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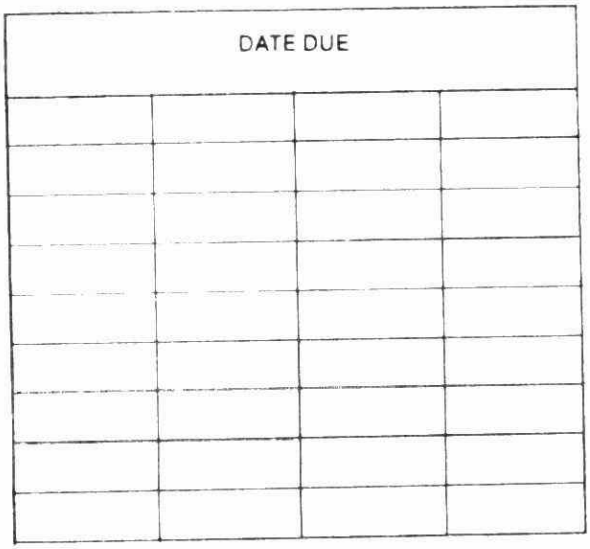
INVENTORY OF RESEARCH

1984 - 85 PROJECTS

January 1985

MINISTRY OF THE ENVIRONMENT

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POLICY AND PLANNING BRANCH

RESEARCH COORDINATION OFFICE

INVENTORY OF RESEARCH

1984-85 PROJECTS

JANUARY 1985

MINISTRY OF THE ENVIRONMENT

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MOE GOAL STATEMENT:

"To achieve and maintain a quality of the Environment--including air, water and land--that will protect human health and the ecosystem and will contribute to the well-being of the people of Ontario."

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PREFACE

The Inventory of Research Projects is coordinated by the Research Coordination Office, Policy and Planning Branch, and is a component in the research planning activity. The report is an unedited compilation of the report summaries of research currently being funded by the Ministry. The report is distributed to staff of the Ministry and is available on request to others.

INTRODUCTION AND EXPLANATION

Origin

The Ministry of the Environment first published an Inventory of Research and Development projects in June, 1973. The publication was initiated by the Deputy Minister who recognized the need for a comprehensive list of research and development projects which would be readily available. The Research Advisory Committee is responsible for its preparation with support from the Research Coordination Office, Policy and Planning Branch.

Purpose

The purpose of the Inventory is to inform the research community of the Ministry of the Environment's research activities and to facilitate a more efficient use of resources devoted to environmental research. The Inventory has become an important means to foster cooperative efforts, to prevent the duplication of programs and to provide a comprehensive technical background for the review of environmental research priorities. It has been found useful in revealing those areas which are already being extensively examined and those which demand increased attention.

Organization of the Inventory

This Inventory consists of profiles of individual research projects being conducted by or for Ministry Branches and Regions in 1984-85. It includes in-house research activities as well as research generated through grants and contracts to universities, research institutions and environmental consulting firms. Funds are derived from the Ministry Regular Budget and from Provincial Lottery dedications to environmental health research.

Projects are classified as follows:

A. Air Pollution Research,

B. Water Pollution Research,

C. Liquid and Solid Waste Research,

D. Analytical Method Development,

E. Pesticides Research.

The external projects summarized in this report are already approved and in progress. Later this year a report on the accomplishments of Scientific Research in 1984-85 will give information on the progress of the work and results obtained which will also be discussed by the researcher at the Technology Transfer Conference.

FORMAT OF INVENTORY

Each project is listed under one classification. The profiles employ the following headings explained below:

Branch	Ministry branch responsible for the project.
Project Title	For identification and filing.
Key Words	Key words relating to each project listed alphabetically in the Index at the back of the Inventory.
Principal Investigator	Contact person for additional information on project.
Liaison Officer or Supervisor	The Ministry of the Environment staff member responsible for project management.
Research Category	Identifies if work is done internally or externally; if external, whether funded through a grant or through a solicited or unsolicited contract; also if multi-year or concurrent.
Objective	Reasons for undertaking the project.
Description	A summary of the project and methodology employed to indicate the nature of the research to persons familiar with the technology.
Duration of Project in Years	Starting and completion dates.
Budget	Current year and total dollars, and man years for the project; these estimates are made prior to start of the project.
Source of Funds	Regular Work Program identifies internal research funded from regular branch budget; Special Ministry Funding identifies a special project indicated as such in the ministry budget; Jointly Funded Project identifies cost sharing between provincial ministries and agencies and between levels of government; Other may include funding from Provincial Lottery proceeds.

Reporting	Tentative dates of interim and final reports.
Participation by Others	Indicates if and how a project is assisted by other government organizations.
Remarks	Special comments on the project not listed under previous headings are shown here.

RESEARCH ADVISORY COMMITTEE

The Research Advisory Committee (RAC) was created in 1975 to provide a broadly based coordinating and planning group for the Minstry's research program. The committee is made up of representatives of the various Ministry Branches with research responsibilities plus a member from the Policy and Planning Branch, and from the Approvals Branch and representatives from the Regional Offices.

The Research Advisory Committee is also responsible for the administration of the proceeds from the Provincial Lottery Trust Fund dedicated to health-oriented environmental projects.

POLICY AND PLANNING BRANCH

Following the reorganization of MOE in 1982, the Policy and Planning Branch undertook the responsibility for coordination the Ministry's external research activities. The role of the Branch is to utilize the Ministry's limited resources for research in the most effective manner by:

1. Coordinating the identification of the Ministry's research needs and evaluating those needs.

2. Monitoring external research performance and encouraging the application of research results to the solution of environmental problems.

A Reseach Coordination Office established in the Policy and Planning Branch has responsibilities to:

- chair and provide support services for the Research Advisory Committee,

- administer the Provincial Lottery Grants program and other environmental research grants programs,
- develop Ministry research strategies and policies
- monitor research performance,
- encourage the application of research results to the solution of environmental problems,
- develop improved management processes for the best use of limited budgets.

RESEARCH PLANNING PROCESS

In 1983, the Policy and Planning Branch developed and obtained approval for the Ministry's Research Planning Process to:

- ensure that research is consistent with Ministry goals and objectives,
- allow Branches and Regions to identify research requirements and priorities and develop research programs,
- coordinate multi-branch research programs,
- allocate resources based on established Ministry priorities,
- distribute research results and recommendations,
- evaluate research performance.

The Ministry's research program comprises:

(a) internal research projects conducted by Ministry staff in head office branches and regional offices;

(b) external research projects conducted by universities and by consultants under contract.

The Research Planning Process, which applies both to internal and external research, follows a 12-month cycle commencing in April with the preparation of a Performance Evaluation Report and terminating the following March with the distribution of an approved Ministry Research Plan.

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Air Pollution Research

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

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Branch/Office	Date (Day Month Year)
Policy and Planning Branch, Research Coordination Office	

Project Title

"INVESTIGATION OF SLEEP DISTURBANCE EFFECTS OF ROAD TRAFFIC NOISE."

Key Words

Noise, Sleep Disturbance, Traffic Noise, Road Traffic Noise

Principal Investigator and Organization	Tel.	
S. S. Wilson, S. S. Wilson & Associates,		Internal ☐ Grant ☐ Unsolicited Contract ☒ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
H. Gidami	965-3071	

Objectives

the determination of relationship between road traffic noise levels and sleep disturbance with a view to providing recommended road traffic noise level limits in relation to perceived health effects.

Description

The study will entail a program of objective measurements of sleep disturbance by road traffic noise coupled with a literature review on human response to noise. The data will be assessed for correlation.

Noise level limits will be recommended for indoor living environments based upon possible health impairment effects due to sleep disturbance.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
3	3rd Year	1985		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	--	153.0		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

The study will provide recommended outdoor noise level limits for living areas in residences to be built in new developments adjacent to sources of traffic noise.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

66RR

Branch/Office	Date (Day Month Year)
Policy and Planning Branch, Research Coordination Office	

Project Title

OV "MONITORING GENOTOXICITY IN THE ATMOSPHERE USING SISTER CHROMATID EXCHANGE IN MICE."

Key Words

Genotoxicity, Air Pollution monitoring.

Principal Investigator and Organization	Tel.	
Dr. M. Petras, Department of Biology University of Windsor		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor Dr. M. Salamone	**Tel.** 248-3008	

Objectives

To develop a straightforward procedure for ongoing monitoring of the atmosphere for agents genotoxic to a mammalian system.

Description

Field mice are used as monitor-indicators of outdoor air pollution, and in vivo sister chromatid exchange assay will be used to measure genotoxic damage. Data will be compared to control animals.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
2	3rd Year	1985	☒ Yes ☐ No

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	-	62.0		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

68 RR

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

"EXPERIMENTAL MODELLING STUDIES OF HAZARDOUS SUBSTANCES IN ONTARIO."

Key Words

Hazardous Contaminants Modelling, Environmental Fate.

Principal Investigator and Organization	Dr. D. Mackay, University of Toronto	Tel.	Internal ☐ Grant ☒
Liaison Officer or Supervisor	Dr. A. Szakolcai	Tel. 965-4081	Unsolicited Contract ☐ Solicited Contract ☐

Objectives

To study environmental fate of specific toxic substances and devise novel hazard assessment methods. The developed model will be extended to include human exposure.

Description

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
3	3rd Year	1985	

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	30	165		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Presented at the Technology Transfer Conference.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

70 RR

Branch/Office	Air Resources	Date Day Month Year

Project Title
Production of ozone insensitive field bean varieties

Key Words
Phytotoxicology, ozone, beans

Principal Investigator and Organization	Tel.	
Profs. W.D. Beversdorf & B.D. McKersie, University of Guelph		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor R. Pearson	Tel.	

Objectives

To generate basic plant population for ozone resistant white beans.

Description

The ozone tolerance of specific bean populations will be measured and the capability for transferring tolerance characteristics to Ontario field beans will be investigated.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
2	2nd Year	1985	

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	17.8	33.3		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

72 RR

Branch/Office	Date (Day Month Year)
Air Resources	

Project Title
Ozone-early blight interaction of potato: implication and disease control.

Key Words
Phytotoxicology, ozone, potato

Principal Investigator and Organization	Tel.	
Professor G. Hofstra, University of Guelph		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
R. Pearson	965-4516	

Objectives

To increase potato yield by improving understanding of ozone damage.

Description

Ozone injury to differenct potato cultivars will be assessed and this will be related to early blight and yield loss. Effectiveness of chemical protectants will also be studied.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
1	2nd Year	1985	☒ Yes ☐ No

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	-	38.3		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Previous Funding $43,900.00

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

73 RR

Branch/Office	Date (Day Month Year)
Air Resources	

Project Title

OV

Sweet corn and green and wax bean response to air pollution in Southern Ontario

Key Words

Phytotoxicology, ozone

Principal Investigator and Organization	Tel.	
Professor D. Ormrod, University of Guelph		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
R. Pearson		

Objectives

To determine optimum protection strategy against ozone for sweet corn and green bean crops.

Description

The effect of ozone, chemical protectants, location and cultivar type will be measured and correlated with yield and visible leaf injury for sween corn and green bean crops.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
1	2nd Year	1985	☒ Yes	☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	-	36.7		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Previous Funding $14,000.00

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

74 RR

Branch/Office	Date (Day Month Year)
Air Resources	

Project Title
0 Evaluation of contaminated water and soil sites as sources of airborne hazardous materials.

Key Words
Contaminated water and soil, airborne hazardous materials.

Principal Investigator and Organization	Tel.	
Professor D. MacKay		Internal ☐ Grant ☒
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐ Solicited Contract ☐
, A. Szakolcai	965-4081	

Objectives

To develop equations for predicting the rate of volatilization (and hence the source strength to the atmosphere) of organic pollutants which are present in dispersed source from in water bodies or in soils.

Description

Relevant equilibrium physical chemcial properties of selected organic compounds will be measured and two small scale experimental systems will be set up and operated to validate the proposed equations and determine the binetic parameters.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
3	3rd Year	1985	

	Cost $000		Number of Man Years	
Budget	Current 17	Total 51	Current	Total

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

76 RR

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title The chemoreceptive membrane as an electrochemical sensor for trace organic species in the amtosphere

0 ✓

Key Words Lipid membranes, trace organic gas analysis, electrochemical sensor

Principal Investigator and Organization	Tel.	
Professor M. Thompson, University of Toronto		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Dr. W. Tam	965-4081	

Objectives

To develop supported membrane systems for selective chemical sensing in the gas-phase.

Description

This project will study the deposition and protection of lipid films on support and device structure. The properties of these films will be characterized, and the application of the films for selective gas sensing will be pursued.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
1	2nd Year	1985	☒ Yes ☐ No

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	-	31.5		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

79 RR

Branch/Office	Date (Day Month Year)
Air Resources	

Project Title

D

Development of a tunable diode laser based hydrogen peroxide monitor

Key Words

Hydrogen peroxide, tunable diode laser

Principal Investigator and Organization	Tel.	
Professors H.I. Schiff and D. Hastie, York University		Internal ☐
		Grant ☒
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐
Dr. M. Lusis	965-1634	Solicited Contract ☐

Objectives

To develop a Turnable Diode Laser Absorption Spectrometer to measure the concentration of hydrogen peroxide in air.

Description

Hydrogen peroxide is an important intermediate in atmospheric chemical reactions. This monitor offers significant advances in sensitivity. The feasibility of measuring ammonia and formaldehyde with the same technique will be looked at.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
2	2 Year	1985	☒ Yes ☐ No

	Cost $000		Number of Man Years	
Budget	Current –	Total 39.5	Current	Total

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

82 RR

Branch/Office	Date (Day Month Year)
Air Resources	

Project Title
Laser induced emission spectroscopy of polycyclic aromatic hydrocarbons in low temperature matrices.

Key Words
PAH, analysis, method development, laser fluorescence

Principal Investigator and Organization	Tel.	
Profs. S.V. Filseth, F.J. Morgan and C. Sadowski, York University		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
W. Tam	965-4081	

Objectives

To develop a laboratory capability to obtain laser excited fluoresence spectra of PAH's in low temperature matrices.

Description

A pulsed tunable dye laser will be used to excite the fluorescence spectra of trace quantities of PAH's in alkane matrices at 10-20 K in order to make quantitative analyses of complex mixtures obtained in environmental sampling programs.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
2	2nd Year	1985	☒ Yes	☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	-	33.7		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Presented at Technology Transfer Conference.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

83 RR

Branch/Offic	Air Resources	Date Day Month Year

Project Title: Methods for sampling and analysis of asbestos air pollution in Ontario

Key Words: Asbestos, Sampling, Analysis

Principal Investigator and Organization	Tel.	Internal ☐
Professor D. Verma, McMaster University		Grant ☒
Liaison Officer or Supervisor	Tel.	Unsolicited Contract ☐
Dr. D. Corr	965-4081	Solicited Contract ☐

Objectives

To obtain by electron micorscopy baseline data for asbestos levels in outdoor air and relate these exposure levels to those obtained by traditional optical microscopy.

Description

Asbestos levels in various situations will be measured both e.m. and optical microscopy.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
3	3rd Year	1985	

Budget	Cost $000 Current	Total	Number of Man Years Current	Total
	-	75		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Presented at Technology Transfer Conference.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

88 RR

Branch/Office	Date (Day Month Year)
Policy and Planning Branch	

Project Title

Inhalable particulate sampling

O

Key Words

Particulate, aerosol, dichotomous samples

Principal Investigator and Organization	Tel.	
Air Resources		Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
D. Corr		

Objectives

To determine inhalable/total particulate ratios at a number of urban sites across Ontario and to transfer the knowhow of inhalable particulate monitoring to regional staff. Data will be used to set an Ontario inhalable particulate standard.

Description

Dichotomous and Hi-vol particulate samplers are being operated at a number of regional sites throughout Ontario. Statistical assessment of airborne mass and elemental concentrations will follow.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
3	3rd Year	1985	☒ Yes ☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	-	142.0		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Funds used to purchase the necessary Dochotomus Samplers.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

93 PL

Branch/Office	Air Resources, Laboratory Services & Waste Management	Date Day Month Year

Project Title

Trace Organic Contaminants

Key Words

Waste, Incineration, Polychlorinated dibenzodioxins (PCDDs), Polychlorinated dibenzofurans (PCDFs), Chlorinated Aromatics, PCBs

Principal Investigator and Organization	Tel.	
F. Hopton - ORF and H. Tosine - M.O.E Laboratory		Internal ☒
		Grant ☐
Liaison Officer or Supervisor	Tel.	Unsolicited Contract ☐
V. Ozvacic		Solicited Contract ☒

Objectives

Determine quantities of PCDDs, PCDFs and other related species in all discharge steams into the environment at selected waste incinerator plants, identify likely precursors in the feedstock, develop measurement technology and monitor development of related health standards.

Description

Dioxin guideline for ambient air and point of impingement was issued by the Minsitry of Labour and the ARB.

Sampling and preparation of sample extracts from the garbage incinerators - Commissioners Street in Toronto and SWARU in Hamilton - and a sewage sludge incinerator at Ashbridges Bay were completed

Chemcial analysis of sample extracts and sampling at Dow have been postponed because of a high priority sampling at SWARU.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
1	2nd Year	1984	☒ Yes	☐ No

	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	-	420.1		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Ministry of Energy, Co-Sponsor
Ministry of Labour, Health Effect Study

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

98 PL

Branch/Office	Date 31 08 84 (Day Month Year)
Air Resources	

Project Title

Study on Adsorption Tube Storage and Sample Handling Techniques for Organic Vapor Sampling

Key Words

Organic vapor, sample handling, storage

Principal Investigator and Organization	Tel.	
Ontario Research Foundation	822-4111	Internal ☐ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☒
Liaison Officer or Supervisor	**Tel.**	
A. Szakolcai	965-4081	

Objectives

To determine the optimum storage and handling techniques for adsorption tubes used for sampling organic vapors.

Description

This is a joint ARB/ORF/LSB project. Adsorption tubes will be loaded with various concentrations of organic vapors at ARB, put through various handling and storage routines by ORF and analyzed by LSB. ORF will analyze the results statistically and recommend optimum storage and handling routines.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
2	2 Year	1985	☒ Yes ☐ No

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	29.6	49.6	3	3

Source of Funds (Specify) RAC

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

100 RR

Branch/Office	Date (Day Month Year)
Policy and Planning Branch	

Project Title

The dispersal of airborne particulates on a short and long term scale

Key Words

Aerosol, PIXE, Elemental Analysis, Tree, Histroical Pollution

Principal Investigator and Organization	Tel.	
Professor J.D. McArthur, Queens University		Internal ☐
		Grant ☒
Liaison Officer or Supervisor	Tel.	Unsolicited Contract ☐
W.D. McIlveen	(823)549-4000	Solicited Contract ☐

Objectives

To determine short (20 min.) and long (before industrial revolution) time scale variations in air pollution.

Description

Proton induced x-ray emission analysis will be applied to aerosol collected on filters and to tree rings.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
2	2nd Year	1985	☒ Yes	☐ No

	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	-	39.0		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Presented at the Technology Transfer Conference.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

101 RR

Branch/Office	Date (Day Month Year)
Policy and Planning Branch	

Project Title

0 Retrospective Correlation Spectroscopy and its application to atmospheric monitoring

Key Words Retrospective digital correlation, atmospheric spectral data

Principal Investigator and Organization	Tel.	
Professor R.W. Nicholls, York University		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
W.H. Chan.		

Objectives

To treat observational atmospheric spectra data so as to reveal column densities of numerous molecular pollutants

Description

A number of digital correlation masks, each appropriate to the spectrum of a specific pollutant molecule will be prepared and calibrated. Correlation software and a field application program will be developed.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
3	3rd Year	1985		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	16.0	43.5		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Presented at the Technology Transfer Conference.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

110 RR

Branch/Office	Date (Day Month Year)
Policy and Planning Branch, Research Coordination Office	

Project Title

"MODIFICATIONS TO CHEMILUMINESCENT INSTRUMENTS OF NO AND NO_2 FROM AN AIRCRAFT AND A MOBILE LABORATORY."

Key Words

Chemiluminescence, Nitrogen Oxide Monitoring, Mobile Air Monitoring

Principal Investigator and Organization	Tel.	
Dr. H. Schiff, Department of Chemistry York University		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Dr. M. Lusis	965-2053	

Objectives

- To modify existing chemiluminescent nitrogen oxide detectors for use to measure NO and NO_2 in tropospheric air from aircraft and from a mobile laboratory.

Description

The modified instrument will be used by the Ministry for testing urban plume and for transporting models at high sensitivity. The developed technology will be transferred to MOE by converting one of its instruments for such measurements.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
1	2nd Year	1985	☒ Yes ☐ No

	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	-	22.0		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

115 PL

Branch/Office	Policy and Planning Branch, Research Coordination Office	Date Day Month Year

Project Title

E OV

"SURVEY OF BLOOD LEAD LEVELS IN SCHOOL CHILDREN."

Key Words

Blood Lead, Lead Survey

Principal Investigator and Organization	Tel.	Internal ☐ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☒
Contractor		
Liaison Officer or Supervisor	Tel.	
C. Duncan	965-5776	

Objectives

- To determine blood lead levels of Ontario school children.

Description

Studies of blood lead levels in Ontario children (the group at greatest risk) have been carried out primarily in Toronto. It is proposed to measure blood lead levels of school children in other Ontario communities with known above average ambient air lead concentrations.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
2	2nd Year	1985	

Budget	Cost $000 Current	Total	Number of Man Years Current	Total
	36.0	70		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

MOL, MOH

Remarks

Total cost equally covered by MOE, MOL and MOH.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

116 RR

Branch/Office	Date (Day Month Year)
Policy and Planning Branch, Research Coordination Office	

Project Title

"DEVELOPMENT OF A MEASUREMENT METHOD FOR NICKEL CARBONYL."

∂

Key Words

Nickel Carbonyl, Air Pollution

Principal Investigator and Organization	Tel.	
Contractor		Internal ☐ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☒
Liaison Officer or Supervisor	**Tel.**	
Dr. W. Tam	965-4081	

Objectives

- Develop a method of measurement for nickel carbonyl for ambient air.

Description

At the present time, the Ministry has an ambient air criterion for nickel carbonyl of 0.5μ gm/m^3 (24 hr. avg.) and a point of impingement standard of 1.5μ gm/m^3 (½ hr. avg.). However, there are no currently available field methods of measurement for ambient air concentrations in this range.

Duration of Project (Yrs.)	Present Year is (Year)	Reporting Date	Is a Report Anticipated ?	
1	1	1985	☒ Yes	☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
		40.0		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

117 PL

Branch/Office	Date (Day Month Year)
Air Resources	31 08 84

Project Title

OV

To Investigate the "Short Term Test" Mutagenicity and Chemical Composition of Benzene Extractable Fraction of Coke Oven Emissions.

Key Words

Short term test, mutagencity, benzene extractable fraction, coke oven emissions, PAHs

Principal Investigator and Organization	Tel.	
Ontario Research Foundation	822-4111	Internal ☐ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☒
Liaison Officer or Supervisor	**Tel.**	
W.C. Tam	965-4081	

Objectives

1. To determine whether a correlation exist between the benzene extractable fraction of coke oven emissions and short term mutagencity tests.
2. To establish possible correlations between the epidemiological data on cancer occurrence among coke oven workers and the short term mutagencity tests.

Description

Representative airborne particulate samples at coke oven batteries in three different Ontario steel mills are collected and the benzene extractable fraction determined. Two-tiered short term mutagenic tests and concurrent chemical analysis for PAHs are carried out on extracts. Potential correlations between mutagenicity and the benzene extractable fraction will be sought and linked to existing epidemiological data on cancer occurrence of coke oven workers.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
2	1 Year	June 1985	

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	175.0	205.0	5	5

Source of Funds (Specify) RAC

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Ministry of Labour

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

119 RR

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

OWE

"ANALYSIS OF DATA FROM THE STUDY, 'RESPIRATORY HEALTH OF SCHOOL CHILDREN IN HAMILTON.'"

Key Words: Air Pollution, Inhalable particulates, Respiratory effects, Hamilton.

Principal Investigator and Organization		Tel.	
	McMaster University Dr. L. Pengelly		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	Dr. D. Corr	Tel.	965-4081

Objectives

The subject research project produced a tremendous amount of data which was only partially used in the original study. The present funding is to ensure that the data is fully utilized and to provide a small amount of additional data to complete some identified gaps.

Description

The Ministry of Health is providing funding to continue the evaluation of the children.

MOE needs to reanalyze some of the air particulate data to better relate air quality to lung function. There are some identified shortages in the SO_2 data, and further and better monitoring of this facit is needed.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1	1 Year	1985		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	-	47.1		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Presented at the Technology Transfer Conference.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

123 PL

Branch/Office	Air Resources	Date 31 (Day) 08 (Month) 84 (Year)

Project Title

"Field and Laboratory Validation of a Hi-Vol Denuder for Minimizing PAH-Oxidant Reactions During Sampling".

Key Words

Denuder, PAH, oxidant, sampling

Principal Investigator and Organization	Tel.	
Concord Scientific Corp.	630-6331	Internal ☐ Grant ☐ Unsolicited Contract ☒ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
W.C. Tam	965-4081	

Objectives

1. Evaluate the Hi-Vol Denuder in terms of mass and PAH attenuation, effectiveness for removal of NO_2.
2. Quantitation and identification of the oxy- and nitro-PAH in extract of denuder filter vs. standard Hi-Vol filter.

Description

Earlier work has determined that a denuder is effective in reducing ozone in air supply to Hi-Vol filter and in lab conditions allows proper sampling for PAHs. Field trials under hot and cold weather conditions required and also to test for NO_2 removal by this sampling system.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
1	1 Year	March 1985	☒ Yes	☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	41.8	41.8	2	2

Source of Funds (Specify)

RAC

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Prof. M. Quilliam, McMaster University

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

144 PL

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

To determine Dose-Response Relationships for Food Crops due to the Effects of Airborne Gaseous and Particulate Pollutants

Key Words

Air pollution effect, Food crops

Principal Investigator and Organization	Tel.	
University of Guelph Dr. D. P. Ormrod		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
D. Harper	456-2504	

Objectives

1. Determine response of tomatoes, potatoes and cabbages to ozone and particulates with nickel.
2. Determine pathway of contamination of potatoes, tomatoes, and cabbages.
3. Dose-response relationships for visible injury and growth rates under long-term exposure at ambient levels in polluted regions.
4. Provide objective data on relationships of pollutant concentrations to plant growth and yield and indicate acceptable levels to protect food crops from damage.

Description

Controlled exposure experiments are to be conducted at the University of Guelph using ozone and nickel application to tomatoes, potatoes and cabbages. Visible injury, growth and yield effects will be evaluated. Statistical and experimental procedures leading to development of response curves and surfaces will be used to graphically portray plant responses. Tissue analysis will reveal the distribution of nickel and its pathway to edible fruit and tubers. Dose-response relationships will be expressed by equations. Direct comparisons will be made with monitored levels of pollutants in contaminated regions and emphasis will be placed on the utilization of 7-hour per day regimes in ozone studies.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1	1st Year	1987		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	30	89.7		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

158 PL

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

Preliminary Evaluation of Plume Tracker in Remote Sensing of Stack Emissions of Sulphur Dioxide

Key Words

Plume tracker, stack emission, remote sensing

or and Organization	Tel.	
Moniteq Ltd.		Internal ☐ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☒
Liaison Officer or Supervisor	**Tel.**	
D. Mafti	965-5776	

Objectives

To evaluate modifications to Plume Tracker to obtain reliable measurements of sulphur dioxide stack emissions remotely from the emission source.

Description

Necessary modifications will be made to a Plume Tracker and the effect of these changes will be evaluated at 2 sources. Initial evaluation experiments will be carried out at either Brampton or Mississauga using a smoke machine available from the MOE Training Section.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
1	1st Year	1985	☒ Yes ☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	13.0	13.0		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

164 PL

Branch/Office	Date (Day Month Year)
Policy and Planning Branch	

Project Title

"The deposition of aerosols on cylinders and filters in turbulent crossflow."

Key Words

Aerosols, scrubbers, emission sources, pollution control, air filters

Principal Investigator and Organization	Tel.	
Queen's University Dr. P. Douglas		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
H. Corinthies	965-4081	

Objectives

To develop a mathematical model for the deposition of submicron aerosols on non-streamlined surfaces, and apply it for the design of source control equipment and deposition processes.

Description

A theoretical computer model for aerosol deposition will be developed and used in the simulation of source control equipment such as scrubbers and turbulent flow filters. The system will then be evaluated for emission control.

The findings will assist in understanding and predicting deposition rates of aerosols in air scrubber design.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1	1st Year	1985		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	7.5	7.5		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

165 PL

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

"The Quantitative Assessment of Toxicity of Ingested and Inhaled Halogenated Aromatic Hydrocarbons (Dioxins, Etc.)

Key Words

Immune function, Dioxins, PCB, Toxicity, Halogenated aromatics, inhalable particulates.

Principal Investigator and Organization	Tel.	
McMaster University Dr. George D. Sweeny		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
J. Onderdonk	965-1193	

Objectives

1. To study the suppression of immune function and alteration in susceptibility to disease due to exposure of biological systems to dioxin, PCB, PBB, and other halogenated aromatic hydrocarbons with similar mechanisms for toxicity.

2. To develop non-invasive tests which could be used to assess whether or not exposure to these hazardous contaminants has occurred and provide a predictive dose-response relationship that can be used to the effect of such exposures on the immune system.

Description

Work on the assays of thymus hormone will be commenced and studies of oral as opposed to intrapertionially-administered dioxin will be carried out.

Information obtained on thymus hormone or the frequency of occurrence of T-lymphocyte surface markers will move towards the development of in-vivo tests, time and dose-response for immunosuppression for halogenated aromatic hydrocarbons both individually and in mixtures.
BENEFITS: 1. The ability to test chemically ill-defined mixtures of hazardous contaminants and to determine their potential biological effect.
2. The ability to survey human popuations for exposure to mixed halogenated aromatic hydrocarbons.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
1	1st Year	1985	☒ Yes	☐ No

	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	67.8	67.8		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

171 PL

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

Chemical and Physical Characterization of Airborne Particulates and their Sources through Multi-Element Analysis and Receptor Modelling.

Key Words Air particulates, characterization, toxic metals, analysis.

Principal Investigator and Organization	University of Toronto Dr. R. E. Jervis	Tel.	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	T. Hicks	Tel. 965-4081	

Objectives

To study aerosol matter from man made and natural sources in Ontario.

Elemental concentration data will be used to apply receptor models to urban areas.

The above will provide a basis for the comparison of receptor models and the refinement of those models.

Description

Air filter sample sets will be collected at various sites in an urban area and near dominant point sources. Samples will be analysed for up to 40 major, minor, and trace elements by proton and thermal activation analysis. The concentration data, in conjunction with particle size distributions and wind direction, will be used to evaluate receptor models and to examine some assumptions of these models.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
2	1st Year	1986	☒ Yes ☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

172 PL

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

Exchange and impact of external air particulates on inside air.

Key Words

Indoor-Outdoor air, air particulates, air sampling metals, x-ray analysis

Principal Investigator and Organization	Tel.	
Queen's University Dr. Duncan MacArthur		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
J. Smith	965-1193	

Objectives

To study the relationship between air particulates inside and outside a building in order to detect the time required for an external pollution episode to penetrate the building and its impact on internal air quality.

Description

Streak sampling systems suitable for indoor monitoring will be constructed using modifications of the present outdoor model. Air particulates inside and outside the school will be collected during a period in the winter when doors and windows are normally closed. The analysis of these streaks with proton induced X-ray emission (PIXE) will be undertaken and the indoor results will be correlated with those from the outside.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
2	1st Year	1986		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	20.1	39.7		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

173 PL

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

OC

An Integrated Approach to the Investigation of Lung response of sensitive subjects to diverse Air Pollutants

Key Words

Air pollution effect, Exposure, Air Contaminants, Personal air monitoring.

