity of oxygen resides in its
 tendency to undergo univalent reductions and thus to generate free radicals.

 The reactivities of such free radicals could then lead to the molecular

 damage whose consequences are characteristic of oxygen toxicity. The discovery

 of enzymes which minimize the potential lethality of oxygen radicals, by

 catalytically scavenging superoxide radicals, has provided an excellent

 vantage point from which to launch a fresh attack on the problems of oxygen

 tolerance and oxygen toxicity. The induction of these enzymes (superoxide

dismutases) by oxygen has been seen in bacteria, yeast and in rat lung and

 this increase in enzyme level has been correlated with enhanced tolerance
RELATED TECHNOLOGIES:
 towards oxygen. We now propose experiments aimed at verifying, extending

 and probing the mechanisms of these correlations between superoxide dismutases

CATEGORY:

SUBCATEGORY:

TECHNOLOGY:

SUBTECHNOLOGY:

OBJECTIVE:

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PROJECT:

TITLE: The Basis of Oxygen Tolerance and Toxicity

.....

.....

RES. FACILITY:

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S):

DURATION:

FUNDING:

.....

DESCRIPTION: and tolerance towards oxygen.

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..... Oil and Gas
RELATED TECHNOLOGIES:

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CATEGORY: Health Effects.....
SUBCATEGORY:
TECHNOLOGY: Coal.....
SUBTECHNOLOGY:
OBJECTIVE: To determine the processes of damage, repair recovery,
protection and amelioration in biological systems exposed to hazardous agents
associated with energy technologies.....

PROJECT:

TITLE: Mucociliary Transport Mechanisms.....
.....
.....

RES. FACILITY: Mount Sinai Medical Center.....

RES. LOCATION: Miami, Florida.....

INVESTIGATOR(S): Marvin A. Sackner.....

SPONSOR(S): NIH/DHEW.....

DURATION: 1 year.....

FUNDING: FY '75 \$20,000 (25% energy related).....

.....
DESCRIPTION: A study of the mucociliary transport system role as a
defense mechanism against invasion of the body by airborne pollutants.
.....
An understanding of the mechanisms of the mucociliary transport will aid
.....
in ways to protect the lung from injuries due to a variety of infectious
.....
agents, inhaled pollutants, and allergic reactions.
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RELATED TECHNOLOGIES: Oil and Gas.....
.....

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, protection
 and amelioration in biological systems exposed to hazardous agents
 associated with energy technologies.

PROJECT:

TITLE: Alterations of Cell Membranes and Metabolism by Ozone

RES. FACILITY: Univ. of CA

RES. LOCATION: Riverside, CA

INVESTIGATOR(S): R. Heath

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY75 \$46,062 (100% energy related)

..... These studies will utilize two model biological systems.
DESCRIPTION:
 1. The unicellular alga Chlorella Sprikiniana will be subjected to ozone under

 two regions: a) high levels for short durations and b) continuous low levels

 K levels, specific permeability indicators, level of pertinent enzymes, lipid

 composition changes, and sulfhydryl alterations will be assayed.

 (2) Membrane fragments of Red Blood Cells will be subjected to ozone to

 ascertain which biochemicals in the membrane are altered first.

RELATED TECHNOLOGIES:

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, protection
 and amelioration in biological systems exposed to hazardous agents
 associated with energy technologies.
 q

PROJECT:

TITLE: Lead Encephalopathy Metabolic Activity of Capillaris

.....

.....

RES. FACILITY: Univ. of CA

RES. LOCATION: San Francisco, CA

INVESTIGATOR(S): G. Goldstein

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY75 \$49,739 (100% energy related)

DESCRIPTION: Although lead poisoning is an important public health
 problem, the pathogenesis of the neurotoxicity is not well understood. We
 propose to study the metabolic basis of the acute encephalopathy which is
 produced in young rat pups by feeding their mother lead carbonate. The
 young rats develop severe cerebellar edema which has the same pathological
 features found in human cases of lead poisoning.

RELATED TECHNOLOGIES:
 Geothermal

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery,
protection and amelioration in biological systems exposed to hazardous
agents associated with energy technologies.

PROJECT:

TITLE: Environmental Mutagenesis and DNA Repair

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RES. FACILITY: Emory University

RES. LOCATION: Atlanta, Georgia

INVESTIGATOR(S): P. Smith

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY 75 \$27,255 (100% energy related)

.....

DESCRIPTION: This proposal describes studies aimed at developing and
testing new genetic strains of the complex multicellular eucaryote,
Drosophila melanogaster, which will be useful tools in the evaluation of
environmental chemicals for potential mutagenic activity. The experiments
have been designed to assay the entire Drosophila genome in order to isolate
mutant strains which exhibit sensitivity or resistance to particular
chemical agents, especially ----- Such strains will undergo
genetic and biochemical characterizations for deficiencies in ---- repair
to determine their feasibility as test strains for the evaluation of the
mutagenic potential of environmentally important compounds.

RELATED TECHNOLOGIES:

CATEGORY: HEALTH EFFECTS
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous
agents associated with energy technologies.

PROJECT:

TITLE: Biochemical Effects and Reactions of Sulfur Dioxide
RES. FACILITY: Univ. of California - Davis Campus
RES. LOCATION: Davis, CA
INVESTIGATOR(S): S.F. Yang
SPONSOR(S): NIH/DHEW
DURATION: one year
FUNDING: FY75 \$39,689 (100% energy related)

DESCRIPTION: Research includes three parts. 1) A study of the free
radical damage of cell components caused by the aerobic oxidation of
bisulfite or sulfite ions, which are generated during the aerobic oxidation
of sulfite and are particularly suspect as toxic agents which may destroy
amino acids, hormones, lipids and coenzymes. 2) Examination of the invitro
effect of sulfite ion on various enzyme and membrane systems and to charac-
terize oxidase from plant sources. 3) Investigate the invivo effect of SO₂
on metabolism of harvested fruits and the fate of SO₂ in the fruit.

RELATED TECHNOLOGIES:

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, protection
 and amelioration in biological systems exposed to hazardous agents
 associated with energy technologies.

PROJECT:

TITLE: Biochemical Effects of Air Pollutant Oxidants

.....

.....

RES. FACILITY: Air Pollution Research Center, Univ. of Calif.

RES. LOCATION: Riverside, CA

INVESTIGATOR(S): J.B. Mudd

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY75 \$75,325 (50% energy related)

.....

DESCRIPTION: The research is to elucidate the chemical basis for the
 toxicity of oxidant air pollutants, ozone and peroxyacetyl nitrate. The
 specific objectives in the case of ozone are to examine the reactions with
 glycerolipids which form biological membranes. These studies will be linked to
 experiments with artificial membranes and to studies of the capability of
 lungs to repair the damage done by ozone.

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RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery,
protection and amelioration in biological systems exposed to hazardous
agents associated with energy technologies.

PROJECT:

TITLE: Interactions of Toxic Metal Species with Biomolecules
.....
.....

RES. FACILITY: University of Illinois

RES. LOCATION: Urbana, Illinois

INVESTIGATOR(S): D. Natusch

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY 74 \$66,279 FY 75 \$49,365
.....
..... (100% energy related)

DESCRIPTION: The proposed research seeks to obtain fundamental structural
and kinetic information about the ways in which certain toxic metal species,
.....
present as contaminants in the environment, interact with biomolecules.
.....
..... The interactions considered are basic to the toxicology
.....
of trace metals and relate to: the inhibition of δ -aminolevulinic acid
.....
dehydratase by Pb in impairing heme synthesis; the role of metallothionein in
.....
storing Cd in the kidney; enzyme inhibition by Cd-Zn exchange in the
.....
representative enzyme aspartate transcarbamylase from E. coli; and the
.....
factors affecting trans-membrane transport of inorganic and organic species
.....
Pb, Cd, Hg, Tl, As, Se and He across membranes.

RELATED TECHNOLOGIES:

.....
Shale

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous agents associated
with energy technologies.

PROJECT:

TITLE: Air Pollutant - Lipid Air Interactions

RES. FACILITY: University of Texas Medical Branch

RES. LOCATION: Galveston, Texas

INVESTIGATOR(S): L. Smith

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY 74 \$40,638 FY 75 \$43,320
(100% energy related)

DESCRIPTION: It is proposed to determine whether certain common air
pollutants, such as excited singlet molecular oxygen,
be involved in the oxidation of membrane-bound cholesterol in select
biological membranes and in model systems. Analysis of the cholesterol
hydroperoxides initially formed in such systems upon exposure to the air
pollutants can be used to determine whether excited singlet molecular
oxygen or ground-state triplet oxygen be involved. The sterol hydroperoxides
will be analyzed. A fundamental study of membrane-bound cholesterol
oxidation by other common air pollutants will be made. The thermal
decomposition and enzymic alteration products of the sterol hydroperoxides
will be analyzed in order to identify the initially formed hydroperoxides
with more certainty. Means of controlling or moderating cellular membrane
damage from such oxidations will be sought. Specific human tissues and
cell lines most sensitive to air pollutant-moderated oxidations will be
determined, and specific cause-and-effect relationships between the
primary oxidative events and recognized human disorders will be sought
after.

RELATED TECHNOLOGIES: Oil and Gas

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery,
protection and amelioration in biological systems exposed to hazardous
agents associated with energy technologies.

PROJECT:

TITLE: Environmental Trace Metal Intoxication of the Kidney
.....
.....

RES. FACILITY: University of California

RES. LOCATION: Los Angeles, Calif.

INVESTIGATOR(S): H. Gonick

SPONSOR(S): NIH/DHE'

DURATION: 2 years

FUNDING: FY 74 \$49,555 FY 75 \$49,725
.....
..... (100% energy related)

DESCRIPTION: This study will explore the biochemical pathogenesis of
renal dysfunction secondary to trace metal intoxication and magnesium
depletion. The studies will be performed on rats chronically exposed to an
excess of the trace metal or on a magnesium deficient diet. When renal
tubular abnormalities appear, the kidneys will be removed and examined.
The effect of Vitamin D on the renal tubular dysfunction and biochemical
abnormalities will be explored.
.....
..... Patients with acquired renal dysfunction secondary to
.....
..... industrial exposure from trace metals will also be studied in detail.
.....
..... Attempts will be made to reverse the renal lesion by the use of chelating
RELATED TECHNOLOGIES: agents.

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous agents associated
with energy technologies.

PROJECT:

TITLE: Factors Affecting Irritant Potency of Gases and Aerosols
.....

RES. FACILITY: Harvard University

RES. LOCATION: Boston, Mass.

INVESTIGATOR(S): M. Amdur

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY 74 \$55,245 FY 75 \$57,013

..... (100% energy related)

DESCRIPTION: The program will study the correlation of physical or
chemical factors of the exposure environment with observed biological response.

..... Priority is given to two general areas: the effect of particle size on
the irritant potency of aerosols and the possible potentiation of irritant
gases by aerosols. For a certain group of irritants, including sulfur
dioxide and sulfuric acid, the increase in flow-resistance is the most
sensitive criterion of response and can be related to the concentration
of irritant present.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery,
protection and amelioration in biological systems exposed to hazardous
agents associated with energy technologies.

PROJECT:

TITLE: Can Dietary Vitamin E or Lipid Alter NO₂ or O₃ Toxicity
..... in Lung

RES. FACILITY: Duke University Medical Center

RES. LOCATION: Durham, North Carolina

INVESTIGATOR(S): D. Menzel

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY 74 \$44,982 (100% energy related)

DESCRIPTION: In sum, these experiments will determine in vivo if
..... dietary or pharmacological alterations of the vitamin E content or of the
..... PUFA content of the lung provide means of protection from NO₂ or O₃.
..... In addition, these experiments provide a new and independent test of the
..... theory that the essential action of E is as an antioxidant.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery,
protection and amelioration in biological systems exposed to hazardous
agents associated with energy technologies.

PROJECT:

TITLE: Induction of Metallothionein by CD, CU and HG

.....

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RES. FACILITY: University of New Orleans

RES. LOCATION: New Orleans, Louisiana

INVESTIGATOR(S): S. Bryan

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY 74 \$40,333 FY 75 \$54,909

..... (100% energy related)

DESCRIPTION: The proposed study is designed to further elucidate the
induction process initiated by cadmium, copper and mercury (known to
bind to metallothionein) and to characterize the proteins induced in
response to high levels of the respective metals.

..... The study should give insight into molecular events which determine
biological tolerance as opposed to toxicity, and should contribute to our
understanding of the regulation of specific gene expression.

.....

.....

..... Geothermal, Shale

RELATED TECHNOLOGIES:

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery,
protection and amelioration in biological systems exposed to hazardous
agents associated with energy technologies.

PROJECT:

TITLE: Protection by Zinc Against Toxic Metals and Gases

RES. FACILITY: University of Arizona

RES. LOCATION: Tucson, Arizona

INVESTIGATOR(S): M. Chnapil

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY 74 \$92,820 FY 75 \$46,000
(100% energy related)

DESCRIPTION: This proposal presents a new approach to combating chemical
hazards of the industrial and urban environment. Our goal is to demonstrate
the possible therapeutic use of zinc and certain chelating agents in the
prevention of tissue injury caused by toxic metals and gases.

..... A new concept of the biological action of zinc, based on
our recent findings, is proposed suggesting that the membrane stabilizing
effect of Zn or the Zn:8-HQ complex is related either to an interference
with metal-catalyzed lipid peroxidation and oxidation of thiol groups of
the membrane components or to the formation of stable mercaptides with thiol
groups. However, other possible mechanisms of the effect of zinc will also

RELATED TECHNOLOGIES:
be explored.

..... Geothermal, Shale

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: . . . Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, protection
. and amelioration in biological systems exposed to hazardous
. agents associated with energy technologies.
.

PROJECT:

TITLE: Toxicity of Inert Particles to Alveolar Macrophages
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.

RES. FACILITY: Georgetown Univ.
.

RES. LOCATION: Washington, D.C.
.

INVESTIGATOR(S): S/ Schwartz
.

SPONSOR(S): NIH/DHEW
.

DURATION: 2 year
.

FUNDING: FY74 \$35,848 FY75 \$37,641 (100% energy related)
.

DESCRIPTION: The proposed research will study a major aspect of the toxicology
. of airborne inert particles: the effects of these articles on the function
. of alveolar macrophage. Inert particles in sizes comparable to those that reach
. the alveolar surface from air will be studied for effects on the activity of
. cultured rabbit alveolar macrophag. Also included will be a comparison of the
. endocytic activity of alveolar macrophages with that of peritoneal macrophages
. and an effort to distinguish the possible different energy requirements of
. phagocytosis, pinocytosis, and micorpinocytosis.
.

RELATED TECHNOLOGIES:

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, protection
 and amelioration in biological systems exposed to hazardous agents
 associated with energy technologies.

PROJECT:

TITLE: Interaction of Air Pollutants with Liver Function

.....

.....

RES. FACILITY: John Pierce Foundation Laboratory

RES. LOCATION: New Haven, Connecticut

INVESTIGATOR(S): M. Hitchcock

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY75 \$35,201 (100% energy related)

.....

DESCRIPTION: The objectives of this study are to investigate the interaction
 of some important airborne environmental pollutants with selected areas of
 liver metabolism in different species of animals. The effects of carbon
 monoxide will be compared to the effects of lowered blood pO2 equivalent to
 that produced by CO. If changes following acute exposure to CO are observed,
 then experiments will be designed to study the effect of chronic exposure to
 see if adaptation takes place. The development of a model system showing the
 interaction of inhaled CO with drug metabolism lends itself to a variety of
 physiologic conditions from which it can be studied. These may include the
 effects of exposure to CO under hypoxic conditions (altitude), exposure of the

RELATED TECHNOLOGIES: pregnant animal and the subsequent effect on the fetus, and exposure of newborn.

.....

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery,
protection and amelioration in biological systems exposed to
hazardous agents associated with energy technologies.

PROJECT:

TITLE: Biochemical Effects of Ambient Oxidant Air Pollution

RES. FACILITY: New York Univ. School of Medicine

RES. LOCATION: N.Y., N.Y.

INVESTIGATOR(S): B..Goldstein

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY74 \$24,923 (100% energy related)

DESCRIPTION: These studies will attempt to establish biochemical techniques
sufficiently sensitive to detect the effects of exposure to oxidant air
pollutants. In particular, the objective is to evaluate our hypothesis that
long-term exposure to ozone and other oxidant air pollutants leads to an
acceleration of lung aging thereby producing an increased incidence of chronic
respiratory disease. The two techniques to be evaluated are: 1) Assessment
of carbonyl compound formation. 2) Detection of oxidant-induced modification
of protein using spectrofluorometry.

RELATED TECHNOLOGIES: Shale

HEALTH EFFECTS

CATEGORY:

SUBCATEGORY:
Coal

TECHNOLOGY:

SUBTECHNOLOGY: To determine the processes of damage, repair recovery, protection

OBJECTIVE: and amelioration in biological systems exposed to hazardous agents
..... associated with energy technologies.
.....

PROJECT:

TITLE: Biochemical Effects of Ozone and NO₂ in the Lung
.....
.....

RES. FACILITY: New York, Univ.

RES. LOCATION: N.Y., N.Y

INVESTIGATOR(S): B. Goldstein

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY75 \$42,160 (100% energy related)

.....

DESCRIPTION: This study will evaluate the effects of inhalation of the
..... oxidant air pollutant ozone on rat and rabbit lung subcellular fractions
..... utilizing a number of potentially sensitive parameters of toxicity. These
..... parameters include: 1. Lipid peroxidation, 2. Microsomal cytochrome P-450
..... and benzpyrene hydroxylase levels, 3. Protein sulfhydryl levels, 4. Native
..... protein fluorescence, 5. Response of 1-anilino-8-naphthalene sulfonic acid
..... fluorescence to divalent cation. Additional studies will assess the bio-
..... chemical basis for the observed effects and will evaluate the combined effect
..... of ozone and nitrogen dioxide on these parameters. The experimental design
..... will include dose response studies aimed at obtaining information of use in
RELATED TECHNOLOGIES: determining appropriate air quality standards for humans breathing these
..... pollutants.

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery, ...
 protection and amelioration in biological systems exposed to hazardous ...
 agents associated with energy technologies.

PROJECT:

TITLE: Diagnosis and Therapy of Chronic Childhood Plumbism

.....

.....

RES. FACILITY: Childrens Hospital Medical Center

RES. LOCATION: Boston, Mass.