Principal Investigator and Organization	el.	
University of Toronto Gage Institute Silverman & Corey		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Dr. D. Corr	965-4081	

Objectives

To bring together health effects data comprised of:

A. Inhalation toxicology from work in environmental chambers and lung function tests of participants

B. Field exposure to natural pollutants gathered via personal monitors and related to the MOE sampling in Toronto in previous and one ongoing study

Description

1. Match health data to pollution data such as ozone, temperature, humidity, hydrocarbons.
2. Determine the dangers of pooled data.
3. Influence of drug use in asthmatics in the response to air pollutants.
4. Determine need for personal monitoring vis-a-vis fixed outdoor monitoring to assess exposure to air pollution.
5. Is some measure of respiratory ventilation necessary in assessing exposure to environmental pollutants?
6. Dose response relationships based on exposure data drawn from tests in environmental chambers.
7. Comparison of personal monitor data to MOE central station monitoring data.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☐ Yes ☐ No
1	1st Year	1985	

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	75.0	75.0		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

177 PL

Branch/Office	Date (Day Month Year)
Policy and Planning Branch	

Project Title

"APPLICATION OF TAGA 6000 METHOD IN THE MEASUREMENT OF DIOXIN AND FURAN EMISSIONS AT MUNICIPAL SOLID WASTE INCINERATORS."

Key Words

Source emission, stack sampling, Air pollution

Principal Investigator and Organization	Internal	Grant	Unsolicited Contract	Solicited Contract
Sciex (Division of MDS Health Group Ltd.)	☐	☐	☒	☐

Liaison Officer or Supervisor	Tel.
Dr. V. Ozvacic	965-4081

Objectives

To assess cost effectiveness and practicality of a methodology to rapidly analyze dioxin and furans at municipal solid waste incinerators.

Description

Apply and validate an alternative method for analyzing PCDD and PCDF in fly ash and compare with conventional methods.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
2	1st Year	1986	☒ Yes ☐ No

	Cost $000		Number of Man Years	
Budget	Current 150.0	Total 168.0	Current	Total

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

179 PL

Branch/Office	Date (Day Month Year)
Policy and Planning Branch	

Project Title

D/E "THE HAMILTON STUDY: EFFECT OF ENVIRONMENTAL FACTORS ON THE RESPIRATORY HEALTH OF SCHOOL CHILDREN."

Key Words

Air pollution, Hamilton Study

Principal Investigator and Organization	Tel.	
To be determined with Communications Branch		Internal ☐ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☒
Liaison Officer or Supervisor	**Tel.**	
Dr. D. Corr	965-4081	

Objectives

To provide a summary report for public use.

Description

To arrange through Communications Branch for a contract to summarize the technical report from McMaster University and put in layman's language for distribution mainly to the Council and public interest groups in Hamilton.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
1	1st Year	1985	☒ Yes ☐ No

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	5.0	5.0		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

183 PL

Branch/Office	Date (Day Month Year)
Policy and Planning Branch	

Project Title

"PORTABLE COMPUTING SYSTEM FOR USE IN TOXIC GAS EMERGENCIES."

Key Words

Air pollution, emergency response, computer, toxic gas

Principal Investigator and Organization	Tel.	
Contractor		Internal ☐ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☒
Liaison Officer or Supervisor	**Tel.**	
Dr. D. Corr	965-4081	

Objectives

1. To utilize IBM mainframe computer time (Downsview) to upgrade an existing Air Resources Branch emergency response program for use on a portable microcomputer.
2. To purchase a compatible microcomputer to run the revised emergency response model, "on-site" if necessary, but also in the office.

Description

1. Air Resources Branch has developed a users manual which documents how to use a toxic gas emergency computer model to predict dispersion of hazardous contaminants.
2. The original system utilizes a microcomputer which is not compatible with most other systems available on the market today. This limits the adoptability of the system within the Ministry.
3. This project involves revision of the software for use on a current portable microcomputer and acquiring the most compatible system.
4. As the system is "user-friendly", it could be adopted by each of the regions for use in emergencies.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
1	1st Year	1985	☒ Yes ☐ No

	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	25.0	25.0		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other — Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date 31 08 84 (Day Month Year)
Air Resources	

Project Title

2 Inhalable Particulate Sampling

Key Words

Particulate, aerosol, dichotomous samplers

Principal Investigator and Organization	Tel.	
J. Hicks	965-4081	Internal ☒
Liaison Officer or Supervisor	**Tel.**	Grant ☐
D. Corr	965-4081	Unsolicited Contract ☐
		Solicited Contract ☐

Objectives

To determine inhalable/total particulate ratios at a number of sites across Ontario and to transfer knowhow concerning inhalable particulate monitoring to regional staff. Data will be used to set an Ontario inhalable particulate standard.

Description

Dichotomous and Hi-vol particulate samplers are being operated at a number of regional sites throughout Ontario. Statistical assessment of airborne mass and elemental concentrations will follow.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
2	2nd Year	1985		
	Cost $000		Number of Man Years	
Budget	Current 40	Total 80	Current 1	Total 2

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Regions

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date 31 08 84 (Day Month Year)
Air Resources	

Project Title

Organic Vapour Sampling

Key Words

Organic Vapour, Sampling

Principal Investigator and Organization	Tel.	
A. Szakolcai - MOE	965-4081	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
D. Corr	965-3081	

Objectives

To develop a small number of reliable methods, specific to different groups of organic vapors, for sampling in the field with subsequent analysis in the laboratory.

Description

The present methodology (i.e. Dynamic standards generator, 2 adsorbent cartridges, thermal cleaner, personal and sequential sampling pump, and analytical methodology of trace organic preconcentrator followed by multidimensional high resolution gas chromatography) will be developed and expanded to include:

1. Field testing of the system.
2. Automating the analytical procedure.
3. Expanding the methodology to include reactive organic vapors (e.g. amines, mercaptans, aldehydes, carboxylic acids, etc).
4. Investigation of mass spectral identification techniques (e.g. mass selective detector) in the analytical step.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
4	1 Year			
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	25		2	

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

ARB, LSARB, Regions

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date (Day / Month / Year)
Air Resources - Phytotoxicology	31 / 08 / 84

Project Title

Phytotoxicology of Calcium Magnesium Acetate as an Alternative to Deicing Road Salt

Key Words

CMA, deicing compound

Principal Investigator and Organization	Tel.	
R.G. Pearson - MOE	965-4516	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Dr. S.N. Linzon	965-4516	

Objectives

To generate biological effect information on the phytotoxicity of CMA as a substitute deicing compound for rock salt on Ontario highways. This will include direct vegetation contact, soil application and seed germination studies.

Description

The experiments are being carried out at the Vineland Research Station (OMAF) and the controlled Environment Facility (MOE), Brampton. In each of the 3 major phases CMA is being compared with similar concentrations of sodium chloride to provide comparative information on injurious effects. In the direct contact phase CMA and salt are applied to tagged branches of fruit and ornamental trees during the winter months and growth effects and fruit production are assessed in the spring and summer.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
3	2nd Year	1985		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	1.2	1.5	0.2	0.3

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Frequent contact has been made with the MT&C to keep them informed on the progress of the study and to receive information on other studies being conducted on the material.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date (Day / Month / Year)
Air Resources - Phytotoxicology	31 / 08 / 84

Project Title

Lead Movement in Soils

Key Words

Soil, Lead, Migration

Principal Investigator and Organization	Tel.	
D. McLaughlin	965-4516	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
R.G. Pearson	965-4516	

Objectives

To examine the movement of lead in urban soils with emphasis on vertical migration both up and down and on the timing of this mobility over an 18 year period. This information will assist in the design of effective methods for replacing contaminated surface soils in the vicinity of lead emission sources.

Description

The work is being conducted at 2 sites in the Toronto area. At one site the treatments are exposed to ongoing lead deposition in the immediate vicinity of a secondary lead smelter, while at the other site normal urban deposition is occuring. The soils have been placed in plastic columns in the plots and these columns will be harvested at 3 year intervals over an 18 year period.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
18	2nd Year	1985 and every 3 years	☒ Yes ☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Air Resources - Phytotoxicology (APIOS)	31 Day 08 Month 84 Year

Project Title

Effects of Acid Rain Simulants on Germination and Seedling Growth for Major Crop Varieties Grown in Ontario

Key Words

acid rain, germination, growth, crop effects

Principal Investigator and Organization	Tel.	
A.J. Kuja	456-2504	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Dr. S.N. Linzon	965-4516	

Objectives

To determine the relative sensitivity of seedling establishment to acid rain simulants for several field crops and vegetation grown in Ontario.

Description

The study is being carried out at the Controlled Environmental Facility (MOE), Brampton. It will involve the use of 3-5 common varieties of each of 10 major crop species as well as each of the major vegetable species. Rainfall will be applied in indoor chambers and will vary in acidity as follows (pH, 2.6, 3.0, 3.4, 3.8, 4.2, 4.6, 5.0 and 5.6).

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
2	1st Year	1986	☒ Yes ☐ No

	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
			0.5	0.1

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other (APIOS)

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date (Day Month Year)
Air Resources - Phytotoxicology	31 08 84

Project Title

Assessment of Yield and Biomass in Soybean and Radish Subjected to Simulated Acid Rain in an Outdoor Mobile Rain Exclusion System.

Key Words

Acid rain, soybean, radish, exclusion canopy

Principal Investigator and Organization	Tel.	
A.J. Kuja	456-2504	Internal ☒
		Grant ☐
Liaison Officer or Supervisor	Tel.	Unsolicited Contract ☐
Dr. S.N. Linzon	965-4516	Solicited Contract ☐

Objectives

To determine under ambient outdoor conditions the effect of various acid rain simulants on the yield and growth of soybeans and radish.

Description

This work is being conducted at the Controlled Environment Facility (MOE), Brampton, utilizing the newly constructed acid rain exclusion canopy system. These movable greenhouses permit the application of 5 different rainfall acidity to crop grown under field conditions. The simulants are applied during the actual (natural) rainfall event at the same volume and time while the canopy protects the crops from receiving natural rain. Additional plots outside the canopy receive the natural rain.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
1	1 Year	1985	☒ Yes ☐ No

	Cost $000		Number of Man Years	
Budget (APIOS)	Current 1.0 (Supplies)	Total 1.0	Current 0.1	Total 0.1

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other (APIOS)

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Air Resources - Phytotoxicology	Date 31 Day	08 Month	84 Year

Project Title

Effect of Ethylene on Growth and Flowering of Soybean and Petunia

Key Words

Ethylene, soybean, petunia, plant response

Principal Investigator and Organization	Tel.	
D.S. Harper - R.D. Jones	456-2504	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Dr. S. N. Linzon	965-4516	

Objectives

The phytotoxic - effects of ethylene on soybean and petunia are being assessed in order to establish whether significant damage is occuring on these crops/ornamentals in Ontario and to determine if the current Ontario air quality standards/criteria are providing adequate protection from the this pollutant.

Description

This research is being conducted at the Controlled Environment Facility (MOE), Brampton. It is a follow-up to field studies conducted in the Sarnia area which indicated measurable damage was occuring (petunia) but which was, in the case of soybean probably masked by variations due to normal environmental conditions and cultural practices.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
3	3rd Year	1985	☒ Yes	☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current 0.2	Total 0.25

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

141 RR

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

ORGANIZATION OF A POSTER SESSION ON ORGANIC SAMPLING AT TECHNOLOGY TRANSFER CONFERENCE NO. 5.

Key Words

Organic sampling, Technology transfer

Principal Investigator and Organization	Tel.	
Air Resources Branch		Internal ☐ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☒
Liaison Officer or Supervisor	**Tel.**	
Dr. D. Corr	965-4081	

Objectives

To publicize and to transfer the technology developed for sampling organic contaminants in air.

Description

A poster session was organized demonstrating the sampling and analytical procedures used to sample hazardous contaminants in air.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☐ Yes ☒ No	
1	First Year	1984		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	5.0	5.0		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Air Resources - Phytotoxicology	Date 31 (Day) 08 (Month) 84 (Year)

Project Title

Reclamation of Oil Polluted Soils

Key Words

Reclamation, oil spills, vegetation effects

Principal Investigator and Organization	Tel.	
R.N. Emerson	965-4516	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
R.G. Pearson	965-4516	

Objectives

Phase 1: To determine under Ontario climatic conditions the most effective practices for the restoration of oil contaminated soil.

Phase 2: To screen several Ontario crop species and varieties to determine those which are sensitive and tolerant to oil residues in soil.

Description

The experiment will be conducted at the Controlled Environment Facility (MOE), Brampton. Amelioration techinques will include all combinations of tillage frequency, fertilizer application frequency, gypsum as an enhancer of soil tilth and soil irrigation. Seed germination and growth will serve as bioindicators of the effectiveness of treatment application. Phase 2 will be conducted in the greenhouse and will consist of screening of crop species to develop appropriate recommendations for oil spill reclamation.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
3	1st Year	1986	☒ Yes	☐ No

	Cost $000		Number of Man Years	
	Current	Total	Current	Total
Budget 0.5	0.3	0.5	.05	0.15

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Air Resources	Date 31 08 84 (Day Month Year)

Project Title
Cartridge Analysis Using a TAGA 3000

Key Words
Cartridge, TAGA 3000, Disorder interface

Principal Investigator and Organization	Tel.	
Gary B. DeBrou	965-4081	Internal [X] Grant [ ] Unsolicited Contract [ ] Solicited Contract [ ]
Liaison Officer or Supervisor	**Tel.**	
Dr. E. Singer	965-4081	

Objectives

Analysis of cartridges containing various solid absorbents using TAGA 3000 (APCI/MS) system.
Purpose is to expand the range and lower the detection limits of the TAGA for more chemical classes e.g. aromatics alcohols, chlorinated alkyl organics.

Description

- o needed is a mini cartridge/desorber system to be interfaced with the TAGA front-end
- o establish ways to calibrate such a system for a variety of compounds not easily measured using direct air sampling.
- o looking at a variety of desorbers including thermal and microwave

Duration of Project (Yrs.)	Present Year is Year	Reporting Date	Is a Report Anticipated ? [ ] Yes [ ] No	
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	20			

Source of Funds (Specify)

[X] Regular Work Program [ ] Special Ministry [ ] Jointly Funded [ ] Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date 31 08 84 (Day Month Year)
Air Resources	

Project Title

Real-time Detection of Chlorine Dioxide Using a Mobile TAGA

Key Words

Chlorine Dioxide, Real-time, TAGA

Principal Investigator and Organization	Tel.	
Gary B. DeBrou, ARB, MOE	965-4081	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Dr. E. Singer, ARB, MOE	965-4081	

Objectives

Detect and quantitate gaseous chlorine dioxide (ClO_2) using the mobile TAGA Unit i.e. MAMU #3. Establish detection limits, quantitation limits. Examine possible interferences i.e. Cl_2 and matrix effects near pulp and paper mills e.g. SO_2, TRS, humidity etc.

Description

ClO_2 will be generated and monitored in situ using the well known reaction $NaClO_2$ + Cl_2. Study will involve examining ClO_2 yields, temperature effects, reaction (flow) times. Attempt to miniaturize the ClO_2 generator. Design a portable device for rapid field calibrations.

Duration of Project (Yrs.)	Present Year is (Year)	Reporting Date	Is a Report Anticipated ? ☐ Yes ☐ No	
	Cost $000		Number of Man Years	
Budget	Current 10	Total	Current	Total

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Air Resources	31 (Day) 08 (Month) 84 (Year)

Project Title

Dilution Flow System for Emergency Response of Chemical Spills and TAGA Monitoring

Key Words

Dilution flow system detectability range TAGA

Principal Investigator and Organization	Tel.	
Gary B. DeBrou, ARB	965-4081	Internal ☒ Grant ☐
Liaison Officer or Supervisor	**Tel.**	**Unsolicited Contract ☐ Solicited Contract ☐**
Dr. E. Singer, ARB	965-4081	

Objectives

The TAGAs detection limits are extremely low e.g. ppb and ppt. However, for quantifying higher levels such as ppm levels the inlet sample flow has to be diluted by 100 to 1000 times. Presently, a prototype system has been tested and high levels of acetone and ammonia can be quantitated. Additional work using a high capacity zero air generator is needed to establish relative response for ambient air vs clean air carrier gases. In some cases, the humidity content of the carrier gas plays an important role in the overall detection. Studies will be conducted to establish a reference response/dilution for all chemicals. The aspects of this reseach has applications to monitoring near chemical spills using the TAGA.

Description

The TAGAs detection limits are extremely low e.g. ppb and ppt. However, for quantifying higher levels such as ppm levels the inlet sample flow has to be diluted by 100 to 1000 times. Presently, a prototype system has been tested and high levels of acetone and ammonia can be quantitated. Additional work using a high capacity zero air generator is needed to establish relative response for ambient air vs clean air carrier gases. In some cases, the humidity content of the carrier gas plays an important role in the overall detection. Studies will be conducted to establish a reference response/dilution for all chemicals. The aspects of this reseach has applications to monitoring near chemical spills using the TAGA.

Duration of Project (Yrs.)	Present Year is Year	Reporting Date	Is a Report Anticipated ? ☐ Yes ☐ No	
	Cost $000		Number of Man Years	
Budget	Current 5	Total	Current	Total

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Air Resources	Date 31 08 84 (Day Month Year)

Project Title

Methodology Development for the Real-Time Measurements of Selected Organic and Inorganic Pollutants.

Key Words

Real-time, Organic Contaminants, TAGA 3000, Inorganic Contaminants

Principal Investigator and Organization	Tel.	
Gary B. DeBrou, ARB	965-4081	Internal ☒
		Grant ☐
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐
Dr. E. Singer, ARB	965-4081	Solicited Contract ☐

Objectives

Expand our inventory of methodologies to detect and quantitate potential contaminants using the TAGA. Chemical compounds to be investigated are: chlorinated phenols, glycols, nickel carbonyls and phosphine (also, possibly, other chemical classes as requested by the Regional (MOE)).

Description

This will involve generating standards and the methodology development for TAGA detection determine detection limits and sensitivities over a linear response range.

Duration of Project (Yrs.)	Present Year is Year	Reporting Date	Is a Report Anticipated ? ☐ Yes ☐ No	
	Cost $000		Number of Man Years	
Budget	Current 50	Total	Current	Total

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date 31 08 84 (Day Month Year)
Air Resources	

Project Title

Determination and unequivocal identification of volatile organic compounds in air by high resolution, multidimensional gas chromatography and gas chromatography/mass - spectrometry

Key Words

Volatile Organic Compounds, High Resolution, Multidimensional GC, GC/MS

Principal Investigator and Organization	Tel.	
Dr. E. Singer - MOE/ARB	965-4081	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	

Objectives

Development of a library of organic compounds unequivocaly identified in "clean air" in urban, suburban and industrial areas of Ontario. Development of methods for sampling, preconcentration and unequivocal identification by $(GC)^2$ and GC/MS and other methods. Standard synthesis, preservation and methods of quantification sampling and sample preservation and stability.

Description

A sample of clean air may contain from 10^4 - 10^6 org. compounds in the range of ug/m^3 or less. Identification of individual compounds in such a complex mixture is a very complex tasks, which requires a multidisciplinary approach. Only a few of the compounds were already identified. The unidentified compounds might be environmentally active, toxic or carcinogenic and it is important for us to know as much as possible. New instrumentation techniques for sample preconcentration, preservation and identification will be used and developed.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
10 years	5th Year		☒ Yes	☐ No

	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	50			

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Air Resources	Date 31 08 84 (Day Month Year)

Project Title

Theodolite with automated azimuth and elevation reading and wireless data transmission to the logging and data processing computer

Key Words

Theodolite, automated position reading, wireless data transmission

Principal Investigator and Organization	Tel.	
D. Schneeberger - F.H. Schaedlich Consult. Ltd.	651-2544	Internal ☐ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☒
Liaison Officer or Supervisor	**Tel.**	
Dr. E. Singer - MOE/ARB	965-4081	

Objectives

An automated theodolite system for monitoring of the position of meteorological balloons was developed. The next generation shall have radio-transmission of data to the logging and processing computer.

Description

A semi-automated theodolite system was developed in the past. Although each theodolite has to be manually operated, it frees the operator of reading the azimuth and elevation in regular intervals. The present system uses optical shaft position encoders and data are transmitted through a line to a computer logging and processing system. This cumbersome system shall be replaced this year by radio data transmission.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
3	2 Year			
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	10			

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Air Resources	31 (Day) 08 (Month) 84 (Year)

Project Title

Sampling and preconcentration of trace volatile organic compounds from ambient air.

Key Words

Volatile organic compounds, sampling, preconcentration

Principal Investigator and Organization	Tel.	
Dr. E. Singer - MOE/ARB	965-4081	Internal [X]
		Grant [ ]
Liaison Officer or Supervisor	Tel.	Unsolicited Contract [ ]
		Solicited Contract [ ]

Objectives

Sampling and preconcentration of VOC from the air for information surveys, development of passive sampler

Description

Development of sampling procedures for use by untrained field personnel

Passive samplers and subsequent analysis

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? [X] Yes [ ] No	
5	1st Year			
	Cost $000		Number of Man Years	
Budget	Current 20	Total	Current	Total

Source of Funds (Specify)

[X] Regular Work Program [ ] Special Ministry [ ] Jointly Funded [ ] Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Air Resources	31 Day 08 Month 84 Year

Project Title

Sampling, identification and determination of reduced organic sulfur compounds in air.

Key Words

Reduced organic sulfur compounds, sampling, identification, determination.

Principal Investigator and Organization	Tel.	
Dr. E. Singer - MOE/ARB	965-4081	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	

Objectives

Development of sampling and sample preservation methods for organic reduced sulfur compounds in air.

Development of methods for identification and analysis of reduced organic compounds in air.

Description

The methods presently available for the monitoring of TRS leaves a lot to be desired.

Methods for sampling event preconcentration, standards preparation and analysis will be developed.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
2	1 Year		☒ Yes	☐ No
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	10			

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date 04 09 84 (Day Month Year)
Air Resources	

Project Title
Depoistion Monitoring Intercomparison Studies

Key Words
Deposition Monitoring, Intercomparison

Principal Investigator and Organization	Tel.	
Dan Orr, Air Resources Branch	965-1634	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Dr. Walter H. Chan	965-1634	

Objectives

To ascertain that the data collected by various wet deposition monitoring network in Canada and U.S.A. are comparable. Then the database can be merged and mapping of deposition results can extend past provincial and international boundaries.

Description

APIOS (Acid Precipitation in Ontario Study) data are compared with those of NADP (National Atmospheric Deposition Program), CANSAP (Canadian Network for Sampling Precipitation) and Quebec MOE by means of co-located precipitation collectors and gauges operating at compatible sampling cycles.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
3	3rd Year	1984	☒ Yes ☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	1.0	3.0	0.2	0.6

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)
National Atmospheric Deposition (NADP)
Atmospheric Environment Services (AES), Environment Canada
Ministere de l'Environment, Gouvernment du Quebec
Laboratory Services Branch

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date 04 09 84 Day Month Year
Air Resources	

Project Title

Precision and Accuracy Measurements in Deposition Monitoring

Key Words

Precision, accuracy, deposition monitoring, measurement quality, database management

Principal Investigator and Organization	Tel.	
Dan Orr, Air Resources Branch	965-1634	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Dr. Walter H. Chan	965-1634	

Objectives

To determine the precision and accuracy for the data obtained by the APIOS cumulative (28-day) and daily precipitation networks. The aims are to improve deposition database management and to help in validation by modelling effort.

Description

Measurements are carried out at the Dorset APIOS site. Precision is measured by doing co-located replicate sampling using the same instrument type. Accuracy can be assessed by the change over time in the chemical integrity of standard samples after being subjected to prevalent sampling and analytical conditions. Alternatively, deviations from equivalency of cumulative deposition results and the sum of daily deposition results occurring in a corresponding period of time is a good indicator of inaccuracy.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
3	3rd Year	1984		
	Cost $000		Number of Man Years	
Budget	Current 10	Total 30	Current 0.2	Total 0.6

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Laboratory Services Branch

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date 04 09 84 (Day Month Year)
Air Resources	

Project Title

Sampling of Organic in Precipitation

Key Words

Organic, hazardous, volatile, non-volatile, precipitation, deposition, long-range transport, instrumentation development, resin/cartridge recovery study, collection efficiency, retention capabilities.

Principal Investigator and Organization	Tel.	
Dr. Walter H. Chan, Air Resources Branch	965-1634	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Dr. Maris A. Lusis	965-1634	

Objectives

This is a feasibility study for monitoring of volatile and non-volatile organics in precipitation with a purpose to assess atmospheric pathways and their role in long-range transportation phenomenon. The primary objective is to estimate depositional flux of organics at two test locations. Concurrently, the required field and laboratory procedure will be developed and/or refined.

Description

A state-of-the-art report is being prepared to recommend field instrumentation, sampling and analysis methodology and a list of targeted compounds. Grab samples will be collected for compound identification scans, field instrumentation development and laboratory resin/cartridge recovery studies. At a later stage, several cumulative (28-day) precipitation samples will be collected using "wet-only" collectors equipped with a resin/cartridge sampling train to isolate organic compounds in the field. These will be desorbed and analysed in the lab. Breakthrough will also be checked to estimate collection efficiency and retention capability of the resin/cartridge for organics.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
2	1st Year	1985		
	Cost $000		Number of Man Years	
Budget $90,00	Current: 90.	Total: not known	Current: 0.2 (ARB)	Total: not known

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☒ Jointly Funded ☐ Other

Participation By Others (Specify)

Trace Organic Section, Laboratory Services and Applied Research Branch
Acid Precipitation Office
Hazardous Contaminants and Standards Branch

Remarks

Water Pollution Research

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

62 PL

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

Investigations of nitrate distribution and nitrogen transformations in a shallow, sandy aquifer near Alliston, Ontario.

Key Words

Ground-water quality, nitrates, nitrogen transformation

Principal Investigator and Organization	Tel.	
R. W. Gillham, Dept. of Earth Sciences University of Waterloo		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
P. McKenna	965-6954	

Objectives

To characterize the nitrate distribution in a shallow sand aquifer near Alliston, Ontario, to evaluate factors controlling the occurrence of denitrification in the aquifer, and to develop alternate ground-water development methods that would alleviate the existing contamination problem in domestic wells.

Description

A recent survey by Dr. A. K. Hill of York University has shown extensive nitrate contamination of domestic wells located in a shallow aquifer near Alliston, Ontario. Based on previous studies conducted at the University of Waterloo, it is probably that as a result of denitrification, the zone of contamination extends for a relatively shallow depth below the water table. Field studies will be conducted to evaluate the extent of the contaminated zone, to develop alternate groundwater development procedures and to determine the hydrogeochemical controls on the denitrification process.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
2	3rd Year	1985	☒ Yes	☐ No

Budget	Cost $000		Number of Man Years	
	Current _	Total 49	Current	Total

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Presented at the Technology Transfer Conference.

Ministry of the Environment
Ontario

Inventory: Research and Development Project

65 RR

Branch/Office	Date
WATER RESOURCES BRANCH	01 (Day) 09 (Month) 84 (Year)

Project Title
Removal Of Selected Hazardous Contaminants In A WPCP

Key Words
Hazardous Contaminants, Conventional Waste Activated Sludge Plant

Principal Investigator and Organization	Tel.	
R. Rush, Canviro Consultants Ltd	579-3500	Internal ☐ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
K.W. Anthony Ho	965-1655	

Objectives

To determine the treatment efficiency, mechanisms and factors influencing the removal of 7 selected polyaromatic hydrocarbons, total PCB , pesticides and heavy metals in a full scale treatment plant.

Description

Concentrations of the selected priority pollutants were measured in raw sewages, final effluents and waste activated sludges for 3 periods (summer, winter and spring) of 4 - 6 weeks each. Concentrations of priority pollutants in (filtered) liquid phase and in solids phase were measured seperately. This approach provided a better understanding of the removal mechansims and effects of final effluents may exert on recieving water qualities.

The WPCP operating conditions were closely monitored but not changed during the study.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ N
3	3 Year	December, 1984	
	Cost $000		Number of Man Years
Budget	Current	Total	Current / Total
	$ 1.34	$68.6	1

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☒ Jointly Funded ☐ Other RAC

Participation By Others (Specify)

Environment Canada

Remarks

Environment Canada provided $ 10 K to the study in 82/83

A progress report was presented and published in the MOE Technology Transfer Conference No. 4 Proceedings, November, 1983.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

89PL

Branch/Office	Date 28 8 84 Day Month Year
LABORATORY SERVICES	

Project Title EPIDEMIOLOGICAL STUDY OF DISEASE INCIDENCE AND RECREATIONAL WATER QUALITY AT SELECTED CONSERVATION AREAS IN SOUTHERN ONTARIO

05

Key Words EPIDEMIOLOGY, RECREATIONAL WATER QUALITY, VIRUSES, STANDARDS

Principal Investigator and Organization	Tel.	
Professor P.L. Seyfried, University of Toronto		Internal ☐ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
G. Jenkins, Water Resources Branch	965-2401	

Objectives

1) To investigate the relationship between recreational water quality and disease incidence at selected conservation sites and to perform risk assessment analyses on the accumulated data.
2) To develop suitable methods for the recovery, enumeration and identification of Campylobacter jejuni and Giardia from environmental samples.
3) To refine methods for virus isolation and identification from environmental samples.

Description

Selected conservation areas will be monitored for bacteria and viruses during the summer of 1983. An epidemiological survey of the swimmers and non-swimmers at the sites will beconducted concurrently.

Techniques for detecting Legionella, Campylobacter jejuni, Giardia and enteric viruses inrecreational waters will be investigated. Viruses will be identified by serological and electron microscopic methods.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
2	2nd Year	Apr. 1985	

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	- 34.7	$149.00	5	7

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

yes

Remarks

The results of the study will provide valuable information for the assessment of recreational water quality standards

Final report in completion by P. Seyfried, University of Toronto

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

94 RR

Branch/Office	Date (Day Month Year)
Policy and Planning Branch, Research Coordination Office	

Project Title

"WATER QUALITY ANALYSIS OF TROUT FARM EFFLUENT."

Key Words

Fish Farm Effluent, Water Quality.

Principal Investigator and Organization	Tel.	
Dr. J. Hilton and Dr. S. Slinger, University of Guelph		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
A. McLarty	811-521-7640	

Objectives

- To determine water quality of trout farm effluents and correlate the results to farm operating practices.
- To determine the effects of dietary phosphorous on growth and physiology of fish and on wastewater quality.

Description

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1	2nd Year	1984	

	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	-	16.4		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Presented at the Technology Transfer Conference.

Ministry of the Environment
Ontario

Inventory: Research and Development Projec

96 PL

Branch/Office: WATER RESOURCES BRANCH

Date: 01 09 84 (Day Month Ye)

Project Title:

Development Of An Efficient Protocol For Routine Analyses Of Organic Trace Contaminants In Municipal Raw Sewages And Final Effluents

Key Words:

Analytical Methods Hazardous Contaminants Raw Sewage Final Effluents

Principal Investigator and Organization	Tel.	
John Martin, Mann Tesing Laboratory	848-5550	Internal Grant Unsolicited Contract Solicited Contract X
Liaison Officer or Supervisor	Tel.	
K.W. Anthony Ho	965-1655	

Objectives:

1. To develop an Analytical Protocol which uses relatively inexpensive instrument, but gives equivalent or more accurate results than GC/MS method.

2. To automate the Analytical Protocol such that it will be very man-power efficient

Description:

The study will progress in three Phases.

Phase 1 - Investigate the potential application of various extraction and clean-up procedures through literature review and discussion with experts in this area.

Phase 2 - Evaluate the accuracy and application of a selected extraction/clean-up procedure and the use of "Mass Selective Detector" for compound identification instead of the extremely expensive Mass Spectrometer. Raw sewages and final effluents from a designated WPCP will be used for the entire phase.

Phase 3 - Fully test the developed Analytical protocol by applying it to raw sewages and final effluents collected from many WPCP's. Automation of analyses will also be developed/tested at this phase.
GC/MS analyses will be used throughout the entire study as the Standard Reference.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
3	1 Year	December, 1987	X Yes	
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	$ 55.2	$ 180	1	3

Source of Funds (Specify)

Funding is provided by Research Advisory Committee

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded X Other Provincial Lottery

Participation By Others (Specify)

No

Remarks:

Gerry Rees and OttoMeresz, represent the Laboratory Services Branch

Phase 1 of the study will commence on September 15, 1984.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

99 PL

Branch/Office: Water Resources Branch, Drinking Water Section

Date: 13 09 84 (Day Month Year)

Project Title:
Trace Organic Removal from Drinking Water

Key Words:
Activated Carbon, (GAC), Trace Organic Contaminants

Principal Investigator and Organization	Tel.	
McLaren Plansearch (J. Hilton)	365-7275	Internal ☐ Grant ☐
Liaison Officer or Supervisor	**Tel.**	**Unsolicited Contract ☐ Solicited Contract ☒**
K. J. Roberts	965-6995	

Objectives:

To investigate drinking water treatment processes including modified conventional treatment with add-on activated carbon adsorption for the removal of trace organic contamfinants from drinking water.