INVESTIGATOR(S): L. Kopito

SPONSOR(S): NIH/DHEW

DURATION: 2 years

FUNDING: FY 74 \$64,976 FY 75 \$23,146

..... (100% energy related)

DESCRIPTION: 1. To develop and test micromethods for the analysis of
 lead in one drop of capillary whole blood, red blood cells and serum for
 the purpose of mass screening for plumbism.

..... 2. To analyze lead in a single hair by laser spectroscopy.

..... 3. To evaluate and compare the above in addition to ALA
in serum and protoporphyrins in whole blood.

..... 4. To study therapy with chelating agents and lead
 mobilization by EDTA and BAL for diagnostic purposes.

.....

RELATED TECHNOLOGIES: Oil and Gas, Geothermal

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair, recovery, ..
protection and amelioration in biological systems exposed to hazardous ...
agents associated with energy technologies.

PROJECT:

TITLE: Subcellular Pathology of Heavy Metals

RES. FACILITY: Union of North Carolina

RES. LOCATION: Chappel Hill, N. C.

INVESTIGATOR(S): R. Goyer

SPONSOR(S): NIH/DHEW

DURATION: 1 year

FUNDING: FY 74 \$94,240 (100% energy related)

DESCRIPTION: The overall objectives of the project are to define the
subcellular pathological or adverse health effects of heavy
metals in mammalian systems and to determine metabolic factors which influence
the occurrence of these effects. The program is a problem oriented,
multi-disciplinary study and extends from the investigation of whole animal
models and cellular and organelle ultrastructure to the effects of
nutrition and chelatin agents on susceptibility to metal intoxication to
biochemical studies on the structure and function of mitochondria and
metalloenzymes. Dose-response models will be designed to determine the
smallest dose of a metal which will produce a particular effect.

RELATED TECHNOLOGIES: Geothermal, Solar 387

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Conservation
SUBTECHNOLOGY: Increased Efficiency
OBJECTIVE: .. To determine the processes of damage, repair recovery, protection
..... and amelioration in biological systems exposed to hazardous
..... agents associated with energy technologies.
.....

PROJECT:

TITLE: ..Development of Microwave Instrumentation.....
.....
.....

RES. FACILITY: ..National Institute of Environmental Health Sciences.....

RES. LOCATION: ..Research Triangle Park, North Carolina.....

INVESTIGATOR(S): W. T. Joines

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: ..FY '74 \$15,000.....FY '75.....(100% energy related)

.....
DESCRIPTION: ..The proposed work of this contract is threefold: (1) study
..... the electrical dipole model of the neural membrane and its implications,
..... and to determine the unknown parameters in the interaction of the dipole
..... model with microwave radiation, (2) develop microwave instrumentation and
..... methods to investigate microwave-neuron interactions over the 0.2 to
..... 3.0 GHz frequency band, (3) develop the instrumentation and dosimetry of
..... a more accurate method of determining the microwave power absorbed by a
..... neuron.
.....

RELATED TECHNOLOGIES:

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Conservation.....

SUBTECHNOLOGY:Increased Efficiency.....

OBJECTIVE: ..To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous
agents associated with energy technologies.....

PROJECT:

TITLE: ..Investigation of Non-thermal Microwave Radiation Effects on.....
Neurological Functioning.....

RES. FACILITY:National Institute of Environmental Health Sciences.....

RES. LOCATION:Research Triangle Park, North Carolina.....

INVESTIGATOR(S):R. H. Wyatt.....

SPONSOR(S):

DURATION:

FUNDING: ..FY '74..\$26,881.....FY '75.....(100% energy related)

DESCRIPTION: ..The project objective is to conduct an investigation into the
non-thermal effects of microwave radiation in neurological functioning....
More specifically, recent efforts have been aimed at investigating the
effects of microwave radiation on spinal reflex function in the cat.
The lower lumbar spinal cord was exposed, and the ventral roots of L7 and
S1 segments were cut at their exit from the vertebral canal. Pulses of
.05 msec. were used to stimulate the sciatic nerve, and the response at
the ventral root was recorded for both irradiated and non-irradiated
controls. Microwave radiation at 2450MHz with power levels from 2 to....

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Conservation

SUBTECHNOLOGY: Increased Efficiency

OBJECTIVE: .. To determine the processes of damage, repair recovery, protection
..... and amelioration in biological systems exposed to hazardous
..... agents associated with energy technologies.

PROJECT:

TITLE: .. Effects of Microwave Radiation on the Neural Response

RES. FACILITY: .. National Institute of Environmental Health Sciences

RES. LOCATION: .. Research Triangle Park, North Carolina

INVESTIGATOR(S): .. D. I. McRee

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY '74 \$2,355 FY '75 \$6,000 (100% energy related)

DESCRIPTION: .. The objective of this project is to determine the effects of
..... microwave radiation on the functioning of the central nervous system when
..... exposed to CW and modulated microwave radiation in the frequency range of
..... 1 - 10 GHz. Isolated neurons and surviving spinal cords of decerebrated
..... cats will be exposed. The effects of the radiation on action potentials
..... conduction velocities, and firing patterns will be observed.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Conservation

SUBTECHNOLOGY: Increased Efficiency

OBJECTIVE: .. To determine the processes of damage, repair recovery, protection
and amelioration in biological systems exposed to hazardous
agents associated with energy technologies.

PROJECT:

TITLE: .. Effects of 2450 MHz Microwave Radiation on Biological Material..
.. at Cellular and Macromolecular Level

RES. FACILITY: .. National Institute of Environmental Health Sciences

RES. LOCATION: .. Research Triangle Park, North Carolina

INVESTIGATOR(S): P. E. Hamrick

SPONSOR(S): NIH/HEW

DURATION:

FUNDING: FY '74 \$18,693..... FY '75 \$20,000 (100% energy related)

.....
DESCRIPTION: The objectives of this project are to determine the effects
of 2450 MHz microwave radiation on biological material at the cellular and
macromolecular level and relate the amount of microwave energy absorbed
to the effects. Various cellular and macromolecular systems will be tested
by exposure to microwaves under carefully controlled temperature and dose
conditions. Parameters such as viability, cell membrane permeability and
denaturation will be used as indicators of microwave effects.
.....
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RELATED TECHNOLOGIES:

CATEGORY: HEALTH EFFECTS

SUBCATEGORY:

TECHNOLOGY: . . . Oil and Gas

SUBTECHNOLOGY:

OBJECTIVE: . . . To determine the processes of damage, repair recovery, protection
. . . and amelioration in biological systems exposed to hazardous agents
. . . associated with energy technologies.

PROJECT:

TITLE: Effect of Low Levels of Lead

.

.

RES. FACILITY: . . . Univ. Of Tennessee

RES. LOCATION: . . . Knoxville, Tennessee

INVESTIGATOR(S): . . . W. Farkas

SPONSOR(S): . . . NIH/DHEW

DURATION: . . . 1 year

FUNDING: . . . FY74 \$42,319 (100% energy related)

DESCRIPTION: . . . Lead has been shown to inhibit protein synthesis by rabbit
reticulocytes at concentrations as low as 1.0 UM. Although a great deal
.
has been learned about the steps involved in protein synthesis the precise
.
point in this process which is so sensitive to lead has not yet been
.
determined. The objective of this proposal is therefore to uncover the
.
mechanism of the inhibition of protein synthesis by lead.
.

.
. Shale, Geothermal
RELATED TECHNOLOGIES:

SECTION 1

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

LEAVE BLANK

PROJECT NUMBER

RESEARCH OBJECTIVES

1 P01 ES HL 01162-01

NAME AND ADDRESS OF APPLICANT ORGANIZATION

Southwest Foundation for Research and Education
P.O. Box 26147 (8848 West Commerce Street)
San Antonio, Texas 78284

NAME, SOCIAL SECURITY NUMBER, OFFICIAL TITLE, AND DEPARTMENT OF ALL PROFESSIONAL PERSONNEL ENGAGED ON PROJECT, BEGINNING WITH PRINCIPAL INVESTIGATOR

John R. Rowlands, Ph.D. [REDACTED], Director, Environmental Sciences
 Emily M. Gause, M.S. [REDACTED], Sr. Res. Scientist, Environ. Sci.
 Martin L. Meltz, Ph.D. [REDACTED], Sr. Res. Scientist, Environ. Sci.
 Bruce McCullough, Ph.D. [REDACTED], Staff Pathologist, Environ. Sci.

TITLE OF PROJECT

Effects of Pollutants Upon Alveolar Macrophages

USE THIS SPACE TO ABSTRACT YOUR PROPOSED RESEARCH. OUTLINE OBJECTIVES AND METHODS. UNDERSCORE THE KEY WORD (NOT TO EXCEED 10) IN YOUR ABSTRACT.

A research study has been designed to: 1) detect directly, by means of spin label measurements, membrane lesions produced from in vivo exposure of alveolar macrophages to pollutant atmospheres--both oxidant and reducing; 2) obtain experimental evidence that these lesions are, or are not, associated with activity of membrane-bound enzymes and with phagocytic and respiratory capacity of the alveolar macrophage; 3) relate dose-dependence of observed induced membrane lesions with response of intracellular systems--specifically lysosomal enzymes, a cytoplasmic enzyme, cAMP, and RNA/DNA synthesis; 4) assess the effects of the same in vivo exposures upon selected lung systems which will either exert a pharmacological effect upon the macrophage membrane (such as cAMP), or provide an altered substrate for phagocytosis by the alveolar macrophage (i.e., the lung surfactant); and 5) evaluate the effects of the metabolic and functional state of the alveolar macrophage itself (i.e., actively phagocytic or resting) upon production of lesions, impairment of function, and particularly upon surrounding lung tissue.

ER 12 -76 (5A1)

\$ 86,495

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RESEARCH OBJECTIVES

PROJECT NUMBER

2R01ES00798-04

NAME AND ADDRESS OF APPLICANT ORGANIZATION

Duke University Medical Center, Durham, N.C. 27709

NAME, SOCIAL SECURITY NUMBER, OFFICIAL TITLE, AND DEPARTMENT OF ALL PROFESSIONAL PERSONNEL ENGAGED ON PROJECT, BEGINNING WITH FIRST NAME

Daniel S. Menzel, [REDACTED] Assoc. Prof. Pharmacology & Medicine,
Head, Div. of Pharmacology, Dept. of Physiology & Pharmacology
Hugo O. Jauregui, [REDACTED] Ast. Prof. of Pathology, Dept. of
Pathology

TITLE OF PROJECT

Can Vitamin E or Lipid Alter NO₂ or O₃ Toxicity in Lung?

USE THIS SPACE TO ABSTRACT YOUR PROPOSED RESEARCH. OUTLINE OBJECTIVES AND METHODS. UNDERScore THE KEY WORDS (NOT TO EXCEED 10% IN YOUR ABSTRACT).

Ozone and nitrogen dioxide may exert their toxic effects by peroxidation of the unsaturated fatty acids of the lung and other tissues. To test this hypothesis, mice will be fed chemically defined diets known to produce lung lipids having differing degrees of susceptibility to lipid peroxidation. Diets will be deficient or sufficient in vitamin E or contain -tocopheryl quinone or phenolic antioxidants. Animals will be exposed to ozone and nitrogen dioxide and the dose-response relationship between the toxicity of these air pollutants and the peroxidizability of the lung lipids will be determined. The protective effect of vitamin E and other phenolic antioxidants will be determined. The effects of air pollutant exposure will also be measured by changes in growth and in lung lipid composition and enzyme content. Potential defense mechanisms of peroxidases will be investigated in both lung and liver. The toxic effects of ozone and nitrogen dioxide will be compared with putative chemical intermediaries of toxicity. These studies are designed to test the free radical theory of action of these air pollutants, and to determine the dietary levels of antioxidants necessary to prevent lung damage at current concentrations of air pollution.

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ERR-7.7 (5A1)

\$ 63,000 ✓

SECTION 1

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

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RESEARCH OBJECTIVES

PROJECT NUMBER

1R01 ESHL 01166-01A1

NAME AND ADDRESS OF APPLICANT ORGANIZATION

College of Veterinary Medicine
Michigan State University, East Lansing, MI 48824

NAME, SOCIAL SECURITY NUMBER, OFFICIAL TITLE, AND DEPARTMENT OF ALL PROFESSIONAL PERSONNEL ENGAGED ON PROJECT, BEGINNING WITH PRINCIPAL INVESTIGATOR

Kin, J.C.S.

Associate Professor of Pathology

TITLE OF PROJECT

Vitamin A Effect on Lung Cell Cycle Kinetics After NO₂

USE THIS SPACE TO ABSTRACT YOUR PROPOSED RESEARCH. OUTLINE OBJECTIVES AND METHODS. UNDERSCORE THE KEY WORDS (NOT TO EXCEED 10) IN YOUR ABSTRACT.

Epidemiological as well as experimental evidence suggests that the development of lung cancer is a result of complex interaction of a number of exo-and endogenous factors. Besides the carcinogenic insult, environmental factors modifying the target organs, the host factors such as genetic susceptibility, aging, nutrition and other host factors may be of paramount importance.

Vitamin A is known to be essential on epithelial cellular differentiation and a deficiency of it causes squamous metaplasia. Nitrogen dioxide not only produces basal cell hyperplasia in the respiratory tract but also promotes infection and the tumorigenesis of chemical carcinogens. The presence of this component not only as an air pollutant but also in cigarette smoke emphasizes its importance.

The objective of this proposal is to investigate the influence of Vitamin A on the cell cycle kinetics of the hamster respiratory tract resulting from exposure to 10ppm of NO₂ for 5 hours. The role of Vitamin A in the respiratory tract will be studied by both light and electron autoradiography with particular emphasis on epithelial cell differentiation and metaplastic changes.

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ERR - 7.8 (5A1)

\$19,000

SECTION 1		LEAVE BLANK
DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE PUBLIC HEALTH SERVICE		PROJECT NUMBER
RESEARCH OBJECTIVES		1R01 ES HL 01243-01

NAME AND ADDRESS OF APPLICANT ORGANIZATION

University of Vermont
Burlington, Vermont 05401

NAME, SOCIAL SECURITY NUMBER, OFFICIAL TITLE, AND DEPARTMENT OF ALL PROFESSIONAL PERSONNEL ENGAGED ON PROJECT, BEGINNING WITH PRINCIPAL INVESTIGATOR

Hart, Beth A. [REDACTED]
Assistant Professor
Department of Biochemistry

TITLE OF PROJECT

THE INTERACTION OF CADMIUM WITH THE PULMONARY ALVEOLAR MACROPHAGE.

USE THIS SPACE TO ABSTRACT YOUR PROPOSED RESEARCH. OUTLINE OBJECTIVES AND METHODS. UNDERSCORE THE KEY WORDS (NOT TO EXCEED 10) IN YOUR ABSTRACT.

The heavy metal cadmium, a known environmental pollutant, has been implicated as a causative agent in the development of lung pathology. It has been suggested that one of the sites of cadmium toxicity is the oxidative metabolism of the pulmonary alveolar macrophage. At present, there is little known about the interaction of cadmium with the alveolar macrophage under physiological conditions. It is the purpose of the proposed research, therefore, to study the transport, intracellular distribution, and accumulation of cadmium by the pulmonary alveolar macrophage and to relate the amount of cadmium accumulated within the cells to alterations in physiological function. Transport by macrophage monolayers will be quantitated by the use of ^{109}Cd . The intracellular distribution of cadmium will be determined by measuring the radioactivity present in the sub-cellular fractions (i.e., soluble cytoplasmic fraction, mitochondria, microsomes, and membranes) obtained after cell homogenation and differential centrifugation. Attempts to identify a specific cadmium-binding protein will be made by using column chromatographic techniques. Direct measurements of the cadmium content of macrophages will be made with the use of an atomic absorption spectrophotometer equipped with a micro-atomizer. Experiments will then be conducted to determine how the rate of cadmium transport is affected by pH, divalent ions, thiol-containing agents, protein(s) and alveolar lining material, and to determine whether cadmium accumulation can occur during the phagocytosis of bacteria and/or kaolin. Macrophages that have accumulated known amounts of cadmium under different environmental conditions will also be monitored for phagocytic activity, release of lysosomal enzymes, endogenous respiration, and ATPase activity. Comparative studies with macrophages from various animal sources are planned. It is hoped that the results of the proposed study will contribute to our understanding of the role cadmium plays in the development of lung pathology in man.

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ERR-7.9 (541)
\$ 46,000 ✓

RESEARCH CATEGORY

Integrated Assessment

CATEGORY: INTEGRATED ASSESSMENT
SUBCATEGORY:
TECHNOLOGY: Multi-Technology

SUBTECHNOLOGY:
OBJECTIVE: To assess the direct and indirect environmental consequences
..... of energy production and control alternatives (whether similar
..... or different in all regions)
.....

PROJECT:
TITLE: Environmental chemicals as co-intoxicants
.....
.....

RES. FACILITY: Univ. of Minnesota
RES. LOCATION: Minneaspolis, MN
INVESTIGATOR(S): M.W. Anders
SPONSOR(S): NIH/DHEW
DURATION: 1 year
FUNDING: FY75 \$49,940 (25% energy related)

.....
DESCRIPTION: It is well known that the total ecosystem currently carries
..... a large burden of contamination with various chemicals and that it may be
..... expected that this burden will increase in the future. The purpose of the
..... project is to describe an experimental approach in which the role of
..... environmental chemicals as co-toxicants is explored. This approach is based
..... on the knowledge that many environmental chemicals are present together
..... in the ecosystem and, therefore, may act to potentiate the effects of other
..... chemicals.
.....

RELATED TECHNOLOGIES:

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE

NATIONAL INSTITUTE OF OCCUPATIONAL SAFETY AND HEALTH

FIRST YEAR NIOSH ENERGY PROJECTS
USING EPA PASS-THRU FUNDS

<u>Project</u>	<u>PROJECT</u>	<u>TYPE OF EFFORT</u>	<u>FUNDING</u> <u>SUBTOTAL HE 3</u>	<u>KING/MUR</u> <u>IGW/NEGATIVE</u>	<u>TECHNOLOGY</u>
Determine the relationship of metabolism and fate and the toxicology of particulates and organic compounds		Grants	500	HE 3	All
Enumeration of Energy Occupational Health Problems		In-house	80	HE 4	All
Oil Shale Workers Mortality		In-house	160	HE 4	Oil Shale
Occupational Exposures to Insulation Materials		Contract	205	HE 4	Efficiency
Coal Liquefaction and Gasification Workers' Study		Contract	200	HE 4	Coal and Synthetic Fuels
<i>COF</i> Divers Epidemiology Study <i>PROJ. DESCRIPTION NOT INCL.</i>		Contract	125	HE 4	Gas and Oil
TVA High Risk Workers' Mortality		Contract	185	HE 4	Coal and Synthetic Fuels
Occupational Exposures to Sulfuric Acid and Sulfates		In-house	50	HE 4	Coal and Synthetic Fuels
		<i>SUB TOTAL HE 4</i>	<u>1055</u>		
Recirculation of Industrial Exhaust Air		Contract	125	HE 5	Efficiency
Cold Stress on Alaskan Pipeline		In-house and Contract	140	HE 5	Gas and Oil

<u>PROJECT</u>	TYPE OF EFFORT	\$ (1000)	KING MUIR CST.	TECHNOLOGY
<u>COUNTER MEASURES TO PROTECT DIVERS</u>	CONTRACT	389	HE 5	Gas and Oil
Development of Gas and Vapor Monitors	Contract	110	CMM J3	All
Development of a Microwave Spectrometer	Contract	90	CMM J3	All
Personal Samplers Cold Testing	Contract	50	CMM J3	All
Development of a Fibrous Aerosol Monitor	Contract	140	CMM J3	Efficiency
	SUBTOTAL CMM3	390 ✓		
	TOTAL CMM	390		

*Note: HE = Health Effects
CMM = Characterization, Measurement, and Monitoring

404

RESEARCH CATEGORY:

Characterization, Measurement, and Monitoring

CATEGORY: Characterization Measurement and Monitoring
SUBCATEGORY:
TECHNOLOGY: Conservation
SUBTECHNOLOGY:
OBJECTIVE: Air Monitoring
.....
.....

PROJECT:

TITLE: Asbestos Textile Study
.....
.....
RES. FACILITY: Division of Lab and Criteria Development
RES. LOCATION: Cincinnati, Ohio
INVESTIGATOR(S): R. Curtis
SPONSOR(S): NIOSH/DHEW
DURATION: 1 year
FUNDING: FY '75 \$9,510 (50% energy related)
.....

DESCRIPTION: The OSHA asbestos standard of 2 fibers per cubic
..... centimeter for fibers greater than 5 micrometers in length, effective July
..... 1, 1976, has been the subject of controversy since its promulgation in regard
..... to the technical feasibility for attaining said standard in asbestos textile
..... plants. Previous studies have indicated that the technical feasibility of
..... attaining the standard is questionable.
.....

..... Because of the existing controversy over the ability to achieve this
..... standard in asbestos textile plants, the concern over the health hazards of
..... asbestos exposures and the fact that the OSHA Advisory Committee on asbestos
..... may reconvene to consider recent information on the subject, detailed
RELATED TECHNOLOGIES:
..... industrial hygiene surveys of well controlled textile plants will be conducted
..... to gather the necessary information on exposure levels and control and work
..... practices.

CATEGORY: **Characterization, Measurement and Monitoring**
SUBCATEGORY:
TECHNOLOGY: **Conservation**
SUBTECHNOLOGY:
OBJECTIVE: **Air Monitoring**
.....
.....

PROJECT:

TITLE: **Asbestos Textile Study -- Environmental Aspects**
.....
.....

RES. FACILITY: **DHEW - Environmental Investigation Branch**
RES. LOCATION: **Cincinnati, Ohio**
INVESTIGATOR(S): **B. Curtis**
SPONSOR(S): **NIOSH/DHEW**
DURATION: **1 year**
FUNDING: **FY 1974 \$19,250 (50% energy related)**
.....

DESCRIPTION: **The OSHA asbestos standard of 2 fibers per cubic centimeter**
..... **for fibers greater than 5 micrometers in length, effective July 1, 1976, has**
..... **been the subject of controversy since its promulgation in regard to the**
..... **technical feasibility for attaining said standard in asbestos textile plants.**
..... **Previous studies have indicated that the technical feasibility of attaining**
..... **the the standard is questionable; however, the actual control measures and**
..... **work practices in use at the time of the studies was not properly documented.**
..... **Because of the existing controversy over the ability to achieve this standard**
..... **in asbestos textile plants, the concern over the health hazards of asbestos**
..... **exposures and the fact that the OSHA advisory Committee on asbestos may**
RELATED TECHNOLOGIES:

..... **reconvene to consider recent information on the subject, detailed industrial**
..... **hygiene surveys of well controlled textile plants will be conducted to gather**
.....

CATEGORY:

SUBCATEGORY:

TECHNOLOGY:

SUBTECHNOLOGY:

OBJECTIVE:

.....

.....

PROJECT:

TITLE: Asbestos Textile Study -- Environmental Aspects

.....

.....

RES. FACILITY:

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S):

DURATION:

FUNDING:

.....

DESCRIPTION: the necessary information on exposure levels and

..... control and work practices.

.....

.....

.....

.....

.....

.....

.....

RELATED TECHNOLOGIES:

.....

CATEGORY: Characterization, Measurement and Monitoring
SUBCATEGORY:
TECHNOLOGY: Conservation
SUBTECHNOLOGY:
OBJECTIVE: Air Monitoring
.....
.....

PROJECT:

TITLE: Asbestos - Sampling Procedure and Environment Field
..... Surveys
.....

RES. FACILITY: DHEW- Environmental Investigation Branch

RES. LOCATION: Cincinnati, Ohio

INVESTIGATOR(S): R. Zumwalde

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY 1974 \$38,500 (50% energy related)

DESCRIPTION: Because asbestos has been identified as a serious
..... occupational hazard in regard to development of asbestosis, mesotheliomas,
..... lung cancer and possibly other cancers, and because OSHA has promulgated an
..... asbestos standard, there is a continual need to supply support to State,
..... local and other Federal agencies, through consultative services for assistance
..... in accomplishing their research and regulatory goals. Such services include
..... providing technical capabilities concerning the procedures for sampling and
..... analysis and actual field sampling

..... The Environmental Investigations Branch, Division of Field Studies and

RELATED TECHNOLOGIES: Clinical Investigations has the major expertise in NIOSH concerning this

..... topic and will respond to the assistance requests as
..... received.

CATEGORY: Characterization, Measurement and Monitoring

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: Air Monitoring

PROJECT:

TITLE: Organic Methods Development

RES. FACILITY: Division of Labs and Criteria Development

RES. LOCATION: Cincinnati, Ohio

INVESTIGATOR(S): A. W. Teass

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY '75 \$390,654 (50% energy related)

DESCRIPTION: The study of methods for the analysis of workplace
environments for toxic organic substances will continue. Specific areas
of investigation will be:

..... A. Limitations to the use of activated charcoal in collecting organic
vapors from air for analysis.

..... B. Polynuclear arenes in "coal-tar pitch volatiles" samples

..... C. Mass-spectral analysis of samples of industrial-hygiene interest

..... D. Determination of isocyanates in air using reagent-coated sorbents

..... E Determination of amines in air

RELATED TECHNOLOGIES: F. Determination of alcohols in air

..... G. Determination of volatile organic acids in air

OIL and GAS

U.S. ENVIRONMENTAL PROTECTION AGENCY		Form Approved OMB No. 158-R0081	
NOTICE OF RESEARCH PROJECT		PROJECT NO. (Do not use this space)	
PREPARED FOR THE SMITHSONIAN SCIENCE INFORMATION EXCHANGE		SSIE EPA EPA-IAG-D5-E773-DE	
TITLE OF PROJECT Direct Reading Personal Gas and Vapor Monitors			
GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED IN THE PROJECT. Project Director - Dr. Lawrence Doemeny Phone: (513) 684-2591			
NAME AND ADDRESS OF APPLICANT INSTITUTION National Institute for Occupational Safety and Health, Division of Laboratories and Criteria Development, Cincinnati, Ohio 45202			
SUMMARY OF PROPOSED WORK - (1) Objectives, (2) Approach, (3) Current Plans and/or Progress (200 words or less. Omit confidential data). In the Smithsonian Science Information Exchange, summaries of work in progress are exchanged with government and private agencies supporting research and are forwarded to investigators who request such information. Your summary is to be used for these purposes. The increased attention to the development of alternate energy sources will result in increased numbers of workers exposed to toxic chemical substances. The recent advances in solid state electronics and surface physics is making it possible to consider personal, direct reading instruments which can take breathing zone samples of the worker and quickly display the concentration or give suitable warning. The personal monitors would use metal oxide surface semiconductors, piezoelectric crystals, microminiature gas chromatograph columns as sample collectors and separators. Collector responses would be analyzed using state-of-the-art electronics with the concentrations displayed in a suitable format. Preliminary information as to specific applications in mind, dealing with coal processing are as follows: a. H ₂ S - e.g., specific contaminant in the Synthane Process under investigation by the U.S. Bureau of Mines. b. CO - e.g., specific contaminant in the Synthane Process under investigation by the U.S. Bureau of Mines. c. Hydrocarbons - e.g., contaminants in the Solvent Refined Coal Process under development by Pittsburg and Midway.			
ENTIRE PROFESSIONAL SCHOOL INVOLVED (Medical, etc.)		SIGNATURE OF PRINCIPAL INVESTIGATOR	
DATE		DATE	
FOR OFFICE USE ONLY			
METHOD (Check one) ☐ FIELD ☒ STATE (Instrumental) ☐ CONTRACT ☐ GRANT		TASK NO. 1	
PROJECT OFFICER		RESPONSIBLE ORGANIZATION	
ESTIMATED F.Y. 75		NO. OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT F.Y. 2	
STARTING DATE 5/75		ESTIMATED COMPLETION DATE 12/77	

U.S. ENVIRONMENTAL PROTECTION AGENCY		Form Approved OMB No. 158-R0081	
NOTICE OF RESEARCH PROJECT		PROJECT NO. (Do not use this space)	
PREPARED FOR THE SMITHSONIAN SCIENCE INFORMATION EXCHANGE		SSIE EPA EPA-IAG-D5-E773-DE	
TITLE OF PROJECT Development of a Portable Microwave Spectrometer			
GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED IN THE PROJECT. Project Director - Dr. Lawrence Doemeny Phone: (513) 684-2591			
NAME AND ADDRESS OF APPLICANT INSTITUTION National Institute for Occupational Safety and Health, Division of Laboratories and Criteria Development, Cincinnati, Ohio 45202			
SUMMARY OF PROPOSED WORK - (1) Objectives, (2) Approach, (3) Current Plans and/or Progress (200 words or less. Omit confidential data). In the Smithsonian Science Information Exchange, summaries of work in progress are exchanged with government and private agencies supporting research and are forwarded to investigators who request such information. Your summary is to be used for these purposes. Present requirements exist for a portable gas monitor which is capable of selectively detecting several trace contaminants of a hazardous or toxic nature in air. Few techniques are available which are based upon a physical measurement and have the required specificity and sensitivity. This project will be the continuation of a feasibility study (scheduled for completion in 10/75) into the development of a portable microwave spectrometer for the detection of several low molecular weight compounds. The spectrometer would be capable of selectively quantifying one of several compounds sampled directly from the working environment. The first phase of development would lead to a field prototype with later stages directed to increasing the sensitivity and variety of compounds which would be monitored. Ten substances, including the following, are being investigated for use on a feasibility basis presently: a. NH ₃ - e.g., specific contaminant in the Synthoil Process under investigation by the U.S. Bureau of Mines. b. SO ₂ - e.g., specific contaminant in the Solvent Refined Coal Process under development by Pittsburgh and Midway.			
IDENTIFY PROFESSIONAL SCHOOL INVOLVED (Medical, etc., etc.)		SIGNATURE OF PRINCIPAL INVESTIGATOR	
		DATE	
FOR OFFICE USE ONLY			
SUPPORT METHOD (Check one) ☐ FEDERAL AGENCY STAFF (Intramural) ☒ EXTERNAL CONTRACT ☐ RESEARCH GRANT		PROJECT OFFICER	
TASK NO. 2		RESPONSIBLE ORGANIZATION	
NO. OF YEARS ASSURED	F.Y.	NO. OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT F.Y.	STARTING DATE
10, (XX)	75	2	3/75
		ESTIMATED COMPLETION DATE	12/77

U.S. GPO: 1976-1 (7-72)

REPLACES PHS FORM 166 AND SI-SIE 76A WHICH MAY NOT BE USED.

U.S. ENVIRONMENTAL PROTECTION AGENCY		Form Approved OMB No. 158-0005-1	
NOTICE OF RESEARCH PROJECT		PROJECT NO. (Do not use this space)	
PREPARED FOR THE SMITHSONIAN SCIENCE INFORMATION EXCHANGE		SSIE EPA EPA-IAG-D5-E773-DE	
TITLE OF PROJECT Personal Samplers Testing in Cold Environments			
GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED IN THE PROJECT. Project Director - Dr. Lawrence Doemeny Phone: (513) 684-2591			
NAME AND ADDRESS OF APPLICANT INSTITUTION National Institute for Occupational Safety and Health, Division of Laboratories and Criteria Development, Cincinnati, Ohio 45202			
SUMMARY OF PROPOSED WORK - (1) Objectives, (2) Approach, (3) Current Plans and/or Progress (200 words or less. Omit confidential data). In the Smithsonian Science Information Exchange, summaries of work in progress are exchanged with government and private agencies supporting research and are forwarded to investigators who request such information. Your summary is to be used for these purposes. Although a number of sampling and monitoring devices have demonstrated their usefulness to measure personal occupational exposure to toxic substances in the continental United States, where temperatures are generally mild, it is questionable if some of these devices can properly function at the low temperatures expected along the Alaskan pipeline. This project will test the adequacy of several gas detector tube sampling pumps and portable direct reading instruments in cold environments.			
IDENTIFY PROFESSIONAL SCHOOL INVOLVED (Medical, etc.)		SIGNATURE OF PRINCIPAL INVESTIGATOR	
		DATE	
FOR OFFICE USE ONLY			
PROJECT METHOD (Check one) ☐ STAFF (Intermittent) ☐ STAFF (Contract) ☐ CONTRACT		TASK NO. 3	
		PROJECT OFFICER	
		RESPONSIBLE ORGANIZATION	
NO. OF YEARS (1-10)	F.Y. 75	NO. OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT F.Y. 2	STARTING DATE 5/75
		415	ESTIMATED COMPLETION DATE 6/77

U.S. GPO: 1974-1-722

REPLACES PHS FORM 166 AND SI-SIE 76A WHICH MAY NOT BE USED.

U.S. ENVIRONMENTAL PROTECTION AGENCY		Form Approved OMB No. 158-R0081	
NOTICE OF RESEARCH PROJECT		PROJECT NO. (Do not use this space) SSIE EPA EPA-IAG-D5-E773-DE	
PREPARED FOR THE SMITHSONIAN SCIENCE INFORMATION EXCHANGE			
TITLE OF PROJECT Development of a Fibrous Aerosol Monitor			
GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED IN THE PROJECT. Project Director - Dr. Laurence Doemeny Phone: (513) 684-2591			
NAME AND ADDRESS OF APPLICANT INSTITUTION National Institute for Occupational Safety and Health, Division of Laboratories and Criteria Development, Cincinnati, Ohio 45202			
SUMMARY OF PROPOSED WORK - (1) Objectives, (2) Approach, (3) Current Plans and/or Progress (200 words or less. Omit confidential data). In the Smithsonian Science Information Exchange, summaries of work in progress are exchanged with government and private agencies supporting research and are forwarded to investigators who request such information. Your summary is to be used for these purposes. Occupational Safety and Health Administration standards presently require assessment of worker exposure to asbestos aerosol. Exposure to fibrous glass and other fibrous aerosols will have to be monitored in the future. These materials are widely used in the insulation industry and with the current push for energy conservation will be used more extensively. At this time, there is no instrument available to rapidly measure the concentration of fibrous dust in the air. The development of a fibrous aerosol monitor would allow real time measurement of fibrous aerosols for the purpose of accurately detecting areas in the workplace that contain potentially dangerous concentrations of fibrous aerosols. The development of the monitor will be a one year contract effort after which it will be necessary to comprehensively test the monitor for accuracy and suitability under a wide range of field and laboratory conditions. The results of these tests will be used in further development of the fibrous aerosol monitor as a rugged, portable and accurate field survey instrument for the assessment of worker exposure to fibrous aerosols.			
IDENTIFY PROFESSIONAL SCHOOL INVOLVED (Medical, Dental, etc.)		SIGNATURE OF PRINCIPAL INVESTIGATOR	
		DATE	
FOR OFFICE USE ONLY			
REPORT METHOD (Check one) ☐ Agency Staff (Interagency) ☒ Related Contract ☐ Other Grant		TASK NO. 4	
		PROJECT OFFICER RESPONSIBLE ORGANIZATION	
NO. OF PERSONNEL 140,000	F.Y. 75	NO. OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT F.Y. 2	STARTING DATE 5/75
		ESTIMATED COMPLETION DATE 6/77	

CATEGORY: Characterization, Measurement and Monitoring

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: Air Monitoring Instrumentation

PROJECT:

TITLE: Coal Mine Dust Sampling

RES. FACILITY: DHEW - Engineering Branch

RES. LOCATION: Cincinnati, Ohio

INVESTIGATOR(S): G. Carson

SPONSOR(S): NIOSH/DHEW

DURATION: 1 Year

FUNDING: FY 1974 \$98,500 (100% energy related)

DESCRIPTION: The Coal Mine Health and Safety Act of 1969 (Public Law 91-173) directs the Secretary of HEW to conduct several programs related to the Health, protection of life and prevention of diseases in miners and persons who although not miners, work with or around the products of coal mines. The measurement of coal dust in the mine atmosphere is a vital part of this program as it relates to worker exposure and the control of dust in the mine. Approximately 150,000 active miners are exposed to coal dust and their exposures must be determined accurately and reliability for compliances purposes periodically. This program established and is continuing to carry out the mission of developing reliable instruments and sampling methods that can be used accurately

RELATED TECHNOLOGIES: in the mine environment.

CATEGORY:Characterization, Measurement and Monitoring.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE:Air Monitoring Instrumentation.....

.....
.....

PROJECT:

TITLE:Direct Reading Instrument Research.....

.....
.....

RES. FACILITY:Division of Labs and Criteria Development.....

RES. LOCATION:Cincinnati, Ohio.....

INVESTIGATOR(S):L. Doeming.....

SPONSOR(S):NIOSH/DHEW.....