Description:

Laboratory scale and pilot scale studies (at Niagara Falls WTP) will be carried out on Niagara River water, possibly 'spiked' with a number of target compounds covering a range of physical/chemical properties, to examine removal methodologies, effectiveness and costs of alternate treatment technologies.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
	1st Year	Feb. 1987		
	Cost $000		Number of Man Years	
Budget $1M	Current 150.0	Total $1M	Current	Total

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other — Lottery Funded

Participation By Others (Specify)

Remarks:

A Steering Committee comprising members from MOE, Health and Welfare Canada, U.S. EPA, Expert Advisor (Dr. Snoeyink, U. of Illinois) will oversee the project.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

103PL

Branch/Office	Date 28 8 84 (Day Month Year)
POLICY AND PLANNING BRANCH, RESEARCH COORDINATION OFFICE	

Project Title AN EXTRACTION AND CONCENTRATION METHOD FOR THE TESTING OF LANDFILL LEACHATES, SOIL FRACTIONS, AND LIQUID INDUSTRIAL WASTES FOR GENOTOXIC ORGANIC COMPOUNDS

Key Words LEACHATE, CONCENTRATION OF ORGANIC COMPOUNDS, HAZARDOUS CONTAMINANTS, LIQUID INDUSTRIAL WASTES

Principal Investigator and Organization	Tel.	
ONTARIO RESEARCH FOUNDATION		Internal ☐ Grant ☐ Unsolicited Contract ☒ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Dr. D. Rokosh, Water Resources Branch	248-3008	

Objectives

To develop and validate methods for mutagenicity testing of leachates and groundwater at waste disposal sites. Validate the methods and apply to water and soil.

Description

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
3	1st Year	1986	☒ Yes ☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	25.00	300.00		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☒ Other Provincial Lottery

Participation By Others (Specify)

no

Remarks

Everything proceeding; Sept. 1 is starting date

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

105 PL

Branch/Office	Date (Day Month Year)
Policy and Planning Branch, Research Coordination Office	

Project Title *TLE:* EVALUATION OF DATA OF PROJECT 28 PL - 'EFFECTS OF HYDRAULIC CHARACTERISTICS AND EFFLUENT CHLORINATION ON THE INCIDENCE OF MICROORGANISMS OF PUBLIC HEALTH SIGNIFICANCE IN RECEIVING WATERS.'"

Key Words Effluent, Chlorination, Wastewater Treatment, Effluent microorganisms

Principal Investigator and Organization	Tel.	
Contractor to be selected		Internal ☐ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☒
Liaison Officer or Supervisor	**Tel.**	
S. Black	965-6954	

Objectives

- To develop a critique of the statistical methodology used in Project 28 PL and devise a new approach if the former is inappropriate.
- To integrate the data in the appropriate model.
- To conduct statistical analysis of data.

Description

Duration of Project (Yrs.)	Present Year is Year	Reporting Date	Is a Report Anticipated ?	
1	1	1986	☒ Yes	☐ No

	Cost $000		Number of Man Years	
Budget	**Current**	**Total**	**Current**	**Total**
		20		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

106 RR

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

Determination of Volatization Rates of Organic Compounds of Public Health Concern

Key Words

Volatilization, spills, organics, Grand River

Principal Investigator and Organization	Tel.	
Gore & Storrie Ltd.		Internal ☐ Grant ☐ Unsolicited Contract ☒ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
D. Draper	965-6194	

Objectives

For specified priority organic substances, to determine rates of volatilization from specified sites in the Grand River basin and to establish general procedures/programs for other substances, based on moecular structure.

Description

Several river reaches in the Grand River have been previously investigated to directly measure their rate of atmospheric re-oxygenation. Data from these studies will be re-examined to determine rates at which organic compounds would be volatilized. In addition to field data analysis, the volatilization rate determination involves determining Henry's constant for each compound, and whether liquid film or gas film diffusion controls. An evaluation will be done for most of the substances specified in the Ministry's Hazardous Contaminants list of Chemicals for Further Evaluation and additionally for several pesticides and priority potential contaminants in drinking water.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1	2nd Year	1985	
	Cost $000		Number of Man Years
Budget	Current -	Total 24.1	Current / Total

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Presented at the Technology Transfer Conference.
Report Available.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

108 RR

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

"CONTAMINANT MOBILIZATION AND UPTAKE FROM MINE TAILINGS AT COBALT, ONTARIO."

Key Words Contaminant migration, mobilization, metals, mine tailings, Cobalt

Principal Investigator and Organization	Tel.	
J. E. Hanna Associates, Inc.		Internal ☐ Grant ☐ Unsolicited Contract ☒ Solicited Contract ☐
Liaison Officer or Supervisor: G. Miller	Tel. IC 865 264-9474	

Objectives

To determine the mobility and bioavailability of contaminants, primarily heavy metals, in mine tailings under varying moisture and chemical regimes.

Description

Field monitoring of tailings in Cobalt under varying hydrological, chemical, and biological conditions will be undertaken to characterize the types, concentrations, and fluxes of heavy metals with particular attention to the experimental artificial marsh system.

Laboratory experiments will be used to ascertain the leachability of soil contaminants under varying chemical conditions and the bioavailability of contaminants in sampled waters.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
2	2nd Year	1985	☒ Yes	☐ No

	Cost $000		Number of Man Years	
Budget	Current: 31	Total: 49.4	Current	Total

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Presented at the Technology Transfer Conference.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

109 RR

Branch/Office	Date (Day Month Year)
Policy and Planning Branch, Research Coordination Office	

Project Title

"EFFECTS OF METALS FROM MINE TAILINGS ON THE MICROFLORA OF A MARSH TREATMENT SYSTEM."

Key Words

Marsh treatment systems, Effect of Metals on Microflora, Mine Tailings

Principal Investigator and Organization	Tel.	
Dr. P. Seyfried, Department of Microbiology University of Toronto		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
W. Lewandawski	965-6954	

Objectives

- To assess the effect of metals on the normal microflora of a marsh treatment system.
- To determine if the pH of the effluent has an effect on toxicity.
- To compare metal susceptibility of heterotrophic bacteria from mine tailings and normal marsh systems.

Description

The potential toxic effects of metals on the microflora of a marsh system at Cobalt will be determined. Laboratory test will include the effects of toxic metals both individually and in combinations at various pH. Quantitative toxicity assessment will be performed.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1	1 Year	1985		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	-	49.0		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Presented at the Technology Transfer Conference.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

111 RR

Branch/Office	Date
Water Resources	29 (Day) 08 (Month) 84 (Year)

Project Title

Ottawa River Nuclear Spill Contingency Model Development

Key Words

Tritium, Contingency, Ottawa River, 2-D Model

Principal Investigator and Organization	Tel.	
T.P.H. Gowda/Gore & Storrie Ltd.	(416) 485-7715	Internal ☐ Grant ☐ Unsolicited Contract ☒ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
D. Draper	(416) 965-6194	

Objectives

To develop a two dimensional river model for finite-time released pollutants, with immediate application to the Ottawa River for accidental nuclear spill contingency planning.

Description

Field work pre-planning, using model output has been carried out by consultant. Field survey in mid-September followed by data analysis and model calibration will result in a verifiable model for application next year. The model will simulate behaviour of a spilled effluent in a lateral and longitudinal direction over time.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
1½ years	1984 Year	March, 1984	☒ Yes ☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	11.0	30		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Field work by MOE, Southeastern Region in cooperation with Atomic Energy Canada Ltd.

Remarks

State-of-the-art deterministic model

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

114 PL

Branch/Office	Date (Day Month Year)
Policy and Planning Branch, Research Coordination Office	

Project Title

OE "EFFECTS ON THE MUSCLE OF YOUNG FISH AND RATS OF EXPOSURE TO LEAD, CADMIUM AND MERCURY."

Key Words

Effects of heavy metals on Fish and rats. Toxicity

Principal Investigator and Organization	Tel.	
Dr. D. M. Nicholls, Department of Biology York University		Internal ☐ Grant ☒
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐ Solicited Contract ☐
J. Ralston	965-6954	

Objectives

- To study enzymatic effects and genetic activities on fish and young rats due to exposure to lead, cadmium and mercury. R.N.A. will be examined for alterations in quality and quantity of gene expression. Enzyme reactions in fish due to exposure to metals will be investigated.

Description

Test animals and fish will be examined with respect to functional activities, enzymes of protein synthesis, and for genetic changes due to exposure to toxic metals lead, cadmium and mercury.

The results will allow the development of a bioassay for heavy metal poisoning of vertebrates based on biochemical functions.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
2	2nd Year	1985	☒ Yes	☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	16.3	32.6		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Presented at the Technology Transfer Conference.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

120 PL

Branch/Office	Date
Water Resources Branch/Drinking Water Section	13 09 84 (Day Month Year)

Project Title

A Critical Study of the Status of Great Lakes Drinking Water

Key Words

Drinking Water, Quality, Great Lakes

Principal Investigator and Organization	Tel.	
Canadian Public Health Association (Allan Bierbrier)	(613)-725-3769	Internal ☐ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☒
Liaison Officer or Supervisor K. Roberts	Tel. 965-6995	

Objectives

A review of the quality of drinking water produced from the Great Lakes and interconnecting waterways.

Description

The review will cover:

- Examination of data (interpret and evaluate validity) pertaining to Great Lakes drinking water.
- Impact of inplace drinking water treatment
- Evaluation of human health implications and draw conclusions concerning the quality and gaps in, the data and identify research needs.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1	1st Year	March, 1985	
	Cost $000		Number of Man Years
Budget $200K	Current 100	Total 100	Current Contract / Total

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other — Lottery Funded

Participation By Others (Specify)

Joint program with Health and Welfare Canada

Remarks

Study has been sub-contracted by CPHA to:

1. Canada Centre for Toxicology (Dr. I. Munro)
2. Gore and Storrie Ltd. (Dr. W. Hargrave)
3. Dr. C. Hertzman; part-time co-ordinato

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

121 PL

Branch/Office	Date
Water Resources Branch, Drinking Water Section	13 09 84 (Day Month Year)

Project Title

Ozononation - theoretical study

Key Words

Ozone, Drinking Water

Principal Investigator and Organization	Tel.	
Gorre & Storrie (W. Hargrave)	485-7715	Internal ☐ Grant ☐
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐
K. J. Roberts	965-6995	Solicited Contract ☒

Objectives

To identify gaps in present ozone technology as applied to Drinking Water Treatment.

Description

To investigate zone technology with respect to drinking water treatment including:

- treatment equipment
- treatment by - products
- health effects
- costs
- anemies for future research from identified gaps in technology

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1	1 Year	April, 84		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	15	15		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Lottery Funded

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

125 RR

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title
"GROWTH-LIPID DEPOSITION RELATIONSHIPS IN JUVENILE CYRPINIDS AND YELLOW PERCH."

Key Words
Fish toxicity, Bioaccumulation

Principal Investigator and Organization	University of Guelph Dr. J. Hilton	Tel.	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	Dr. D. Rokosh	Tel. 248-3008	

Objectives

1. Review literature on growth-lipid deposition relationships.
2. To document interrelationships re climate, food, environmental factors on growth-lipid deposition.

Description

Determine whether climatic changes and food supply significantly alter growth rates and lipid stores in the fish and therefore alter contaminant accumulations.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1	1 Year	1985		
	Cost $000		Number of Man Years	
Budget	Current –	Total 2.0	Current	Total

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

128 RR

Branch/Office	Water Resources	Date	04 09 84 (Day Month Year)

Project Title

Development of an Artificial Marsh Treatment Facility at Listowel, Ontario.

Key Words

Listowel, Experimental Marsh, Heavy Metals, Nutrients, Bacterial Contamination

Principal Investigator and Organization	Tel.	
M. Sequin, Town of Listowel		Internal [X] Grant [ ] Unsolicited Contract [ ] Solicited Contract [ ]
Liaison Officer or Supervisor	**Tel.**	
Doug Snell	965-1655	

Objectives

To establish a pilot artificial marsh sewage treatment system to:

1. determine the effectiveness of the system for reducing bacteriological contamination, heavy metals and nutrients on a year round basis;

2. assess the cost of establishing and operating a marsh-type sewage treatment system in relation to presently accepted modes of treatment;

3. seek the best design and operation of an artificial marsh system, including possible need for plant harvesting measures.

Description

Project consists of design, construction and monitoring of a pilot artificial marsh sewage treatment system. The system occupies a total of 2.5 acres and provides for flexibility of operation in terms of retention times and quality and quantity of sewage influent. Both lagoon effluent and effluent from an aerated cell are used. Some of the emergent vegetation cells are channeled to permit plant harvesting. It is anticipated that artificial marshes will be effective in providing a low cost alternative for the treatment of sewage effluent for small communities and rural industries.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? [X] Yes [ ] No
8	6th Year	1986	
	Cost $000		Number of Man Years
Lottery Fund Budget 398.30	Current 31.5	Total 554.14	Current 2 / Total 12

Source of Funds (Specify)

[ ] Regular Work Program [ ] Special Ministry [ ] Jointly Funded [ ] Other

Participation By Others (Specify)

This project is shared with Southwestern Region

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

136

Branch/Office	Date
Water Resources Branch	Day Month Year

Project Title

"STUDY OF UPPER HUMBER RIVER TO IDENTIFY POLLUTANT SOURCES."

Key Words

Contaminant identification, Upper Humber River, toxic metals in sediments.

Principal Investigator and Organization	Tel.	
Metro Toronto - TAWMS		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
D. Wetherbe	965-6194	

Objectives

1. Target potential soil erosion & sediment loading problems in agricultural areas.
2. Use results to compute potential soil losses from suburban & forested areas.
3. Determine relative sediment contribution for suspended solids in 20 catchments.
4. Use information from 1-3 to prioritize tributaries based on sediment contribution.
5. Complete similar exercise to 3 using indicator bacteria.
6. Measure levels of copper, zinc, phosphorous and cadmium in sediments.
7. Do survey of major tributaries of upper Humber.

Description

This study is to identify pollutant sources from the upper Humber River that are contributing to pollution in the lower Humber, specifically bacterial contamination and sediments. This is of particular concern because of the water quality problems currently being experienced in Metropolitan Toronto and along the waterfront.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1	1st Year	1985	

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	99.0	99.0		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Ref. TAWMS Study

Remarks

* Paid by Water Resources Branch

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

137 RR

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

"BIOLOGICAL PHOSPHORUS REMOVAL."

Key Words

phosphorous removal, sewage treatment, water pollution.

Principal Investigator and Organization	By contract to an Ontario consultant.	Tel.	Internal ☐ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☒
Liaison Officer or Supervisor	P. Seto	Tel. 965-1655	

Objectives

To investigate the feasibility of implementing Bardenpho biological phosphorus removal at Great Lakes sewage treatment plants based on information gained in the operation of a full-scale biological phosphorus removal plant funded by Environment Canada at Kelowna, B.C.

Description

The possibility of retrofitting the Bardenpho process to several activated sludge process configurations used in Ontario plants will be investigated, and detailed estimates for hardware modifications and annual operating costs developed. These will be compared to existing operating costs for the activated sludge plants providing integrated chemical precipitation for phosphorus removal.

Duration of Project (Yrs.)	Present Year Is Year	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1	1	1985	

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	20	20		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Participants:

Federal Funding:	The Eutrophication Issues Group of the Great Lakes	$35,000
	EPS - Environment Canada	$20,000
	FEDERAL TOTAL	$55,000
Ontario Funding:	Ministry of the Environment	$20,000
	ONTARIO TOTAL	$20,000

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

138 RR

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

"INTEGRATED PEST MANAGEMENT ON FIELD CORN: A FEASIBILITY STUDY."

Key Words

Pest Management, corn, rootworm control

Principal Investigator and Organization	Tel.	
University of Guelph/OMAF		Internal ☐ Grant ☒
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐ Solicited Contract ☐
J. Onderdonk	965-1193	

Objectives

1) to define the scope of the problem through a one year survey of the pest complex (insects and weeds) in field corn;
2) to evaluate available monitoring techniques with emphasis on combining various methods into a total program suitable for Integrated Pest Management;
3) to demonstrate the capability of making cost-effective Integrated Pest Management decisions for field corn.

Description

Approximately 1/2 of the 0.8M hectares of field corn grown annually in Ontario are treated with insecticides for rootworm control. Previous studies have shown that this extent of pesticide usage is unwarranted, but a suitable data base for evolving an Integrated Pest Management approach is unavailable. The present study would therefore monitor some 20 field sites for both weeds and insects. Monitoring techniques presently recommended for each pest would be evaluated. Research inputs from Agriculture Canada and the University of Guelph, combined with the survey data, would then be used to evaluate the effectiveness and reliability of an IPM program for field corn.

Duration of Project (Yrs.)	Present Year is Year	Reporting Date	Is a Report Anticipated ? ☐ Yes ☐ No	
	Cost $000		Number of Man Years	
Budget	Current 65.4	Total 378.2	Current	Total

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

145 PL

Branch/Office Water Resources Branch, Drinking Water Section

Date 14 Day 09 Month 84 Year

Project Title

Investigation of the Distribution, Origins and Behaviour of Local Shallow Ground Waters Containing Elevated Concentrations of Chloride - Provincial Lottery Project No. 145.

Key Words

Chloride, Contamination, Ground Water

Principal Investigator and Organization	Tel.	
Dr. K. W. F. Howard, Assistant Professor, Geology Dept., Scarboro Campus, University of Toronto	416/284-3336	Internal ☐ Grant ☒
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐ Solicited Contract ☐
F. P. McKenna	965-6991	

Objectives

1. To determine natural background levels of groundwater contaminants and identify their sources.

2. To determine chemical behaviour of ground water contaminants, their migration and accumulation rates, and evaluate regional magnetide of the problem.

Description

1. Literature and land use data will be reviewed and sampling and analyses of groundwater for background data and site selection will be developed.

2. Contaminated ground water will be analysed to identify contaminant migration and accumulation. Completion of this project will provide MOE with a protocol to identify point or non-point contamination from sources and with the capability to predict long-term hazard from non-point sources of contamination.

uration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
3	1(1984/85) Year	Annual		
	Cost $000		Number of Man Years	
udget	Current 25	Total 80	Current 1	Total 3

ource of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery Trust Fund

articipation By Others (Specify)

emarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

148 PL

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

"Development and validation of protocols for sampling surface and groundwaters for volatile organic contaminants"

Key Words

Groundwater, volatile organics, water sampling

Principal Investigator and Organization	Tel.	
Dept. of Earth Sciences University of Waterloo Dr. J. Barker		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor T. Yakutchuk	Tel. 965-6991	

Objectives

To evaluate water sampling techniques presently used for volatile organic contaminants and develop improved methods and validate them.

Description

A group of volatile organic compounds will be selected to test present ground and surface water sampling techniques. New methods will be developed to alleviate losses due to volatilization and other possible sampling bias using sorption resins.

The project will provide the Ministry with reliable means of sampling natural water. This is especially important for sampling groundwater near landfills.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
2	1st Year	1986	☒ Yes	☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	9.7	21.6		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

149 PL

Branch/Office	Date (Day Month Year)
Policy and Planning Branch	

Project Title

"The fate of hazardous organic compounds in municipal water pollution control plants"

Key Words Hazardous Contaminants, wastewater, contaminant fate

Principal Investigator and Organization		Internal ☐
Dr. J. Henry & Dr. D. MacKay	Depts. of Civil & Chemical Engineering, University of Toronto	Grant ☒
Liaison Officer or Supervisor	Tel.	Unsolicited Contract ☐
		Solicited Contract ☐

Objectives

To develop a model and protocol for the prediction of fate of hazardous organic compounds in municipal water pollution control plants.

Description

Literature will be reviewed, analytical methods developed for a selection of hazardous chemicals, and a laboratory model simulating a municipal wastewater treatment system will be constructed. The latter will be tested and used to study the fate of hazardous contaminants in control and actual wastewater samples. The refined model will be applied to data obtained from a full-scale plant.

The present study complements several related studies now in progress such as: hazardous contaminants in WPCP in Hamilton, development of a routine protocol for wastewater analyses, etc.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
3	1st Year	1987	

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	19.0	60.0		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Proje

150 PL

Branch/Office	Date
WATER RESOURCES BRANCH	01 (Day) 09 (Month) 84

Project Title

Fate of Hazardous Organic Chemicals During Municipal Wastewater Treatment Processes

Key Words

Hazardous Contaminants Mathematical Model Municipal Sewage Treatment

Principal Investigator and Organization	Tel.	
Glynn Henry, University of Toronto	978-3141	Internal Grant X Unsolicited Contract Solicited Contract
Liaison Officer or Supervisor	**Tel.**	
K.W. Anthony Ho	965-1655	

Objectives

To develop a Model and Protocol for the prediction of the Fate of Hazardous Contaminants in municipal water pollution control plants

Description

Bench-scale equipment will be used to develop a preliminary model in the first year to describe the fate of selected priority pollutants during treatment.

In the second and third years, further studies on pilot-scale will be carried out to improve and generalize the modol and protocol to predict the fate of priority pollutants during sewage treatment.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
3	1 Year	December, 1987	X Yes	No
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	$ 19	$ 60	1	3

Source of Funds (Specify)

Funding is provided by Research Advisory Committee.

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☒ Other

Participation By Others (Specify)

No

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

157 PL

Branch/Office	Date (Day Month Year)
Policy and Planning Branch	

Project Title

"The assessment of a point source discharge of suspected mutagenic and carcinogenic contaminants: an epidemiological approach."

Key Words

Mutagenicity, Carcinogenicity, fish toxicity, Point source discharge

Principal Investigator and Organization	Dept. of Pathology University of Guelph Dr. V. Valli	**Tel.**	**Internal** ☐ **Grant** ☒ **Unsolicited Contract** ☐ **Solicited Contract** ☐
Liaison Officer or Supervisor	Dr. D. Rokosh	**Tel.** 248-3008	

Objectives

To develop methodologies and assess mutagenic and carcinogenic effects on fish.

Description

Techniques will be developed for sampling and testing adult and young-of-the-year fish exposed to waters contaminated with industrial wastes for genotoxic, mutagenic and carcinogenic damage.

This subject has lately received public and scientists attention.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1	1st Year	1985		
	Cost $000		Number of Man Years	
Budget	**Current**	**Total**	**Current**	**Total**
	40.0	40.0		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

49PL. 139RR, 159PL

Branch/Office	Date (Day Month Year)
Policy and Planning Branch, Research Coordination Office	

Project Title

"AQUATIC TOXICITY STUDIES OF MULTIPLE ORGANIC COMPOUNDS."

Key Words

Aquatic Toxicity, Organics in Water, Fish Testing, Biological Testing, Hazardous Contaminants.

Principal Investigator and Organization	Tel.	
Dr. G. W. Ozburn and Dr. D. E. Orr Lakehead University, Thunder Bay		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	

Objectives

To determine the effective biological concentrations of selected organics commonly discharged in industrial wastes.

The effects of individual industrially related organic compounds on fish reproduction as well as rates of accumulation and depuration of those organics will be determined. Mixtures of the individual organics will also be tested to determine their joint toxicity effects on the same biological parameters.

Exposure of flagfish to these selected organics will identify concentrations that impair or inhibit egg production, hatching success, fry survival and growth. Bio-concentration factors due to uptake from water will also be determined. Rates of uptake through food will be determined in rainbow trout to establish food chain effects.

Once individual organic effects are established, mixtures of those organics representative of concentrations found in river systems will be tested to determine synergistic, additive or antagonistic effects on reproduction and bio-accumulation.

Concentrations of industrial organic compounds that produce detrimental effects on fish reproduction and recruitment will be established. Levels of organics accumulation that impair or reduce the edibility of sport and commercial fish will be determined in light of biological, chemical and mutagen/carcinogen studies reported in the literature or under study in other environmental laboratories.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1	1st Year	1985		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	90	90		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

MOE Branches

Remarks

No. This project was supported in FY 80-81 with Bridge Funding from Lottery Project No. 48 for $10,900.

Partners in FY 80-81 were Environment Canada and MOE Hazardous Contaminants Branch. Contribution from Lottery Funds is one half, e.g. $175,420.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

160

Branch/Office	Date
Water Resources Branch	Day Month Year

Project Title

"DEVELOPMENT OF A TORONTO URBAN RUNOFF PREDICTION AND CONTROL EVALUATION MODEL."

Key Words

Urban Run-off, Pollution source, Toronto Water shed

Principal Investigator and Organization	Tel.	
Gartner-Lee Associates		Internal ☐ Grant ☐ Unsolicited Contract ☒ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
S. Black	965-6954	

Objectives

1. To do detailed analyses of sources of pollution extended in time and space.
2. To do a preliminary screening of control options to be adopted in the watershed model (HSPF).

Description

The HSPF model will be applied to evaluate the impact of surface runoff together with combined sewer overflows and other background and baseflow loadings on the receiving stream. A link and comparison between the 2 models will be carried out by means of a relative loading reduction or by direct adjustment of input functions.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1	1st Year	1985		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	49.8	49.8		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☒ Other TAWMS

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

162 PL

Branch/Office	Date (Day Month Year)
Policy and Planning Branch	

Project Title

"Development of a methodology for use of freshwater clams as a biological response system to monitor the nearshore environment of the lower Great Lakes."

Key Words

clams, toxicity test, Gt. Lakes, water pollution

Principal Investigator and Organization	Tel.	
University of Western Ontario Dr. R. H. Green		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
P. Kauss	965-6957	

Objectives

1. To select biological response variables related to molluscs in Lake Erie.
2. To identify analytical methods and contaminants, and evaluate the use of bivalve mollusc shells to generate time-profile environmental impact data.
3. To develop statistical models which predict biological response from environmental quality.
4. To assess the developed models and genetic response at several locations.

Description

The developed models will be used to conduct field studies in the Long Point Bay area to establish the dominant mollusc species and environmental and biological gradients. Genetic response to contaminants will be estimated for various mollusc species.

The study will provide the Ministry with an inexpensive, long-term method for assessing the quality of Great Lakes nearshore environment using molluscs for bio-monitoring.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
3	1st Year	1987	

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	31.3	73.4		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

163 PL

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

"A Study of Water Filtration -Sampling Systems."

Key Words

Water filtration, water analysis

Principal Investigator and Organization	Tel.	
D. Mackay Environmental Research Ltd.		Internal ☐ Grant ☐ Unsolicited Contract ☒ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Dr. W. Berg	248-3031	

Objectives

To provide MOE with improved procedures for obtaining water samples for analysis in which it is possible to discriminate between dissolved and particulate associated contaminants. Specifically, the work will involve obtaining performance data for existing filtration systems and attempting to improve the efficiency and performance of systems by novel methods for preconcentration of hazardous contaminants such as dioxins and other halogenated aromatics.

Description

The Study will include:

1. Literature review and identification of potential filtration systems.
2. Acquisition, installation, and testing of all systems on natural and drinking waters.
3. Compilation of test data and interpretation as volume flowed and flow rate versus pressure drop.
4. Develop methods to improve flow characteristics and make recommendations for use by the Ministry.

The study is of special value to analytical, water quality, and hazardous contaminants programs.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1	1st Year	1985	

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	14.0	14.0		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

166 RR

Branch/Office	Water Resources	Date	30 08 84 (Day Month Year)

Project Title

Wet Oxidation of Cheese Whey

Key Words

Wet Oxidation - Cheese - Whey

Principal Investigator and Organization	Tel.	
Seaton or Baird Stone & Webster/Kenox	482-8500	Internal ☐ Grant ☐
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☒ Solicited Contract ☐
W. P. Suboch	965-2105	

Objectives

To demonstrate that a Canadian designed wet/oxidation reactor will decompose cheese whey to produce steam which is used by the cheese plant.

Description

The wet oxidation research done by the Ontario Research Foundation when funded by the Ministry of Energy has resulted in a Canadian patented reactor design. This project should demonstrate that the cheese-maker can pay much lower sewer use surcharges while reducing his purchase of fuel.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
6 months	1984 Year	March, 1985	☒ Yes	☐ No
	Cost $000		Number of Man Years	
Budget	Current 20.0	Total 20.0	Current	Total

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Ministry of Energy - shared with MOE.

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

167

Branch/Office	Date (Day Month Year)
Water Resources Branch	

Project Title

"FEASIBILITY OF PLANT HARVESTING IN WATER QUALITY AMELIORATION & PHOSPHORUS MANAGEMENT IN SHALLOW IMPOUNDMENTS."

Key Words

Water quality, phosphorus control, amelioration.

Principal Investigator and Organization	Tel.	
Credit Valley Conservation Authority		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
S. Black	965-6594	

Objectives

To monitor plant harvesting in Orangeville Reservoir in order to: (a) assess water quality improvement; (b) assess technical & economic feasibility of harvesting as a management tool for phosphorus control in impoundments of Southern Ontario tributaries to the Great Lakes.

Description

This study will identify the important factors affecting the nutrient budget and water quality of the Orangeville Reservoir; it will also evaluate the efficacy, constraints and economics of plant harvesting in phosphorous control.

Duration of Project (Yrs.)	Present Year is Year	Reporting Date	Is a Report Anticipated ? ☐ Yes ☐ No	
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other Water Resources Branch

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

168 PL

Branch/Office: Water Resources Branch, Drinking Water Section

Date: 13 (Day) 09 (Month) 84 (Year)

Project Title:
Combined Ozone/Biologically Activated Carbon Treatment at Atikokan

Key Words:
Ozone, Biologically Activated Carbon (BAC)

Principal Investigator and Organization: M. M. Dillon (M. Provart) — Tel. 229-4646

Liaison Officer or Supervisor: F. J. Dart/K. J. Roberts — Tel. 965-6995

- Internal ☐
- Grant ☐
- Unsolicited Contract ☒
- Solicited Contract ☐

Objectives:

The application and development of the Biologically Activated Carbon (BAC) Treatment Process to a Potable Water Treatment Plant (Atikoken).

Description:

Pilot plant work on-site will compare the ozone/BAC process with conventional treatment with respect to costs and treatment efficiency for a highly coloured raw water source.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
2	1st Year	1986	
	Cost $000		Number of Man Years
Budget	Current: 38.0	Total: 70.0	Current:	Total:

Source of Funds (Specify): Lottery Funded

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify):

Remarks:

Project administered by P. Joseph of the Project Engineering Section of Environmental Approvals and Project Engineering Branch.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

180 PL

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

"APPLYING NEW TECHNOLOGY FOR DEFLUORIDATION OF WATER SUPPLY SYSTEMS."

Key Words: Fluoride removal, Drinking water, activated alumina

Principal Investigator and Organization	Tel.	
The Proctor & Redfern Group		Internal ☐ Grant ☐ Unsolicited Contract ☒ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
J. Dart	965-6954	

Objectives

Evaluate at pilot plant scale the use of activated alumina for the removal of fluoride under varying temperature, flow and regeneration conditions.

Description

A number of reports have been received reporting on the removal of fluoride by activated alumina. All have been from the U.S.A. and do not indicate the temperature and regeneration conditions. Since these are known to be crucial to the leakage of fluoride during the operating cycle, further local testing is required before the system could be recommended for use in Ontario.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
2	1st Year	1985	

	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	5.0	8.0		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

181 PL

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

"COMPREHENSIVE ANALYSIS OF ACTIVATED SLUDGE AERATION DEVICES INCLUDING HEALTH-RELATED FACTORS."

Key Words Activate sludge, aeration devices, aerosol, sewage treatment

Principal Investigator and Organization	Tel.	
J. Ganczarczyk and Associates		Internal ☐ Grant ☐ Unsolicited Contract ☒ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
H. Toza		

Objectives

Activation sludge aeration devices will be evaluated, including health-related factors, and guidelines for the selection of appropriate devices will be recommended for specific wastewater treatment plants.

Description

Factors affecting the selection of aeration devices, such as stripping and cooling ability, formation of aerosols, and noise characteristics, in addition to oxygenation capacity and cost, will be assessed.