DURATION:1 year.....

FUNDING:FY '75 \$298,303 (50% energy related).....

.....

DESCRIPTION:The purpose of this project is to develop and evaluate

.....portable instruments that measure toxic substances in the industrial environ-

.....ment. The results of the evaluation or developments will be published in the

.....open literature and the data will also be used to develop equipment performance

.....standards and procurement specifications.

.....

.....

.....

.....

RELATED TECHNOLOGIES:Oil and Gas.....

.....

RESEARCH CATEGORY:

Health Effects

CATEGORY:Health.Effects.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE:To identify hazardous agents associated with energy..

.....technologies,.....

.....

PROJECT:

TITLE:Identification of Particles in Human and Animal Tissue

.....

.....

RES. FACILITY:Division of Labs and Criteria Development

RES. LOCATION:Cincinnati, Ohio

INVESTIGATOR(S):L. Stettler

SPONSOR(S):NIOSH/DHEW

DURATION:1 year

FUNDING:FY '75 \$46,555 (100% energy related)

.....

DESCRIPTION:The objectives are to develop analytical methods for

.....and perform analyses to chemically characterize inorganic particles and organic

.....inorganic particles in situ in biological samples, including lung tissue

.....from people with suspected occupational lung disease and tissue from animals

.....exposed to inorganic compounds. The information derived from human tissue

.....will be used to determine the type and source of exposure and the relation-

.....ship between the lesion and the particulate chemistry. In animal tissue

.....the data will be used to help determine how inorganic, industrial chemicals

.....react in mammalian systems.

.....

RELATED TECHNOLOGIES:

.....

CATEGORY:Health.Effects.....
SUBCATEGORY:
TECHNOLOGY:Multi.....
SUBTECHNOLOGY:
OBJECTIVE:To develop more sensitive and rapid biological methods
to evaluate dose and damage to man,.....
.....

PROJECT:

TITLE: Biochemical Profiling -- Multiple Analyses
.....
.....
RES. FACILITY: DHEW - Biochemistry Branch
RES. LOCATION: Morgantown, W. VA.
INVESTIGATOR(S): H. Resnick
SPONSOR(S): NIOSH / DHEW
DURATION: 1 year
FUNDING: FY 1974 \$ 17,400 (80 % energy related)

.....
DESCRIPTION: The studies in this area of investigation are
..... primarily concerned with biochemical indices for the early detection of
..... occupationally-related respiratory diseases. Various biochemical assays with
..... respect to serum proteins -- immunoglobulins, complement -- and enzymatic
..... levels (multiphasic analyses) are being performed; a possible correlation in
..... "pattern" changes are being evaluated for possible use as a diagnostic
..... aid in pulmonary disorders.
.....
.....

RELATED TECHNOLOGIES:
.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Multi

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods
..... to evaluate dose and damage to man.

PROJECT:

TITLE: Lung Zone Pattern of Sample CWP Related to Functional
..... Impairment

RES. FACILITY: DHEW - Statistics Branch

RES. LOCATION: Morgantown, W. Va.

INVESTIGATOR(S): R. Reger

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY 1974 \$25,000 (100% energy related)

.....
DESCRIPTION: The general effect of simple CWP of lung function has
..... been well established. However, the conclusions thus far reached have never
..... taken into account areas of the lung that are affected and in addition to
..... patterns involved, no account has been taken of mixtures of profusion across
..... zones within the lungs and how this influences functional impairment.
..... There are over 4,000 patterns of profusion (i.e. when we consider six zones)
..... of simple CWP which can occur and to date, no analyses has been made regarding
..... the most prevalent patterns, let alone their influences on impairment.
.....

..... The methodology will involve statistics and the computer science in
..... that we will basically be dealing with discriminate analyses where generate
RELATED TECHNOLOGIES:

..... functions which enable us to state what the likelihood is of individuals
.....

CATEGORY:

SUBCATEGORY:

TECHNOLOGY:

SUBTECHNOLOGY:

OBJECTIVE:

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PROJECT:

TITLE: Lung Zone Pattern of Sample CWP Related to

..... Functional Impairment

.....

RES. FACILITY:

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S):

DURATION:

FUNDING:

DESCRIPTION: with specified lung pattern and profusion mixture in-

..... volvement being functionally impaired.

.....

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RELATED TECHNOLOGIES:

.....

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE:To develop more sensitive and rapid biological methods
.....to evaluate dose and damage to man.....
.....

PROJECT:

TITLE:Aerosol Deposition in Human Subjects.....
.....
.....

RES. FACILITY:New York University.....

RES. LOCATION:New York, New York.....

INVESTIGATOR(S):E. Palmes.....

SPONSOR(S):NIOSH/DHEW.....

DURATION:1 year.....

FUNDING:FY 1974 \$38,225 (70% energy related).....
.....

DESCRIPTION:The objective of this study is a better understanding of
.....the fate of aerosols inhaled by human subjects. The project has two aspects
.....a) the influence of anatomical and physiological factors on deposition and the
.....utility of deposition studies as tools in the diagnosis of respiratory
.....disease such as emphysema, and b) the development of a simple, rapid screening
.....procedure for measuring aerosol deposition in human populations under circum-
.....stances which will make the results applicable to the estimation of dosage
.....rates in working environments. The first phase will employ single breath
.....techniques with breath-holding developed at this laboratory; the second will
.....be based on a new type of apparatus and procedure to be developed for steady

RELATED TECHNOLOGIES:

CATEGORY:

SUBCATEGORY:

TECHNOLOGY:

SUBTECHNOLOGY:

OBJECTIVE:

.....

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PROJECT:

TITLE: Aerosol Deposition in Human Subjects

.....

.....

RES. FACILITY:

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S):

DURATION:

FUNDING:

.....

DESCRIPTION: state breathing of aerosols. Both phases will utilize

.. personnel and facilities at the N.Y.U. Institute of Environmental Medicine

.. and at the Appalachian Laboratory for Occupational Respiratory Diseases

.. (ALFORD).

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.....

RELATED TECHNOLOGIES: Oil and Gas

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods
to evaluate dose and damage to man.

PROJECT:

TITLE: Biochemical Profiling; Multiphasic Analysis

RES. FACILITY: Appalachian Lab for Occupational Respiratory Diseases

RES. LOCATION: Morgantown, W. Va.

INVESTIGATOR(S): H. Resnick

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY '75 \$29,696 (100% energy related)

DESCRIPTION: The studies in this area of investigation are
primarily concerned with biochemical indices for the early detection of
occupationally-related respiratory diseases.

..... Various biochemical assays with respect to serum proteins
..... immunoglobulins, complement -- and enzymatic levels (multiphasic analyses)
..... are being performed; a possible correlation in "pattern" changes are
..... being evaluated for possible use as a diagnostic aid in pulmonary
..... disorders in the mining industries.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects.....

SUBCATEGORY:

TECHNOLOGY: Coal.....

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods
..... to evaluate dose and damage to man.....
.....

PROJECT:

TITLE: Association of Pneumoconiosis (CWP) with Human
..... Histocompatibility Loci.....
.....

RES. FACILITY: Appalachian Lab for Occupational Respiratory Diseases

RES. LOCATION: Morgantown, W. Va.....

INVESTIGATOR(S): P. Major.....

SPONSOR(S): NIOSH/DHEW.....

DURATION: 1 year.....

FUNDING: FY '75 \$12,760 (100% energy related).....
.....

DESCRIPTION: This project proposes to test for a possible association
..... of certain or characteristic major human histocompatibility specificities
..... and the susceptibility to development of simple or complicated pneumoconiosis
..... in coalworkers. Following up on the selection of appropriate diseased and
..... control populations in coalworkers, the investigators will screen all sera
..... for the presence of specific humoral antibodies to any major histocompati-
..... bility locus, classify all subjects according to individual histocompatibility
..... types, and then expanded family studies will follow should it become
..... necessary to establish an association of particular haplotype(s) with
..... pneumoconiosis. The finding of any specific associations could provide

RELATED TECHNOLOGIES:
..... the basis for predictive diagnostic laboratory measures.....
.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To develop more sensitive and rapid biological methods
..... to evaluate dose and damage to man.
.....

PROJECT:

TITLE: Respiratory Flow Rates in Coal Miners Utilizing Mixtures
..... of Helium

RES. FACILITY: Appalachian Lab for Occupational Respiratory Diseases

RES. LOCATION: Morgantown, W. Va.

INVESTIGATOR(S): L. Dayton

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY '75 \$36,515 (100% energy related)

DESCRIPTION: Several investigators have found that in performing
..... flow-volume maneuvers utilizing helium-oxygen mixtures, the sensitivity of
..... the maneuver in detecting small airway disease may be enhanced. The goal
..... of this project is to discover:
..... 1. If flow-volume curves utilizing helium-oxygen mixtures
..... are more sensitive in discovering "abnormality" in coal miners than conven-
..... tional curves.
..... 2. The degree of correlation of alteration in helium-
..... oxygen flow rates with other indices of pulmonary function in miners,
..... smokers, and controls...i.e. closing volumes, DLCO, etc.

RELATED TECHNOLOGIES:

CATEGORY:

SUBCATEGORY:

TECHNOLOGY:

SUBTECHNOLOGY:

OBJECTIVE:

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.....

PROJECT:

TITLE: Respiratory Flow Rates in Coal Miners Utilizing Mixtures

..... of Helium

.....

RES. FACILITY:

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S):

DURATION:

FUNDING:

.....

DESCRIPTION: 3. The degree of correlation of alteration in helium-

... oxygen flow rates with differences in age, smoking, and occupational history,

... and respiratory symptoms.

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RELATED TECHNOLOGIES:

.....

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Multi
SUBTECHNOLOGY:
OBJECTIVE: To determine the metabolism and fate of hazardous agents
..... associated with energy technologies
.....
PROJECT:
TITLE: Particle Deposition and Clearance Related To Lung
..... Geometry
.....
RES. FACILITY: DHEW - Medical Research Branch
RES. LOCATION: Morgantown, W. Va.
INVESTIGATOR(S): P. Dennee
SPONSOR(S): NIOSH/DHEW
DURATION: 1 year
FUNDING: FY 1974 \$58,400 (100% energy related)
.....
DESCRIPTION: The working hypothesis is to determine the patterns of
..... particle (0.5 to 2.0 u diameter) deposition and clearance as a function of
..... changes in lung volume and geometry. If we can understand this problem we
..... will hopefully have learned the effect of the differences in lung geometry
..... within individuals and how best to evaluate these differences on an early
..... detection basis. These individual variations have been shown to exist in
..... studies conducted within ALFORD.
.....
.....
.....
RELATED TECHNOLOGIES:
.....

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE:To determine the metabolism and fate of hazardous

.....agents associated with energy technologies.....

.....

PROJECT:

TITLE:Air Pollutants and Lung Clearance of Particles.....

.....

.....

RES. FACILITY:University of Rochester.....

RES. LOCATION:Rochester, New York.....

INVESTIGATOR(S):J. Fain.....

SPONSOR(S):NIOSH/DHEW.....

DURATION:1 Year.....

FUNDING:FY 1974 \$74,240 (50% energy related).....

.....

DESCRIPTION:Lung clearance is part of the defensive mechanisms of the
.....respiratory system, which among other things, provides a formidable resistance
.....of the body to inhaled particles. Using the nontoxic-particle-challenge
.....system the integrated alveolar clearance function will be measured quantita-
.....tively in serially sacrificed animals, exposed to sulfur dioxide, asbestos,
.....carbon monoxide and some oxidants, respectively. In various exposure schedules
.....the emphasis will be on low concentrations, on uniform exposures as well as
.....on ones with excursions of different exposure regimens of TiO2 particles,
.....representing "nontoxic particle challenge", on alveolar clearance will be
.....investigated. Except of yielding information on clearance mechanisms,

RELATED TECHNOLOGIES:

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CATEGORY:
SUBCATEGORY:
TECHNOLOGY:
SUBTECHNOLOGY:
OBJECTIVE:
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.....

PROJECT:

TITLE: Air Pollutants and Lung Clearance of Particles
.....
.....

RES. FACILITY:

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S):

DURATION:

FUNDING:

.....
DESCRIPTION: these factors have importance to the health of individuals
.....
..... in urban and occupational environments. The objectives of this project
.....
..... may be defined as: to describe the effect of some air pollutants on particle
.....
..... clearance from the lung, to compare the response of normal experimental
.....
..... animals and of animals with inflicted pathologies and to discover possibly
.....
..... new facts about clearance mechanisms.
.....
.....
.....
.....

RELATED TECHNOLOGIES: Oil and Gas, Nuclear, Conservation

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To determine the metabolism and fate of hazardous agents
associated with energy technologies.

PROJECT:

TITLE: Particle Deposition and Clearance Related to Lung...
..... Geometry

RES. FACILITY: Appalachian Lab for Occupational Respiratory Diseases

RES. LOCATION: Morgantown, W. Va.

INVESTIGATOR(S): P. De Nee

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY '75 \$43,171 (100% energy related)

.....
DESCRIPTION: Several occupationally related diseases are initiated
as a result of inhaled or ingested materials for which the body has inadequate
defense mechanism or for which the body cannot compensate due to the quantity
of materials taken in. This study proposes to use respirable particles of
known composition, concentration and geometry in an attempt to learn more
about the effect of lung geometry on particle deposition and clearance.
The results will be applicable to diseases such as coal workers' pneumoconi-
osis, asbestosis, berylliosis, byssinosis, silicosis, etc. Thus, this
project is related to the NIOSH long range goal of reducing the incidence and
severity of injuries and diseases from occupational hazards. This would

RELATED TECHNOLOGIES:
..... hopefully be accomplished by providing early detection of those individuals
predisposed to increased particle deposition by the nature of their lung
geometry.

CATEGORY:

SUBCATEGORY:

TECHNOLOGY:

SUBTECHNOLOGY:

OBJECTIVE:

.....

.....

PROJECT:

TITLE: Particle Deposition and Clearance Related to Lung...

..... Geometry.....

.....

RES. FACILITY:

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S):

DURATION:

FUNDING:

.....

DESCRIPTION: The working hypothesis is to determine the patterns
... of particle (.1 to 2.0 u diameter) deposition and clearance as a function
... of changes in lung volume and geometry. If we can understand this problem,
... we will hopefully have learned the effect of the differences in lung...
... geometry within individuals and how best to evaluate these differences on
... an early detection basis. These individual variations have been shown to
... exist in studies conducted within ALFORD.....

.....

.....

RELATED TECHNOLOGIES: Conservation, nuclear.....

.....

U.S. ENVIRONMENTAL PROTECTION AGENCY		Form Approved OMB No. 158-R0981	
NOTICE OF RESEARCH PROJECT		PROJECT NO. (Do not use this space)	
PREPARED FOR THE SMITHSONIAN SCIENCE INFORMATION EXCHANGE		SSIE EPA EPA-IAG-D5-F773-CW	
TITLE OF PROJECT Relationship of Metabolism, Fate, and Toxicology of Particulates and Organic Compounds GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED IN THE PROJECT. Project Director - Dr. Benjamin Bruckner Phone: (301) 443-4493			
NAME AND ADDRESS OF APPLICANT INSTITUTION National Institute for Occupational Safety and Health, Office of Extramural Activities, Rockville, Maryland 20852			
SUMMARY OF PROPOSED WORK - (1) Objectives, (2) Approach, (3) Current Plans and/or Progress (200 words or less. Omit confidential data). In the Smithsonian Science Information Exchange, summaries of work in progress are exchanged with government and private agencies supporting research and are forwarded to investigators who request such information. Your summary is to be used for these purposes. Specific projects within this area will be funded through the grant mechanism. These projects will be designed to explain, interpret, and predict the occupational health effects of particulates and organic compounds associated with the various coal technologies as well as other primary energy search and utilization proposals being developed in response to the Nation's effort toward energy self-sufficiency.			
PROFESSIONAL SCHOOL INVOLVED (Medical)		SIGNATURE OF PRINCIPAL INVESTIGATOR	
		DATE	
FOR OFFICE USE ONLY			
PROJECT METHOD (Check one) ☐ STATE (intramural) ☒ CONTRACT ☐ GRANT		TASK NO. 1	
		PROJECT OFFICER RESPONSIBLE ORGANIZATION	
CURRENT F.Y. 75	NO. OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT F.Y. 4	STARTING DATE 5/75	ESTIMATED COMPLETION DATE 5/80

158-106-102 (1-7-72)

REPLACES PHS FORM 166 AND SI-SIE 76A WHICH MAY NOT BE USED.

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Conservation
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Investigation of Occupational Safety and Health Effects
..... Associated with Reduced Levels of Illumination
.....

RES. FACILITY: Division of Laboratories and Criteria Development

RES. LOCATION: Cincinnati, Ohio

INVESTIGATOR(S): A. Heins

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY '75 \$15,290 (100% energy related)

.....
DESCRIPTION: A symposium will be sponsored to accomplish the following objectives:
..... a. To ascertain the current state-of-the-art knowledge regarding safety and health effects associated with reduced levels of illumination.
..... b. To identify areas where research is needed
..... c. To create an awareness of these areas so that future research efforts can be appropriately directed
..... Particular emphasis will be placed on current problems associated with lowering illumination levels to achieve energy conservation goals. The
RELATED TECHNOLOGIES: proceedings of the symposium will be published after editing and review by the participants.

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of ..
 exposure of normal, susceptible and stressed population groups to different
 levels and combinations of biologically active agents associated with energy
PROJECT: technologies.
TITLE: Industrial Tar Studies

RES. FACILITY: DHEW - Toxicology Branch
RES. LOCATION: Cincinnati, Ohio
INVESTIGATOR(S): L.D. Scheel
SPONSOR(S): NIOSH/DHEW
DURATION: 1 year
FUNDING: FY 1974 \$272,500 (100% energy related)

DESCRIPTION: This study consists of two parts: 1) the in-house
 fractionation and characterization of coal tar into its acids, basic, neutral,
 and polynuclear aromatic fractions and 2) the carcinogenic and toxic testing
 areas which are principally under contract with the University of Cincinnati
 and by Interagency Agreement with the Toxic Hazard Laboratory of Wright-
 Patterson Air Force Base.

RELATED TECHNOLOGIES:

CATEGORY:Health Effects.....
SUBCATEGORY:
TECHNOLOGY:Coal.....
SUBTECHNOLOGY:
OBJECTIVE:To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy.....