The impact of use of these devices on the health of treatment plant personnel and neighbouring communities will also be evaluated. The study would provide guidelines for Ministry approval procedures of aeration devices.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1	1st Year	1985	

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	9.3	9.3		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

182 PL

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

"SAMPLING AND CORING PROGRAM FOR EVALUATING SPATIAL DISTRIBUTION AND APPROXIMATE MASS OF POLLUTANTS IN THE SEDIMENTS OF THE HUMBER MARSH, TORONTO."

Key Words

contaminant distribution, Humber River sediment analysis, Marsh, pollutant impact

Principal Investigator and Organization	Tel.	
Dr. Allan V. Jopling, Department of Geography, University of Toronto		Internal ☐ Grant ☒
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐ Solicited Contract ☐
Z. Novak	965-6954	

Objectives

1. To elucidate the natural history of the Humber River System.
2. To evaluate the environmental impact of urbanization (construction, storm sewers, river stabilization).
3. To estimate residual concentration and spatial distribution of pollutants within the Humber Marsh.

Description

Core samples several metres in length will be extracted from strategically located areas in the marsh and will be studied and processed for textural attributes and chemical pollutants.

The results will provide a preliminary estimate of selected pollutants stored in underground sediments as well as the persistence and mass-balance of these pollutants.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1	1st Year	1985		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	17.4	17.4		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date (Day Month Year)
Water Resources Branch	

Project Title

"UPDATE OF STORM WATER MANAGEMENT MODEL."

Key Words

Stormwater, model

Principal Investigator and Organization	Tel.	
University of Ottawa		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
S. Black	965-6954	

Objectives

To provide a continuous update of the model used in storm water management modelling.

Description

MOE has assisted in the development of a number of models used in storm water modelling and maintained at the University of Ottawa. These models need to be continually updated and maintained in order to be of continuing value.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
1	1 Year	1985	☒ Yes	☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	15*	15		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

* Paid by Water Resources Branch

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office: Water Resources Branch

Date: 12 09 84 (Day Month Year)

Project Title

Filtration Plant Studies for Iron and Manganese Removal

Key Words

Iron, Manganese, Water Filtration, Biological Fouling.

Principal Investigator and Organization	Tel.	
F. J. Dart	965-6995	Internal [X] Grant [ ] Unsolicited Contract [ ] Solicited Contract [ ]
Liaison Officer or Supervisor: K. Roberts	Tel. 965-6995	

Objectives

To help resolve ailing filtration performance at facilities dedicated to iron and manganese removal.

Description

Operational changes in chemical and physical conditions of filtration are studied through interpretation of resultant chemical and biological analysis of samples in light of the literature and additional in-house experience.

ration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? [X] Yes [ ] No	
1 1/2	1st Year	Dec. 1985		
	Cost $000		Number of Man Years	
udget	Current	Total	Current	Total
	$2	$8	0.05	0.20

urce of Funds (Specify)

[X] Regular Work Program [ ] Special Ministry [ ] Jointly Funded [ ] Other

rticipation By Others (Specify)

PUC personnel in Village of Beeton

marks

A recommenced project based on return of facilities to operation following interruption due to filter plant revamping.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Water Resources Branch	12 09 84 (Day Month Year)

Project Title

Analysis of Water Treatment Plant Chemicals for Contaminants Proj. #127 RR

Key Words

Water Treatment, Chemicals, Organic Contaminants

Principal Investigator and Organization	Tel.	
Dr. F. W. Karasek, Univ. of Waterloo	(519)885-1711 Ext. 3423	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
F. J. Dart	965-6995	

Objectives

To develop analytical methods and define analytical protocols for analyzing water treatment chemicals.

Description

Water plant chemicals such as alum, fluoridation chemicals, polyelectrolytes, chlorine etcetera may contain organic contaminants of potential human health concern. Improved procedures for testing such difficult-to-analyze chemical concentrates are being sought mainly through solvent extraction, as chromatography and mass spectroscopy sequences.

uration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
1 1/2	1st Year	Nov. 1985	☒ Yes	☐ No
	Cost $000		Number of Man Years	
Budget	Current —	Total 25	Current 0.60	Total 1.5

Source of Funds (Specify)

RAC approved grant, Mar.21, /84

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office: Water Resources Branch

Date: 13 09 84 (Day Month Year)

Project Title

Manganese removal from surface water

Key Words

Drinking water, manganese

Principal Investigator and Organization	Tel.	
G. Martin	248-3935	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor: K. Roberts	Tel. 965-6995	

Objectives

To study various coagulation/filtration techniques for effectiveness in removing manganese from surface waters.

To study the use of ozone for colour removal in iron- and manganese-bearing waters.

Description

Pilot plants including upflow clarifier and filters will be set up to investigate manganese removal by the high lime/ferric chloride process. Proprietary filters such as Durcon electromedia, manganese greensand will also be investigated.

Raw water conditions involving high colour and taste and odour are encountered also.

Ozone treatment will be evaluated for the effectiveness in reducing colour levels in manganese-laden waters.

ration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
3	final Year	1985	
	Cost $000		Number of Man Years
udget	Current 0.5	Total 12	Current 0.05 / Total 0.35

urce of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

rticipation By Others (Specify)

narks

Interim report available
Project held in abeyance 1983/84

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Water Resources Branch, Drinking Water Section	13 09 84 (Day Month Year)

Project Title
Trace Contaminants in Water Treatment Plant Chemicals

Key Words
Water Treatment Chemicals, Trace Contaminants

Principal Investigator and Organization	Tel.	
D. E. Wemyss - A. Vajdic	965-6995	Internal ☒ Grant ☐
Liaison Officer or Supervisor	**Tel.**	**Unsolicited Contract ☐ Solicited Contract ☐**
K. Roberts	965-6995	

Objectives

To examine chemicals used in the potable water treatment process, by both physical and chemical analytical methods, for trace contaminants.

Description

Water treatment plant chemicals will be sampled and subjected to chemical and physical analyses for constituents with special emphasis being placed on trace contaminants.

In addition, raw chemicals and production processes at the manufacturing level will be checked for any variation in manufacturing techniques or precursor materials that might affect the quality of the products. The results will have probable significance in the water industry specifications for chemicals used in process or as additives.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
3.5	3 Year	Dec. 1984		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	10	77	0.3	3.0

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Water Resources Branch, Drinking Water Section	13 (Day) 09 (Month) 84 (Year)

Project Title

Retention Time Tracer Studies in Water Treatment Plants

Key Words

Retention Time, Detention Time, Tracer Studies, Nata Plant

Principal Investigator and Organization	Tel.	
R. Hunsinger	965-6995	Internal ☒ Grant ☐
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐ Solicited Contract ☐
K. J. Roberts	965-6995	

Objectives

Development of and application of technology for determining retention time through various processes in drinking water treatment systems.

Description

Pilot and full scale studies in the engineering laboratory and at Drinking Water Treatment Plants using chemical tracers to determine retention times.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
0.5	final Year	May, 1985	☒ Yes ☐ No

	Cost $000		Number of Man Years	
	Current	Total	Current	Total
Budget	8	12	0.2	.5

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Water Resources Branch, Drinking Water Section	13 (Day) 09 (Month) 84 (Year)

Project Title

Corrosion Rate Studies

Key Words

Corrosion, Drinking Water

Principal Investigator and Organization	Tel.	
R. Hunsinger, J. Dart, G. Martin,	965-6995	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
K. Roberts	965-6995	

Objectives

To determine effects of aggressive water on distribution systems and water quality during worst case conditions.

Description

Studies of a Northern Ontario water supply system will be carried out during snow melt in the spring of 1985 to determine effect on drinking water

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1	final Year	Dec. 85		
	Cost $000		Number of Man Years	
Budget 10	Current 10	Total	Current 0.2	Total 0.2

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Water Resources Branch	Date 31 Day	08 Month	84 Year

Project Title

Neoplasms in Fish

Key Words

Neoplasms, Fish, Tumors, Fish cancer

Principal Investigator and Organization	Tel.	
A. F. Johnson & D.A. Rokosh	965-6954 248-3008	Internal [X] Grant [X]
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract [ ] Solicited Contract [X]

Objectives

To investigate the human and environmental health implications of neoplasms in Ontario fish and identify possible man-made source contributing to the induction of neoplasm's.

Description Details of this project are under development but should include:

a) A review of available literature and current listing of the occurrence of Neoplasms in Ontario Fish (site and species specific).

b) Pathological examination of fish with neoplasms

c) Chemical analysis of fish with and without growths for relative comparison of organic and inorganic chemical body burdens.

d) Wider inspection of fish for neoplasms

Duration of Project (Yrs.)	Present Year is 1st Year	Reporting Date	Is a Report Anticipated ? [X] Yes [ ] No	
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total

Source of Funds (Specify)

[ ] Regular Work Program [ ] Special Ministry [X] Jointly Funded [ ] Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Water Resources	Date	04 (Day)	09 (Month)	84 (Year)

Project Title

Validation of Sister Chromatid Exchange Assay (SCE) in Chinese Hamster ovary cells using World Health Organization reference compounds

Key Words

Quality Assurance, Sister Chromatid Exchanges, Mutagenicity

Principal Investigator and Organization	Tel.	
Dr. M. Salamone, Biohazard Unit	248-3008	Internal [X]
		Grant [ ]
Liaison Officer or Supervisor	Tel.	Unsolicited Contract [ ]
		Solicited Contract [ ]

Objectives

Validate our SCE assay using a group of chemicals currently being tested in a WHO international mutagencity study.

Description

The WHO chemicals are each being tested using the SCE chinese hamster tissue culture assay. Results are then to be compared with those of other laboratories involved in the study.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
2 yrs.	1984 Year	05/85	[X] Yes	[ ] No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current .9	Total

Source of Funds (Specify)

[X] Regular Work Program [ ] Special Ministry [ ] Jointly Funded [ ] Other

Participation By Others (Specify)

Remarks

The study is a component of a major international evaluation of these WHO chemicals. Our lab has been involved in testing these chemicals using a battery of four mutagenicity tests.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Water Resources	Date	04 09 84 (Day Month Year)

Project Title

OV

Development of techniques to test pulp mill effluents for mutagenicity

Key Words

Industrial effluents, Pulp and Paper, Ames test, Mutagenicity

Principal Investigator and Organization	Tel.	
Dr. D. Rokosh, Biohazard Unit	8-3008	Internal [X] Grant [ ] Unsolicited Contract [ ] Solicited Contract [ ]
Liaison Officer or Supervisor	Tel.	

Objectives

To determine the mutagenic response of various pulp mill effluents and to develop methods by which these effluent samples could be sterilized without interferring with the response on the Ames Assay.

Description

Samples final effluents and process streamline samples from a pulp and paper mill have been taken and tested for mutagenicity on the Ames Assay Samples were first sterilized and then tested unconcentrated.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? [X] Yes [ ] No	
6 months	1984 Year	03/85		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current 0.5	Total

Source of Funds (Specify)

[X] Regular Work Program [ ] Special Ministry [ ] Jointly Funded [ ] Other

Participation By Others (Specify)

Great Lakes Unit, Water Resources Branch

Remarks

Development of methods for anticipated future screening of pulp and paper effluents for mutagenicity.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Water Resources/Aquatic Contaminants Section	31 (Day) 08 (Month) 84 (Year)

Project Title
The Significance of Phenolic Compounds In Ontario's Waters

Key Words
Phenolic Compounds, Phenols, Environmental Fate, Toxicity, Aquatic Environment, Organoleptic Properties, Analytical Procedures, Sources.

Principal Investigator and Organization	Tel.	
Conrad de Barros/Assessment Unit	5-6954	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	

Objectives

To address several problem areas MOE water quality assessors and industrial abatement officers have concerning the detection of high concentrations of phenolic compounds in surface waters and provide alternative strategies for future dealings with these aquatic contaminants.

Description

The review covers the structure of ~~basic~~ phenolic compounds, analytical problems and solutions for measuring these compounds in aqueous samples, toxicity, environmental fate, organoleptic properties, sources of phenolics and a critical review of the existing Provincial Water Quality Objective for "total phenols".

Duration of Project (Yrs.)	Present Year is (Year)	Reporting Date	Is a Report Anticipated?	
9 months		August, 1984	☒ Yes	☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	5		0.25	

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

This an internal document intended for the use of the Ministry of the Environment staff.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Water Resources Branch	29 (Day) 08 (Month) 84 (Year)

Project Title

0✓ Development of Water Quality Criteria (PWQO) for benzene/substituted benzene, aluminum & total dissolved solids

Key Words

Objective, development, water quality, benzene/substituted benzenes, aluminum, total dissolved solids

Principal Investigator and Organization	Tel.	
Water Management Working Group #1 (MOE Committee)		Internal ☐ Grant ☐ Unsolicited Contract ☐ 3 Solicited Contracts ☒
Liaison Officer or Supervisor	**Tel.**	
Chairman - John Ralston	965-6954	

Objectives

To obtain and document pertinent information on benzene/substituted benzenes, aluminum and total dissolved solids and determine criteria that would ensure protection of aquatic organisms and other water uses such as recreation and aesthetics.

Description

Review and documentation of all available information of substances selected related to physical/chemical properties, environmental distribution and fate, toxicity, uses and ambient levels in Ontario. Development of water quality criteria that would ensure protection of the most sensitive aquatic life species peer reviewed reports would be submitted to the Standards Steering Committee for the final stages of Ministry review before being published in the PWQO table of the Water Management publication.

Duration of Project (Yrs.)	Present Year is (Year)	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
6-9 months each				
Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	$25-30K/substance	$75-90K	< 1 per substance	< 3

Source of Funds (Specify)

HC&SB Standards Development Budget

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

- MOE Water Management Steering Committee - Approval of Program
- MOE Standards Steering Committee - Approval of Substances, Arrangement for Funding and Recipients of final report

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Water Resources/Aquatic Contaminants Section	28 (Day) 08 (Month) 84 (Year)

Project Title

A Comparison of Three Methods of Sewage Disinfection based on Fish Exposures Downstream of the Tillsonburg (Ontario) STP.

Key Words

Sewage Disinfection, Fish Exposures, Lethality, STP, chlorination, UV irradiation, sodium bromide/chlorination treatment.

Principal Investigator and Organization	Tel.	
K. Flood/Assessment Programs Unit	248-3011	Internal ☒
		Grant ☐
Liaison Officer or Supervisor	Tel.	Unsolicited Contract ☐
		Solicited Contract ☐

Objectives

i) To define the zone of impact of the effluent plume in Big Otter Creek downstream of the Tillsonburg STP in regard to fish lethality, under normal conditions of effluent disinfection by chlorination;

ii) To compare the degree and extent of fish lethality downstream of the STP during the use of alternative methods of sewage disinfection;

Description

Hatchery-reared rainbow trout were caged at various sites in Big Otter Creek downstream of the STP for each of three treatments of the sewage effluent, in the form of: (i) chlorination, (ii) UV irradiation, and (iii) a sodium bromide/chlorination process. Lethality and in-stream chemistry were monitored throughout the exposures for comparison purposes.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
2	Second Year	complete		
	Cost $000		Number of Man Years	
Budget $20K	Current $20K	Total $20K	Current 0.8	Total 0.8

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

S. W. Region
Lab Services Branch

Remarks

Ministry of the Environment

Inventory: Research and Development Projects

ch/Office	Date
Water Resources Branch	29 Day 08 Month 84 Year

ject Title

Metals Accumulations in Fishes from Poorly Buffered Ontario Lakes

Words

Mercury, lead, cadmium, pH, alkalinity, acidification
Bio-accumulation, Yearling Yellow Perch, acidic precipitation

cipal Investigator and Organization	Tel.	
K. Suns, Ministry of Environment	248-3011	Internal ☒
		Grant ☐
son Officer or Supervisor	Tel.	Unsolicited Contract ☐
		Solicited Contract ☐

ctives

- Investigate metals accumulation in fish-water quality relationships with particular reference to acidification.
- Develop metals residue data for Muskoka-Haliburton Lakes for trends with time assessment.
- Assess the influence of acidic precipitation on mercury residue accumulation in fishes.
- Assess fish condition changes in lakes with depressed pH.

scription

Yearling Yellow Perch from selected lakes are used as biomonitors for biologically available metals fraction determination in individual watersheds. Metals residues in Perch are compared to fish condition to evaluate trends in fish health. Metals residue levels from comparable lakes are compared across the province to assess the role of acidic precipitation in contaminant loading.

tion of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
On-going	6 Year	January 1985	☒ Yes	☐ No
	Cost $000		Number of Man Years	
lget	Current Oper. - 18 Analytical - 8	Total	Current 0.4	Total 2.4

ces of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☒ Jointly Funded ☐ Other APIOS

ticipation By Others (Specify)

rks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Water Resources Branch	Day Month Year

Project Title

Nearshore Fish Contaminants Surveillance - Great Lakes

0

Key Words

Spottail shiners, contaminant uptake, water quality, trends with time

Principal Investigator and Organization	Tel.	
K. Suns, Ministry of Environment	248-3011	Internal ☒
		Grant ☐
Liaison Officer or Supervisor	Tel.	Unsolicited Contract ☐
		Solicited Contract ☐

Objectives

- Establish a data base for temporal trend assessment
- Identify areas of concern for point-source identification
- Provide an early warning system for bio-accumulative material identification.

Description

Young-of-the-year spottail shiners (notropis hudsonius) are used as biomonitors to obtain time-integrated organic and inorganic contaminant uptake data that reflect on most recent water quality conditions at a given locality. Approximately 40-50 sites are sampled annually in the Great Lakes.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
on-going	10th Year	annual *	☒ Yes	☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	OP-30k Analytical 36K		0.5	5.0

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☒ Jointly Funded ☐ Other

Participation By Others (Specify)

Canada-Ontario Agreement on Great Lakes Water Quality

Remarks

* Annual Report for I.J.C. surveillance sub-committee

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Water Resources/Aquatic Contaminants Section	Date	28 08 84 (Day Month Year)

Project Title

0 ✓ The Acute Lethality and Bioconcentration of Trace Contaminants in Fish Exposed to a Pulp Mill Effluent in Moberly Bay, Lake Superior

Key Words

Lethality, Bioconcentration, Fish Exposure, Chlorophenols, Pulp Mill Effluent

Principal Investigator and Organization	Tel.	
K. Flood/Assessment Programs Unit	248-3011	Internal [X]
		Grant [ ]
Liaison Officer or Supervisor	Tel.	Unsolicited Contract [ ]
		Solicited Contract [ ]

Objectives

i) Define the zone of fish lethality within the Kimberly Clark pulp mill plume in Moberly Bay;

ii) Attempt to determine the cause/effect relationship between the plume characteristics and field bioassay results;

iii) Compare the laboratory and field bioassay results;

iv) Assess the usefulness of short-term fish exposures in an effluent plume to determine the bioconcentration potential of trace contaminants in fish.

Description

Hatchery-reared rainbow trout were exposed to the effluent in cages situated throughout the plume in Moberly Bay. Acute fish lethality and related water chemistry were monitored daily during the 96-h exposure.

Laboratory bioassays were undertaken on daily grab and/or composite samples of the final mill effluent and the Blackbird Creek discharge to Moberly Bay.

Whole body analyses of rainbow trout which survived the 96-h field exposure were also undertaken in order to measure the bioconcentration of specific chlorophenols by fish.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
2	second Year	March 31/85	[X] Yes	[ ] No
	Cost $000		Number of Man Years	
Budget $35K	Current $10K	Total $35K	Current .4	Total 1.25

Source of Funds (Specify)

[X] Regular Work Program [ ] Special Ministry [ ] Jointly Funded [ ] Other

Participation By Others (Specify)

Northwestern Region
Lab Services

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Water Resources Branch, Aquatic Biology Section	30 Day 8 Month 84 Year

Project Title

Acidic Precipitation in Ontario Study

Key Words

Acidification, acidic precipitation, deposition, susceptibility.

Principal Investigator and Organization	Tel.	
P.J. Dillon, Limnology Unit, M.O.E.	(705) 766-2412	Internal ☐ Grant ☐
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐ Solicited Contract ☐
J. Pagel, Aquatic Biology Section	(416) 248-3058	

Objectives

To determine what the chemical and biological effects of acidic deposition have been on aquatic systems; to determine critical thresholds for aquatic organisms-particularly fish, but also amphibians, benthic invertebrates, zooplankton; to determine relationships between rate of change in aquatic systems and acidic deposition rate to allow prediction of critical acid deposition levels.

Description

a) Lake and watershed mass balance; mass balances of important chemical substances (strong acids, alkalinity, base cations) have been measured for 20 catchments and 8 lakes for the course of this study. These data are the basis for modelling the relationships between environmental stresses (acidic deposition) and the chemical and biological response of the lakes, and for determining acceptable levels of environmental stress.

b) Long term trends in aquatic chemistry; a set of about 30 lakes and 30 streams have been monitored for the course of the study to directly determine long-term rate of acidification and to provide a data base for testing predictive models.

c) pH/aluminum thresholds for organisms; the lethal pH and aluminum thresholds in low ionic strength water for 5 sport fish species, 2 other fish species, 3 amphibian species, and a number of invertebrate species have been determined using laboratory and field bioassays.

d) Aluminum biogeochemistry; sources of aluminum in terrestrial systems, the fate of aluminum in aquatic systems, and the distribution of aluminum in its different chemical forms has been measured and will be related to toxicological studies.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? *	
	5th Year	1985-86	☒ Yes	☐ No
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	1138K		12	

Source of Funds (Specify)

A.P.I.O.S.

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Co-operative work is carried out with other government agencies (DOE/CCIW, DOE/AES, DFO, OMNR, NIVA (Norway) CIIR (Norway) and universities (Toronto - H. Harvey, P. Stokes, G. Sprules, J. Hoeniger; Trent - D. Evans, C. Taylor, P. Adams, M. Berrill, D. Lasenby; Guelph - G. Mackie, J. Sprague).

Remarks

*Since the beginning of the study 45 journal papers, 15 ministry technical reports and 15 ministry data reports have been produced and released.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Water Resources Branch, Aquatic Biology Section	22 Day 8 Month 84 Year

Project Title

Relationship of reservoir phosphorus concentrations to aquatic plant harvesting.

Key Words

Phosphorus, Aquatic Plants, Reservoirs

Principal Investigator and Organization	Tel.	
I.E.C.-Beak Consultants Ltd., (K. Clarke-Whistler)	671-2600	Internal ☐ Grant ☐ Unsolicited Contract ☒ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
K.H. Nicholls, Aquatic Biology Section	248-3058	

Objectives

To determine if, in small lakes and reservoirs with abundant aquatic plant growth, plant harvesting alters significantly the aqueous concentrations of dissolved and total phosphorus (potential use in utilization of outflow waters for augmentation at wastewater treatment plants).

Description

Nutrient (emphasis on phosphorus) budget of Orangeville Reservoir (Credit Valley Conservation Authority) is being determined prior to and after large scale macrophyte harvesting.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
1-2	1st Year	March, 1985	☒ Yes	☐ No
	Cost $000		Number of Man Years	
Budget $8K/yr.	Current	Total	Current	Total

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Credit Valley Conservation Authority

Remarks

Background waterquality data are available on the Orangeville reservoir outflow (3 years); however, the project will probably require additional time in 1985/86 for a thorough assessment.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Water Resources Branch, Aquatic Biology Section	30 Day 8 Month 84 Year

Project Title

Filamentous Algae Programme

Key Words

Filamentous algae, Cladophora, monitor, nutrients, heavy metals, PCB's, acidification, eutrophication

Principal Investigator and Organization	Tel.	
M.B. Jackson, Aquatic Biology Section	(416) 248-3058	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
K.H. Nicholls, Aquatic Biology Section	(416) 248-3058	

Objectives

1) To determine the effects of acidication on the distribution and abundance of filamentous algae in Ontario inland lakes.
2) To assess phosphorus control strategies for the Great Lakes relative to Cladophora growth requirements.
3) To apply filamentous algal tissue analysis to biomonitor long term trends in nearshore trace contaminants (nutrients, heavy metals, PCB's) in the Great Lakes and Ontario inland lakes.

Description

1) Investigations of filamentous algae and controlling environmental factors, especially the role of pH in Ontario inland lakes and streams.
2) Surveillance of filamentous algal heavy metal, PCB and nutrient levels in the Great Lakes and Ontario inland lakes in cooperation with investigations by I.J.C. and other government agencies.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
Ongoing	1) 3rd year 2) 3rd Year	As information made available	☒ Yes*	☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	70K		1½	

Source of Funds (Specify) Canada-Ontario Agreement, A.P.I.O.S.

☒ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

1) A Facts Sheet on filamentous algae in acidic lakes was prepared for distribution by the APIOS Coordinator's Office.
2) A report on algal tissue contaminants in the Niagara River is in preparation.

*Three available - others planned.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Water Resources, Aquatic Biology	30 Day 8 Month 84 Year

Project Title

Taxonomy and Ecology of Phytoplankton in Lake Acidification, Neutralization and Eutrophication Studies.

Key Words

Algae, Phytoplankton, Acidification, Eutrophication

Principal Investigator and Organization	Tel.	
K.H. Nicholls, Aquatic Biology Section	(416) 248-3058	Internal [X] Grant [ ] Unsolicited Contract [ ] Solicited Contract [ ]
Liaison Officer or Supervisor	**Tel.**	
J.E. Pagel, Manager, Aquatic Biology Section	(416) 248-3058	

Objectives

To describe structure and function of phytoplankton communities (taxonomy and ecology) relative to lake acidity and lake trophic state and effects of management strategies (e.g. phosphorus removal, $CaCO_3$ additions).

Description

Muskoka-Haliburton

1) Study of several lakes relating composition and biomass of phytoplankton to other ecosystem variables (e.g. lake morphometry, water chemistry, food chain components).
2) Taxonomy of diatom frustules and Mallomonas scales in selected lake sediments (along with ^{210}Pb dating) to determine rate of lake acidification.
3) Factors controlling growth and odour production by Chrysochromulina breviturrita.

Great Lakes

4) Response of phytoplankton to phosphorus loading reductions and long term changes related to nutrient loading, hydrology and climate (Bay of Quinte, south Georgian Bay, nearshore Great Lakes).

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
Ongoing.(2) to be finished in 1985	1) 7 year 2) 2 year 3) 3 Year 4) 12 Year	Significant findings reported as they arise.	* [X] Yes	[ ] No
Budget	**Cost $000**		**Number of Man Years**	
	Current: 120K	Total:	Current: 4	Total:

Source of Funds (Specify)

A.P.I.O.S.

[X] Regular Work Program [X] Special Ministry [ ] Jointly Funded [ ] Other

Participation By Others (Specify)

Ministry of Natural Resources, Dept. of Fisheries & Oceans, Queen's & Guelph Universities.

Remarks

Re: Project 4 (Bay of Quinte) - future draft reports on Project Quinte have been prepared. Future work will be low level monitoring - research completed.

*Several have been completed, more in progress.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date (Day / Month / Year)
Water Resources	28 / 08 / 84

Project Title

Toronto Waterfront - Effects of Dredging/Lakefilling Activities

Key Words

East Headland, water quality, suspended sediment quality, transmissometer, centrifuge

Principal Investigator and Organization	Tel.	
M. Griffiths, Great Lakes Section	965-6957	Internal [X]
		Grant [ ]
		Unsolicited Contract [ ]
Liaison Officer or Supervisor	Tel.	Solicited Contract [ ]
I. W. Heathcote	965-6957	

Objectives

To monitor water and suspended sediment quality at the Toronto waterfront in the vicinity of the East Headland to assess potential interference with water uses (drinking water, aquatic life, recreation).

Description

Previous studies have indicated that the short-term effects of dredging/lakefilling activities on water quality were localized. In 1983, sediment traps were installed and limited turbidity profiling was undertaken to assess the quality/quantity of sediments moving away from the East Headland. To provide an adequate data base for assessment of long-term accumulation and migration of potentially contaminated sediments from the Headland, a transmissometer was employed in 1984 to assess subsurface movement of material and suspended solids were sampled with a centrifuge. Limited sediment trap sampling will be carried out, and current velocity profiles will be obtained. In addition, limited water quality sampling will be undertaken at inputs (Don River, Main STP outfall, near lakefilling/dredge dumping) for nutrients and trace contaminants to assess the magnitude of the various potential sources impacting the area.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
ongoing	5 Year	1985/86	[X] Yes [ ] No

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	239.00		1.0	

Source of Funds (Specify)

COA (50/50 provincial-federal)

[X] Regular Work Program [ ] Special Ministry [X] Jointly Funded [ ] Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date (Day / Month / Year)
Water Resources	28 / 08 / 84

Project Title

St. Mary's River

Key Words

biomonitoring, clams, polycyclic aromatic hydrocarbons

Principal Investigator and Organization	Tel.	
Y. Hamdy, Great Lakes Section	965-4590	Internal [X]
		Grant [ ]
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract [ ]
F. C. Fleischer	965-4590	Solicited Contract [ ]

Objectives

Assess the effectiveness of remedial measures that were outlined in the June 1982 Control Order to Algoma Steel. Continue monitoring the effects of flow changes on the river ecosystem.

Description

Flows through the Power Canal are maintained at 30,000 cfs after the completion of the Great Lakes Power Redevelopment Project. Phenol levels along the Ontario shoreline of the river in 1983 were well below levels found in previous years, albeit slightly higher than the provincial and Agreement objectives. This decrease was attributed to low production capacity of Algoma Steel coupled with the high river flows along the Ontario shoreline due to the completion of the Great Lakes Power Redevelopment Project.

Biomonitoring sampling using freshwater clams will be carried out at 10 sites along the Ontario shoreline of the river. Clams will be analyzed for polycyclic aromatic hydrocarbons (PAHs). Effluent from the Terminal Basins will be analyzed for trace organics.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? [X] Yes [ ] No	
ongoing	3 Year	1985/86		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	47.00		0.5	

Source of Funds (Specify)

COA (50/50 provincial-federal)

[X] Regular Work Program [ ] Special Ministry [X] Jointly Funded [ ] Other

Participation By Others (Specify)

Northeastern Region, Ministry of the Environment

Remarks

This preliminary study will provide insight into emerging problems which will be investigated intensively next year.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date 28 08 84 (Day Month Year)
Water Resources	

Project Title

Impacts of Lakefill Embayments on Nearshore Sediment Quality

Key Words

water quality, sediment quality, benthic diversity, benthic contaminant levels

Principal Investigator and Organization	Tel.	
D. Persaud, Aquatic Contaminants Section	965-6954	Internal [X] Grant [ ] Unsolicited Contract [ ] Solicited Contract [ ]
Liaison Officer or Supervisor	**Tel.**	
J. Ralston	965-6954	

Objectives

To determine the quality of water and sediment in the embayments created by lakefills and to assess changes in benthic diversity and contaminant levels through comparison with the exposed faces of such lakefills.

Description

The study will be directed towards determining sediment quality on the exposed sides and embayments of selected lakefills (Humber Bay, Ashbridges Bay and Bluffers Park lakefills). Benthic organisms will be identified and enumerated and levels of selected contaminants in important species of organisms will be determined. The influence of various discharges in the vicinity of the lakefills and material contributed by the lakefills themselves on sediment quality will be investigated. The information gathered will be evaluated against pre and post construction monitoring data where available.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? [X] Yes [ ] No
2	1 Year	1985/86	

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	38.00		0.3	

Source of Funds (Specify)

COA (50/50 provincial-federal)

[X] Regular Work Program [ ] Special Ministry [X] Jointly Funded [ ] Other

Participation By Others (Specify)

Metropolitan Toronto and Region Conservation Authority

Remarks

This study will assist in the development of policies and guidelines that would minimize impacts of lakefills.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date 28 08 84 (Day Month Year)
Water Resources	

Project Title

0 ✓

Environmental Impacts on In-place Pollutants in Sediments

Key Words

sediments, contamination, impact, mitigation, management

Principal Investigator and Organization	Tel.	
D. Persaud, Aquatic Contaminants Section	965-6954	Internal [XX]
		Grant [ ]
Liaison Officer or Supervisor	Tel.	Unsolicited Contract [ ]
J. Ralston	965-6954	Solicited Contract [ ]

Objectives

To assess the potential hazards of selected contaminants in sediments at several areas of known sediment contamination in the Great Lakes and develop strategies for the management of contaminated sediments where required. The assessment will address:

(a) The levels of the contaminants in sediments.
(b) The levels of contaminants in benthic organisms.
(c) The potential availability and danger to biota of selected metals.