PROJECT:technologies.....
TITLE:Behavioral/Neurological Effects of Toxic Gases -- CO, Anesthetics.....
.....
RES. FACILITY:DHEW- Behavioral Motivational Factors Branch.....
RES. LOCATION:Cincinnati, Ohio.....
INVESTIGATOR(S):B. Johnson.....
SPONSOR(S):NIOSH/DHEW.....
DURATION:1 Year.....
FUNDING:FY 1974 \$64,500 (60% energy related).....

.....
DESCRIPTION:This project seeks to detect the effects on behavioral performance and neurological function of exposure to gases known to have neurotoxic properties. The toxic gases to be investigated are carbon monoxide and two anesthetics, halothane and nitrous oxide. The CO activities will be twofold. Laboratory investigations will focus on the effects on such performance tasks as vigilance, eye-hand coordination, task time-sharing, and sensory discrimination. The emphasis of the CO laboratory study will be to attempt to resolve discrepant findings in the literature bearing on CO effects on performance at levels below the current TLV. A CO field study will study the effects of CO on performance capabilities of personnel working at border crossing stations.
RELATED TECHNOLOGIES:

CATEGORY:

SUBCATEGORY:

TECHNOLOGY:

SUBTECHNOLOGY:

OBJECTIVE:

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PROJECT:

TITLE: Behavioral/Neurological Effects of Toxic Gases --

..... CO, Anesthetics

.....

RES. FACILITY:

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S):

DURATION:

FUNDING:

.....

DESCRIPTION: This study will determine by breath and blood samples
..... the degree of CO exposure and the effects on human performance capabilities.
.....

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RELATED TECHNOLOGIES: Oil and Gas

.....

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Conservation.....

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of..
normal, susceptible and stressed population groups to different levels...
and combinations of biologically active agents associated with energy....

PROJECT:technologies.

TITLE:Asbestos Follow-Up.....
.....
.....

RES. FACILITY:DHEW - Biometry Branch.....

RES. LOCATION:Cincinnati, Ohio.....

INVESTIGATOR(S):R. Leman.....

SPONSOR(S):NIOSH/DHEW.....

DURATION:1 year.....

FUNDING:FY 1974 \$30,000 (50% energy related).....

.....
DESCRIPTION:A cooperative project will be undertaken with the National
Cancer Institute and the East Texas Chest Hospital to provide continuing
surveillance of approximately 900 past employees of a thermal pipe insulation
plant, expected to experience an excess cardio-pulmonary disease risk.
.....
NIOSH will compile a roster of former employees and determine the present
vital status of each. Death certificates or current addresses will be obtained
as appropriate. Epidemiologic assistance will be provided to NCI and ETCH
for further investigation.
.....
.....

RELATED TECHNOLOGIES:

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of
exposure of normal, susceptible and stressed population groups to different
levels and combinations of biologically active agents associated with energy
technologies.

PROJECT:

TITLE: Occupational Heart Disease -- Medical Effects of Low
Level Carbon Monoxide Exposure

RES. FACILITY: DHEW - Medical Investigation Branch

RES. LOCATION: Cincinnati, Ohio

INVESTIGATOR(S): W. Parnes

SPONSOR(S): NIOSH/ DHEW

DURATION: 1 year

FUNDING: FY 1974 \$47,500 (100% energy related)

DESCRIPTION: Chronic low level carbon monoxide exposure has been impli-
cated in increasing the incidence of deaths due to coronary artery disease.
Results, cross sectional electrocardiographic screening, both static and
dynamic, will be correlated with exposure data, currently collected atmospheric
and carboxyhemoglobin levels and past records, on a population of approximately
500 motor vehicle inspectors for evidence of increased morbidity due to
occupational exposures.

RELATED TECHNOLOGIES: .. Oil and Gas

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE:To evaluate the short term and long term hazards of
 exposure of normal, susceptible and stressed population groups to different
 levels and combinations of biologically active agents associated with energy
 technologies.

PROJECT:technologies.

TITLE:Occupational Heart Disease --Low Level Carbon
Monoxide Exposures & Environmental Aspects

RES. FACILITY:DHEW --Environmental Investigation Branch.....

RES. LOCATION:Cincinnati, Ohio.....

INVESTIGATOR(S):R. Curtis.....

SPONSOR(S):NIOSH/DHEW.....

DURATION:1 year.....

FUNDING:FY 1974 \$27,000 (100% energy related).....

.....

DESCRIPTION:Chronic low level carbon monoxide exposure has been impli-
 cated in increasing the incidence of deaths due to coronary artery disease.
 Worker exposure levels to carbon monoxide will be determined for approximately
 500 motor vehicle inspectors for correlation with cross-sectional electro-
 cardiographic screening, both static and dynamic, worker carboxyhemoglobin
 levels and past medical records for determination of evidence of increased
 morbidity due to occupational exposures.

RELATED TECHNOLOGIES:Oil and Gas.....

.....

CATEGORY: Health Effects.....

SUBCATEGORY:

TECHNOLOGY: Coal.....

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of
exposure of normal, susceptible and stressed population groups to different
levels and combinations of biologically active agents associated with
energy technologies.

PROJECT: energy technologies.

TITLE: Mortality of Coal Miners in the Appalachian
..... Region
.....

RES. FACILITY: DHEW - Appalachian Lab - Occupational Respiratory Disease

RES. LOCATION: Morgantown, W. Va.

INVESTIGATOR(S): C. Ortmeier

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY 1974 \$ 55,000 (100% energy related)

.....

DESCRIPTION: To determine age-standardized death rates of coal miners
..... relative to all men in the nation, for all deaths, and for specified
..... cardiopulmonary causes of death. To analyze the effects of CWP, apart
..... from airway obstruction, cigarette smoking, dyspnea, and pulmonary
..... function abnormalities, in increasing death rates of coal miners.
.....
.....
.....
.....

RELATED TECHNOLOGIES:

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of
 exposure of normal, susceptible and stressed population groups to different
 levels and combinations of biologically active agents associated with energy
 technologies.

PROJECT:

TITLE: Seroepidem----- of Selected Coal Workers and
 Occupational Cohorts

.....

RES. FACILITY: DHEW - Infectious Disease Branch

RES. LOCATION: Morgantown, W. Va.

INVESTIGATOR(S): H. Echert

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY 1974 \$23,800 (100% energy related)

.....

DESCRIPTION: Paired sera, illness histories, and, if possible,
 spirometric data will be obtained within a community from randomly selected
 coal workers, railroad (or other) workers, and their respective wives over a
 winter season to determine whether differences in selected infections and
 certain respiratory illness episodes occur. The findings of an increased
 rate of chronic respiratory symptoms among coal workers' wives will be
 re-examined.

.....

.....

RELATED TECHNOLOGIES:

.....

CATEGORY: **Health Effects**

SUBCATEGORY:

TECHNOLOGY: **Coal**

SUBTECHNOLOGY:

OBJECTIVE: **To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.**

PROJECT: **Post Mortem Pulmonary Roentgenographic And Lung Function Studies**

TITLE: **Post Mortem Pulmonary Roentgenographic And Lung Function Studies**

RES. FACILITY: **DHEW -- Medical Research Branch**

RES. LOCATION: **Morgantown, W. Va.**

INVESTIGATOR(S): **A. Gelderman**

SPONSOR(S): **NIOSH/DHEW**

DURATION: **1 year**

FUNDING: **FY 1974 \$28,700 (100% energy related)**

DESCRIPTION: **This project will define the structural abnormalities seen at post mortem examination to the post-mortem pulmonary roentgenographic and lung function studies. The project will aid in the diagnosis of early coal workers' pneumoconiosis and in the interpretation of the material gathered from the National Coal Workers' Autopsy Study.**

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of
exposure of normal, susceptible and stressed population groups to different
levels and combinations of biologically active agents associated with...

PROJECT: energy technologies.

TITLE: Effects of Coal Dust Exposure on the Response of
..... Airway Smooth Muscle Drugs

RES. FACILITY: DHEW - Medical Research Branch

RES. LOCATION: Morgantown, W. Va.

INVESTIGATOR(S): P. Miles

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY 1974 \$25,600 (100% energy related)

DESCRIPTION: The inhalation of coal dust for a prolonged period of
time modifies the membrane of airway smooth muscle such that the response
of the muscle to drugs is altered. One way to characterize smooth muscle
function is to test its response to various drugs. For example, airway smooth
muscle usually contracts in response to histamine, acetylcholi--- and
5-hydroxytryptamine and it usually relaxes when treated with epinephrine
and norepinephrine. These responses of the muscle are caused by interaction
of drug molecules with receptors on the muscle membrane. One possibility in
coal workers pneumoconiosis is that the muscle membrane is changed in such a
way that the receptor molecules are altered. In this investigation the

RELATED TECHNOLOGIES:
interaction of drug molecules with receptor sites will be studied in...

CATEGORY:

SUBCATEGORY:

TECHNOLOGY:

SUBTECHNOLOGY:

OBJECTIVE:

.....

.....

PROJECT:

TITLE: Effects of Coal Dust Exposure on the Response of

..... Airway Smooth Muscle Drugs

.....

RES. FACILITY:

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S):

DURATION:

FUNDING:

.....

DESCRIPTION: normal muscles and in muscles from animals exposed to

..... coal dust by using well established pharmacologic

..... techniques.

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RELATED TECHNOLOGIES:

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CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Nuclear
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of ..
 exposure of normal, susceptible and stressed population groups to different
 levels and combinations of biologically active agents associated with energy
PROJECT: technologies.
TITLE: Mortality of Uranium Mill Workers

RES. FACILITY: DHEW - Division of Field Studies and Clinical Investigation
RES. LOCATION: Salt Lake City, Utah
INVESTIGATOR(S): V. Archer
SPONSOR(S): NIOSH/DHEW
DURATION: 1 year
FUNDING: FY 1974 \$42,500 (100% energy related)

DESCRIPTION: A potential health problem exists among uranium mill
 workers from exposure to natural uranium and Th-230. Animal experiments and

 other considerations indicate that present maximal permissible concentrations

 in air for these elements may be too high.

 A preliminary study of about 700 mill workers greatly strengthens

 this concern.

 In addition to the occupational health problem, this study will

 yield data of great interest to other government agencies concerned with

 environmental radiation problems, e.g., are small amounts of plutonium

 (an alpha emitter like Th-230) deposited in lymph nodes likely to increase
RELATED TECHNOLOGIES:
 the incidence of lymphomas in human populations.

CATEGORY:

SUBCATEGORY:

TECHNOLOGY:

SUBTECHNOLOGY:

OBJECTIVE:

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PROJECT:

TITLE:Mortality of Uranium Mill Workers.....

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RES. FACILITY:

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S):

DURATION:

FUNDING:

.....

DESCRIPTION:Death certificates will be collected for deceased persons

.....on about 5,000 former uranium mill workers. Mortality analysis will be done,

.....comparing all causes of death with causes among the general population.

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RELATED TECHNOLOGIES:

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CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of ..
 exposure of normal, susceptible and stressed population groups to different
 levels and combinations of biologically active agents associated with energy
PROJECT: technologies.

TITLE: Experimental Infective Pneumoconiosis

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RES. FACILITY: Industrial Toxicology Research Center

RES. LOCATION: Tuckow, India

INVESTIGATOR(S): S. Zaidi

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY 1974 \$49,908 (100% energy related)

.....

DESCRIPTION: Scope: The objective of the study is to determine the
 role of infection and immune reactions in the development of asbestosis and
 other dust related pneumoconioses.

.....

Utilization of Results: To establish criteria and
 recommendations for industrial standards and work practices for both the
 collaborating country and U.S. Publication of results in appropriate
 foreign and U.S. journals

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RELATED TECHNOLOGIES: Conservation

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of
exposure of normal, susceptible and stressed population groups to different
levels and combinations of biologically active agents associated with
energy technologies.

PROJECT: energy technologies.

TITLE: Development of Criteria for Industrial Air Standards
..... for Bituminous Coal Via Animal Inhalation Experiments
.....

RES. FACILITY: DHEW - Toxicology Branch

RES. LOCATION: Cincinnati, Ohio

INVESTIGATOR(S): W. Wagner

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY 1974 \$33,500 (100% energy related)

.....

DESCRIPTION: Studies, research and experiments on significant aspects
..... of occupational diseases of miners. This project with experimental animals
..... exposed by chronic inhalation to bituminous coal dusts has been designed with
..... four major objectives: (1) to determine comparative toxicologic activity of
..... coal dusts of high and low coal workers' pneumoconiosis (CWP) incidences; (2)
..... to determine the toxicologic effect of superimposed, repeated, intermittent
..... peak exposures on constant exposure levels from high CWP incidence coal dust;
..... (3) establish the threshold level, through a dose response relationship,
..... at which irreversible impairment of pathology and/or pulmonary function occurs;
..... and (4) develop criteria applicable to validation of the 2 mg/m3 respirable.

RELATED TECHNOLOGIES:

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CATEGORY:

SUBCATEGORY:

TECHNOLOGY:

SUBTECHNOLOGY:

OBJECTIVE:

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PROJECT:

TITLE: Development of Criteria for Industrial Air Standards

..... for Bituminous Coal Via Animal Inhalation Experiments

.....

RES. FACILITY:

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S):

DURATION:

FUNDING:

.....
DESCRIPTION: coal dust standard. The above objectives are being accomplished

.....
by judicious selection of animal species, conditions of exposure, response
.....
criteria, and possible modification of such ho---- factors as age and diet.

.....
Significant effort during FY '74 will be expended toward verification of
.....
the demonstrated trend of reduced compliance and peripheral airway disease
.....
in the coal dust exposed monkeys.

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RELATED TECHNOLOGIES:

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CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Conservation
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal,
susceptible and stressed population groups to different levels and combinations
of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Asbestos Mortality
.....
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RES. FACILITY: DHEW - Biometry Branch

RES. LOCATION: Cincinnati, Ohio

INVESTIGATOR(S): R. Lemen

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY 1974 \$17,500 (50% energy related)

.....
DESCRIPTION: The continuing objective of this project is to determine:

..... 1. Whether any differential in lung cancer risk exists between workers
..... exposed to amosite and those exposed to chrysotile. 2. Whether other sites
..... of malignancy appear in excess. 3. Whether continued exposure to asbestos
..... results in cor-pulmonale. 4. Whether the previously noted excess of suicides
..... is related to asbestos disease. 5. Whether smoking is necessary for the
..... development of respiratory cancer in asbestos workers.
.....

..... Further follow-up and analysis is necessary to complete this project.
.....
.....

RELATED TECHNOLOGIES:
.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.....

PROJECT:

TITLE: Analysis of Inhaled Dust Particles In Situ

RES. FACILITY: DHEW - Medical Research Branch

RES. LOCATION: Morgantown, W. Va.

INVESTIGATOR(S): J. Abraham

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY 1974 \$6,500 (100% energy related)

DESCRIPTION: This proposal is in conjunction with the long range goal of NIOSH to reduce the incidence and severity of injuries and disease resulting from occupational hazards. Specifically, under the aspect of health, reduce the hazards of CWP, silicosis, byssinosis, asbestosis, berylliosis and other lung-related diseases through a study which will relate the lesions found in the autopsied lungs of miners and other industrial workers with the specific types of dust found in the localized areas of the lesions.

RELATED TECHNOLOGIES: Conservation

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Conservation

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Relation of Smoking To Neoplasia In Asbestos Workers

RES. FACILITY: City University of New York

RES. LOCATION: New York City

INVESTIGATOR(S): I. Selikoff

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY 1974 \$32,596 (50% energy related)

DESCRIPTION: The entire membership of the Asbestos Workers Union on January 1, 1967 (17,800) has been observed prospectively. Through December 31, 1971, there were 1,092 deaths. Each has been investigated.

..... Analysis has been undertaken concerning expected and observed deaths for asbestosis, lung cancer, pleural and peritoneal mesothelioma, cancer of the gastrointestinal tract and neoplasms of several other sites. In these analyses, smoking histories recorded in 1967 are being taken into account.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects.....
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of..
normal, susceptible and stressed population groups to different levels and
combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Functional Relationships of Lung Ventilation and.....
..... Perfusion
.....

RES. FACILITY: DHEW - Medical Research Branch

RES. LOCATION: Morgantown, W. Va.

INVESTIGATOR(S): K. Weber

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY 1974 \$45,000 (50% energy related)

.....
DESCRIPTION: The proposed experiments for fiscal year '74 will.....
..... attempt to further delineate the mechanisms by which the ventilation and.....
..... the perfusion of the lungs are interrelated. The results of the experiments.....
..... should be applicable to any lung disease where airway resistance is increased.....
..... such as asthma, bronchitis, and emphysema. This project, then, relates to.....
..... the NIOSH mission because the capability for treatment and rehabilitation.....
..... of subjects is not possible without the knowledge of the mechanisms by which.....
..... the disease state has altered the normal lung function......
.....

RELATED TECHNOLOGIES: Nuclear, Conservation

CATEGORY: Health Effect.....
SUBCATEGORY:
TECHNOLOGY: Coal.....
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Occupational Heart Disease -- Low Level Carbon Monoxide Exposures -- Medical Aspects.....

RES. FACILITY: Division of Lab and Criteria Development.....

RES. LOCATION: Cincinnati, Ohio.....

INVESTIGATOR(S): J. Mallon.....

SPONSOR(S): NIOSH/DHEW.....

DURATION: 1 year.....

FUNDING: FY '75 \$17,250 (100% energy related).....

DESCRIPTION: Low-level exposures to carbon monoxide have been shown to decrease the exercise time to angina pectoris in patients with coronary disease. These exposures may also trigger arrhythmias in patients with coronary or respiratory disease, as a result of decreasing the amount of oxygen available to the heart. In addition, animal experiments have suggested that carbon monoxide may have a chronic long-term effect on the heart, in addition to the acute effects mentioned above.

..... Medical testing, along with environmental studies, will be conducted to ascertain the acute and chronic effects of carbon monoxide on cardiac function of various industry groups.

RELATED TECHNOLOGIES:
..... OIL and GAS.....

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Occupational Heart Disease -- Low Level Carbon
..... Monoxide Exposures -- Environmental Aspects
.....

RES. FACILITY: Division of Labs and Criteria Development

RES. LOCATION: Cincinnati, Ohio

INVESTIGATOR(S): R. Curtis

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY '75 \$18190 (100% energy related)

DESCRIPTION: Chronic low level carbon monoxide exposure has been implicated in increasing the incidence of deaths due to coronary artery disease. The results of a literature search and preliminary field surveys to determine worker exposure levels to carbon monoxide will be used in the selection of a worker population suitable for future studies of this hazard. Upon the selection of a suitable working population, comprehensive environmental surveys will be conducted to determine actual carbon monoxide exposures to the population. These data will then be correlated with appropriate medical data that is being compiled simultaneously.

RELATED TECHNOLOGIES: Oil and Gas

CATEGORY: Health Effects.....
SUBCATEGORY:
TECHNOLOGY: Conservation.....
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Mineral Wool.....
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.....

RES. FACILITY: Division of Labs and Criteria Development.....

RES. LOCATION: Cincinnati, Ohio.....

INVESTIGATOR(S): D. Baylis.....

SPONSOR(S): NIOSH/DHEW.....

DURATION: 1 year.....

FUNDING: FY '75 \$17,210 (80% energy related).....

.....
DESCRIPTION: In view of the many animal and human studies that have been completed demonstrating the carcinogenicity of asbestos and fibrous glass and the prevailing belief of many researchers that the morphology and size of the substance is of primary importance in the development of cancer, the National Institute for Occupational Safety and Health (NIOSH) is undertaking a mortality study of the mineral wool worker population in the United States. This population has had a maximum of approximately forty-five (45) years since onset of exposure and were and are supposedly exposed to fairly small diameter fibers, and thus will be an ideal population with which to observe latent effects.

RELATED TECHNOLOGIES:
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CATEGORY: Health Effects.....
SUBCATEGORY:
TECHNOLOGY: Coal.....
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Occupational Heart Disease -- Low Level Carbon
..... Monoxide Exposure -- Mortality Study
.....
RES. FACILITY: Division of Labs and Criteria Development
RES. LOCATION: Cincinnati, Ohio
INVESTIGATOR(S): F. Stern
SPONSOR(S): NIOSH/DHEW
DURATION: 1 year
FUNDING: FY '75 \$28,780 (100% energy related)

DESCRIPTION: Chronic low level carbon monoxide exposure has been implicated in increasing the incidence of deaths due to coronary artery disease. A retrospective study will be undertaken to assess the mortality experience on a cohort of approximately 2100 motor vehicle inspectors.
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RELATED TECHNOLOGIES: Oil and Gas
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CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Response of Airway Smooth Muscle To Drugs After Coal Dust Exposure

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RES. FACILITY: Appalachian Lab for Occupational Respiratory Diseases

RES. LOCATION: Morgantown, W. Va.

INVESTIGATOR(S): P. Miles

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY '75 \$29,695 (100% energy related)

.....

DESCRIPTION: Experiments indicate that in coal workers' pneumoconiosis, bronchil smooth muscles are probably damaged, or at least thei gross mechanical properties are changed. Since these cells are scattered throughout the lung, it is very difficult to ascertain what is happening in them with conventional respiratory physiological techniques. An appropriate method to use would be one in which the muscle is isolated from the respiratory tract and studied individually. One experimental preparation which has been used as a model for airway smooth muscle is the muscle from the tracheal ring known as the trachealis. This muscle is readily accessible and is located such that exposure of the animal to coal dust would insure that the trachealis is exposed. The objective of this investigation then is to study the function

RELATED TECHNOLOGIES:

CATEGORY:

SUBCATEGORY:

TECHNOLOGY:

SUBTECHNOLOGY:

OBJECTIVE:

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PROJECT:

TITLE: Response of Airway Smooth Muscle to Drugs After Coal

..... Dust Exposure

.....

RES. FACILITY:

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S):

DURATION:

FUNDING:

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DESCRIPTION: of the trachealis in normal animals and then to compare

..... this with muscle function in animals which have been exposed to coal dust.

..... The criteria used to characterize smooth muscle function are the responses

..... of the muscle to various drugs.

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RELATED TECHNOLOGIES:

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CATEGORY:Health Effects.....
SUBCATEGORY:
TECHNOLOGY:Coal.....
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies..

PROJECT:

TITLE:Functional Relationships of Lung Ventilation and Perfusion.....
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.....
RES. FACILITY:Appalachian Lab for Occupational Respiratory Diseases.....
RES. LOCATION:Morgantown, W. Va.....
INVESTIGATOR(S):K. Weber.....
SPONSOR(S):NIOSH/DHEW.....
DURATION:1 year.....
FUNDING:FY '75 \$53,079 (100% energy related).....

.....
DESCRIPTION:The proposed studies will begin with a set of experiments, using dogs, designed to relate changes in airway pressure and ventilation/perfusion disturbances. Instrumentation for studying effects of pulmonary gas changes on ventilation/perfusion disturbances will be developed. Instrumented animals will be allowed to breath various concentrations of oxygen and carbon dioxide, and the effects on ventilation/perfusion ratio will be observed.....
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RELATED TECHNOLOGIES:
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CATEGORY: Health Effects.....
SUBCATEGORY:
TECHNOLOGY: Coal.....
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies..

PROJECT:

TITLE: Histologic Standards for Coal Workers' Pneumoconiosis.....
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.....
RES. FACILITY: Appalachian Labs for Occupational Respiratory Diseases.....
RES. LOCATION: Morgantown, W. Va.....
INVESTIGATOR(S): Jerrold Abraham.....
SPONSOR(S): NIOSH/DHEW.....
DURATION: 1 year.....
FUNDING: FY '75 \$51,238 (100% ENERGY RELATED).....

.....
DESCRIPTION: The object of this study is to evaluate the lung from a radiographic and a pathological (both gross and microscopic) standpoint in order to establish the anatomical-pathological basis (if any) of the ILO/UICC X-ray categories of pneumoconiosis. A second objective is to develop a set of gross and microscopic standards, based on the above results, which will allow any pathologist, at and after autopsy, to grade a coal miner's lung as to severity of coal workers pneumoconiosis on a reproducible basis.....
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RELATED TECHNOLOGIES:
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CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE:Dust and Disease, a Dose-Response Relationship.....

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RES. FACILITY:Appalachian Lab for Occupational Respiratory Diseases.....

RES. LOCATION:Morgantown, W. Va.

INVESTIGATOR(S):R. Roger

SPONSOR(S):NIOSH/DHEW

DURATION:1 year

FUNDING:FY '75 \$24,225 (100% energy related)

.....

DESCRIPTION:a). For those miners who began working since 1969, a dose-response relationship could be calculated for x-ray and symptom data. Thus the proportion of miners who respond with respiratory symptoms and x-ray changes could be derived for a particular dust exposure. Dust measurements could be correlated with spirometry data. Statistical analysis of symptomology and x-ray data could be done with regression techniques, probit or logit analyses. Pulmonary function could be related to dust exposure via correlation, regression or analysis of variance.

.....b). A follow-up on those miners in the first round who participated in the second round of the National Coal Study could be

RELATED TECHNOLOGIES:

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CATEGORY:

SUBCATEGORY:

TECHNOLOGY:

SUBTECHNOLOGY:

OBJECTIVE:

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PROJECT:

TITLE: Dust and Disease, a Dose-Response Relationship

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RES. FACILITY:

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S):

DURATION:

FUNDING:

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DESCRIPTION: evaluated. The change in pulmonary function, x-ray

..... diagnosis, and symptomology could be related to any change in the dust

..... exposure levels from the first to second round. The main question asked is,

..... are the dust levels decreasing such that the progression of the disease

..... is also decreasing?

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RELATED TECHNOLOGIES:

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CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies..

PROJECT:

TITLE:Pilot Follow-up Study of Miners Who Left the Industry.....

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RES. FACILITY:Appalachian Lab for Occupational Respiratory Diseases.....

RES. LOCATION:Morgantown, W. Va.

INVESTIGATOR(S):R. Roger.....

SPONSOR(S):NIOSH/DHEW.....

DURATION:1 year.....

FUNDING:FY '75 \$14,322 (100% energy related).....

.....

DESCRIPTION:A lack of correlation has been found between pulmonary function and other indices of impairment and the UICC x-ray scale of profusion.

.....Such results might be due to the miners who have left the industry due to poor health, i.e. those with emphysema, bronchitis or a similar respiratory condition. Thus if this retired population was sampled, it could be determined more accurately if the lack of lung function decrements is a result of out mitration from the mining population. The project would require the aid of the field studies branch. It is recommended that the occupational and medical questionnaire be administered as well as a chest x-ray and spirometry.

.....The study for practical purposes should be limited to West Virginia and Penn-
RELATED TECHNOLOGIES:sylvania coal miners.

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE:Determination of High Risk Individuals in the Mining Industry.....

RES. FACILITY:Appalachian Lab for Occupational Respiratory Diseases.....

RES. LOCATION:Morgantown, W. Va.

INVESTIGATOR(S):R. Roger.....

SPONSOR(S):NIOSH/DHEW.....

DURATION:1 year.....

FUNDING:FY '75 \$14,980 (100% energy related).....

DESCRIPTION:The purpose of this project is to identify (retrospectively) those factors or characteristics which set high risk individuals apart from the ordinary coal worker. Data are available on those individuals who have developed CWP in less than 10 years. Perhaps there is some discriminate function which separates this group from all others. If we are unable to discriminate with high probability, the reasons could be due to the fact that we do not have the proper data on these individuals to make the discrimination. If such is the case, additional measurements (to be determined) might be necessary in our search for a combination of factors accounting for high risk. A short follow-up study may be necessary to gather further information.

RELATED TECHNOLOGIES:This would involve telephone conversations, questionnaire, or personnel interviews (within the W.Va. - Penn. area only).

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies...

PROJECT:

TITLE:National Study of Coal Workers' ~~Pneumoconiosis~~.....

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RES. FACILITY:Appalachian Lab for Occupational Respiratory Diseases

RES. LOCATION:Morgantown, W. Va.....

INVESTIGATOR(S): ..Earle Shoub.....

SPONSOR(S):NIOSH/DHEW.....

DURATION:1 year.....

FUNDING:FY '75 \$35,680 (100% energy related).....

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DESCRIPTION:Miners in 37 underground coal mines will be studied to determine the rate of progression of coal workers' pneumoconiosis and to correlate this with dust levels prevailing in these mines. The study will also determine the prevalence of coal workers' pneumoconiosis in thses same mines; determine those factors, in addition to the level of respirable dust, that influence the prevalence and progression of coal workers' pnrumoconiosis and provide data on which future health standards may be based.

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RELATED TECHNOLOGIES:

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CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal,
susceptible and stressed population groups to different levels and combina-
tions of biologically active agents associated with energy technologies..

PROJECT:

TITLE: Metal Mine - Diesel Study
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.....
RES. FACILITY: Appalachian Lab for Occupational Respiratory Diseases
RES. LOCATION: Morgantown, W. Va.
INVESTIGATOR(S): Earl Shoub
SPONSOR(S): NIOSH/SHEW
DURATION: 1 year
FUNDING: FY '75 \$132,500 (100% energy related)

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DESCRIPTION: This project is intended first to examine metal mines
..... and miners to ascertain if the prevalence of silicosis is less now than it
..... was 15 years ago when the last survey was made and relate disease to dust
..... levels, and second to provide a basis for recommending diesel fume (exhaust)
..... exposure limits in metal, non-metal, and coal mines, and in tunnels.
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RELATED TECHNOLOGIES:
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CATEGORY: Health Effects.....

SUBCATEGORY:

TECHNOLOGY: Coal.....

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies..

PROJECT:

TITLE: Interrelationship of Bacterial/Viral Infections in
..... Chronic Lung Disease

RES. FACILITY: Appalachian Lab for Occupational Respiratory Diseases

RES. LOCATION: Morgantown, W. Va.

INVESTIGATOR(S): H. Eckert

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY '75 \$31,008 (100% energy related)

DESCRIPTION: In this project, a quantitative, specific precipitin antibody test will be developed by the purification and concentration of the H₁ H. influenzae antigen to determine the relationships of H. influenzae serum precipitin titers with various aspects of chronic obstructive lung disease (COLD). In cross-sectional and longitudinal studies the association between precipitin titers and such variables as age, chronic respiratory symptoms (questionnaire), viral infections, etc. will be sought. Longitudinal studies may be applied to demonstrate titer differences following episodes acute illness, therapeutic measures, etc.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Analysis of Inhaled Dust Particles In-Situ
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RES. FACILITY: Appalachian Lab for Occupational Respiratory Diseases
RES. LOCATION: Morgantown, W. Va.
INVESTIGATOR(S): J. Abraham
SPONSOR(S): NIOSH/DHEW
DURATION: 1 year
FUNDING: FY '75 \$29,078 (100% energy related)

DESCRIPTION: This proposal is in conjunction with the long range goal of NIOSH to reduce the incidence and severity of injuries and disease resulting from occupational hazards. Specifically, under the aspect of health, to reduce the hazards of CWP, silicosis, byssinosis, asbestosis, brylliosis and other lung-related diseases through a study which will relate the lesions found in the autopsied lungs of miners and othe industrial workers with the specific types of dust found in the localized areas of the lesions. It is the goal of this project to study the lesions associated with dust inhalation on the ultrastructural level. Most studies of dust in the lungs utilized

gross and light microscopic techniques and compard these with whole lung
RELATED TECHNOLOGIES:
analysis. We have developed techniques to visualize, measure and analyze

CATEGORY:Health Effects.....
SUBCATEGORY:
TECHNOLOGY:Coal.....
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE:Genetic Determinants: Pathologic Role of Serum Proteinase
.....Inhibitors.....
.....
RES. FACILITY:Appalachian Lab for Occupational Respiratory Diseases
RES. LOCATION:Morgantown, W. Va.....
INVESTIGATOR(S):H. Resnick.....
SPONSOR(S):NIOSH/DHEW.....
DURATION:1 year.....
FUNDING:FY '75 \$49,032 (100% energy related).....

DESCRIPTION:The levels of proteinase inhibitors present in several
.....body fluids, tissues and secretions have been found to be genetically deter-
.....mined. Also, the relation between these inhibitors and broncho-pulmonary
.....disorders stems from an increased familial incidence in pulmonary emphysema
.....or of obstructive pulmonary disease in those deficient in these genetic-
.....controlled factors. It is the purpose of this study to assess the genetically-
.....related levels of proteolytic and esterolytic inhibitors in relation to
.....disease processes.....

RELATED TECHNOLOGIES:
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CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies,

PROJECT:

TITLE: Mortality of Coal Miners in the United States

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RES. FACILITY: Appalachian Lab for Occupational Respiratory Diseases

RES. LOCATION: Morgantown, W. Va.

INVESTIGATOR(S): C. Ortmeyer

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY '75 \$ 54,433 (100% energy related)

DESCRIPTION: Purpose: To determine age-standardized death rates of coal miners, relative to all men in the nation, for all deaths, and for specified causes of death, principally, pneumoconiosis, chronic respiratory diseases, cancers and diseases of the heart. For deaths from all causes and the specified causes listed, to analyze the effects of CWP, and also of airway obstruction, cigarette smoking, dyspnea and chronic bronchitis on elevating death rates, or shortening life-spans of coal miners. To improve techniques for standardizing death rates and for analyses of factors elevating mortality.

RELATED TECHNOLOGIES:

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CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Epid. of Respiratory Infections in Coal Workers, Non-Coal Workers and Their Families

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RES. FACILITY: Appalachian Lab for Occupational Respiratory Diseases

RES. LOCATION: Morgantown, W. Va.

INVESTIGATOR(S): H. Eckert

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY '75 \$26,757 (100% energy related)

.....

DESCRIPTION: Paired sera and health status histories will be obtained within a community from randomly selected coal workers, non-miners, and their respective wives over a winter season to determine whether differences in selected infections and certain respiratory illness episodes occur. The findings of an increased rate of chronic respiratory symptoms among coal workers' wives will be re-examined.

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RELATED TECHNOLOGIES:

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CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies..

PROJECT:

TITLE: Mechanical Basis of Small Airways Obstruction

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RES. FACILITY: Appalachian Lab for Occupational Respiratory Diseases

RES. LOCATION: Morgantown, W. Va.

INVESTIGATOR(S): N. Lapp

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY '75 \$36,362 (100% energy related)

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DESCRIPTION: This project will investigate the mechanical bases in terms of pressure, flow, and volume inter-relationships accounting for obstruction to airflow within the small (less than 2 mm i.d. diameter) airways of the lungs of subjects with occupational related lung diseases. It will involve measurements in great detail, under varying respiratory maneuvers of the lung functions, in relation to occupational exposures smoking history, age, sex, weight, and physical fitness. Detailed measurements include compliance, lung recoil, maximal flows, distribution of inspired gas and airways resistance measured during static conditions, quiet breathing and at several rapid frequencies of breathing.

RELATED TECHNOLOGIES:

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CATEGORY:Health Effects.....
SUBCATEGORY:
TECHNOLOGY:Coal.....
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE:Development of Criteria for an Industrial Standard for
.....Bituminous Coal via Animal Inhalation Experiments.....

RES. FACILITY:Division of Labs and Criteria Development.....

RES. LOCATION:Cincinnati, Ohio.....

INVESTIGATOR(S):W. Wagner.....

SPONSOR(S):NIOSH/DHEW.....

DURATION:1 year.....

FUNDING:FY '75 \$43,966 (100% energy related).....

DESCRIPTION:This continuing project is designed to: 1) evaluate the toxic hazards associated with chronic exposure to respirable bituminous coal dusts; 2) identify the research needs and evaluate the toxic limits for the coal standard validation/development; 3) develop early indicators of response having diagnostic importance for characterization of CWP and ultimately lead to its prevention; and 4) establish a dose-response relationship for irreversible impairment resulting from chronic exposure to a high CWP incidence coal dust.

RELATED TECHNOLOGIES:

CATEGORY:Health.Effects.....

SUBCATEGORY:

TECHNOLOGY:Oil and Gas.....

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE:Effect of Underground Diesel Engines on Health of Miners.....

RES. FACILITY: Western Area Lab for Occupational Health and Safety.....

RES. LOCATION:Salt Lake City, Utah.....

INVESTIGATOR(S):V. Archer.....

SPONSOR(S):NIOSH/DHEW.....

DURATION:1 year.....

FUNDING:FY '75 \$53,489 (100% energy related).....