Description

Sediments become the repository for most contaminants that enter the aquatic environment and constant assessment of the presence and potential dangers to human health and the aquatic ecosystem is necessary. A sediment and macrobenthic survey will be carried out during the summer of 1984 in the following areas: Lower St. Clair River, Detroit River, Toronto Waterfront and St. Lawrence River. Taxonomic identification and determination of body burden levels of the contaminants analyzed for within sediment samples will be carried out for the benthic macroinvertebrates. Sediment surface grabs will be taken in the vicinity of selected water intakes.

Duration of Project (Yrs.)	Present Year is (Year)	Reporting Date	Is a Report Anticipated ? [XX] Yes [ ] No	
ongoing	2	1985/86		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	262.00		1.2	

Source of Funds (Specify)

COA (50/50 provincial-federal)

[XX] Regular Work Program [ ] Special Ministry [XX] Jointly Funded [ ] Other

Participation By Others (Specify)

Remarks

This information will provide a baseline for the contaminants identified. It will also provide an indication of whether there is a build up of these contaminants in sediments in the vicinity of water intakes through comparison with levels in depositional areas around industrial and municipal outfalls.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date (Day / Month / Year)
Water Resources	28 / 08 / 84

Project Title

Seasonal Variation in Contaminant Body Burdens of Macroinvertebrates

OJ

Key Words

inplace pollutants, macroinvertebrates, seasonal variation, contaminant body burdens

Principal Investigator and Organization	Tel.	
A. Hayton, Aquatic Contaminants Section	965-6954	Internal [X]
		Grant [ ]
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract [ ]
J. Ralston	965-6954	Solicited Contract [ ]

Objectives

To assess the impact of inplace pollutants on several groups of macroinvertebrates and seasonal variation in contaminant body burdens.

Description

Sediments become the repository for most contaminants that enter the aquatic environment and constant assessment of the presence and potential dangers to human health and the aquatic ecosystem is necessary. Results of earlier investigations showed differences among stations which could not always be attributed to the sediment contaminant levels since the same species were not found at all locations and sampling was carried out over several months. This study will examine seasonal difference in body burdens of several taxa. A sediment and macrobenthic survey will be carried out once in the spring, summer and fall at each of 3 locations (Toronto waterfront, Nanticoke, mouth of the St. Clair River). Analyses of body burdens will be carried out on each of the major taxa found at each location.

Duration of Project (Yrs.)	Present Year Is	Reporting Date	Is a Report Anticipated ?	
2	1 Year		[ ] Yes	[X] No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	54.00		0.3	

Source of Funds (Specify)

COA (50/50 provincial-federal)

[X] Regular Work Program [ ] Special Ministry [X] Jointly Funded [ ] Other

Participation By Others (Specify)

Remarks

The results of this study will assist in the interpretation of data from other studies (ie. Environmental Impacts of In-Place Pollutants, Impacts of Lakefill Embayments on Nearshore Sediment Quality).

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date Day Month Year
Water Resources	28 08 84

Project Title

Development of Instrumentation

Key Words

instrumentation, data acquisition system, cost-effective, surveillance

Principal Investigator and Organization	Tel.	
Y. Hamdy, Great Lakes Section	965-4590	Internal [X]
		Grant [ ]
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract [ ]
F. C. Fleischer	965-4590	Solicited Contract [ ]

Objectives

To ensure use of cost effective and technically advanced instrumentation for data acquisition and recording of physical and water quality variables and to procure suitable instrumentation for surveillance activities.

Description

At present, the Section does not have a data acquisition system that is capable of recording and processing simultaneous navigational (Loran and Miniranger) and water quality (conductivity, temperature, turbidity) data. This short-coming results in delays in processing field data, especially with large data bases, such as plume tracking, as data recording and processing has to be done manually. There is a need to develop new instrumentation or to modify existing instruments to carry out the Section's projects efficiently. A program will also be carried out to study the instrumentation and methodology required to determine the frequency and quantity of sediment resuspension and sediment movement in the nearshore zone of the Great Lakes.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
ongoing	2 Year		[ ] Yes	[X] No
	Cost $000		Number of Man Years	
Budget	Current 53.50	Total	Current 0.4	Total

Source of Funds (Specify)

COA (50/50 provincial-federal)

[X] Regular Work Program [ ] Special Ministry [X] Jointly Funded [ ] Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date (Day Month Year)
Water Resources	28 08 84

Project Title

Development of Sampling Technology and Quality Control and Assurance Methodologies

Key Words

sampling equipment, representative/uncontaminated samples, low level concentrations

Principal Investigator and Organization	Tel.	
Y. Hamdy, Great Lakes Section	965-4590	Internal ☒
		Grant ☐
Liaison Officer or Supervisor	Tel.	Unsolicited Contract ☐
F. C. Fleischer	965-4590	Solicited Contract ☐

Objectives

To test sampling equipment to ensure that representative and uncontaminated samples are collected, especially for trace contaminants; to compare new and existing methodologies and instrumentation. To develop a resin cartridge to concentrate dissolved trace organics for sampling the low concentrations in Great Lakes waters.

Description

There are two major controllable sources of variability in environmental data - analytical and sampling. The former is controlled by the laboratory, the latter needs more comprehensive assessment to ensure quality control. This project will include the development of quality control/quality assurance protocolls for sampling by reviewing relevant literature and compiling a handbook. In addition, studies will be carried out to determine whether existing samplers and sampling technologies contaminate water samples; to measure the efficiency with which centrifuges remove suspended solids from the water; and to determine the short-term (less than a day) variability in water quality. The existing design of the XAD resin cartridge will also be improved to make it more suitable for field use.

Duration of Project (Yrs.)	Present Year is (Year)	Reporting Date	Is a Report Anticipated ?	
ongoing	2		☐ Yes	☒ No
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	43.50		0.6	

Source of Funds (Specify)

COA (50/50 provincial-federal)

☒ Regular Work Program ☐ Special Ministry ☒ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office
Water Resources Branch, Drinking Water Section

Date 13 09 84 (Day Month Year)

Project Title

Recovery of Giardia from drinking water

Key Words

Drinking water, Giardia

Principal Investigator and Organization	Tel.	
H. Graham	965-6995	Internal ☑ Grant ☐
Liaison Officer or Supervisor	Tel.	Unsolicited Contract ☐ Solicited Contract ☐
K. Roberts	965-6995	

Objectives

To develop and use suitable techniques to find Giardia cysts in drinking water

Description

To sample municipal and private water for the presence of Giardia cysts using the state-of-the-are techniques

Duration of Project (Yrs.)	Present Year is ongoing Year	Reporting Date	Is a Report Anticipated ? ☐ Yes ☒ No	
	Cost $000		Number of Man Years	
Budget	Current 3	Total	Current 0.05/yr.	Total

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Water Resources Branch, Drinking Water Section	16 09 84 (Day Month Year)

Project Title
Reconnaisance survey of the effects of agricultural pesticides on shallow aquifers

Key Words
Pesticides, Ground Water, Contamination, Agriculture

Principal Investigator and Organization	Tel.	
E. Rodrigues, Water Resources Branch	965-2105	Internal ☒ Grant ☐
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐ Solicited Contract ☐
T. Yakutchik	965-6995	

Objectives

To determine if detectable levels of agricultural pesticides are reaching the water table in selected shallow aquifers in the immediate vicinity of pesticide applications, and to determine the lateral and vertical extent of any pesticides found in ground water.

Description

The areas selected for the reconnaisance survey are based on the following criteria:
a) intensive pesticide usage in environments most susceptible to ground-water contamination (sand plains and shallow overburden over fractured rock); and,
b) use of shallow ground water for domestic water supplies. Five areas in Southern Ontario have been selected for this study. Piezometer will be installed and ground-water samples will be analysed for specific pesticides.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
3	1 (1984/85) Year	Annual	

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	10,000	10,000	1 1/2	4 1/2

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Ontario Ministry of Agriculture and Food, Hazardous Contaminants and Standards Branch — Assist in site selection, application rates ad listing of pesticides used

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Water Resources, Drinking Water Section	Date	14 08 84 (Day Month Year)

Project Title

Acidic Precipitation in Ontario Studies (APIOS) - Ground Water Studies

Key Words

APIOS; Ground Water, Acidification

Principal Investigator and Organization	Tel.	
Joe Lye, APIOS	416-965-2105	Internal [X] Grant [ ]
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract [ ] Solicited Contract [ ]
T. Yakutchik	965-6995	

Objectives

1. To determine the occurrence and distribution of acidic (low pH) ground waters in Northern and Central Ontario, and to determine the suitability of these waters for consumptive purposes.

2. To assess the contribution (i.e. quality and quantity) of ground water to lakes and streams in the Ministry's calibrated watersheds located in the Muskoka-Haliburton area.

Description

Phases of work being undertaken are as follows:

1. The inventory of ground waters in Northern and Central Ontario has been completed, and the occurrence and distribution of acidic ground waters have been determined. Water quality data are now being analyzed to determine the reason(s) for the acidity.

2. Investigations of ground-water quality in the calibrated watersheds is continuing at several monitoring sites work on the hydrogeologic framework in some of the watersheds is also continuing.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
on-going	4 Year	Annual	[X] Yes	[ ] No
	Cost $000		Number of Man Years	
Budget	Current	Total 107,000	Current 1 1/2	Total 4 1/2

Source of Funds (Specify)

[X] Regular Work Program [ ] Special Ministry [ ] Jointly Funded [ ] Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Water Resources Branch, Drinking Water Section	Date (Day Month Year)	14 09 84

Project Title

Investigation of the Effect of Fertilizers on Shallow Aquifers Beneath the Agricultural Lands

Key Words

Nitrate, Contamination, Agriculture, Fertilizer, Ground Water

Principal Investigator and Organization F. P. McKenna, Drinking Water Section	Tel. 965-6995	Internal	☒
		Grant	☐
Liaison Officer or Supervisor F. P. McKenna, Drinking Water Section	Tel. 965-6995	Unsolicited Contract	☐
		Solicited Contract	☐

Objectives

To establish whether shallow pluatic aquifers in agricultural areas are contaminated by nitrates on a regional basis or whether contamination indicates a localized well supply problem. To determine the physical condition of private wells and their location with regard to potential sources of nitrate.

Description

The scope of work involves the selection of candidate areas, hydrogeologic studies, a well water sampling program and a report analysing the results of the findings.

Candidate areas will be selected on the basis of intensive agricultural usage of fertilizers and intensive use of shallow ground water for domestic water supplies. A total of five areas have been selected that meet the candidate area criteria. The sampling points in the aquifers will be domestic well water supplies.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
3(E)	1 Year	Annual	☒ Yes	☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	---	---	1/4	1

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Regional MOE Offices
Agricultural and Food Representatives

Remarks

Ministry of the Environment
ntario

inventory: Research and Development Projects

anch/Office	Date
Water Resources Branch, Drinking Water Section	Day 13 Month 09 Year 84

roject Title

Trihalomethane Levels in Ontario Drinking Waters

ey Words
Organics, Potable Water

incipal Investigator and Organization	Tel.	
G. Martin	248-3935	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
iaison Officer or Supervisor	Tel.	
K. Roberts	965-6995	

jectives

To survey and monitor trihalomethane compounds in raw and treated water supplies in Ontario.

scription

Samples from water treatment plants throughout the province will be examined for trihalomethanes, particularly those chlorinated organics produced during treatment. The various treatments will be correlated with the occurrence of trace organic contaminants in the finished water.

ation of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
	6 Year	1984		
	Cost $000		Number of Man Years	
dget	Current	Total	Current	Total
	7	184	0.2	6

rce of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

ticipation By Others (Specify)

arks

Report for the data from 1977-82 is in press.

07/84

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office: Water Resources Branch, Drinking Water Section | Date: 13 09 84 (Day Month Year)

Project Title

Drinking Water Quality in Municipal Distribution System

Key Words
Drinking water quality, distribution system

Principal Investigator and Organization	Tel.	
H. Graham	965-6995	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	Tel.	
K. Roberts	965-6995	

Objectives

To examine the water quality in distribution systems for various health and asethetic parameters to determine any changes during transmission.

Description

To examine in detail the water quality in the treatment plant and consumer's taps of selected municipalities to determine charges during distribution including corrosion and biological infiltration parameters examined included general chemistry, micro and macro-organisms, heavy metals and asbestos.

Duration of Project (Yrs.)	Present Year is Year	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
on-going		1985		
	Cost $000		Number of Man Years	
Budget	Current 5	Total 59	Current 3.3	Total 0.1

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Experience Program students conduct much of the field work. Seventeen individual reports have been written; all data collected to date will be integrated into a single report to be completed in 1985.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office: Water Resources Branch, Drinking Water Section

Date: 13 09 84 (Day Month Year)

Project Title:
Non-conventional water treatment techniques

Key Words:
Drinking water, filtration

Principal Investigator and Organization	Tel.	
H. Graham	965-6995	Internal ☒ Grant ☐
Liaison Officer or Supervisor	**Tel.**	**Unsolicited Contract ☐ Solicited Contract ☐**
K. Roberts	965-6995	

Objectives:

Determine the potential for alternative water treatment technology applications for small municipal system.

Description:

Pilot scal studies of unorthodox filter systems specifically for small municipalities. The current study involves cartridge filters which will be assessed under a variety of raw water conditions to: meet Ontario Drinking Water Objectives; determine operational characterization and determine cost effectiveness.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
2	2 Year	1984		
	Cost $000		Number of Man Years	
Budget	Current 10	Total 20	Current 0.25	Total 0.5

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks:

A report on the use of cartridge filters for the production of municipal drinking water is in preparation.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Water Resources	Date (Day Month Year)	30 04 84

Project Title
Contaminants in Sediments in the Humber River

Key Words
Sediment Transport, Heavy Metals, Suspended Sediment, Contaminant Movement

Principal Investigator and Organization	Tel.	
Stephan Klose, MTRCA		Internal ☐ Grant ☐ Unsolicited Contract ☒ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Z. Novak, MOE	965-6194	

Objectives

To define and evaluate sediment transport as a mechanism for contaminant movement in the Humber and Don Rivers.

Description

The relationship between selected heavy metals and suspended sediment will be investigated using historical data from provincial water quality stations in the Don River basin. Field centrifugation study in the Humber basin will be carried out to characterize pollutant concentrations on suspended sediments. The Humber River channel geometry will be established and the sediment distribution in the Humber system will be mapped. Fine sediments will be characterized by particle - size distribution and chemical analysis of the particle fractions. Finally, the sediment transport and deposition capabilities in the river system will be analysed through use of sediment transport models.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated?	
3	3rd Year	March 31, 1986	☒ Yes	☐ No

	Cost $000		Number of Man Years	
	Current	Total	Current	Total
Budget 72.00	48.00	72.00	2.5	3

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Anticipation By Others (Specify)

TAWMS

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Water Resources	29 (Day) 08 (Month) 84 (Year)

Project Title

Feasibility of Plant Harvesting in Water Quality Amelioration and Phosphorus Management in Shallow Impoiunments

Key Words

Weed Harvesting, Water quality management

Principal Investigator and Organization	Tel.	
Credit Valley Conservation Authority	451-1615	Internal ☐ Grant ☒
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐ Solicited Contract ☐
K. Nicholls		

Objectives

To monitor plant harvesting in Orangeville Resevoir in order to: (a) assess water quality improvement; (b) assess technical and economic feasibility of harvesting as a management fool for phosphorus control in impoundments of Southern Ontario tributaries to the Great Lakes.

Description

This study will identify the important factors affecting the nutrient budget and water quality of the Orangeville Reservoir; it will also evaluate the efficacy, constraints and economics of plant harvesting in phosphorus control.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
	1984 Year	1985	☒ Yes	☐ No
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	$8,000.	$8,000.	See Participation	by the others

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Credity Valley Conservation Authority is providing the weed harvester and manpower for data collection.

Remarks

Proposal No. 407 - RAC Project 167

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Water Resources	Date	04 09 84 (Day Month Year)

Project Title
Nitrification - Denitrification for the Control of Ammonia and Hydrogen sulfide in Lagoon Effluents.

Key Words
Extended aeration, nitrification, sludge wasting to lagoon, denitrification.

Principal Investigator and Organization	Tel.	
W. Lewandowski	965-1655	Internal [X] Grant [ ] Unsolicited Contract [ ] Solicited Contract [ ]
Liaison Officer or Supervisor	**Tel.**	
P. Seto	965-1655	

Objectives

1. To establish design and operating criteria for a simplified extended aeration system as a pre-treatment option ahead of lagoons.
2. To determine if the nitrate concentrations produced are adequate to prevent hydrogen sulfide accumulation in the lagoons.
3. To assess if sludge wasting to the lagoons has a detrimental effect on lagoon effluent quality.

Description An existing extended aeration system followed by a polishing lagoon (Sutton, Ont. WPCP) will be operated in the mode mentioned above and monitored extensively until March, 1985.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
3.5	3rd Year	Sept. 1985	[X] Yes	[ ] No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	1.00	5.00	0.1	0.6

Source of Funds (Specify)

[X] Regular Work Program [ ] Special Ministry [ ] Jointly Funded [ ] Other

Participation By Others (Specify)

No

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date 28 08 84 (Day Month Year)
Water Resources Branch-Water & Wastewater Mngmt.-Industrial	

Project Title

Industrial Sewer-Use Control Review Committee

Key Words

Industrial Discharges - Municipal Sewers

Principal Investigator and Organization	Tel.	
Dr. P. Seto (Chairman)	965-4590	Internal ☒ Grant ☐
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐ Solicited Contract ☐
J.R. Hawley (Project Manager & Secretary)	965-2105	

Objectives

(a) To upgrade the existing Model Sewer-Use Bylaw

(b) To help control the discharge of hazardous contaminant to municipal sewers.

Description

This is a high priority Ministry program and is closely associated wit h Waste Management programs. Demands on staff time are significant. Committee membership involves MOE Regional Operations; Municipal and Private; Waste Management; Water Resources, EPS, Municipal Region of Durham.

Duration of Project (Yrs.)	Present Year is (Year)	Reporting Date	Is a Report Anticipated ? ☐ Yes ☐ No	
3	1983			
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total

Source of Funds (Specify) $50,000 available to Water Resources Branch for this fiscal yr. Estimate $100,000 plus for next fiscal years.

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify) Consultants will be used for future contracts but have not yet been chosen. Simcoe Engineering has been involved in two contracts associated with the committee work which is essentially complete.

Remarks

Two formal meetings held June 7, Aug. 1, next meeting scheduled for Sept. 11. Work on bylaw now in progress. Completion expected by end of fiscal year.

Branch/Office
WATER RESOURCES BRANCH

Date 01 09 .84
Day Month

Project Title
Ultra-violet Light Disinfection of Low Quality Effluents

Key Words
UV Disinfection, Combined Sewer Overflows, Primary Effluents

Principal Investigator and Organization	Tel.	Internal / Grant / Unsolicited Contract / Solicited Contract
George Zukovs, Canyiro Consultants Ltd.,	789-1215	
Liaison Officer or Supervisor	**Tel.**	
K.W. Anthony Ho	965-1655	

Objectives
To compare the application and costs of disinfecting

(1) combined sewage overflows (CSO),
(2) chemically coagulated/settled primary effluents,
(3) non-chemically treated primary effluents,

by ultra-violet light irradiation and high-rate chlorination.

Description
Bacterial contaminantion from CSO is a major contributing factor the closing of beaches in many cities. Disinfection of CSO is a feasible interim solution. UV irradiation is an ideal process, if works. UV disinfection does not require on-site chemical storage, it is non-toxic to aquatic life and the process can be switched-on/off automatically.

An eight UV lamps system was used to evaluate dosages/costs required to achieve target fecal coliforms reduction. Effectiveness on streptococci, pesudomonas aeruginosa and salmonella reduction was also monitored. High-rate chlorination (using pilot scale reactor) was ran in parallel for comparative purposes.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
2	2 Year	December, 1984	☒ Yes ☐

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	$66.6	$139.9		2.3

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☒ Jointly Funded ☐ Other

Participation By Others (Specify)

Environment Canada, Department of Supplies and Services

Remarks

MOE funding was provided by Toronto Area Watershed Management Study.
Funding for FY 83/84 was $36.2 K and $ 10K for FY 84/85.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Water Resources Branch	30 (Day) 08 (Month) 84 (Year)

Project Title

A Computer Procedure for Establishing Sewer-Use Bylaw Limits.

Key Words

Sewer-Use Bylaw

Principal Investigator and Organization	Tel.	
Simcoe Engineering	285-2285	Internal ☐ Grant ☐
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐ Solicited Contract ☒
S. Black/P. Seto	965-1655	

Objectives

To develop a computer methodology to help municipalities in setting realistic pollutant discharge limits to their Sewer-Use Bylaws as well as in allocating equitably their sewage treatment plant capacities to industrial users; so that the sewer systems and the STP operations will be protected, the sludge quality will meet the Agricultural Utilization Guidelines, or the STP effluents will meet specified discharge requirements.

Description

Develop a suitable "mass-balance" methodology (easily computerized). Using this method, a municipality could calculate an allocation of its treatment plant capacity for the industries discharging to the municipal system. With input data such as sludge utilization criteria, proportion of industrial flow to commercial/domestic flow, toxicity margin for sewage works biomass, treatment removal efficiencies etc. the municipality can use the "methodology" to estimate allowable sewage treatment plant influent loading limits for various pollutants. With knowledge of the individual industrial discharges, these sewage treatment plant loading limits can be further translated into an equitable allocation of loading capacity among local industry.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
2	1984 Year	Oct. 1984	
	Cost $000		Number of Man Years
Budget $29,300	Current -	Total $29	Current / Total

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☒ Jointly Funded ☐ Other Environment Canada

Participation By Others (Specify)

Environment Canada

Remarks

Branch/Office
WATER RESOURCES BRANCH

Date 01 09 . 8
Day Month

Project Title
Development of HAZPRED MODEL - Phase 1

Key Words
Hazardous Contaminants, Raw Sewage, Combined Sewer Overflows

Principal Investigator and Organization	Tel.	
George Zukovs , Canviro Consultants Ltd.,	789-1215	Internal Grant Unsolicited Contract Solicited Contract
Liaison Officer or Supervisor	**Tel.**	
K.W. Anthony Ho	965-1655	

Objectives
1. To develop a Screening Methodology which predicts the incidence of predominant US EPA priority pollutants and their concentration ranges in municipal raw sewages (Phase 1).

2. To verify the methodology through a well designed field survey/sampling program in two designated areas.

Description The methodology (an interactive computer program) provides a step-by-step approach to estimate annual flow and loadings of priority pollutants contributed by local industrial, residential and commercial sources to the raw sewages received at a WPCP. It enables the user to identify potential problematic catchments within the sewer system, and set useful sewer-use bylaws.

The methodology can be extended to predict annual loadings of priority pollutants in stormwater runoffs and combined sewer overflows (Phase 2)

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
2	2 Year	December, 1984	[X] Yes [ ]

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	$ 7.2	$36		0.6

Source of Funds (Specify)
Funding was provided by Toronto Area Watershed Management Study

[ ] Regular Work Program [ ] Special Ministry [ ] Jointly Funded [X] Other

Participation By Others (Specify)
No

Remarks
Priority pollutants analyses were provided by a seperate contract to Mann Testing Laboratory, Toronto. ($ 40 K)

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Water Resources Branch-Industrial Wastewater	28 (Day) 08 (Month) 84 (Year)

Project Title

Review and Evaluation of Literature on the Aquatic Toxicity of Pulp & Paper Effluents.

Key Words

Laboratory Bioassays - External Environment
- P & P Effluent

Principal Investigator and Organization	Tel.	
D. McLean Associates, West Vancouver, B.C. V7T 1B8		Internal ☐ Grant ☒
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐ Solicited Contract ☐
C. Inniss - Joint Project	965-2105	

Objectives

Assess link between laboratory bioassays of pulp and paper effluent and impact of discharged effluent on fish, fish habitat and man's use of fish.

Description

Canadian Pulp and Paper Association, Environment Canada & Fisheries Canada are funding project with MOE.

Study covers - predictive capability of bioassays
- toxic constituents in effluent
- monitoring test, etc.
- toxic impact within receiving environment
- bioaccumulation and elimination of constituents

Duration of Project (Yrs.)	Present Year is (Year)	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1 yr.max'm	1984	Feb. 1985	

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total

Source of Funds (Specify)

Ministry contributed $5K

☐ Regular Work Program ☐ Special Ministry ☒ Jointly Funded ☐ Other

Participation By Others (Specify)

See Description

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Water Resources	Date	04	09	84
			Day	Month	Year

Project Title
A Full Scale Artificial Marsh Wastewater Treatment and Demonstration Facility at Port Perry, Ontario.

Key Words
Full Scale, Port Perry, Artificial Marsh, Demonstration on Project

Principal Investigator and Organization	Tel.	
J. Neil, Limnos Ltd.		Internal ☐ Grant ☐ Unsolicited Contract ☒ Solicited Contract ☐
Liaison Officer or Supervisor W. Lewandowski	Tel. 965-1655	

Objectives
To operate and monitor a full scale artificial marsh demonstration facility in an attempt to refine design and operating criteria for such systems. To use the facility as demonstration project for other parties interested in this treatment concept.

Description
An existing waste stabilization pond (16 acres) has been converted to a three channel artificial marsh. Simplicity in design and minimal operational flexibility has been provided. Pre-treatment and phosphorus reduction is provided in an aerated facultative pond.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
3	2nd Year	1986	☒ Yes	☐ No

	Cost $000		Number of Man Years	
Budget $170,000	Current 50.00	Total 170.00	Current 1	Total 3

Source of Funds (Specify)
☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)
No

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Water Resources Branch	30 (Day) 08 (Month) 84 (Year)

Project Title

Sewer-Use Bylaw Implementation and Enforcement
- Current and Recommended Practices.

Key Words

Sewer-Use Bylaw

Principal Investigator and Organization	Tel.	
Simcoe Engineering	286-2285	Internal ☐
		Grant ☐
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐
P. Seto	965-1655	Solicited Contract ☒

Objectives

To develop technical and administrative guidelines to assist municipalities in setting up effective Sewer-Use Bylaw enforcement programs.

Description

To survey thirteen municipalities via interviews to catalogue information on their current Sewer-Use Bylaw enforcement activities and the abatement results. Based on these data, technical and administration guidelines (including the identification of resources required) will be developed which will be useful for any municipality intending to set up an effective Sewer-Use Bylaw enforcement program.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☐ Yes ☐ No	
2	1984 Year	Oct. 1984		
	Cost $000		Number of Man Years	
Budget $20,000	Current: -	Total: $20	Current:	Total:

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☒ Jointly Funded ☐ Other Environment Canada

Participation By Others (Specify)

Environment Canada

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Water Resources	30 Day 08 Month 84 Year

Project Title

Audio - Visual Course on Erosion and Sediment Control for Construction Sites (Phase 1)

Key Words

Erosion Control, Sediment Control, Urban Pollution

Principal Investigator and Organization		Tel.	
	I. Lorant M.M. Dillon Ltd.	229-4646	Internal ☐ Grant ☐
Liaison Officer or Supervisor		**Tel.**	**Unsolicited Contract ☐** **Solicited Contract ☒**
	D. G. Weatherbe	965-6194	

Objectives

To develop and prepare an audio-visual course to educate and train planners, engineers, municipal inspectors, construction foreman etc., in the use of erosion and sediment control plans and methods during construction.

Description

The first phase of the project is to prepare a detailed course outline including detailed presentation of contents and cost for preparing the course. Subsequent phases will be based on the results of Phase 1.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
	1984 Year	Sept. 30 1983		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	7.00	7.00		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

The Steering Committee is comprised of representation from MOE, MTC and Municipal Engineers Association.

Remarks

This project will assist in determining subsequent action.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Water Resources	29 (Day) 08 (Month) 84 (Year)

Project Title "Phosphorus Leaching Studies" and/or "Leaching of Phosphorus from the Organic Soils of the Holland Marsh"

Key Words Phosphorus, muck soil, leaching

Principal Investigator and Organization	Tel.	
Prof. L.R. Thomas, Guelph University	(519) 824-4120	Internal ☐ Grant ☒
Liaison Officer or Supervisor	**Tel.**	
Mr. D. Draper, Ministry of the Environment	(416) 965-6194	Unsolicited Contract ☐ Solicited Contract ☐

Objectives

Through laboratory studies of phosphorus content and mobility of P induced by water infiltration, to determine potential of marsh soils to generate export of phosphorus to surface water drainage and potential impact on Lake Simcoe.

Description

This is an ongoing project being carried out under the supervision of the Water Resources Branch.

In laboratory column studies, the effect of natural leaching by drainage water is evaluated. The various forms of phosphorus and changes in form over time is also determined.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
1½ years	1984 Year	09/84	☒ Yes	☐ No

	Cost $000		Number of Man Years	
	Current	Total	Current	Total
Budget $25,000	5.42	30.42	02/83 - 09/84	1½ years

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Director (Prof. Thomas), 1 graduate assistant student, 2 summer undergraduate students

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Water Resources	Date 29 08 84 (Day Month Year)

Project Title

Development of a Toronto Urban Runoff Prediction and Control Evaluation Model

Key Words

Principal Investigator and Organization	Tel.	
B. Pitt/Gartner Lee Ltd.		Internal ☐ Grant ☐ Unsolicited Contract ☒ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
W. Wang, MOE	965-6995	

Objectives

- To do detailed analyses of sources of pollution on urban land extended in time and space to other watersheds.
- To do a preliminary screening of control options for urban drainage to be adopted in the watershed model.

Description

based on catchment data from two locations from stormwater study a model for prediction and control option evaluation will be built for the urbanized Humber River watershed. Controls to be analysed include street sweeping and catch basin clearing.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
1	1st Year	1984	☒ Yes ☐ No

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
$49,800	-	49.80		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other RAC

Participation By Others (Specify)

Related to Toronto Area Watershed Management Strategies Study

Remarks

Proposal No. 404 - Project No. 160

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Water Resources	Date 29 Day 08 Month 84 Year

Project Title

IMPSWM Program for Urban Hydrological Modelling

Key Words

Principal Investigator and Organization	Tel.	
Prof. P. Wisner, University of Ottawa	(613)231-7022	Internal ☐ Grant ☒
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐ Solicited Contract ☐
D. G. Weatherbe, MOE	(416)965-6194	

Objectives

To provide continued development of models, support of model applications and distribution of models.

Description

To continue membership and support of Implementation of Storm Water Management Models (IMPSWM) Program for Urban Hydrologic Modelling.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
3	1st Year	March,31, 1985		
	Cost $000		Number of Man Years	
Budget $45,000	Current 15.00	Total 45.00	Current -	Total -

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Other governmental agencies, municipalities and consulting firms.

Remarks

Liquid & Solid Waste Research

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

58 PL

Branch/Office	Date (Day Month Year)
Policy and Planning Branch, Research Coordination Office	

Project Title TITLE: "FIELD MEASUREMENTS INFILTRATION THROUGH LANDFILL COVERS."

Key Words Infiltration into Landfills, Landfill Sites, Lysimeters

Principal Investigator and Organization	Tel.	
P. K. Lee, Gartner Lee Associates Markham, Ontario L3P 3J9		Internal ☐ Grant ☐
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐ Solicited Contract ☒
Dr. G. Hughes	965-4120	

Objectives

To collect field measurements of the actual amount of water which infiltrates through various types of covers under various conditions at landfill sites. The data collected will be tested for reproducibility and compared to the results expected using the empirical calculations of infiltration.

Description

Through a program of close liaison with the MOE and other regulatory and research bodies, 3 prototype lysimeter systems will be designed and constructed. These systems will be monitored for 12 months and the data analysed and checked for consistency. Additional lysimeter systems incorporating various cover materials and physical settings will then be constructed and monitored. A complete analysis and assessment of the results will be undertaken.

Upon completion of the study, we should know the effect of various types of cover materials, installed under various settings, on the volume of water which can reasonably be expected to infiltrate through the covers. The empirical values which are currently used in cover design can be checked against the field measurements and the equations modified accordingly.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
3	3rd Year	1985	

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	4.9	38.7		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Presented at the Technology Transfer Conference.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

63 PL

Branch/Office	Date (Day Month Year)
Policy and Planning Branch	

Project Title

0 Design of Ground-Water Monitoring Programs for Waste Landfill Sites.

Key Words Ground-water quality monitoring; Landfills

Principal Investigator and Organization	Tel.	
Dr. P. Byers & R. Schwartz Dept. of Civil Engineering, University of Toronto		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor I. Pawlowski,	Tel.	