DESCRIPTION:It is proposed that we study about 200 men who have worked in dieselized potash mines for 10 years or more, and about 200 from nearly non-dieselized mines as controls. The examination will consist of a short questionnaire focusing on symptoms of chest disease and cigarette smoking habits, lung spirometry, including FVC, FEV₁, peak flow, and other flow rates, sputum cytology to determine whether or not there is an increase of atypical metaplasia in response to the hydrocarbons, and repeat the mortality study on the same cohort. Previous analysis had a cut off date of July 1, 1967. An additional follow-up period of 8-10 years should give more definitive data.

RELATED TECHNOLOGIES:

CATEGORY:Health Effects.....

SUBCATEGORY:

TECHNOLOGY:Coal.....

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE:Epidemiological Study -- Coal Liquefaction Industry --
.....Mortality Study.....

RES. FACILITY:Divison of Labs and Criteria Deveopment.....

RES. LOCATION:Cincinnati, Ohio.....

INVESTIGATOR(S):D. Bayliss.....

SPONSOR(S):NIOSH/DHEW.....

DURATION:1 year.....

FUNDING:FY '75 \$32,280 (100% energy related).....

DESCRIPTION:A number of companies are presently investigating at least four basic approaches to coal liquefaction through pilot plant operations. The literature in the field of experimental carcinogenesis of chemicals derived from coal and of other synthetic products similar in structure is voluminous. However, the relationship between experimental cancer in or on laboratory animals, on one hand, and cancer produced in man by the same material, has not been investigated thoroughly because of the lack of human populations who have been exposed for a sufficiently long period to observe latent effects. An estimated 42,000 past and present employees of the Union Carbide plant in Charleston, W. Va. with a variety of exposures to different

RELATED TECHNOLOGIES:

CATEGORY:

SUBCATEGORY:

TECHNOLOGY:

SUBTECHNOLOGY:

OBJECTIVE:

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PROJECT:

TITLE: Epidemiological Study -- Coal Liquefaction Industry --

..... Mortality Study

RES. FACILITY:

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S):

DURATION:

FUNDING:

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DESCRIPTION: chemicals manufactured through the coal liquefaction and
..... other processes, are the subject of a retrospective cohort study utilizing
..... the life-table method. Areas for further study will be identified by compar-
..... ison of cause-specific mortality with current death rates.
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RELATED TECHNOLOGIES:

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CATEGORY:Health Effects.....
SUBCATEGORY:
TECHNOLOGY:Conservation.....
SUBTECHNOLOGY:
OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal,
susceptible and stressed population groups to different levels and combina-
tions of biologically active agents associated with energy technologies.

PROJECT:

TITLE:Asbestos Mortality and Follow-up.....
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RES. FACILITY:Division of Labs and Criteria Development.....
RES. LOCATION:Cincinnati, Ohio.....
INVESTIGATOR(S):R. Lemen.....
SPONSOR(S):NIOSH/DHEW.....
DURATION:1 year.....
FUNDING:FY '75 \$16,800 (50% energy related).....

.....
DESCRIPTION:A cooperative project is being undertaken with the
.....National Cancer Institute and the East Texas Chest Hospital to provide
.....continuing surveillance of approximately 900 past employees of a thermal
.....pipe insulation plant, expected to experience and excess cardio-pulmonary
.....disease risk. Epidemiologic assistance and data handling guidance will be
.....provided to the East Texas Chest Hospital for this project. Other asbestos
.....related mortality will be studied.
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RELATED TECHNOLOGIES:
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CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Nuclear

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Mortality of Uranium Mill Workers

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RES. FACILITY: Western Area Lab for Occupational Safety and Health

RES. LOCATION: Salt Lake City, Utah

INVESTIGATOR(S): V. Archer

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY '75 \$28,400 (100% energy related)

.....

DESCRIPTION: A potential health problem exists among uranium mill workers from exposure to natural uranium and Th-230. Animal experiments and other considerations indicate that present maximal permissible concentrations in air for these elements may be too high. A preliminary study of about 700 mill workers greatly strengthens this concern. In addition to the occupational health problem, this study will yield data of great interest to other government agencies concerned with environmental radiation problems, e.g.: are small amounts of plutonium (an alpha emitter like Th-230) deposited in lymph nodes likely to increase the incidence of lymphomas in human populations.

RELATED TECHNOLOGIES:

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CATEGORY:

SUBCATEGORY:

TECHNOLOGY:

SUBTECHNOLOGY:

OBJECTIVE:

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PROJECT:

TITLE: Mortality of Uranium Mill Workers

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RES. FACILITY:

RES. LOCATION:

INVESTIGATOR(S):

SPONSOR(S):

DURATION:

FUNDING:

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DESCRIPTION: Death certificates will be collected for deceased persons

..... on about 5000 former uranium mill workers. Mortality analysis will be done,

..... comparing all causes of death with causes among the general population.

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RELATED TECHNOLOGIES:

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CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Nuclear

SUBTECHNOLOGY:

OBJECTIVE: To evaluate the short term and long term hazards of exposure of normal, susceptible and stressed population groups to different levels and combinations of biologically active agents associated with energy technologies.

PROJECT:

TITLE: Uranium Miner Epidemiology Study

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RES. FACILITY: Western Area Lab for Occupational Safety and Health

RES. LOCATION: Salt Lake City, Utah

INVESTIGATOR(S): V. Archer

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY '75 \$23,170 (100% energy related)

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DESCRIPTION: Files on the mining exposures and serial sputum samples on about 15,000 present or past uranium miners are available. The sputum sample classifications are to be analyzed to determine the value of sputum cytology in surveys of occupational groups where a lung cancer risk is suspected, and to evaluate the presently used classification system as to its ability to predict cancer development in individuals.

.....

..... The files must be organized and maintained so that after the passage of 10 to 20 years (considering the long latent period for occupational carcinogenesis) a new mortality analysis of uranium miners may be done to determine the magnitude of risk (if any) at low dose rates (near 0.3 W.L.,

RELATED TECHNOLOGIES: the present standard) and low smoking and pulmonary irradiation.

U.S. ENVIRONMENTAL PROTECTION AGENCY		Form Approved OMB No. 158-R0081	
NOTICE OF RESEARCH PROJECT		PROJECT NO. (Do not use this space)	
PREPARED FOR THE SMITHSONIAN SCIENCE INFORMATION EXCHANGE		SSIE	
		EPA	
		EPA-IAG-D5-E773-CX	
TITLE OF PROJECT Enumeration of Energy Occupational Health Problems			
GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED IN THE PROJECT. Project Director - William L Wagner Phone: (801) 524-5287			
NAME AND ADDRESS OF APPLICANT INSTITUTION National Institute for Occupational Safety and Health, Western Area Occupational Health Laboratory, Salt Lake City, Utah 84108			
SUMMARY OF PROPOSED WORK - (1) Objectives, (2) Approach, (3) Current Plans and/or Progress (200 words or less. Omit confidential data). In the Smithsonian Science Information Exchange, summaries of work in progress are exchanged with government and private agencies supporting research and are forwarded to investigators who request such information. Your summary is to be used for these purposes. The Western Area Occupational Health Laboratory is responsible for developing and maintaining a program designed to identify occupational health problems associated with the extraction, processing, utilization, and conservation of energy resources. This project is to provide technical support necessary to identify and define future NIOSH project areas related to energy. There will be interaction with other NIOSH scientists and scientists in other federal agencies and other institutions associated with energy production. Limited laboratory field investigations will be conducted to evaluate current and proposed processes, potential worker exposures, and availability of records and study populations.			
IDENTIFY PROFESSIONAL SCHOOL INVOLVED (Medical, Dental, etc.)		SIGNATURE OF PRINCIPAL INVESTIGATOR	
		DATE	
FOR OFFICE USE ONLY			
REPORT METHOD (Check one) ☐ AGENCY STAFF (Intramural) ☐ OUTSTATED CONTRACT ☐ RESEARCH GRANT		TASK NO. 1	
		PROJECT OFFICER	
		RESPONSIBLE ORGANIZATION	
NO. OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT F.Y. 4	STARTING DATE 5/75	ESTIMATED COMPLETION DATE 5/80	

U.S. ENVIRONMENTAL PROTECTION AGENCY		Form Approved OMB No. 158-R0081	
NOTICE OF RESEARCH PROJECT		PROJECT NO. (Do not use this space)	
PREPARED FOR THE SMITHSONIAN SCIENCE INFORMATION EXCHANGE		SSIE EPA EPA-IAQ-D5-E773-CX	
TITLE OF PROJECT Mortality and Morbidity Among Oil Shale Workers			
GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED IN THE PROJECT. Project Director - J. Dean Gillam Phone: (801) 524-5287			
NAME AND ADDRESS OF APPLICANT INSTITUTION National Institute for Occupational Safety and Health, Western Area Occupational Health Laboratory, Salt Lake City, Utah 84108			
SUMMARY OF PROPOSED WORK - (1) Objectives, (2) Approach, (3) Current Plans and/or Progress (200 words or less. Omit confidential data). In the Smithsonian Science Information Exchange, summaries of work in progress are exchanged with government and private agencies supporting research and are forwarded to investigators who request such information. Your summary is to be used for these purposes. This project is a study of approximately 230 persons who worked in a pilot oil shale operation in Rifle, Colorado, through a retrospective mortality study combined with cross-sectional morbidity examination to evaluate the several morbidity aspects that may be associated with oil shale occupations. Mortality due to 21 specific causes of death will be determined after an extensive follow-up effort and the obtaining of death certificates of those determined to be deceased. Observed deaths will be compared to expected to uncover excess deaths due to a particular cause. Numerous indices of health will be assessed through the physical examinations and health questionnaires administered to the living members of the cohort. Further activities tentatively include environmental exposure and medical assessments of workers entering the industry.			
PROFESSIONAL SCHOOL INVOLVED (Medical)		SIGNATURE OF PRINCIPAL INVESTIGATOR	
DATE		DATE	
FOR OFFICE USE ONLY			
METHOD (Check one) ☐ Intramural ☐ Contract		TASK NO. 2	
PROJECT OFFICER		RESPONSIBLE ORGANIZATION	
NO. OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT F.Y. 75		STARTING DATE 5/75	
ESTIMATED COMPLETION DATE 6/77		ESTIMATED COMPLETION DATE 6/77	

U.S. ENVIRONMENTAL PROTECTION AGENCY NOTICE OF RESEARCH PROJECT		<i>Form Approved</i> OMB No. 158-R0681	
PREPARED FOR THE SMITHSONIAN SCIENCE INFORMATION EXCHANGE		PROJECT NO. (Do not use this space) SSIE EPA FPA-IAG-D5-E773-CX	
TITLE OF PROJECT Mineral Wool and Clay Fibers - Occupational Health Epidemiological Study			
GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED IN THE PROJECT. Project Directors - John Dement, David Bayliss, Alan Palmer, Ph.D. Phones: (513) 684-3255			
NAME AND ADDRESS OF APPLICANT INSTITUTION National Institute for Occupational Safety and Health, Division of Field Studies and Clinical Investigations, Cincinnati, Ohio 45202			
SUMMARY OF PROPOSED WORK - (1) Objectives, (2) Approach, (3) Current Plans and/or Progress (200 words or less. Omit confidential data). In the Smithsonian Science Information Exchange, summaries of work in progress are exchanged with government and private agencies supporting research and are forwarded to investigators who request such information. Your summary is to be used for these purposes. In view of the vast quantity of health data demonstrating the carcinogenicity of asbestos fibers, insulation manufacturers and other industries have begun searching for substitute materials to replace asbestos. However, the fibers constituting these substitute materials may be similar in shape and size to that of asbestos. It is felt by many researchers that the morphology of the fibers is the most important factor in the development of malignant and nonmalignant respiratory disease. Little is known of the health effects of man of respirable fibers other than asbestos. It is incumbent upon the National Institute for Occupational Safety and Health to investigate epidemiologically the health consequences to man of respirable fiber exposures and other insulation materials. The study will be approached through environmental surveys and mortality and morbidity studies designed to quantify the risk of exposure to each of the materials used as well as determine the presence of other substances that may promote the development of adverse health effects or act in a synergistic manner.			
IDENTIFY PROFESSIONAL SCHOOL INVOLVED (Medical, dental, etc.)		SIGNATURE OF PRINCIPAL INVESTIGATOR	
DATE		DATE	
FOR OFFICE USE ONLY			
SUPPORT METHOD (Check one) ☒ AGENCY STAFF (intramural) ☒ NEGOTIATED CONTRACT ☐ RESEARCH GRANT		TASK NO. 3	
NO. OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT F.Y. 3		PROJECT OFFICER RESPONSIBLE ORGANIZATION	
NO. OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT F.Y. 205,000	F.Y. 75	STARTING DATE 1/74	ESTIMATED COMPLETION DATE 9/78

U.S. ENVIRONMENTAL PROTECTION AGENCY		Form Approved OMB No. 158-R0084	
NOTICE OF RESEARCH PROJECT		PROJECT NO. (Do not use this space)	
PREPARED FOR THE SMITHSONIAN SCIENCE INFORMATION EXCHANGE		SSIE EPA EPA-IAG-D5-E773-CX	
TITLE OF PROJECT Coal Liquefaction and Gasification - Occupational Health Epidemiological Study			
GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED IN THE PROJECT. Project Directors - Sherry Selevan and Ronald Young Phone: (513) 684-3514			
NAME AND ADDRESS OF APPLICANT INSTITUTION National Institute for Occupational Safety and Health, Division of Field Studies and Clinical Investigations, Cincinnati, Ohio 45202			
SUMMARY OF PROPOSED WORK - (1) Objectives, (2) Approach, (3) Current Plans and/or Progress (200 words or less. Omit confidential data). In the Smithsonian Science Information Exchange, summaries of work in progress are exchanged with government and private agencies supporting research and are forwarded to investigators who request such information. Your summary is to be used for these purposes. Coal liquefaction and gasification is an alternate energy technology which is currently being explored and discussed for possible future use. The technology has been developed and tested in several pilot plant operations within the last twenty years. The health effect on workers from exposures found in this technology have not been well defined, although coal gasification processes involve many of the polycyclic hydrocarbons known to be carcinogenic. These environmental contaminants are closely related to those from coke oven emissions where exposed workers have been shown to have significantly increased risk of lung cancer. Coal liquefaction processes involve pulverization of coal into fine dust; worker exposure to which may result in coal worker's pneumoconiosis or related chest diseases. The purpose of this project is to conduct an epidemiological study of coal liquefaction and gasification workers to identify health risks associated with the multitude of exposures found in the industry.			
IDENTIFY PROFESSIONAL SCHOOL INVOLVED (Medical, dental, etc.)		SIGNATURE OF PRINCIPAL INVESTIGATOR	
DATE		DATE	
FOR OFFICE USE ONLY			
SUPPORT METHOD (Check one) ☒ AGENCY STAFF (intramural) ☐ CONSULTANT CONTRACT ☐ RESEARCH GRANT		TASK NO. 4	
PROJECT OFFICER		RESPONSIBLE ORGANIZATION	
FUNDING OBLIGATED 200,000	F.Y. 75	NO. OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT F.Y. 2	STARTING DATE 5/75
ESTIMATED COMPLETION DATE 6/78		ESTIMATED COMPLETION DATE	

U.S. ENVIRONMENTAL PROTECTION AGENCY		Form Approved OMB No. 158-R0681	
NOTICE OF RESEARCH PROJECT		PROJECT NO. (Do not use this space)	
PREPARED FOR THE SMITHSONIAN SCIENCE INFORMATION EXCHANGE		SSIE EPA EPA-IAG-D5-E773-CX	
TITLE OF PROJECT Mortality Study of TVA High Risk Workers			
GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED IN THE PROJECT. Project Director - Dr. Carl Ortmeyer Phone: (304) 296-3576			
NAME AND ADDRESS OF APPLICANT INSTITUTION National Institute for Occupational Safety and Health, Appalachian Laboratory for Occupational Respiratory Disease, Morgantown, West Virginia 26505			
SUMMARY OF PROPOSED WORK - (1) Objectives, (2) Approach, (3) Current Plans and/or Progress (200 words or less. Omit confidential data). In the Smithsonian Science Information Exchange, summaries of work in progress are exchanged with government and private agencies supporting research and are forwarded to investigators who request such information. Your summary is to be used for these purposes. Pulmonary disease problems, particularly pneumoconioses and airway obstructive diseases, could arise from exposure to pollutant gas emissions such as SO₂ and NO₂ from coal burned as fuel for steam-powered electricity generating plants. Pneumoconioses could develop from years of exposures to coal dusts in coal-loading areas or to asbestos fibers in linings of steam pipes. The primary purpose of this study is to measure specified effects (decreased longevity, "premature" deaths from pulmonary diseases, and early retirement due to disability attributed to such diseases) on high risk workers in coal-fired steam electricity generating plants who have had exposures to these pollutants that varied in duration and intensity. In the process of collecting information on early disability and on mortality of employees exposed to these air pollutants, data will also be obtained on neoplasms of the respiratory system and on diseases of the heart. This evidence can be analyzed in relation to some hypotheses about carcinogenic effects of pollutants and effects on the heart of lung impairments.			
IDENTIFY PROFESSIONAL SCHOOL INVOLVED (Medical, etc.)		SIGNATURE OF PRINCIPAL INVESTIGATOR	
DATE		DATE	
FOR OFFICE USE ONLY			
REPORT METHOD (Check one) ☐ BY STATE (intramural) ☒ BY CONTRACT ☐ BY GRANT		TASK NO. 6	
PROJECT OFFICER		RESPONSIBLE ORGANIZATION	
NO. OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT F.Y. 75		STARTING DATE 5/75	
ESTIMATED COMPLETION DATE		7/78	

U.S. Form 1762-1 (7-72)

REPLACES PHS FORM 166 AND SI-SIE 76A WHICH MAY NOT BE USED.