Objectives

Evaluation of the applicability of statistical methods, simulation techniques and models in the field of environmental monitoring of ground-water quality at various landfills sites.

Description

To assess the suitability of statistical methods and models through a literature review, analysis of data available to the Ministry of the Environment from two monitored landfill sites, and to apply the most suitable simulation techniques and statistical methods to the design of ground-water quality monitoring programs for landfill sites.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
2	3rd Year	1985	☒ Yes	☐ No

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	–	30		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks Presented at the Technology Transfer Conference.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

104 PL

Branch/Office	Policy and Planning Branch, Research Coordination Office	Date Day Month Year

Project Title

"ASSESSING THE IMPACT OF HAZARDOUS LIQUIDS SPILLED ONTO SOIL."

Key Words

Environmental Impact, Hazardous Spills, Soil Contamination

Principal Investigator and Organization	Tel.	
Dr. G. Farquhar, University of Waterloo		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
R. Pearson	965-3237	

Objectives

- To develop methodology for predicting contaminant dispersal and attenuation arising from spills of hazardous liquids onto soil, and the environmental fate of these chemicals.
- Attention will centre on immiscible liquids including both sinkers and floaters.

Description

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
3	1 Year	1987	

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	82	141.8		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Presented at the Technology Transfer Conference.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

118 PL

Branch/Office	Date (Day Month Year)
Policy and Planning Branch, Research Coordination Office	

Project Title

"OCCURRENCE AND MOBILITY OF HAZARDOUS ORGANIC CHEMICALS IN GROUNDWATER AT ONTARIO LANDFILLS."

Key Words

Mobility of hazardous contaminants, groundwater contaminant, landfill

Principal Investigator and Organization	Tel.	
Dr. J. Cherry, Groundwater Research Institute University of Waterloo		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
M. Goodwin	965-4120	

Objectives

- to study and determine the nature, concentrations and mobility of hazardous organic compounds that occur in groundwater at representative municipal landfills in Ontario.

Description

The study will consist primarily of field investigations that will take place at 7 landfills in a variety of hydrogeologic settings in Ontario. Four of these landfills have been studied as part of our previous Lottery Fund project, which focused on inorganic contaminants. These landfills already have good groundwater monitoring networks. Monitoring networks will be installed at the 3 additional landfills. The landfills represent various ages and are situated in different geologic and hydrologic settings. Sampling of the groundwater monitoring networks will provide information on the spatial and temporal distributions of organic contaminants. These distributions will be related to various factors such as landfill age, type of waste, hydrogeological conditions, and contaminant mobility and attenuation.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
3	1st Year	1987	☒ Yes	☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	168.6	319.0		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Presented at the Technology Transfer Conference.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

130 RR

Branch/Office
Waste Management Branch - Special Waste Unit

Date 24 (Day) 08 (Month) 84 (Year)

Project Title

Road Dust Suppressant Study

Key Words

Dust/Suppressant

Principal Investigator and Organization
Dr. Gilham - University of Waterloo

Tel. 815-885-1211

Liaison Officer or Supervisor
John Smart

Tel. 965-9668

Internal ☐
Grant ☐
Unsolicited Contract ☐
Solicited Contract ☒

Objectives
To provide a review of current road dust suppressant materials and their usage.

To provide an assessment, based on available data, of the possible environmental effects of suppressant chemicals.

Description
A literature review will initially yield data on the common methods of road dust suppression and the types and quantities of chemicals used. As far as possible, the effects of these chemicals on the environment will be assessed. Where no data exist, further practical research may be required.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1	1st Year	March 1985	
	Cost $000		Number of Man Years
Budget $20,000	Current —	Total 25.00	Current 0.5 / Total 1.5

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other RAC

Participation By Others (Specify)

Remarks
This contract may be renewed for a further year should extensive research be warranted.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

131 RR

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

"DEVELOPMENT OF DESIGN CRITERIA FOR OPTIMAL RECOVERY OF LEACHATE UNDER SANITARY LANDFILLS."

Key Words

Leachates, Sanitory landfills, recovery, groundwater infiltration, contaminant migration.

Principal Investigator and Organization	University of Waterloo Dr. Farvolden	Tel.	Internal ☐ Grant ☒
Liaison Officer or Supervisor	M. Goodwin	Tel. 965-2105	Unsolicited Contract ☐ Solicited Contract ☐

Objectives

1. Literature review and compilation of papers on subject.
2. Develop computer model to predict groundwater flow in landfills.
3. Exercise the model to predict the effectiveness of leachate capture for various tile capture systems.

Description

In order to deal with the many factors affecting leachate flow, surface water infiltration, groundwater flow, types of media and tile configuration, a model is required. This preliminary phase of the study will use a simple case of a refuse-filled ditch to assess the factors to be included and make some preliminary predictions.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
1	1 Year	1985	☒ Yes ☐ No

	Cost $000		Number of Man Years	
Budget	Current -	Total 25.0	Current	Total

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

147 PL

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

Geochemical investigation of the Origin and Properties of Near Surface Fractures in Clay Till.
(for potential application in siting of landfills in clay)

Key Words

Leachates, contaminant migration, clay till

Principal Investigator and Organization	Tel.	
University of Waterloo M. B. Dusseault		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
M. Goodwin		

Objectives

1. To determine the distribution and properties of fractures in clayey glacial deposits.
2. To define possible processes by which fractures in clayey deposits were created.
3. To assess the geomechanical effects of clayey till fractures on the flow of leachate through the weathered zone.

Description

It is proposed to investigate the geomechanical behaviour of fractured clayey till in an attempt to probe the origin of these fractured zones. The potential of these fracture networks to allow contaminant migration is of concern to environmental agencies. Studies dealing with the changes in hydrogeologic characteristics under various stress and hydraulic pressure conditions are essential to better evaluate the suitability of these deposits for waste disposal.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
2	1st Year	1986	☒ Yes ☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	25.5	30.3		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

152 PL

Branch/Office	Date (Day Month Year)
Policy and Planning Branch	

Project Title
"The effects of tile drainage and open ditches on peak flows and dry weather flows."

Key Words
Tile drainage, erosion, guidelines

Principal Investigator and Organization	Tel.	
Dept. of Civil Engineering Queen's University Dr. W. Watt		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	Tel.	

Objectives
To assess the effects of tile drainage and open ditches and dry weather flows with particular application to Ontario.

Description
A simulation model for tile-drained agricultural fields and basins will be developed and evaluated. The developed technique will be used to study tile drained fields in the South Nation River.

The study will provide an improved tile drain design that reduces erosion and produces information necessary for the development of drainage guidelines.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
3	1st Year	1987	☒ Yes ☐ No

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	22.0	70.6		

Source of Funds (Specify)
☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

153 PL

Branch/Office	Policy and Planning Branch	Date Day Month Year

Project Title

"Laboratory and Numerical Model Studies to Design Criteria for Optimal Recovery of Leachate under Sanitary Landfills."

Key Words

Leachate recovery, landfill, leachate model.

Principal Investigator and Organization	Tel.	
University of Waterloo Dr. R. N. Farvolden		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
M. Goodwin	965-4120	

Objectives

Evaluation of tile drain systems as a method for leachate capture

Development of criteria for design of tile drain systems for leachate capture.

Development of criteria for overall design of landfills to enhance leachate capture.

Description

To modify a scaled physical model landfill to simulate the effects of tile configuration on leachate capture and migration for different settings including clay liners under varying simple but realistic hydrogeologic and climatic conditions.

To test a numerical model for conditions tested physically and extend model to account for anistropy and simple layered media and use the model to evaluate and predict effectiveness of leachate capture for various tile configurations and hydrogeologic settings.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
3	1st Year	1987		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	30.1	107.1		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

156 PL

Branch/Office	Date Day Month Year
Policy and Planning Branch	

Project Title
To determine the integrity of solidified wastes by Large Scale Leach Columns under Environmental and Controlled Conditions

Key Words
Solidified waste, leachates, Waste disposal

Principal Investigator and Organization	Tel.	
University of Toronto Dr. D. W. Kirk		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
F. Darcel	965-4120	

Objectives

To determine the effects of the parameters of time, temperature, leaching solution, PH, weather and biological action on the integrity of solidified wastes in land disposal.

Description

Relatively large leaching columns (5' x 1' diameter) will be used under natural environmental conditions to follow solid waste degradation products and the extent and rate of leaching. These results will be compared to controlled leaching agents under the same conditions. In addition, short-term leaching tests will be carried out under laboratory conditions to determine the predictive abilities of these tests.

Duration of Project (Yrs.)	Present Year is Year	Reporting Date	Is a Report Anticipated ? ☐ Yes ☐ No	
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office
Waste Management Branch

Date 24 (Day) 08 (Month) 84 (Year)

Project Title
ERRP Compost. An evaluation of its use in container growing and field production of landscape trees and shrubs.

Key Words
Compost, Containers, landscape trees and shrubs

Principal Investigator and Organization Assoc. Prof. Glen Lumis, Agricultural Science
Univ. of Guelph with TCG Materials & Sheridan Nurseries

Tel. 519-824-4120

Liaison Officer or Supervisor
P.J. Provias

Tel. 965-9671

- Internal ☐
- Grant ☒
- Unsolicited Contract ☐
- Solicited Contract ☐

Objectives
To determine the suitability of the ERRP Compost as an organic supplement for containers (growing mixes) and field grown coniferous and deciduous species. Assess also potential salts and chemical toxicity problems.

Description
Sheridan Nurseries - Georgetown, Ontario Tree Farm provided species and land for testing conducted by U. of Guelph. TCG Materials, Aberfoyle Ontario Quarry Pits, provided facilities for planting and testing of landscape trees and shrubs, conducted by Univ. of Guelph. Initial bud growth, shoot growth, leaf size, nutrients, root growth and water survival to be tested. Foliar analysis to be done on container plants, grown in the greenhouses at the Univ. of Guelph.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
2	2nd Year	August 1984	

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	---	27.07		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks
Project finished. Report final to be submitted by Aubust 1984. Funds have been expended (upfront grant).

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Waste Management Branch	24 Day 08 Month 84 Year

Project Title

RDF in Brick Industry.

Key Words

RDF, Brick, Energy

Principal Investigator and Organization	Tel.	
Brampton Brick Co., Anthony Schum	451-5881	Internal ☐ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☒
Liaison Officer or Supervisor	**Tel.**	
P.J. Provias, N. Ahlberg, (Dr. Laughlin, ORF)	965-9671	

Objectives

To utilize RDF and/or char as an energy source - fuel, which can be used as an ingredient of the clay brick mixture; resulting in a decrease of BTU heat units normally supplied externally in form of natural gas.

Description

Original contract ($72,000) has now $30,000 left but must be amended to take in the fiscal year 1984/85. Work to be done by March 31, 1985.

1. Complete testing of RDF pellets. These are to be ground to fine mesh in laboratory hammer mill. Pellets made from dry RDF to be supplied by MOE.
2. Testing of residue char in the brick mixture; the char is the result of a gasification process.

Brampton now has on hand "char" and can proceed with that part of the test.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1	1st Year	Late 1985	
	Cost $000		Number of Man Years
Budget $72,551.16	Current 2.00 to be amended	Total 20.00	Current 1 / Total 1

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☒ Jointly Funded ☐ Other

Participation By Others (Specify)

Energy

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Waste Management Branch	24 Day 08 Month 84 Year

Project Title

Radionuclide concentrations in the Ontario environment, 1983

Key Words

Radioactivity, Nuclear fuel cycle, background radiation

Principal Investigator and Organization	Tel.	
A.W. James	965-9668	Internal [x]
		Grant [ ]
Liaison Officer or Supervisor	Tel.	Unsolicited Contract [ ]
		Solicited Contract [ ]

Objectives

To compile data on radionuclide concentrations and radiation exposure rates, and to make this available to the various branches and regions of the Ministry.

Description

MOE staff routinely send samples of air, water, soil, and biota from various regions to the Radiation Protection Laboratory of the Ministry of Labour. Results of the analyses are being compiled on a personal computer at the Waste Management Branch.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? [x] Yes [ ] No	
Continuous	1984 Year	September 1984		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total

Source of Funds (Specify)

[x] Regular Work Program [ ] Special Ministry [ ] Jointly Funded [x] Other Plus Summer student

Participation By Others (Specify)

Ministry of Labour

Remarks

1983 data will be reported in September 1984. It is intended to produce annual reports on radiological data in future.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Waste Management Branch	24 Day 08 Month 84 Year

Project Title

RDF Consolidated Fibre Co. Toronto
"Pulping of RDF to remove plastics and provide fibre pulp"

Key Words

Refuse Derived Fuel (RDF), Paper fibre reclamation

Principal Investigator and Organization	Tel.	
Consolidated Paper Fibre Co., Black Clawson Co.	479-3245	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
P.J. Provias	965-9671	

Objectives

To utilize the light air classified and shredded paper and plastic fraction (RDF) from the ERRP or similar type operation as a source of mixed paper fibre and light density polyethylene plastic.

Description

For a cost of $3,000 each MOE and CFL total $6,000; typical RDF from the ERRP was shipped to the Black Clawson plant research facilities at Middletown, Ohio. RDF was treated in a full plant scale pulping operation. The separation being made, paper sheets were made from the pulp. Remaining pulp was sent to various paper mills by CFL for evaluation. Results indicate that RDF makes a suitable mixed paper pulp with a market value which could justify such an operation (e.g. ERRP). CFL have made a proposal to MOE to utilize the ERRP facilities for such an operation ($1.5 million).

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
	1st Year	January 1985	
	Cost $000		Number of Man Years
Budget $6,000	Current ---	Total 6.00	Current --- / Total 0.05

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Jointly funded by Consolidated Fibres Ltd.

Remarks

Reports from both Black-Clawson and CFL had been submitted. If RDF test is repeated by Black Clawson on mill size scale; then additional funding would be needed for this test. However, as of now CFL with the co-operation of MOE at the ERRP are unwilling to proceed with a facility to pulp RDF at the ERRP facilities.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office
Waste Management Branch

Date 24 (Day) 08 (Month) 84 (Year)

Project Title
Selection and Evaluation of Samplers for Hazardous and Liquid Industrial Wastes.

Key Words
Sampler, hazardous waste, liquid industrial waste, confidence limits, safety, cost

Principal Investigator and Organization	Tel.	
Dillon Consulting Engineers and Planning	(416) 229-4646	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	Tel.	
H. Kronis	(416) 965-9668	

Objectives
1. Select and evaluate suitable samplers for the manual collection of representative samples from a wide range of hazardous and liquid industrial waste.

2. Address confidence limits for the selected samplers.

3. Develop methodology for using samplers and address safety aspects.

4. Provide cost estimates and availability of recommended samplers.

Description
A survey was done to select and evaluate existing samplers. Selected samplers were evaluated in the laboratory and under field conditions. A major criteria of sampler selection was the collection of representative and reproducible samples (confidence limits) from waste such as immisible liquids, slurries, semi-solids and solids. Sampling was done from drums, large tanks, tanker trucks, large bags and storage piles. The use of disposable vs. reusable samplers was also addressed.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1½	1st Year	January 31, 1985	
	Cost $000		Number of Man Years
Budget $22,000	Current 22.00	Total 22.00	Current --- Total ---

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Waste Management Branch	24 (Day) 08 (Month) 84 (Year)

Project Title
Enhanced Sanitary Landfill Study

Key Words
Landfill, Resource Recovery, Methane, Landfill Gas, Landfill Stabilization

Principal Investigator and Organization	Tel.	
Ontario Research Foundation	822-4111	Internal ☐ Grant ☐ Unsolicited Contract ☒ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
N. Ahlberg/G. Hughes	965-9671 965-4120	

Objectives
Enhance the quality and production of methane gas from landfill.

Improve potential of energy recovery from landfill waste.

More rapid stabilization of landfills to permit unrestricted use of lands sooner.

Description
The study investigates through literature search and computer simulation model the features of a system to permit rapid stabilization of landfills by a system to saturate landfilled wastes through a leachate distribution and collection network, treatment of the leachate in an anaerobic filter to convert solubilized organics to methane (and carbon dioxide), and recycle of the treated leachate back to the landfill to continue the solubilization process.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
3	2nd Year	November 1984	
	Cost $000		Number of Man Years
$280,000 approved Budget $200,000 (orig. proposal)	Current 2.10	Total 28.00	Current 0.02 / Total 0.1

Source of Funds (Specify)
75% Environment
25% Energy

☐ Regular Work Program ☐ Special Ministry ☒ Jointly Funded ☐ Other

Participation By Others (Specify)
Joint funding and participation by Ministry of Energy.

Remarks
Report received, position of both Ministries to be determined with respect to continued funding of originally proposed three year project. Original proposal of bench scale and pilot scale work likely to be modified.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office
Waste Management Branch

Date 6 (Day) 9 (Month) 1983 (Year)

Project Title
Experimental Plant for Resource Recovery

Key Words
Resource Recovery, Waste Management, shredding, refuse derived fuel.

Principal Investigator and Organization	Tel.	
N.R. Ahlberg, Waste Management Branch, Ministry of the Environment	965-9671	Internal ☑ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
N.R. Ahlberg	965-9671	

Objectives

1. To develop and evaluate processes and equipment for resource recovery.
2. To develop criteria for design and for estimating capital and operating costs.
3. To provide a regular supply of recovered materials for product utilization and market development.

Description

The Experimental Plant for Resource Recovery processes 200 tonnes per day of solid waste through processes including shredding, air classification, screening, incineration and composting to recover materials for utilization within existing industry. Plant products include corrugated cardboard, refuse derived fuel, ferrous metal and compost. Products are either sold in industry or provided for market development projects.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
15	8th Year			
	Cost $000		Number of Man Years	
Budget	Current 2,000.00	Total	Current 3.5	Total 60

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Analytical Method Development

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

55 PL

Branch/Office	Date Day Month Year

Project Title

"CHEMICAL IDENTIFICATION AND BIOLOGICAL ASSAY STUDIES OF ENVIRONMENTAL MUTAGENS, PROMOTERS AND INHIBITORS."

Key Words Mutagens, Promoters, Hazardous Contaminants, Carcinogens, Airborne Mutagens, Waterborne Mutagens

Principal Investigator and Organization	Tel.	Internal ☐
Dr. M. Katz, York University 4700 Keele Street, Downsview, Ontario		Grant ☒
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐
Dr. D. Rokosh		Solicited Contract ☐

Objectives

- to utilize newly developed bio-assay systems to determine mutagenic and carcinogenic potential of toxic pollutants.
- to separate and identify quantitatively PAH and other potentially mutagenic and carcinogenic organic compounds from polluted water.
- to identify individual or combinations of chemicals with mutagenic activity.
- to determine promoters and inhibitors of mutagenicity or carcinogenicity.
- to investigate the effect of mutagenic chemicals on Laboratory plants and fish.

Description

It is planned to utilize newly developed in vivo bio-assay systems to determine the mutagenic and carcinogenic potential of various combinations of chemicals found in air and water. It is also planned to investigate promoters and inhibitors of mutagenic potency using mice and fish as test animals. The tier testing will include a spectrum of genetic toxicity tests such as bacterial mutagenicity, in vivo and/or in vitro sister chromatid exchange, in vivo chromosomal aberrations (micronuclei) and in vivo sperm head abnormalities.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
3	3rd Year	1985	
	Cost $000		Number of Man Years
Budget	Current 80.3	Total 452.9	Current / Total

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Presented at the Technology Transfer Conference.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

61PL

Branch/Office	Date
LABORATORY SERVICES	28 Day 8 Month 84 Year

Project Title

DEVELOPMENT OF A METHODOLOGY FOR THE CONCENTRATION AND DETECTION OF ROTAVIRUSES AND HEPATITIS A VIRUS IN ENVIRONMENTAL SAMPLES

Key Words

ROTAVIRUS, HEPATITIS A VIRUS, NORWALK AGENT, ENVIRONMENT, METHODOLOGY

Principal Investigator and Organization	Tel.	
Professor Frances W. Doane, University of Toronto		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor G. Jenkins, Water Resources Branch	965-2401	

Objectives

To develop methods for determining the incidence of pathogenic viruses in sewage effluent and in associated surface waters, particularly with respect to rotaviruses, Norwalk agent and hepatitis A virus

Description

Immunoelectron microscopy, radioimmunoassay, and enzyme immununoassay will be evaluated for their sensitivity and specificity in detecting viruses in environmental samples. A methodology for rotavirus detection will be developed first, and similar techniques will be investigated and applied to Norwalk agent and hepatitis A methods if feasible.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
2	2nd Year	Apr.84	

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	-	$49,000.	0	2

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

yes

Remarks

completed

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

64 PL

Branch/Office	Date (Day Month Year)
Policy and Planning Branch, Research Coordination Office	

Project Title

"THE DEVELOPMENT OF A FRESHWATER FISH TEST TO IDENTIFY AQUATIC TOXIC CONTAMINANTS."

Key Words

Aquatic Toxicity, Fish Toxicity Test, Hazardous Contaminants

Principal Investigator and Organization	Tel.	
Dr. Valli and I. Smith, University of Guelph,		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
D. Rokosh		

Objectives

To assess the use of fish embryos in detecting mutagenic chemicals by examining:
- micronucleus and cellular tyknosis;
- longer exposure time effect on sensitivity;
- use of non-mutagens to check for false positive;
- some long-term health effects of induced mutation.

Description

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
2	2 Year	1985	☒ Yes ☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	-	37.5		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Presented at the Technology Transfer Conference.
The material will also be submitted as MSc thesis.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

67RR

Branch/Office	Date
POLICY AND PLANNING BRANCH, RESEARCH COORDINATION OFFICE	27 Day 8 Month 84 Year

Project Title
REVISED MONITORING SCHEME FOR PERSISTENT AND TOXIC ORGANICS IN GREAT LAKES SPORTS FISH

Key Words
TOXIC ORGANICS; FISH ANALYSIS; GREAT LAKES FISH; ANALYTICAL METHODS

Principal Investigator and Organization	Tel.	
Dr. A. Benedek, Zenon Environmental Enterprises Ltd.		Internal ☐ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☒
Liaison Officer or Supervisor	**Tel.**	
G.A.V. Rees	248-3846	

Objectives

To develop and implement new monitoring methods for the characterization of persistent chemicals in Great Lakes Fish

Description

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
2	2nd Year	1985	
	Cost $000		Number of Man Years
Budget	Current 62.3	Total $130.00	Current / Total

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☒ Other RAC Grant

Participation By Others (Specify)

none

Remarks Project progressing well. Interim reports received on schedule and submitted to RAC with liaison officers'comments. Some delay encountered in acquiring some of the required samples. Project modification (to allow external collection) has been proposed to RAC.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

69 RR

Branch/Office	Date Day Month Year
Policy and Planning Branch, Research Coordination Office	

Project Title

"A MASS SPECTROMETRIC STUDY OF SELECTED AIR POLLUTANTS."

Key Words

Mass Spectrometry, Organic Air Contaminants, Analytical Methods, Instrumental Methods of Analysis.

Principal Investigator and Organization	Tel.	
Dr. R. March, Department of Chemistry Trent University.		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor Ms G. Foster.	Tel.	

Objectives

To investigate the reaction mechanism and specific reaction rates of 9 Polyaromatic Hydrocarbons including their oxidation reactions.

Description

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
2	3rd Year	1985	☒ Yes	☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	-	43.6		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Paper presented at Technology Transfer Conference

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

75RR

Branch/Office	Date 28 08 84 (Day Month Year)
AIR RESOURCES	

Project Title
PROVISION OF PAHs AND Aza-PAHs AS ENVIROMENTAL ANALYTICAL STANDARDS

O

Key Words
PAH, SYNTHESIS

Principal Investigator and Organization	Tel.	Internal ☐
Professor V. Snieckus, University of Waterloo		Grant ☒
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐
O. Meresz, G.A. Rees, A. Szakolcai	248-3031	Solicited Contract ☐

Objectives
To provide PAHs and Aza-PAHs as analytical standards.

Description
Known carcinogenic PAHs and Aza-PAHs will be synthesized by short and efficient routes using previously worked out methods as well as alternatives.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
3	3rd Year	Annual	

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	—	51.0	1	3

Source of Funds (Specify)
☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☒ Other RAC Grant

Participation By Others (Specify)
NO

Remarks
Results were presented at the latest Technology Transfer Conference

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

78 RR

Branch/Office	Air Resources	Date Day Month Year

Project Title
Sampling and analysis of polycyclic aromatic hydrocarbon derivaties in urban air particulates.

Key Words
Trace analysis, method development, nitro-PAH

Principal Investigator and Organization	Tel.	
Professors M.A. Quilliam and B.E. McCarry, McMaster University		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor G. Rees	Tel. 248-3846	

Objectives

To develop analytical methodology for polycyclic aromatic hydrocarbon derivatives, particurlarly nitro-and oxy-PAHs in urban air particulates.

Description

Much of the nutrogenic activity observed in urban air particulate samples is associated with compound classes other than the well-studied PAHs. This project will try to establish analytical methodology for these compounds, mostly nitro- and oxy-PAH derivatives, and to examine their formation as artifacts in various sampling method.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1	2nd Year	1984	

	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	-	28.0		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Previous Funding $57,000.00

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

80 RR

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title Chemical speciation of airborne particulate matter

Key Words Analysis, APM, Neutron Activation

Principal Investigator and Organization	Tel.	
Professor D. Burgess, McMaster University		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
A.B. Foster.	248-3346	

Objectives

To develop procedures for the determination of the chemical composition of airborne particulate matter using volatilization and neutron activation analysis.

Description

A procedure for the optimization of multielement neutron activation analysis and the conditions required for selective volatilization of compounds of interest will be studied.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1	2nd Year	1985	
	Cost $000		Number of Man Years
Budget	Current	Total	Current / Total
	-	32.0	

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Previous Funding $36,000.00

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

81RR

Branch/Office	Date
AIR RESOURCES	28 Day 08 Month 84 Year

Project Title
SYNTHESIS OF POLYNUCLEAR AROMATIC HYDROCARBONS OF INTEREST IN ENVIROMENTAL POLLUTION.

Key Words
PAH, SYNTHESIS

Principal Investigator and Organization	Tel.	
Professor E.Lee-Ruff,York University		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
O.Meresz, G.A. Rees, A. Szakolcai	248-3031	

Objectives
To prepare specific PAHs of interest in enviromental chemistry. Samples are to be used as standards for characterization purposes.

Description
Analogues of cyclopenta (c,d) pyrene and benzo(a)pyrene are going to be prepared for characterization of possible hydrocarbon contaminants of unknown structure.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
2	2nd Year	Annual	☒ Yes ☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	- -	$13.50	1	2

Source of Funds (Specify)
☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other RAC Grant

Participation By Others (Specify)
NO

Remarks
Results were presented at the latest Technology Transfer Conference

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

84RR

Branch/Office	Date
POLICY AND PLANNING BRANCH, RESEARCH COORDINATION OFFICE	28 (Day) 8 (Month) 84 (Year)

Project Title

0 COLLABORATIVE STUDY ON SHORT-TERM TESTS FOR GENOTOXICITY AND CARCINOGENICITY

Key Words

AMES TEST, GENOTOXICITY OF ORGANICS, HAZARDOUS CONTAMINANTS, ANALYTICAL METHODS

Principal Investigator and Organization	Tel.	
Dr. D. Logan, Department of Biology, York University		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Dr. D. Rokosh, Water Resources Branch	248-3008	

Objectives

- to participate in a United Nations international study on genotoxicity and carcinogenicity of a predetermined group of hazardous chemicals
- to apply above techniques to 6 additional chemical compounds selected from MOE list of priority chemicals

Description

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
3	3rd Year	1985	☒ Yes ☐ No

	Cost $000		Number of Man Years	
Budget	Current 13.2	Total 95.2	Current	Total

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

85 RR

Branch/Office	Date 28 08 84 (Day Month Year)
Laboratory Services Branch	

Project Title
"EVALUATION AND APPLICATION OF PULSED NUCLEAR MAGNETIC RESONANCE IN THE ANALYSIS OF ENVIROMENTAL SAMPLES."

Key Words
P-NMR, ENVIROMENTAL ANALYSIS, ORGANIC ANALYSIS

Principal Investigator and Organization	Tel.	
Dr. J. Easton, Department of Chemistry Ryerson Polytchnical Institute		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Dr. O. Meresz	248-3031	

Objectives

- A new Pulsed Nuclear Magnetic Resonance instrument will be used to develop methods for the characterization of organic compounds in enviromental and waste samples.
- The evaluated procedure and equipment will be transferred for use in MOE Laboratories.

Description

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1	2nd Year	1984	

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	-	$49,000		

Source of Funds (Specify)
☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other RAC

Participation By Others (Specify)
NONE

Remarks
The developed methods and the analytical instrument will be transferred for use in the MOE Laboratory.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

89 PL

Branch/Office	Date (Day Month Year)
Policy and Planning Branch	

Project Title

OV

Epidemiological Study of Disease Incidence and Recreational Water Quality at Selected Conservation Areas in Southern Ontario.

Key Words

Epidemiology, Recreational Water Quality, Viruses, Standards

Principal Investigator and Organization	Tel.	
Professor P.L. Seyfried, University of Toronto		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
M. Young	248-3008	

Objectives

1) To investigate the relationship between recreational water quality and disease incidence at selected conservation sites and to perform risk assessment analyses on the accumulated data.
2) To develop suitable methods for the recovery, enumeration and identification of Campylobacter jejuni and Giardia from environmental samples.
3) To refine methods for virus isolation and identification from environmental samples.

Description

Selected conservation areas will be monitored for bacteria and viruses during the summer of 1983. An epidemiological survey of the swimmers and non-swimmers at the sites will be conducted concurrently.

Techniques for detecting Legionella, Campylobacter jejuni, Giardia and enteric viruses in recreational waters will be investigated. Viruses will be identified by serological and electron microscopic methods.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
2	2nd Year	1985	☒ Yes ☐ No

	Cost $000		Number of Man Years	
	Current	Total	Current	Total
Budget	-	149.0		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Presented at the Technology Transfer Conference.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

102PL

Branch/Office	Date
LAB SERVICES BRANCH, DRINKING WATER ORGANICS SECTION	24 (Day) 08 (Month) 84 (Year)

Project Title
"STUDIES OF METHODOLOGY AND INSTRUMENTAL CAPABILITIES FOR OPTIMUM AND RAPID ANALYSIS OF PCDD AND PCDF COMPOUNDS IN WATER AND RELATED ENVIRONMENTAL SAMPLES."

Key Words
DIOXINS AND FURANS, WATER ANALYSIS, INSTRUMENTAL METHODS OF ANALYSIS, ANALYTICAL METHOD DEVELOPMENT

Principal Investigator and Organization	Tel.	
DR. F.W. KARASEK, DEPARTMENT OF CHEMISTRY UNIVERSITY OF WATERLOO	519-885-1211 EXT. 3423	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
DR. R.E. CLEMENT, LABORATORY SERVICES BRANCH DRINKING WATER ORGANICS SECTION	248-7484	

Objectives

- TO DEVELOP SENSITIVE ANALYTICAL METHODS FOR THE DETERMINATION OF ULTRA TRACES OF DIOXINS AND FURANS IN DRINKING AND SURFACE WATERS AND INCINERATOR FLY-ASH.
- TO VERIFY THE CREDIBILITY OF THE NEW METHOD.

Description

THE PRINCIPAL ASPECT OF THIS WORK IS TO DEVELOP A METHOD OF SAMPLING RAW/TREATED DRINKING WATERS USING A SORBENT CARTRIDGE. RAPID EXTRACTION AND ANALYSIS FROM THE SORBENT MATERIAL WILL GREATLY INCREASE SAMPLE THROUGHPUT FOR LARGE VOLUME WATER SAMPLES.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
2	2nd Year	1985	☒ Yes	☐ No

Budget	Cost $000		Number of Man Years	
	Current -	Total 42.80	Current 1	Total 1

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

NONE

Remarks

- PRELIMINARY DEVELOPMENT OF METHOD IS COMPLETE
- VALIDATION BY SAMPLING IN THE FIELD AND COMPARING DATA TO MOE CURRENT METHOD MUST BE DONE.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

112RR

Branch/Office	Date
POLICY AND PLANNING BRANCH, RESEARCH COORDINATION OFFICE	28 Day 8 Month 84 Year

Project Title

COMPARISON OF THE AMES TEST AND THE REPLICATIVE KILLING ASSAY AS DETECTORS OF MUTAGENICITY IN CHEMICAL COMPOUNDS AND ENVIRONMENTAL SAMPLES

Key Words

MUTAGENICITY TESTING, REPLICATIVE KILLING ASSAY, AMES TEST

Principal Investigator and Organization	Tel.	
Dr. D. Logan, Dept. of Biology, York University		Internal ☐ Grant ☒
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐ Solicited Contract ☐
Dr. M. Salomone, Water Resources Branch	248-3008	

Objectives

To evaluate the Replicative Killing Assay as an adjunct to the Ames test for mutagenic activity

To compare the specificities and sensitivities of both assays on mutagenic standard compounds and concentrated water samples.

Description

Preliminary tests in the Ministry have shown a potential use of this test to detect mutagenic activities. Fifteen model compounds will be evaluated parallel to Ames testing, and the sensitivity will be established.

The results will be transferred for use at the MOE laboratory

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1	1st Year	1984	

	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	- -	$13.00		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

none

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

113 PL

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

Identification of Fecal coliforms and Fecal streptococci and verification of newer tests ability to differentiate between human and non-human fecal pollution.

Key Words

E. coli, Enterococci, Pollution Source, Bacterial Identification, animal feces/human feces

Principal Investigator and Organization	Tel.	
Dr. P. Seyfried, University of Toronto		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Michael Young		

Objectives

(1) To provide information essential to the development of two new methods, $mTEC_{IG}$ for E. coli and mE for Enterococci, which are specific indicators of fecal pollution, and

(2) By identifying the genus and species of the bacteria being enumerated, establish the ability of the newer tests to differentiate between human and non-human fecal sources either on their own or in combination with other established parameters.

Description

Water samples will be analyzed for Fecal coliforms (mTEC), E. coli ($mTEC_{IG}$). Fecal streptococci (mEnterococcus), Enterococci (mE) and Pseudomonas aeruginosa (mPA). Bacteria for identification will be picked from mTEC and $mTEC_{IG}$, mEnterococcus, and mE agars. A detailed picture of the Fecal coliform and Streptococcus populations will be provided that can be used to evaluate the specificity of $mTEC_{IG}$ and mE to recover E. coli and Enterococci respectively and by the types of species present, determine the sources of pollution. Plates will be chosen with a count of approximately 20-100, divided into segments and all colonies in a segment picked (minimum 8, maximum 15). Recognized micro identification procedures such as API 20E and API 20 S will be used in combination with standard laboratory tests where necessary. Bacteria will be identified to species level.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1	1st Year	1985	

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	-	23.2		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

122 RR

Branch/Office	Date
LABORATORY SERVICES	27 Day 8 Month 84 Year

Project Title AQUEOUS PHASE LIQUID EXTRACTION (APLE) SYSTEM FOR EXTRACTION AND CONCENTRATION OF TRACE ORGANICS

Key Words Extraction, concentration, trace organics, water analysis.

Principal Investigator and Organization	Tel.	
J. COBURN, , ZENON		Internal ☐ Grant ☐ Unsolicited Contract ☒ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
G.A.V. REES, G. CRAWFORD Trace Organics Section	248-3846	

Objectives To construct and provide cleanliness testing for 2 50 gallon APLE samplers for the field extraction and concentration of trace organics from aqueous samples

Description Using original design provided by National Water Research Institute, Zenon will design a modified APLE extractor. After design approval (Liaison officer) Zenon will construct 2 units to this design using stainless steel/teflon materials. Zenon will carry out all necessary operational and cleanliness testing for these units before delivery to LSB.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☐ Yes ☒ No	
0.5	1st Year			
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	14.50	14.50		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other RAC

Participation By Others (Specify)

No

Remarks

Project commenced March 1984. 2 APLE sample extraction systems were delivered to LSB August 84.
Evaluation of results to follow.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

126 RR

Branch/Office	Date
LAB SERVICES BRANCH, DRINKING WATER ORGANICS SECTION	24 (Day) 08 (Month) 84 (Year)

Project Title STUDY OF CONDITIONS FOR CONDENSATION AND DESORPTION OF POLYCHLORINATED DIBENZO-DIOXINS AND FURANS ON PARTICULATE MATTER UNDER STACK SAMPLING CONDITIONS.

O

Key Words

STACK SAMPLING, INCINERATOR , CHLORINATED DIOXINS AND FURANS

Principal Investigator and Organization	Tel.	
PROF. F.W. KARASEK, CHEMISTRY DEPT. UNIVERSITY OF WATERLOO	519-885-1211 EXT. 3423	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor DR. R.E. CLEMENT, LAB SERVICES BRANCH DIOXIN LABORATORY	**Tel.** 248-7484	

Objectives

TO DETERMINE WHETHER PCDD/PCDF FOUND IN THE VAPOUR PORTION OF INCINERATOR STACK EMISSIONS COULD HAVE ORIGINATED FROM THE EMITTED PARTICLES.

Description

CLEAN GAS WILL BE DRAWN OVER THE SURFACE OF INCINERATOR FLY ASH PARTICLES CONTAINING PCDD/PCDF. THE VAPOURS WILL BE SAMPLED USING STANDARD MOE PROCEDURES AND ANALYZED FOR PCDD/PCDF. DIFFERENT CONDITIONS WILL BE EVALUATED AS TIME PERMITS.

Duration of Project (Yrs.)	Present Year Is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1	1 Year	APRIL, 1985		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	–	15.00	1	1

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other RAC

Participation By Others (Specify)

AIR RESOURCES BRANCH (V. OZVACIC)

Remarks

FLY ASH AND STACK SAMPLING EQUIPMENT HAVE BEEN DELIVERED TO THE UNIVERSITY OF WATERLOO. FLY ASH IS BEING CHARACTERIZED PRIOR TO THE SAMPLING EXPERIMENTS.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

127 RR

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

"ANALYSIS OF WATER TREATMENT PLANT CHEMICALS FOR CONTAMINANTS."

Key Words Organic analysis, drinking water, Water treatment chemicals.

Principal Investigator and Organization	Tel.	
Dr. F. Karasek, University of Waterloo		Internal ☐ Grant ☒
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐ Solicited Contract ☐
R. Clement	248-3011	

Objectives

To develop analytical methods and define analytical protocols.

Description

Water plant chemicals such as alum, fluoridation chemicals, polyelectrolytes, chlorine, etc. may contain contaminants of potential human health concern. These are difficult to determine and special methods and protocols are required in order that plants may have their supplies checked.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
1	2nd Year	1985	☒ Yes	☐ No

	Cost $000		Number of Man Years	
Budget	Current -	Total 25	Current	Total

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

129 RR

Branch/Office	Date
LAB SERVICES BRANCH, DRINKING WATER ORGANICS SECTION	24 (Day) 08 (Month) 84 (Year)

Project Title
LEACHING STUDIES OF POLYCHLORINATED DIBENZO-P-DIOXINS (PCDD) AND POLYCHLORINATED DIBENZOFURANS (PCDF) FROM MUNICIPAL INCINERATOR FLY ASH

Key Words
CHLORINATED DIOXINS AND FURANS, LEACHING, FLY ASH, WATER

Principal Investigator and Organization	Tel.	
PROF. F.W. KARASEK, CHEMISTRY DEPT. UNIVERSITY OF WATERLOO	519-885-1211 EXT. 3423	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
DR. R.E. CLEMENT, LAB SERVICES BRANCH DIOXIN LABORATORY	248-7484	

Objectives

TO DETERMINE WHETHER LEACHATE FROM LANDFILLS CONTAINING MUNICIPAL INCINERATOR FLY ASH ARE LIKELY TO CONTAIN PCDD/PCDF.

Description

MUNICIPAL INCINERATOR FLY ASH CONTAINING HIGH LEVELS OF PCDD/PCDF WILL BE SUPPLIED TO PROF. KARASEK. LEACHING STUDIES BY SHAKING WATER WITH FLY ASH WILL BE PERFORMED AT VARIOUS pH LEVELS TO SIMULATE NEUTRAL AND ACID RAIN CONDITIONS.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1	1 Year	MARCH/85	

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	— —	15.00	1	1

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other RAC

Participation By Others (Specify)

N/A

Remarks

FLY ASH HAS BEEN SUPPLIED TO PROF. KARASEK AND IS BEING CHARACTERIZED. LEACHING STUDIES WILL BEGIN SOON.

Ontario

Inventory: Research and Development Projects

133 RR

Branch/Office	Date
LABORATORY SERVICES	27 Day 8 Month 84 Year

Project Title: MACRORETICULAR RESINS AS PRECONCENTRATORS FOR ORGANICS, CHLORINATED PHENOLICS, PAH'S

Key Words: MACRORETICULAR RESINS, XAD, PRECONCENTRATION, ORGANICS, CHLORINATED PHENOLICS, PAH

Principal Investigator and Organization	Tel.	
Dr. Donald MacKay, University of Toronto	978-4019	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Wendy Moss, Trace Organics Section	248-3846	

Objectives

To extend the proven useful range of macroreticular and other resins for the preconcentration of organic compounds from precipitation and surface waters

Description

Macroreticular and other resins will be evaluated for the preconcentration of trace organic compounds. The project will be conducted by the University of Toronto with technical direction and some instrumental analyses being conducted by MOE

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
0.5	1st Year	Oct.31,1984	☒ Yes ☐ No

Budget	Cost $000		Number of Man Years	
	Current -	Total 15.00	Current 0.5	Total 0.5

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☒ Other RAC grant

Participation By Others (Specify)

No

Remarks Four adsorbent materials were compared for the preconcentration of chlorinated phenolics. Tests to determine optimum operating parameters i.e. flow rate, contact time are being conducted. The recovery efficiency of the absorbent and the effect of storage on recovery have yet to be investigated.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

134 RR

Branch/Office	Date (Day Month Year)
Policy and Planning Branch	

Project Title

"DEVELOPMENT OF AUTOMATED TECHNIQUES FOR READING GEL PLATES."

Key Words

Genetyping - Gel plates

Principal Investigator and Organization	Tel.	
University of Toronto Dr. W. Bradbury		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
M. Young	248-3008	

Objectives

1. To speed up method of reading gel plates associated with gene typing procedure.
2. To develop reading procedure that can provide data in computer compatible form.

Description

A densitometer designed to read agarose gel plates used in gel electrophoreces of DNA will be purchased and used in conjunction with current visual methods. If operational, will proceed to connect to computer.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
1	2nd Year	1985	☒ Yes ☐ No

	Cost $000		Number of Man Years	
Budget	Current 10.0	Total 10.0	Current	Total

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

135 RR

Branch/Office	Date
POLICY AND PLANNING BRANCH	Day Month Year

Project Title

"USE OF A SPECIAL PROTEIN ADSORBENT FOR THE SELECTIVE ACCUMULATION OF TRACE CONTAMINANTS."

Key Words

Preconcentration, trace contaminants, protein adorption

Principal Investigator and Organization	Tel.	
University of Toronto Dr. J. C. Hsia		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Dr. O. Meresz	248-3031	

Objectives

To determine if particular body proteins such as AFP can be used as a method of concentrating traces of organic contaminants for analysis.

Description

AFP is known to bind polyunsaturated fats in humans. Similar compounds circulate in the blood stream of the fetus. DES is known to bind to and accumulate on AFP. It is proposed to apply the technique to laboratory concentration of trace organics.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
1	2nd Year	1985	☒ Yes	☐ No

	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	-	32.0		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

142 PL

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

OV

Experimentally determined mutation rates in lung and Bronchial epithelia as a primary air pollution standard.

Key Words

Mutagenicity, Air pollution effects, atmospheric contaminants

Principal Investigator and Organization	York University Dr. John Heddle	Tel.	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	Dr. M. Salamone	Tel. 248-3008	

Objectives

Development of a mutagenic test for atmospheric contaminants using cells derived from the lining of the lung and the bronchus.

Description

1. Isolate viable cells from the lining of the lung and bronchus.
2. Develop a suitable culture media for the growth of the isolated cells.
3. Develop suitable techniques for rapid examination of large numbers of cells.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
1	1st Year	1985	☒ Yes ☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	89.1	89.1		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

143 PL

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

"A critical comparison of ICP-Mass Spectrometry Instrumental Neutron Activation analysis and Flameless AAS for the analysis of rain, snow and water samples."

Key Words

ICP-MS, Instrumental Analysis, water analysis, toxic metals.

Principal Investigator and Organization	Tel.	
Dept. of Geology McMaster University		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
D. Boomer	240-3029	

Objectives

To develop and verify new multi-element analytical methods using the advanced Inductively Coupled Plasma-Mass Spectrometry technique and compare them to the established Neutron Activation and Atomic Adsorption techniques. Rain, snow, and surface water will be used as test samples.

Description

Standard reference materials will be used during the development and verification stages of analytical methods.

The developed protocol will be available for use by MOE which is also acquiring a similar advanced multi-element analytical system.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
1	1st Year	1985	☒ Yes ☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	30.7	30.7		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

146 PL

Branch/Office	Date (Day Month Year)
Policy and Planning Branch	

Project Title

"Synthesis of chlorinated Azobenzenes"

Key Words

Azobenzenes, Analytical standards

Principal Investigator and Organization	Tel.	
Dept. of Chemistry University of Guelph Dr. N. Bunce		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
G.A.V. Rees	248-3546	

Objectives

To synthesize chlorinated azobenzenes of high purity for use as analytical standards in MOE laboratory.

Description

Seven chlorinated azobenzene compounds will be prepared, purified and tested and supplied in sufficient quantities for MOE use.

The validity and capability of analyses in MOE laboratory depends on the quality and availability of high purity chemicals.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1	1st Year	1985	

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	4.1	4.1		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

151 PL

Branch/Office	Date (Day Month Year)
Policy and Planning Branch	

Project Title

"Development of sampling and measuring techniques to determine correlation and mobility of volatile hydrocarbons in groundwater and leachates."

Key Words

Groundwater, volatile organics, contaminant mobility, sampling

Principal Investigator and Organization	Tel.	
Dept. of Geological Science Queen's University Dr. W. Gorman		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Dr. G. Hendry	248-3846	

Objectives

To develop a reliable sampling technique that will preserve volatile hydrocarbons in groundwater and leachates using Gloucester Township landfill as test site.

Description

A sampling protocol will first be developed and tested in the laboratory prior to its use at Gloucester Landfill site. Well water will be sampled and the mobility of selected volatile hydrocarbon compounds will be determined and compared to laboratory data. Contingency and analytical support will be provided by the Natural Hydrology Research Institute Environment Canada. This project will establish a reliable protocol for use by MOE for groundwater sampling and landfill projects.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
2	1st Year	1986	☒ Yes	☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	25.2	30.5		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

154 PL

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title "To prepare a specific genetic "probe" from fecal streptococci isolated from geese and use it to determine the impact of goose fecal material on the microbiological quality of the bathing water of Toronto Western beaches."

Key Words Beaches, Lake Ontario, water quality, microbiology, fecal streptococci

Principal Investigator and Organization	Toronto General Hospital & Dept. of Microbiology University of Toronto	Tel.	Internal ☐ Grant ☒
Liaison Officer or Supervisor	M. Young	Tel. 248-3008	Unsolicited Contract ☐ Solicited Contract ☐

Objectives

To determine the impact of geese fecal contaminants on the bathing water of Toronto-Western beaches.

Description

Genetic probes will be prepared from fecal streptococci isolated from geese waste at Toronto Western beaches and use them to compare with the DNA of streptococci isolated from beach sediments. The results will indicate the impact of goose fecal contamination on the microbiological quality of bathing water.

Duration of Project (Yrs.)	Present Year Is	Reporting Date	Is a Report Anticipated ?
1	1st Year	1985	☒ Yes ☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	35.6	35.6		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

155 PL

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

"The elimination of solvent effects in IN VIVO mutagenicity assays"

Key Words

Mutagenicity assay, solvent effect, toxicity, chemical mutagens.

Principal Investigator and Organization	Dept. of Biology York University Dr. D. Logan	Tel.	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	Dr. D. Rokosh	Tel. 248-3008	

Objectives

The development of a solvent(s) for use in mutagenicity testing which shows low toxicity, suitable solvent capability, and to modify the response of assay system to the mutagens being assessed.

Description

Several solvent systems will be tested and an optimum solvent will be selected primarily for in vivo mutagenicity assays. The potential for In vitro application will also be tested. This project will result in reduction of inter-laboratory variability in mutagenicity testing and improves credibility of test results.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
1	1st Year	1985	☒ Yes ☐ No

	Cost $000		Number of Man Years	
Budget	Current 53.2	Total 53.2	Current	Total

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

169 PL

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

"Plant bioassays for the detection of environmental mutagens"

Key Words

Mutagenocity, Plant bio-assay.

Principal Investigator and Organization		Tel.	
Dr. W. Grant	Dept. of Biology York University		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor		**Tel.**	
	R. Pearson	965-4516	

Objectives

To develop and demonstrate the value of plant systems as detectors of environmental mutagens, and apply the developed techniques to selected chemicals.

Description

Previous preliminary mutagenicity studies on two plant systems will be extended and verified using standard mutagenic hazardous substances. The assays will further be applied to a series of 10 suspected and non-mutagenic compounds as designated by MOE.

The project will enable the Ministry to carry out in-situ studies using plants subjected to ambient pollutants.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
2	1st Year	1986		
	Cost $000		Number of Man Years	
Budget	Current: 44.2	Total: 119.4	Current	Total

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other — Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

170 PL

Branch/Office	Date (Day Month Year)
Policy and Planning Branch	

Project Title

"Syntheses of oxygen and sulphur PAHs of interest in environmental pollution and toxicology."

Key Words Analytical standards, Air Contaminant Analysis, PAH, Synthesis

Principal Investigator and Organization	Tel.	
Dept. of Chemistry York University Dr. E. Lee-Ruff		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
G.A. Rees	248-3846	

Objectives

To prepare polynuclear aromatic hydrocarbon compounds for use as chemical standards in the analysis of air particulate matter.

Description

A method will be developed for the preparation of PAH furans and related hazardous compounds. The method will be extended to the preparation of thiophenes and other chemicals suspected in emission sources from coal, municipal incineration and diesel engines.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
3	1st Year	1987	

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	13.0	33.5		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

174 RR

Branch/Office	Date (Day Month Year)
Policy and Planning Branch	

Project Title

"Fish Samples in Support of Project No. 67 RR - 'Revised Monitoring Scheme for Persistent & Toxic Organics in Great Lakes Sports Fish.'"

Key Words: Sampling, Fish collection

Principal Investigator and Organization	Tel.	
Limnos		Internal ☐ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☒
Liaison Officer or Supervisor	**Tel.**	
J. Ralston	965-6954	

Objectives

To provide fish for analysis for Project No. 67 RR with Zenon Environmental.

Description

The fish were originally to come from the Ministry of Natural Resources; but are unobtainable from this source.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1	1st Year	1985	

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	4.0	4.0		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

175 PL

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

"MICROWAVE DIGESTION OF ENVIRONMENTAL MATERIALS PRIOR TO INORGANIC ANALYSIS."

Key Words

ICP, Multielement analysis, sample digestion, heavy metals, sediment analysis

Principal Investigator and Organization	Tel.	
Dr. J. Mackey Department of Chemistry Ryerson Polytechnical Institute		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor D. Boomer	248-3029	

Objectives

To develop new methods for dissolution of solid environmental samples such as sediments, soils, minerals, etc. prior to ICP multielement analysis.

Description

A microwave energy source will be used to bring complex samples into dissolution. Various power levels, times and reagents will be tested. The solutions and any remaining residues will be analyzed to determine the efficiency of metal extraction.

The developed technology will be transferred to the Ministry and will improve laboratory productivity.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
1	1st Year	1985	☒ Yes ☐ No

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	9.4	9.4		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

176 PL

Branch/Office	Date (Day Month Year)
Policy and Planning Branch	

Project Title

"SOLID SAMPLE INTRODUCTION AND LASER EXCITATION IN AN INDUCTIVELY COUPLED PLASMA."

Key Words

Multielement analysis, ICP-MS, Atomic Spectroscopy, Solid sample introduction - ICP

Principal Investigator and Organization	Tel.	
Dr. E. D. Salin McGill University		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
D. Boomer	248-3029	

Objectives

1. Development of a solid sample introduction system for the ICP.
2. Investigation of laser excited atomic fluorescence (LEAF) as a routine tool for use in analytical laboratories for the analysis of environmental samples for trace levels of lead, mercury and uranium.

Description

This study will include an evaluation of the detection limits, linearity and dynamic ranges as well as determination of elements which have volatilization problems. It is intended to investigate LEAF with the ICP using conventional nebulization and a new ICP sample introduction device developed partially in this laboratory.

The direct sample insertion device should minimize sample handling increasing the number of solid samples that a laboratory can handle by a factor of 10 to 100. The laser experiments should provide drastic improvements in detection limits.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1	1st Year	1985	

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	27.8	27.8		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

178 PL

Branch/Office	Date
Policy and Planning Branch	Day Month Year

Project Title

OV "OPERATING FUNDS FOR THE CANADIAN CENTRE FOR TOXICOLOGY."

Key Words Toxicology

Principal Investigator and Organization	Tel.	
Canadian Centre for Toxicology		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Research Coordination	965-5788	

Objectives

To provide a start-up fund for Canadian Centre for Toxicology operating costs to implement an environmental research program.

Description

The Canadian Centre for Toxicology is a non-profit research centre jointly established by the Universities of Toronto and Guelph with facilities at both campuses. The Centre was designed to carry out toxicological research pertaining to the environment. In this regard, the Centre will be an important contributor as a potential vehicle for active research in areas of vital concern to the Ministry.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
1	1st Year	1985	☐ Yes ☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	150	150		

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other Provincial Lottery

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date 04 09 84 (Day Month Year)
Northeastern Region, Sudbury	

Project Title

Biogeochemical Study, Northeastern Ontario

Key Words

Principal Investigator and Organization	Tel.	
Northern Terrestrial Consultants, Sudbury	(705) 522-4119	Internal ☐ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☒
Liaison Officer or Supervisor	**Tel.**	
W. D. McIlveen	(705) 675-4501	

Objectives

To document changes in elemental distribution and nutrient cycling within a forested ecosystem under the influence of acidic precipitation. The established site is located near High Falls at Agnew Lake.

Description

The work consists of operating a network of incident precipitation collectors, throughfall collectors, stem flow collectors, stream flow monitoring, soil lysimeters, low volume air sampler, defining snow pack characteristics, evapotransperational rates. The study also includes sampling of vegetation chemical composition and litterfall chemical composition. In 1984, a program to determine biomass of the forest vegetation on the watershed was initiated.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
-	3 Year	March 31, 1985	☒ Yes ☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	163 —	163	5	

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
LABORATORY SERVICES	27 Day 8 Month 84 Year

Project Title
ESTABLISHMENT OF THE TOTAL PURGEABLE ORGANIC HALOGEN (POX) METHOD FOR SCREENING LANDFILL SITE SAMPLES

Key Words
POX, PURGEABLES, ORGANIC HALOGEN, HALOFORMS, VOLATILE ORGANOHALIDES

Principal Investigator and Organization	Tel.	
Dr. G.S. Hendry, Trace Organics Section	248-3846	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Dr. E.G. Adamek	248-3846	

Objectives
To establish and test the analytical method for the determination of POX in the screening of aqueous landfill samples, by using the Dohrmann DX-20 Total Organic Halogen Analyzer

Description
After setting up the new model of the Dohrmann DX-20 Analyzer System, the instrument will be tested for compliance with the manufacturer's specifications. Subsequently, development work will be aimed at gathering information on the following topics: 1) Accuracy, 2) Reproducibility, 3) Interferences (by halides, etc.), 4) Minimum Detection Level, 5) Linearity of Detector Response 6) Recoveries of Halides from Organic Standards, 7) Comparison with other methods (using organic halogen standards and actual landfill samples)

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1	1st Year	March 1985		
Budget	**Cost $000**		**Number of Man Years**	
	Current	**Total**	**Current**	**Total**
	$3,00	$3.00	0.3	0.3

Source of Funds (Specify)
☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☒ Other Experience '83

Participation By Others (Specify)
no

Remarks
Development phase under an Experience '83 Project is complete and an internal interim report is available through G. Hendry. Final validation of the method awaits analysis of routine samples.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
LABORATORY SERVICES	27 Day 08 Month 84 Year

Project Title

ESTABLISHMENT OF THE TOTAL ORGANIC HALOGEN (TOX) METHOD FOR SCREENING LANDFILL SITE SAMPLES

Key Words

TOX, TOTAL HALOGEN, HALOGENATED ORGANIC SOLVENTS, PCBs, MICROCOULOMETRY, WATER SAMPLE

Principal Investigator and Organization	Tel.	
DR. G.S. Hendry Trace Organics Section	248-3846	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Dr. E.G. Adamek	248-3846	

Objectives

To establish and test the analytical method for the determination of TOX in the screening of landfill samples by using the Dohrmann DX-20 Total Organic Halogen Analyzer.

Description

The Dohrmann Adsorption Unit and other functional components of the Dohrmann DX-20 Analyzer System for the analysis of TOX will be tested for compliance with the manufacturer's specifications. Subsequently, development work will be aimed at gathering information on the following topics: 1) Charcoal Performance Characteristics, 2) Accuracy, 3) Reproducibility, 4) Interferences (by inorganic halides, etc., 5) Minimum Detection Level, 6) Linearity of Detector Response, 7) Recoveries of Halides from Organic Standards, 8) Comparison with Other Analytical Methods (using organic halogen standards and actual landfill samples).

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
2	2nd Year	Mar 1985		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	$6,00	$ 12.00	0.4	0.8

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☒ Other Experience'84

Participation By Others (Specify)

NO

Remarks

The characteristics of the method have been determined for one model compound (2,4,6-trichlorophenol). The method is ready for limited use and not for routine work.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
LABORATORY SERVICES	27 Day 8 Month 84 Year

Project Title
ESTABLISHMENT OF A COMPREHENSIVE TIERED TESTING SCHEME FOR LANDFILL STUDY PROJECTS

Key Words
TIERED TESTING: LANDFILL SITE: SCREENING TESTS: MONITORING: LEACHATES: WASTES

Principal Investigator and Organization	Tel.	
Dr. G.S. Hendry, Trace Organics Section	248-3846	Internal [X] Grant [ ]
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract [ ] Solicited Contract [ ]
Dr. E.G. Adamek	248-3846	

Objectives

To devise a tiered system of testing, which will promote the economical use of simple, rapid, low cost tests first, followed by complex, expensive tests when necessary. This involves the development of a comprehensive Laboratory Services approach to the analysis of landfill related samples.

Description

Carrying out a comprehensive literature survey on landfill monitoring techniques.
Contacting specialists in other jurisdictions to obtain expert advice in appropriate test procedures.
Critically evaluating the current MOE practice of selecting analytical tests for specific landfill evaluations.
Combining the information and judgement obtained by this to form the basis for a rational selection of parameters to be included in each phase of a tiered testing system for landfill monitoring. The tiered system would comprise one level of simple, rapid, low cost tests, which would define the necessity of progressing to further stages of more complex, costly testing.
Implementing the final tiered testing system using a single window approach for the controlled processing of landfill related samples.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
3	2nd Year	Dec./85	[X] Yes	[ ] No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	$9.00	$30.00	0.3	1.0

Source of Funds (Specify)

[X] Regular Work Program [ ] Special Ministry [ ] Jointly Funded [ ] Other

Participation By Others (Specify)

no

Remarks

The survey of literature and the initial stages of evaluating the present system of landfill monitoring is completed and an interim report is available from G.S. Hendry.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date (Day / Month / Year)
LABORATORY SERVICES	27 / 08 / 84

Project Title
ANALYSIS OF FATTY AND RESIN ACIDS IN WATER AND SEDIMENTS

Key Words ANALYSIS, RESIN ACIDS, FATTY ACIDS, AROMATICS, CAPILLARY GAS CHROMATOGRAPHY

Principal Investigator and Organization	Tel.	
Y. Jones Trace Organic Section	248-3846	Internal ☒
Liaison Officer or Supervisor	**Tel.**	Grant ☐
G.A.V. Rees	248-3846	Unsolicited Contract ☐
		Solicited Contract ☐

Objectives

To produce a method for the analysis of fatty, resin and aromatic acids in waters and sediments, using capillary gas chromatography

Description

Appropriate standards will be obtained, after which the G.C. conditions will be optimized for analysis of these compounds. Recovery studies will be performed on the matrices to be analyzed to ensure analytical efficiency and reproducibility of results.

When the above stages have been completed, the analytical procedure will be implemented

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
2	1st Year	unknown	

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	$5.00	$10.00	0.25	0.5

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

NO

Remarks

The methodolgy for analysis of water samples is in the final stages of develoment. Some problems have been encountered with specific compounds. Sediment methodology development will follow.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
LABORATORY SERVICES	27 (Day) 08 (Month) 84 (Year)

Project Title
CHARACTERIZATION OF PHENOLS IN WATERS

Key Words
SPECIATION, PHENOLS, WATER, ANALYSIS, CAPILLARY, GAS CHROMATOGRAPHY

Principal Investigator and Organization	Tel.	
Y. Jones, Trace Organics Sect.	248-3846	Internal ☒
		Grant ☐
Liaison Officer or Supervisor	Tel.	Unsolicited Contract ☐
G.A.V. Rees	248-3846	Solicited Contract ☐

Objectives

To develop a capillary gas chromatographic method to speciate individual phenols in water samples which have been found to contain phenols, using general analytical procedures.

Description

When water samples have been found to contain phenols, it is proposed to speciate the phenols present by using capillary gas chromatography. It is proposed that an analytical procedure will be developed to perform this speciation, involving purchase of analytical standards and carrying out of recovery studies.

Also, cap G.C. conditions will be optimized for efficient separation of the compounds involved.

Duration of Project (Yrs.)	Present Year is (Year)	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
2	1st	unknown		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	5,00	10.00	0.25	0.50

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)
no

Remarks

Project on hold although some preliminary work has been carried out. Project will commence again when resources and manpower become available.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
LABORATORY SERVICES	27 Day 8 Month 84 Year

Project Title
EVALUATION OF CAPILLARY GAS CHROMATOGRAPHY FOR ROUTINE FISH CONTAMINATION MONITORING

Key Words
CAPILLARY COLUMNS, ELECTRON CAPTURE, FISH ANALYSIS

Principal Investigator and Organization	Tel.	
(J. Osborne and) G. Crawford, Trace Organics Section	248-3846	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
G.A.V. Rees	248-3846	

Objectives
To investigate the feasibility of using capillary columns for the routine analysis of pesticides, herbicides and other halogenated organics in fish

Description

Due to the lowresolving capability of packed GC columns, interfering materials may not be fully separated from the compounds of interest. Accordingly, the results reported may not be the true value due to presence of these interferences. By use of the capillary columns it may be possible to fully resolve these interferences and provide a more accurate result.

A comparison will be made of the results obtained from fish extracts analysed on both packed and capillary columns for PCB's and other halogenated environmental contaminants.

Duration of Project (Yrs.)	Present Year Is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
2	2nd Year	1985		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	$4.00	$12.00	0.2	0.5

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)
no

Remarks Simultaneous dual capillary gas chromatography has been evaluated and implemented for analysis of chlorophenols, chlorinated aromatics, phenoxy acid herbicides and some chlorinated pesticides. Evaluation/implementation is continuing for PCB's.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date 27 08 84
LABORATORY SERVICES	Day Month Year

Project Title
INVESTIGATION OF THE STORAGE STABILITY OF VARIOUS MULTI-COMPONENT CARTRIDGES USED IN THE ANALYSIS OF AMBIENT AIR FOR TRACES ORGANIC CONTAMINANTS

Key Words
TRACE ORGANICS, AMBIENT AIR, ANALYSIS, STABILITY, ADSORPTION CARTRIDGES

Principal Investigator and Organization	Tel.	
J. Osborne Trace Organics Section	248-3846	Internal ☒ Grant ☐
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐ Solicited Contract ☐
G.A.V. Rees	248-3846	

Objectives

To compare the stability of trace organic residues adsorbed onto multi-component cartridges from ambient air.