494

U.S. ENVIRONMENTAL PROTECTION AGENCY		Form Approved OMB No. 158-R0081	
NOTICE OF RESEARCH PROJECT		PROJECT NO. (Do not use this space)	
PREPARED FOR THE SMITHSONIAN SCIENCE INFORMATION EXCHANGE		SSIE EPA FPA-IAG-D5-E773-CX	
TITLE OF PROJECT Sulfuric Acid and Sulfates - Occupational Health Epidemiological Study			
GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED IN THE PROJECT. Project Directors - Melvin Cassady and Sherry Selevan Phone: (513) 684-3255			
NAME AND ADDRESS OF APPLICANT INSTITUTION National Institute for Occupational Safety and Health, Division of Field Studies and Clinical Investigations, Cincinnati, Ohio 45202			
SUMMARY OF PROPOSED WORK - (1) Objectives, (2) Approach, (3) Current Plans and/or Progress (200 words or less. Omit confidential data). In the Smithsonian Science Information Exchange, summaries of work in progress are exchanged with government and private agencies supporting research and are forwarded to investigators who request such information. Your summary is to be used for these purposes. EPA in its CHES report (1970-71) studied seven cities for community exposure to different air contaminants. One community had a primary exposure to sulfur oxides and particulates. EPA's epidemiological study has indicated that soluble and insoluble sulfates have a more adverse effect on human health than particulates or SO ₂ . The National Air Quality Advisory Committee has suggested that particulates be studied not as total suspended particulate but according to particle size distribution. The findings of the CHES study strongly suggest that occupational exposures to sulfates and sulfuric acid need further study in terms of exposure levels and mortality experience. The study proposed by FY 76 will determine exposures to a variety of soluble and insoluble sulfates and sulfuric acid in a number of industries. These data will be used to choose populations for mortality studies beginning in FY 77.			
IDENTIFY PROFESSIONAL SCHOOL INVOLVED (Medical, Dental, etc.)		SIGNATURE OF PRINCIPAL INVESTIGATOR	
		DATE	
FOR OFFICE USE ONLY			
SUPPORT METHOD (Check one) ☒ STAFF (intramural) ☐ EXTERIOR CONTRACT ☐ GRANT		TASK NO. 7	
		PROJECT OFFICER RESPONSIBLE ORGANIZATION	
TOTAL BUDGETED \$0,000	F.Y. 75	NO. OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT F.Y. 3	STARTING DATE 5/75
		ESTIMATED COMPLETION DATE 6/78	

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To determine the processes of damage, repair recovery, protection and amelioration in biological systems exposed to hazardous agents associated with energy technologies.

PROJECT:

TITLE: Impact of Dusts on Cell Defence and Susceptibility to Infections
.....

RES. FACILITY: DHEW - Infectious Disease Branch

RES. LOCATION: Morgantown, W. Va.

INVESTIGATOR(S): H. Echert

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY 1974 \$74,760 (80% energy related)

DESCRIPTION: The reactions of viable cells to different dusts vary from overt cytotoxicity to inapparent morphological changes. In the latter circumstance, seemingly inert coal dust inhibits cellular interferon production, and presumable as a consequence, promotes increased virus replication. This phenomenon is reversed to normal conditions in the test cells' progeny which are cleared of all dust. Detailed kinetics interferon from a wide variety of dusts, including those whose semiconductor properties promote cytotoxicity, will be investigated. The effect of inhaled dusts on host susceptibility to infectious agents will also be determined.

RELATED TECHNOLOGIES:
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CATEGORY:Health Effects.....
SUBCATEGORY:
TECHNOLOGY:Coal.....
SUBTECHNOLOGY:
OBJECTIVE:To determine the processes of damage, repair recovery, protection and amelioration in biological systems exposed to hazardous agents associated with energy technologies.

PROJECT:

TITLE:Cellular Response to Coal Mine Dust in Vitro (DWP).....

RES. FACILITY:University of Cincinnati.....

RES. LOCATION:Cincinnati, Ohio.....

INVESTIGATOR(S):R. Christan.....

SPONSOR(S):NIOSH/DHEW.....

DURATION:1 year.....

FUNDING:FY 1974 \$42,340 (100% ENERGY RELATED).....

DESCRIPTION:A cell culture test system has been developed which indicates the growth-inhibitory properties of coal dust and coal dust extracts. Samples of coal dust and extracts obtained by leaching coal dust in water, calf serum and minimal essential medium have been found to inhibit cell growth. Two coal dusts were tested, one from mines in Pennsylvania, an area in which there is a high incidence of Coal Worker's Pneumoconiosis (CWP), and one from mines in Utah, in which there is a low incidence of the disease. It was found that coal dust from both areas contained extractable substances which inhibited cell growth and this inhibition was much greater in samples from Pennsylvania than in samples from Utah. The results were reproducible and dose dependent.

RELATED TECHNOLOGIES:

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair recovery,
 ... protection and amelioration in biological systems exposed to..
 hazardous agents associated with energy technolgies.

PROJECT:

TITLE: Treatment of PMP

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RES. FACILITY: DHEW - Medical Research Branch

RES. LOCATION: Morgantown, W. Va.

INVESTIGATOR(S): W. Morgan

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY 1974 \$40,000 (100% energy related)

DESCRIPTION: Complicated pneumoconiosis is the main cause of disabil-
 ity in coal miners. If Auto Immune Factors are responsible for progression
 of PMF steroids may reduce or delay fibrogenesis in the lung.

 Method: 1. Select group of miners with complicated
 CWP Stages A and B; 2. Treat one group with INH and steroids and one group
 with steroids alone; 3. Follow these miners at six month intervals with
 spirometry and x-ray.

RELATED TECHNOLOGIES:

.....

CATEGORY: Health Effects

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: To determine the processes of damage, repair, recovery, ..
..... protection and amelioration in biological systems exposed to
..... hazardous agents associated with energy technologies.

PROJECT:

TITLE: Interaction of Coal Dust With Essential Metals

RES. FACILITY: University of Cincinnati

RES. LOCATION: Cincinnati, Ohio

INVESTIGATOR(S): H. Petering

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY 1974 \$47,608 (100% ENERGY RELATED)

DESCRIPTION: We propose to continue our evaluation of the organic
..... chelating components derived from two coals obtained from mines of differing
..... incidence of Coal Workers' Pneumoconiosis (CWP). We will continue to use
..... extraction procedures to obtain these components. Following ion-exchange
..... chromatography to remove the metal component concomitantly extracted from
..... coal, these extracts will be physically fractionated on the basis of solubility.
..... The individual fractions will be evaluated with regard to metalloenzyme
..... inhibitory activity.

..... Fractions which have unique metalloenzyme inhibitory activity will be
..... chromatographically fractionated in an attempt to obtain the active components
RELATED TECHNOLOGIES:
..... in pure form for biological testing and chemical characterization.

CATEGORY:Health Effects.....
SUBCATEGORY:
TECHNOLOGY:Coal.....
SUBTECHNOLOGY:
OBJECTIVE:To determine the processes of damage, repair recovery,
protection and amelioration in biological systems exposed to hazardous agents
associated with energy technologies.....

PROJECT:

TITLE: In Vitro Transformation of Cells by Mineral Dusts

RES. FACILITY: Appalachian Labs for Occupational Respiratory Diseases

RES. LOCATION: Morgantown, W. Va.

INVESTIGATOR(S): H. Eckert

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY '75 \$ 25,093 (100% energy related)

DESCRIPTION: That coal dust can modify the cell immune defense, i.e.
..... inhibit the induction of interferon and promote viral replication, cells
..... chronically infected with incomplete virus, i.e. Type C particles, may
..... undergo change when exposed to coal dust. The exposure of chronically infected
..... cells with the fibrogenic material, asbestos, will also be investigated.
..... Cell transformation under these conditions may be a mechanism for the initia-
..... tion of fibrotic changes in tissue.

RELATED TECHNOLOGIES: Conservation

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To determine the processes of damage, repair recovery,
protection and amelioration in biological systems exposed to hazardous agents
associated with energy technologies.

PROJECT:

TITLE: Tissue Culture Studies: Embryonic Human Lung Fibroblasts
.....
.....

RES. FACILITY: Appalachian Labs for Occupational Respiratory Diseases
.....

RES. LOCATION: Morgantown, W. Va.

INVESTIGATOR(S): H. Resnick

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY '75 \$44,389 (100% energy related)

.....
DESCRIPTION: The ultimate objective is to relate lung pathology in
coal worker's pneumoconiosis with events that occur at the cellular
level through the use of tissue cultures.
.....
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.....
.....
.....
.....
.....

RELATED TECHNOLOGIES:
.....

CATEGORY: Health Effects
SUBCATEGORY:
TECHNOLOGY: Coal
SUBTECHNOLOGY:
OBJECTIVE: To determine the processes of damage, repair recovery,
protection and amelioration in biological systems exposed to hazardous agents
associated with energy technologies.

PROJECT:

TITLE: Study of Treatment of PMF
.....
.....
RES. FACILITY: Appalachian Lab for Occupational Respiratory Diseases
RES. LOCATION: Morgantown, W. Va.
INVESTIGATOR(S): R. O'Brian
SPONSOR(S): NIOSH/DHEW
DURATION: 1 year
FUNDING: FY '75 \$92,450 (100% energy related)

.....
DESCRIPTION: This project will be conducted by contract and will
investigate the effect of treatment with prednisone, 20 mg every other day,
in conjunction with isoniazid, 300 mg per day, on the subsequent course
of development of PMF. Subjects with Category A will be selected in three
high prevalence locations: Wilkes Barre -Scranton, Johnstown, Pa., and
Charleston, W.Va. Approximately 20 controls and 20 treated subjects will be
recruited in each area. Controls will receive INH, 300 mg daily, alone.
Progression will be assessed radiographically and with ventilatory capacity
tests. Principal investigator physicians in each area will supervise the
treatment under a master protocol. Prior to beginning this study a working
RELATED TECHNOLOGIES:
party of 5 recognized experts will be convened in Morgantown to review the
protocol.

RESEARCH CATEGORY:

Ecological Effects:

Air/Terrestrial

U.S. ENVIRONMENTAL PROTECTION AGENCY		Form Approved OMB No. 158-R0081	
NOTICE OF RESEARCH PROJECT		PROJECT NO. (Do not use this space)	
PREPARED FOR THE SMITHSONIAN SCIENCE INFORMATION EXCHANGE		SSIE EPA EPA-IAG-D5-E773-CZ	
TITLE OF PROJECT Cold Stress Associated with the Alaskan Pipeline			
GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED IN THE PROJECT. Project Directors - William Wagner and Roger Jensen Phone: (801) 524-5287 (513) 684-2707			
NAME AND ADDRESS OF APPLICANT INSTITUTION National Institute for Occupational Safety and Health, Western Area Occupational Health Laboratory, Salt Lake City Utah and Division of Laboratories and Criteria Development, Cincinnati, Ohio			
SUMMARY OF PROPOSED WORK - (1) Objectives, (2) Approach, (3) Current Plans and/or Progress (200 words or less. Omit confidential data). In the Smithsonian Science Information Exchange, summaries of work in progress are exchanged with government and private agencies supporting research and are forwarded to investigators who request such information. Your summary is to be used for these purposes. The primary purpose of this project is to study the "work practices" which are and should be used to protect the workers constructing the Alaska pipeline from cold stress. Work practices include such procedures as selection of workers, work-rest regimen, training, acclimation procedures, first aid and medical coverage, monitoring of exposures, fluid and food intake, clothing, and availability and type of heating devices. The approach is to: 1. Identify the work practices which are presently being followed by the workers constructing the pipeline; 2. Evaluate the effectiveness of these work practices; and 3. Recommend methods for increasing protection from cold stress by improving the present work practices or introducing additional or alternative work practices.			
PROFESSIONAL SCHOOL INVOLVED (Medical, etc.)		SIGNATURE OF PRINCIPAL INVESTIGATOR	
		DATE	
FOR OFFICE USE ONLY			
PROJECT METHOD (Check one) ☐ EXTERNAL ☒ INTRAMURAL ☐ CONTRACT ☐ GRANT		TASK NO. 2	
		PROJECT OFFICER RESPONSIBLE ORGANIZATION	
ESTIMATED F.Y. 75	NO. OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT F.Y. 2	STARTING DATE 5/75	ESTIMATED COMPLETION DATE 2/78

158-7221

REPLACES PHS FORM 166 AND SI-SIE 76A WHICH MAY NOT BE USED.

507

NOTICE OF RESEARCH PROJECT

PROJECT NO. (Do not use this space)

SSIE

EPA

EPA-IAG-D5-E773-CZ

PREPARED FOR THE SMITHSONIAN SCIENCE INFORMATION EXCHANGE

TITLE OF PROJECT

Development of Criteria for Recirculation of Exhaust Air

GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED IN THE PROJECT.

Project Director - Robert Hughes

Phone: (513) 684-2591

NAME AND ADDRESS OF APPLICANT INSTITUTION

National Institute for Occupational Safety and Health, Division of Laboratories
and Criteria Development, Cincinnati, Ohio 45202SUMMARY OF PROPOSED WORK - (1) Objectives, (2) Approach, (3) Current Plans and/or Progress (200 words or less. Omit confidential data).
In the Smithsonian Science Information Exchange, summaries of work in progress are exchanged with government and private agencies supporting research and are forwarded to investigators who request such information. Your summary is to be used for these purposes.

Since the advent of the energy crisis, recirculation of industrial process exhaust air has been receiving widespread attention as an energy conservation method. Recirculation of process exhaust air to the workplace rather than to the outside will reduce the amount of heating or cooling of make up air with a significant reduction in energy usage. Recirculation of exhaust air has, in the past, been used infrequently and has essentially been limited to processes which generate nontoxic nuisance type dusts. The major limiting factor in the widespread use of recirculation for toxic materials is the lack of criteria relating to both system performance and work protection. Without such criteria, the use of recirculation systems could result in serious worker exposure to toxic substances.

This project will be a follow-on to a study initiated in FY 74 to develop criteria for the recirculation of exhaust air. The results of that initial contract effort will be evaluated and a symposium then held on recirculation of exhaust air. After this, a one-year contract will be awarded to develop the exhaust system performance and reliability criteria required to permit safe recirculation of exhaust air from processes which generate toxic gases, vapors, fumes, and particulates. Studies will also be made to determine the effect of process variables such as temperature and contaminant generation rate on system effectiveness. Another follow-on contract will be awarded to investigate the air cleaning devices necessary to permit recirculation of exhaust air.

IDENTIFY PROFESSIONAL SCHOOL INVOLVED (Medical, Dental, etc.)

SIGNATURE OF PRINCIPAL INVESTIGATOR

DATE

FOR OFFICE USE ONLY

SUPPORT METHOD (Check one)		TASK NO. 1	PROJECT OFFICER		
AGENCY STAFF (Intramural)			RESPONSIBLE ORGANIZATION		
X NEGOTIATED CONTRACT					
RESEARCH GRANT					
ESTIMATED FUNDING	F.Y.	NO. OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT F.Y.	STARTING DATE	ESTIMATED COMPLETION DATE	
125,000	75	3	7/73	3/78	

U.S. ENVIRONMENTAL PROTECTION AGENCY		Form Approved OMB No. 158-R0081	
NOTICE OF RESEARCH PROJECT		PROJECT NO. (Do not use this space)	
PREPARED FOR THE SMITHSONIAN SCIENCE INFORMATION EXCHANGE		SSIE	
		EPA	
		EPA-IAG-D5-E773-CZ	
TITLE OF PROJECT Development of Countermeasures to Protect Divers			
GIVE NAMES, DEPARTMENTS, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS OR PROJECT DIRECTORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED IN THE PROJECT. Project Director - Dr. Edward Fairchild Phone: (513) 684-3541			
NAME AND ADDRESS OF APPLICANT INSTITUTION National Institute for Occupational Safety and Health, Office of the Associate Director for Cincinnati Operations, Cincinnati, Ohio 45202			
SUMMARY OF PROPOSED WORK - (1) Objectives, (2) Approach, (3) Current Plans and/or Progress (200 words or less. Omit confidential data). In the Smithsonian Science Information Exchange, summaries of work in progress are exchanged with government and private agencies supporting research and are forwarded to investigators who request such information. Your summary is to be used for these purposes. While hyperbaric medical research has a history of over 100 years, the recent global energy crisis had added a note of urgency to the need for further research. Since 1954, ten million acres of sea floor have been leased for fossil fuel exploration. Plans are now underway to lease an equivalent amount of acreage in the next 1-3 years. Not only will such plans require a very large increase in the number of divers but the depths of planned leased areas are approaching 2000 feet. The capability to operate safely at such depths exceeds our medical knowledge and at the same time requires the presence of divers to execute tasks which are essential to the recovery of fossil fuels and minerals located on and beneath the sea floor. Energy-related development of deep-water (super tanker) ports and offshore power plants will also require the extensive use of divers. Other nations have already recognized the need for identifying national priorities, and regulations are currently in effect in the United Kingdom, Australia, and Japan. It is clear that the expanding Federal sea floor leasing program obligates the Government to protect the health and safety of divers to the same extent as workers in other occupations. Extensive discussions and communication with representatives of the major diving companies have revealed their interest in cooperating with NIOSH in solving the problems facing the offshore diving industry. In cooperation with ERDA, NOAA, and the National Heart and Lung Institute, one project has been initiated in this area which will provide a National plan for diving related health research. This plan will be available in December 1975.			
IDENTIFY PROFESSIONAL SCHOOL INVOLVED (Medical, Dental, etc.)		SIGNATURE OF PRINCIPAL INVESTIGATOR	
FOR OFFICE USE ONLY			
SUPPORT METHOD (Check one) ☐ EXISTING STATE (Intramural) ☒ RELATED CONTRACT ☐ RESEARCH GRANT		TASK NO. 3	
		PROJECT OFFICER RESPONSIBLE ORGANIZATION	
ESTIMATED F.Y. 197,000	F.Y. 75	NO. OF FUTURE YEARS TENTATIVELY ASSURED BEYOND CURRENT F.Y. 4	509
		STARTING DATE 5/75	ESTIMATED COMPLETION DATE 5/80

CATEGORY: Ecological Effects: Air/Terrestrial

SUBCATEGORY:

TECHNOLOGY: Coal

SUBTECHNOLOGY:

OBJECTIVE: Evaluate the Impact of Airborne Pollutants on Materials

.....

.....

PROJECT:

TITLE: Respirator Research

.....

.....

RES. FACILITY: Division of Labs and Criteria Development

RES. LOCATION: Cincinnati, Ohio

INVESTIGATOR(S): A. Gudeman

SPONSOR(S): NIOSH/DHEW

DURATION: 1 year

FUNDING: FY '75 \$287,126 (80% energy related)

.....

DESCRIPTION: The objectives of this project are to (1) develop
 ... and evaluate performance criteria and test methods and develop new test
 ... equipment as needed for approval testing of respirators and (2) develop
 ... technical criteria to improve respirator performance and acceptability to
 ... workers. Criteria will be developed by contract and in-house research work.
 ... Significant new work to be initiated includes the development of in-house
 ... capability to conduct research projects to evaluate existing respirator
 ... equipment and develop improved respirator equipment.

.....

RELATED TECHNOLOGIES: Oil and Gas

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