Description

Two multi-component adsorption cartridges used for sampling ambient air will be tested to determine the stability of a wide range of trace organic contaminants upon storage. The organics will be eluted off the cartridges and analyzed by capillary gas chromatography.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
2	1st Year			
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	$5,00	$15.00	0.3	1.0

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☒ Jointly Funded ☐ Other

Participation By Others (Specify)
NO

Remarks

External (storage protocols) portion being carried out by ORF under RAC contract (Project 98). See project 98 for external funding & Reporting schedule.
All tube clearing & analysis- LSB
tube loading ARB
Completion anticipated Dec 1984

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	LABORATORY SERVICES	Date	28 Day	8 Month	84 Year

Project Title
MULTI-COMPONENT CARTRIDGES FOR SAMPLING AND ANALYSIS OF TRACE ORGANICS IN AIR.

Key Words
ANALYSIS, AIR, ORGANIC CONTAMINANTS

Principal Investigator and Organization	Tel.	
J. Osborne, Trace Organics Section	248-3846	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
G.A.V. Rees	248-3846	

Objectives
To evaluate a multi-component cartridge for sampling and analysis of air for various classes of organic trace contaminants

Description
A combined Carbosieve and Florisil cartridge has been designed. Prel iminary tests willdetermine the efficiency of a thermal cleaning procedure for the cartridge packing. If this proves satisfactory, a recovery study will be conducted by spiking cartridges, pumping air through and eluting with solvent to recover OC's, PCB's and chlorinated aromatics.

This methodology will then be extended to other classes of pesticides and organic trace contaminants.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
2	2nd Year		☐ Yes	☒ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	$8.00	$16.00	0.2	0.5

Source of Funds (Specify)
☐ Regular Work Program ☐ Special Ministry ☒ Jointly Funded ☐ Other

Participation By Others (Specify)
no

Remarks
Ongoing project
Interest has been shown by ARB for further evaluating the system for determination of lower chlorinated aromatic hydrocarbons in ambient air as well as compounds not yet suitable for conventional thermal desorption i.e. Sulphur compounds, amines etc.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
LABORATORY SERVICES	27 Day 8 Month 84 Year

Project Title

PAH ANALYSIS IN AMBIENT AIR

Key Words

PAH; ANALYSIS; AIR

Principal Investigator and Organization	Tel.	
J. Osborne, Trace Organics Section	248-3846	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
G.A.V. Rees	248-3846	

Objectives

To develop an improved procedure for the analysis of PAH's in ambient air

Description

A new procedure will be developed for PAH's in ambient air using capillary gas chromatography.

A cold on-column injector will be tested for use in this analysis.

Recovery studies will be conducted to determine the analytical efficiency of theprocedure prior to its implementation.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
2	1 st Year	1986	☒ Yes	☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	$5.00	$10.00	0.10	0.25

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

no

Remarks Methodology for extraction, cleanup & GC separation is tested and complete for airborne particulates (HI-VOLS). GC methodology requires more sensitive and highly specific detector (Mass Selective Detector).
No funding currently available. Methodologies could be automated.
Interim report will be prepared.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
LABORATORY SERVICES	28 (Day) 08 (Month) 84 (Year)

Project Title
AN IN-DEPTH REVIEW OF THE ENTIRE CHLOROPHYLL PROCEDURE (FPD7802)

Key Words
CHLOROPHYLL

Principal Investigator and Organization	Tel.	
M. Rawlings; W.B. Moody, Water Quality Section	248-3512	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
L. T. Vlassoff	248-3512	

Objectives

Objective: To determine precision limiting steps in the existing procedure; to improve throughput time by examining alternative maceration procedures; to investigate analytical methods and preservation techniques.

Description

The present procedure is not very precise. Acidification to obtain corrected Chylorophyll often provides anomalous results. The procedure presently being used is time consuming with some problems observable. The effect of the preservation and/or natural turbidity filtered extracts on analytical results needs to be investigated.

The entire test procedure is being examined. New maceration technique will be investigated. Preservation techniques will be examined to clarify the amount of MgCO necessary for preservation and its effect on chlorophyll and acidified chlorophyll results.

Automation of the test procedures will also be undertaken.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
5	5th Year	Nov 1984	

	Cost $000		Number of Man Years	
Budget	**Current** $15.00	**Total** $20,00	**Current** 6	**Total** 12

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

NO

Remarks

Development work almost complete. Report to be written soon.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
LABORATORY SERVICES	27 Day 8 Month 84 Year

Project Title

THE DEVELOPMENT AND IMPLEMENTATION OF A METHOD AND QUALITY CONTROL PROCEDURE FOR THE ANALYSIS OF LEAD-210 IN SEDIMENTS (WQS8204)

Key Words

LEAD, ANALYSIS, SEDIMENTS

Principal Investigator and Organization	Tel.	
W.B. Moody, Water Quality Section	248-3512	Internal ☒
		Grant ☐
Liaison Officer or Supervisor	Tel.	Unsolicited Contract ☐
L.T. Vlassoff	248-3512	Solicited Contract ☐

Objectives

To implement an analytical procedure for lead-210 in sediments for use in studies of sedimentation rates and sediment dating

Description

Spiked samples will be used to obtain a calibration curve for the alpha spectrometer. Quality control parameters such as recovery, precision, detection limit and detection criterion will be determined as the operating conditions are optimized.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
2	2nd Year	Dec. '84	

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	$1.00	$4,00	0.05	0.2

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

no

Remarks

Problems with detector and data acquisition have slowed progress; work is underway

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
LABORATORY SERVICES	28 Day 8 Month 84 Year

Project Title IDENTIFICATION OF FECAL COLIFORMS AND FECAL STREPTOCOCCI AND VERIFICATION OF NEWER TESTS ABILITY TO DIFFERENTIATE BETWEEN HUMAN AND NON-HUMAN FECAL POLLUTION

Key Words E. COLI, ENTEROCOCCI, POLLUTION SOURCE, BACTERIAL IDENTIFICATION, ANIMAL FECES/HUMAN FECES

Principal Investigator and Organization	Tel.	
Dr. P.Seyfried, University of Toronto		Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Michael Young, Water Quality Section	248-3512	

Objectives (1) To provide information essential to the development of two new methods, $mTEC_{IG}$ for E. Coli and mE for Enterococci, which are specific indicators of fecal pollution, and (2) By identifying the genus and species of the bacteria being enumerated, establish the ability of the newer tests to differentiate between human and non-human fecal sources either on their own or in combination with other established parameters.

Description Water samples will be analyzed for fecal coliforms (mTEC), E. coli ($mTEC_{IG}$). Fecal streptococci (mEnterococcus), Enterococci (mE) and Pseudomonas aeruginosa (mPA). Bacteria for identification will be picked from mTEC and $mTEC_{IG}$, mEnterococcus, and mE agars. A detailed picture of the Fecal coliform and Streptococcus populations will be provided that can be used to evaluate the specificity of $mTEC_{IG}$ and mE to recover E. coli and Enterococci respectively and by the types of species present, determine the sources of pollution. Plates will be chosen with a count of approximately 20 - 100, divided into segments and all colonies in a segment picked (minimum 8, maximum 15). Recognized micro identification procedures such as API 20E and API 20 S will be used in combination with standard laboratory tests where necessary. Bacteria will be identified to species level.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1	1st Year		

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	$23.20	$23.20	1	1

Source of Funds (Specify)

☐ Regular Work Program ☒ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

no

Remarks

Identifications to be finished Aug. 31/84.
Report to be given at Technology Transfer Conference

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
LABORATORY SERVICES	27 Day 8 Month 84 Year

Project Title
FLOW INJECTION ANALYSIS FOR ATOMIC ABSORPTION

Key Words
FLOW INJECTION ANALYSIS; ATOMIC ABSORPTION ANALYSIS

Principal Investigator and Organization	Tel.	
Walter M. Wright, Water Quality Section	248-3512	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor Joan Crowther	Tel. 248-3512	

Objectives

To increase the stability, repeatability and sampling rate of a dual atomic absorption system with subsequent computerized data capture and reporting

Description

The use of a Valco injection valve to introduce the sample to two Varian atomic absorption units is to be automated by building a clock interface to perform all of the necessary operations. This interface will control the valve, sampler and initalization of the integration period of the instruments. The resulting data from the instruments will be captured by a minicomputer and processed to yield final results which can then be transferred to the Laboratory Information System.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
2 or 3	2nd Year	Apr. 85		
	Cost $000		Number of Man Years	
Budget	Current 0	Total $13,00	Current 0	Total 0.5

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)
no

Remarks Progress on this project was limited due to lack of instrument time; will try again this year.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
LABORATORY SERVICES	28 Day 8 Month 84 Year

Project Title

SAMPLING METHODS FOR DIOXINS

Key Words

DIOXINS, SAMPLING, DRINKING WATER, RAW WATER, SLUDGE

Principal Investigator and Organization	Tel.	
R. Hunsinger, Water Resources Branch		Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
K.Roberts. Water Resources Branch		

Objectives

To develop a standardized sampling protocol for the sampling of dioxins in raw water, potable water and sludge.

Description

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1.0	1st Year	Apr.84		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	35.00	35.00	0.2	0.2

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Report available on water sampling portion of project
Work continuing on alternate sampling methods as a WRB/LSB joint project.

Ontario

Inventory: Research and Development Projects

Branch/Office	Date
LABORATORY SERVICES	27 Day 8 Month 84 Year

Project Title

"CHEMICAL IDENTIFICATION AND BIOLOGICAL ASSAY STUDIES OF ENVIRONMENTAL MUTAGENS, PROMOTERS AND INHIBITORS"

Key Words

MUTAGENS, PROMOTERS, HAZARDOUS CONTAMINANTS, CARCINOGENS, AIRBORNE MUTAGENS, WATERBORN MUTAGENS

Principal Investigator and Organization	Tel.	
Dr. M. Katz, York University, 4700 Keele St. Downsview, Ont.		Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Dr. D. Rokosh Water Resources Branch	248-3008	

Objectives

- to utilize newly developed bio-assay systems to determine mutagenic and carcinogenic potential of toxic pollutants
- to separate and identify quantitatively PAH and other potentially mutagenic and carcinogenic organic compounds from polluted water
- to identify individual or combinations of chemicals with mutagenic activity
- to determine promoters and inhibitors of mutagenicity or carcinogenicity
- to investigate the effect of mutagenic chemicals on laboratory plants and fish

Description

It is planned to utilize newly developed in vivo bio-assay systems to determine the mutagenic and carcinogenic potential of various combinations of chemicals found in air and water. It is also planned to investigate promoters and inhibitors of mutagenic potency using mice and fish as test animals. The tier testing will include a spectrum of genetic toxicity tests such as bacterial mutagenicity, in vivo and/or in vitro sister chromatid exchange, in vivo chromosomal aberrations (micronuclei) and in vivo sperm head abnormalities.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
3	2nd Year	1984		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	$80.50	$452.84	none	none

Source of Funds (Specify)

☑ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☒ Other Provincial Lottery Trust Funds

Participation By Others (Specify)

Remarks

Provincial Lottery contribution - $392,800

Anticipated completion: Nov/84.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
LABORATORY SERVICES	27 Day 8 Month 84 Year

Project Title ANALYSIS OF HAZARDOUS VOLATILE ORGANICS IN INDUSTRIAL WASTE SAMPLES

Key Words ANALYSIS, HAZARDOUS ORGANICS, INDUSTRIAL WASTE, VOLATILE ORGANICS

Principal Investigator and Organization	Tel.	
Patricia Baulu, Trace Organics Section	248-3846	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
E.G. Adamek	248-3846	

Objectives

To investigate the feasibility of headspace and/or purge-and-trap procedures for the gas chromatographic analysis of hazardous volatile organics in industrial wastes

Description The feasibility of purge-and-trap (by impinger) techniques will be explored for the analysis of volatile chlorinated, aliphatic, and aromatic organics in industrial wastes.

A prototype apparatus will be designed to test the suitability of these techniques for the analysis of heavily contaminated samples and for complex matrices such as liquid and solid industrial wastes.

The headspace gas chromatographic technique presently in use will serve to validate the newly developed procedure.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1	1st Year	Sept./85		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	$12.00	$12.00	0.75	0.75

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☒ Other Experience '84

Participation By Others (Specify)

no

Remarks A preliminary study conducted as an Experience '84 Project has indicated that a simple, quick purge-and-trap technique can be used to effectively recover purgeable chlorinated solvents from heavily contaminated non-aqueous samples. Further work will involve broadening the scope of the method to include a wider range of organics and a variety of "dirty" samples.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
LABORATORY SERVICES	28 Day 8 Month 84 Year

Project Title

THE ANALYSIS OF LANDFILL WASTE SAMPLES FOR AROMATIC, ALIPHATIC, AND CHLORINATED HYDROCARBONS BY STATIC HEADSPACE GAS CHROMATOGRAPHY

Key Words LANDFILL SITE; LEACHATES; GAS CHROMATOGRAPHY; STATIC HEADSPACE; AROMATIC HYDROCARBONS; ALIPHATIC HYDROCARBONS; CHLORINATED HYDROCARBONS

Principal Investigator and Organization	Tel.	
Dr.G.S. Hendry, Trace Organics Section	248-3846	Internal [X] Grant [ ] Unsolicited Contract [ ] Solicited Contract [ ]
Liaison Officer or Supervisor	**Tel.**	
Dr.E.G. Adamek	248-3846	

Objectives To develop a method for the automated gas chromatographic analysis by the headspace technique for volatile hazardous organics in landfill leachates, surface runoff and groundwater, solid wastes and samples too heavily contaminated for analysis by existing analytical methods.

Description The conditions of gas chromatography using packed columns have been satisfactorily developed. In phase 1, the variables of the method to be investigated include 1) volume of headspace to volume of liquid phase at different hydrocarbon concentration levels, 2) linearit of detector response, 3) detection limits, 4) preparation of calibration standards, 5) interferences, 6) accuracy, 7) reproducibility, 8) use of samples spiked with pure compounds, and 9) comparison with other reference methods, such as purge and trap chromatography.
In phase 2 the method is to be updated by investigating the use of an automated headspace sampler in conjunction with a capillary based gas chromatograph for determining volatile hazardous organics. By this method, heavily contaminated liquid and solid samples are to be analysed which are not amenable to other analytical methods, such as purge and trap gas chromatography. The cost of new instrumentation for phase 2 of this project is estimated at $60,000.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? [X] Yes [ ] No
1	1st Year	Aug.1985	

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	$9.00	$17.00	0.5	1.0

Source of Funds (Specify)

[X] Regular Work Program [ ] Special Ministry [ ] Jointly Funded [ ] Other

Participation By Others (Specify)

no

Remarks

Work on phase 1 of this project is progressing; work on phase 2 is awaiting funds for required instrumentation.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
LABORATORY SERVICES	27 Day 8 Month 84 Year

Project Title

THE LANDFILL INFORMATION DATA BASE

Key Words

LANDFILL; COMPUTER; DATA BASE; MONITORING STUDIES

Principal Investigator and Organization	Tel.	
Dr. G.S. Hendry, Trace Organics Section	248-3846	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Dr. E.G. Adamek	248-3846	

Objectives

To set up and maintain a computerised data base for landfill site analytical data and descriptive information to assist in handling analytical problems associated with landfill site monitoring studies

Description

The first step is to list the data base requirements. The number of data entries per sample, and the data handling requirements for report production will be determined. Selection and purchase of a microcomputer, such as an Apple 1le, will be made, followed by selection and purchase of other hardware, such as a disc data storage system. The writing of the necessary software to run the system will be contracted out. Finally data will be entered and the system maintained. Analytical records in the laboratory information system (LIS) will be used whenever possible. The completed system will make use the WMB landfill inventory data base and the data base of analytical results of landfill monitoring in the SIS.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☐ Yes ☒ No	
2	1 Year	1985		
	Cost $000		Number of Man Years	
Budget	Current $9.00	Total $15.00	Current 0.3	Total 0.5

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

no

Remarks The Apple IIe has been purchased, and a small data base has been set up of descriptive information on 120 of the most frequently sampled landfill sites. A small data base of selected analytical results has also been set up as an interim measure. The complete system will make use of the SIS and Downsview computer.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
LABORATORY SERVICES	28 Day 8 Month 84 Year

Project Title
A PRECONCENTRATION PROCEDURE FOR THE SAMPLING OF ORGANICS IN PRECIPITATION

Key Words
XAD, PRECONCENTRATION, ORGANICS, PRECIPITATION, PCB, CHLORINATED HYDROCARBONS

Principal Investigator and Organization	Tel.	
W. Moss, Trace Organics Section	248-3846	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
G.A.V. Rees	248-3846	

Objectives

To develop field preconcentration procedure for the continuous sampling of organics in precipitation

Description

The application of a similar laboratory procedure which uses an XAD-2 resin cartridge for sampling PCBs and chlorinated insecticides in surface waters will be assessed for PCBs, chlorinated insecticides, chlorinated aromatics, triazine, and toxaphene in precipitation. A method using a Tenax resin cartridge will be developed for volatile solvent sampling in precipitation. Both techniques will be developed in the laboratory with the testing to be conducted under laboratory and field conditions.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1	1 Year	Mar./85	
	Cost $000		Number of Man Years
Budget	Current	Total	Current / Total
	$70.00	$70.00	0.4 / 0.4

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☒ Jointly Funded ☐ Other

Hazardous Contaminants Branch
Air Resources Branch

Participation By Others (Specify)

J. Osborne, Trace Organics Section
M. Lusis, W. Chan D. Orr of ARB

Remarks A method using an XAD-2 resin cartridge has been tested and found unsuitable under laboratory conditions for the preconcentration of PCB's, chlorinated insecticides, chlorinated aromatics and toxaphene. Field testing is scheduled for Fall 1984. Laboratory testing of procedures for triazines and the volatile solvents is continuing.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
LABORATORY SERVICES	28 Day 8 Month 84 Year

Project Title
DEVELOPMENT OF TECHNIQUES FOR ON-SITE SAMPLING AND ANALYSIS OF VOLATILE ORGANIC COMPOUNDS IN UNSATURATED SOIL

Key Words
VOLATILE ORGANIC COMPOUNDS UNSATURATED SOIL

Principal Investigator and Organization	Tel.	
J. Osborne, Trace Organics Section	248-3846	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
G.A.V. Rees	248-3846	

Objectives
To investigate the use of well point probes or other devices for the sampling and analysis of volatile organic compounds present in the unsaturated zone. If proven feasible, the probes will be used for the on-site monitoring of suspected chemical spill sites, landfill site etc.

Description
The well point will be installed vertically in a column of sand to duplicate field conditions. A multi component adsorption tube will be attached to the capped probe via a vacuum pump. The sampling and subsequent analysis by thermal desorption/ capillary gas chromatography using FID/EC detectors will determine the presence of the target volatile organic compounds.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
2	1st Year	Sept./86	

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	$10.00	$18.00	0.3	0.5

Source of Funds (Specify)
☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)
No.

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date 27 8 84 (Day Month Year)
LABORATORY SERVICES	

Project Title

PERISHABILITY AND PRESERVATION OF SEWAGE SAMPLES (WQS 8401)

Key Words

PERISHABILITY, PRESERVATION, SEWAGE, PRESERVATIVES

Principal Investigator and Organization	Tel.	
P. Campbell, Water Quality Section	248-3512	Internal [X] Grant [ ] Unsolicited Contract [ ] Solicited Contract [ ]
Liaison Officer or Supervisor	**Tel.**	
L.T. Vlassoff	248-3512	

Objectives

1) To indicate the perishability of sewage samples under normal lab operating conditions with respect to standard analytical tests
2) To identify preservatives and storage procedures for general use with sewage samples
3) To test other preservatives for restricted use in special studies

Description

About 50L of raw sewage and final effluent will be collected from each of three sewage treatment plants. Each sample will be well mixed and poured into 1L glass bottles. Bottles will be separated into 4 treatments; none, refrigerated, ATU, and H_2SO_4. Suspended solids, NH_4, NO_3, soluble reactive and total P, TKN, BOD and COD. Tests will be done at least twice per week for approximately 24 days. The whole run will be repeated once before testing more specialized preservatives such as mercuric chloride, soldium azide, chloroform, etc. or freezing.

Final results will be continuously monitored for anomalies so that repeats can be organized.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? [X] Yes [ ] No
1	1st Year	Dec./84	

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	$12.00	$12.00	0.5	0.5

Source of Funds (Specify)

[X] Regular Work Program [ ] Special Ministry [ ] Jointly Funded [X] Other Experience '84

Participation By Others (Specify)

yes

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
LABORATORY SERVICES	27 Day 8 Month 84 Year

Project Title

AUTOMATION OF pH, CONDUCTIVITY, AND ALKALINITY COUPLED WITH DIRECT COMPUTER INPUT (WQS 8402)

Key Words

pH, CONDUCTIVITY, ALKALINITY, DIRECT COMPUTER INPUT, AUTOMATION

Principal Investigator and Organization	Tel.	
M.W. Rawlings and J. Crowther, Water Quality Section	248-3512	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
L.T. Vlassoff	248-3512	

Objectives

To combine three work stations using an automated system with DCl capabilities

Description

Sampler, syringe delivery system, conductivity meter, and a pH titrator will be combined into a system controlled by an HP85. Initial titration rates will be based on pH/conductivity measurements; titration data will be reduced using both fixed endpoint and Gran calculations. System will have DCl capabilities

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
2/3	1st Year	Apr./85	☒ Yes	☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	$5.00	$13.00	0.2	0.5

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

no

Remarks

Report to be issued on completion of project.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Laboratory Services Branch	27 Day 08 Month 84 Year

Project Title
Direct computer input (DCI) system for the determination of solids.
(WQS8403)

Key Words
Direct computer input, solids, microcomputer, laboratory information system (LIS).

Principal Investigator and Organization	Tel.	
Bernard Wright, Water Quality Section	248 3512	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Joan Crowther	248-3512	

Objectives

To institute a microcomputer system for solids analysis, and to write DCI software for the system. Using the LIS queue this software will permit formulating runs for any combination of required solids analysis, and permit direct transmission of analytical results to LIS.

Description

Interfaces between balances and microcomputer system will be purchased a manufactured in-house. Software will be written for the PET microcomputer system to handle solids analysis. The resultant system will perform the following functions:

(a) Sort LIS queues into runs which reflect laboratory analysis procedures.
(b) Handle solids analyses by storing appropriate weights (interface between balances and microcomputer) and by carrying out necessary calculations to convert these weights to solids concentrations.
(c) Maintain Q.C. data files, and process data in accordance with the Water Quality Assurance program.
(d) Match analytical data with LIS runs.
(e) Transmit data to LIS.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
0.5	First Year	March 1985	

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	12.00	12.00	0.5	0.5

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

No

Remarks

Complete documentation will be provided for the microcomputer system as well as a memorandum which summarizes the operation.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date (Day / Month / Year)
LABORATORY SERVICES	27 / 08 / 84

Project Title
A NEW LANDFILL SITE MONITORING SCHEME

Key Words SANITARY LANDFILL, CO-DISPOSAL LEACHATE, EP-TEST, TOXICITY, ENVIROMENTAL-IMPACT, MONITORING, TIERED-TESTING, DATA-BASE, GROUNDWATER

Principal Investigator and Organization	Tel.	
G.S. Hendry Trace Organics Section	248-3846	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
(J.E. Pagel) E.G. Adamek	248-3846	

Objectives
To review all aspects of landfill site operations with the objective of establishing new landfill site monitoring scheme.

Description

1. To carry out an in-depth literature search which will assist in the design of a more systematic laboratory approach to landfill monitoring.

2. To devise a tiered system of testing, which will promote the economical use of simple, rapid, low cost tests first, followed by complex, expensive tests later, and only when necessary.

3. To aid in the evaluation of limitations to the present monitoring scheme, by establishing liaison with other MOE groups dealing with landfill waste disposal.

4. To set up a separate data base of landfill site data backround information, utilising the laboratory information system (LIS) as a source of data.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
2	2nd Year	Oct. 1984	

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	$10.00	$20.00	1.0	2.0

Source of Funds (Specify)
☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)
NO

Remarks
Work on this project has progressed so that further specialized work programs are needed . Therefore, this preliminary study has been superseded by several new landfill-related projects.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
LABORATORY SERVICES	27 Day 8 Month 84 Year

Project Title

EXTENSION OF HCl DIGESTION/EXTRACTION OF FISH TISSUES FOR THE ANALYSIS OF ORGANIC POLLUTANTS

Key Words

ACID (HCL) DIGESTION; HERBICIDES; ORGANIC POLLUTANTS

Principal Investigator and Organization	Tel.	
George Crawford, Trace Organics Section	248-3846	Internal ☒
		Grant ☐
Liaison Officer or Supervisor	Tel.	Unsolicited Contract ☐
G.A.V. Rees	248-3846	Solicited Contract ☐

Objectives

To extend the use of an acid extraction/digestion procedure to the analysis of fish and biota for herbicide residues and organic pollutants

Description

This acid digestion has proven effective for PCB/OC analysis in fish. The intention is to expand its use to analysis of other pesticides such as chlorophenoxy acids and triazines as well as to chlorophenols and chlorinated aromatics.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1	1st Year	1985		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	$6.00	$12.00	0.25	0.50

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

no

Remarks

Acid extraction has been tested and validated for chlorinated phenols and chlorinated aromatics in fish, clams and other biota. Future work on other biocides and matrices will depend on available manpower and time.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date 28 08 84 (Day Month Year)
LABORATORY SERVICES & APPLIED RESEARCH	

Project Title
CONCENTRATION OF ORGANIC POLLUTANTS FOR MUTAGENICITY TESTING: MACRORETICULAR RESIN TECHNIQUES

Key Words
EXTRACTION, CONCENTRATION, XAD RESIN, RESIN COLUMNS, ORGANIC POLLUTANTS

Principal Investigator and Organization	Tel.	
O.W. Berg, Organic Characterization Section	248-3846	Internal [X] Grant [ ] Unsolicited Contract [ ] Solicited Contract [ ]
Liaison Officer or Supervisor	**Tel.**	
Dr. O. Meresz	248-3031	

Objectives
To develop efficient isolation technique for mutagenicity testing of organic micro-pollutants

Description
Mutagenicity testing of potentially hazardous organics in water require relatively large quanities of the organic materials. Due to the very low concentrations of these organics in the aqueous phase, very large volumes of samples(50-100 litres) would have to be handled. The classical approach of using solvent extractions is impractical with these large sample volumnes. The use of resin accumulator columns has become a useful technique in this context. However, so far a more systematic approach in addressing the potential short-comings of this method, collection efficiencies and stripping efficiencies, have not been investigated in any great detail. This is the intent of this project. The investigation will involve the design of efficient column hardware, and the rigorous testing of the adsorbents with the organics on the proirity pollutants list.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? [X] Yes [ ] No
2	1st Year	1985	

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	$2.00	$4.00	0.2	0.5

Source of Funds (Specify)
[X] Regular Work Program [ ] Special Ministry [ ] Jointly Funded [ ] Other

Participation By Others (Specify)

Remarks
An interim report is available in the form of a Ryerson thesis.
Concentration of Aqueous Micro-pollutants: Macro-reticular Resin Techniques.
Mark W. Clancy, Ryerson Polytechnical Institute 1984

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Laboratory Services Branch	27 Day 8 Month 84 Year

Project Title

Determination of fluoride in vegetation by Ion Selective Electrode method after extraction with dilute perchloric acid.

Key Words

Fluoride, Ion selective Electrode. Vegetation, perchloric acid extraction

Principal Investigator and Organization	Tel.	
P.N. Vijan Inorganic Trace Contaminants	248-3346	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
B. Loescher	248-3346	

Objectives

To achieve rapid determination of fluoride in ground vegetation by simple extraction with dilute perchloric acid and direct measurement in the slurry with the fluoride ion electrode.

Description

Weigh 0.5 to 1.0 gram sample in screw cap plastic test tube calibrated at 50 ml. Add 25 ml 0.1N perchloric acid and shake for one-half or one hour. Add 25 ml of 0.1N perchloric acid and stir with a magnetic stirrer. Introduce the fluoride ion electrode in the slurry and read the fluoride concentration.

Study the effects of temperature, shaking time, conc. of perchloric acid on extract ability of fluoride. Test the method against an established method and determine its accuracy and precision.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1/2	1st Year	May, 1984		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	4.00	7.00	1/4	1/2

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

None

Remarks

Project completed and a report is available. A publication on this project is expected in Sept. 1984, American Laboratory.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Laboratory Services Branch	27 Day 8 Month 84 Year

Project Title

0 Determination of Sulphide in Effluents by Differential Pulse Cathodic Stripping Voltammetry (DPCSV)

Key Words

Sulphide, Effluents, Cathodic Stripping Voltammetry

Principal Investigator and Organization	Tel.	
R. S. Sadana Inorganic Trace Contaminants	248-3346/7101	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
B. Loescher	248-3346	

Objectives

To develop an analytical method for the determination of sulphide in effluents.

Description

Sulphide concentration as low as 2 ug/l is reportedly toxic to the fish and aquatic life. The Laboratory Services Branch does not have a sensitive and selective method for this parameter. This analyte is perishable and therefore a better preservation method is needed.

A literature review of existing methodologies will be followed by the development of a sensitive DPCSV method to meet the analytical needs of the Ministry. A sample preservation technique will also be developed. The accuracy, precision and interference study will be carried out.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1/2	2nd Year	April, 1984		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
	6.00	12.00	1/4	1/2

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

None

Remarks

Experimental part has been completed. Testing of alternative field preservation procedure is ongoing. QC data is being evaluated. Report expected by April 1985.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
Laboratory Services Branch	28 Day 8 Month 84 Year

Project Title

A comparison of methods for leaching solid industrial waste materials.

Key Words

Solid industrial waste, leach test.

Principal Investigator and Organization	Tel.	
Dr. J. A. Pimenta Inorganic Trace Contaminants	248/3346	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Dr. B. Loescher	248-3346	

Objectives

The transport of soluble hazardous contaminants into ground water systems poses a serious health problem. Several extraction procedures have been proposed to simulate and predict the effect of water on solid industrial waste, before its disposal at a landfill site. The present study will investigate some extraction procedures to determine their effectiveness.

Description

Several industrial waste materials, such as foundry sand, fly ash, slag will be treated with distilled water using various agitation procedures. The extracts will be analysed for metals listed in Schedule 5 of the Waste Management Branch's "Interim Guideline for the Interpretation of the Hazardous Waste Definition" (Regulation 308).

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
0.25	1st Year	Dec. 1984	

Budget	Cost $000 Current	Cost $000 Total	Number of Man Years Current	Number of Man Years Total
	4.00	4.00	0.25	0.25

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

None

Remarks

All experimental work has been completed. A computer program is being developed for data evaluation. A report is expected by December 1984.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date (Day / Month / Year)
LAB SERVICES BRANCH, DRINKING WATER ORGANICS SECTION	24 / 08 / 84

Project Title

DETERMINATION OF POLYCHLORINATED DIBENZO-P-DIOXINS AND DIBENZOFURANS IN FISH

Key Words

POLYCHLORINATED DIBENZO-P-DIOXINS, POLYCHLORINATED DIBENZOFURANS, GC-MS, HPLC, TRACE ANALYSIS

Principal Investigator and Organization	Tel.	
DR. R.E. CLEMENT, LABORATORY SERVICES BRANCH DRINKING WATER ORGANICS SECTION	248-7484	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
H.M. TOSINE, LABORATORY SERVICES BRANCH DRINKING WATER ORGANICS SECTION	248-7484	

Objectives

TO EXPAND THE CURRENT MOE METHOD FOR 2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN IN FISH TO INCLUDE ALL DIBENZO-P-DIOXIN AND DIBENZOFURAN CHLORINATED CONGENERS

Description

THE METHOD WILL INCLUDE HPLC FRACTIONATION, COLUMN CHROMATOGRAPHY CLEAN-UP AND GC-MS ANALYSIS. ONE HPLC FRACTION CONTAINS THE 2,3,7,8-TCDD ISOMER AND THE OTHER CONTAINS OTHER TCDD COMPOUNDS AS WELL AS THE REMAINING DIOXIN AND FURAN CHLORINATED CONGENERS. QUALITY CONTROL IS PROVIDED BY SPIKING WITH LABELLED CHLORINATED DIOXINS.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
2	2ND Year	N.A.	☒ Yes	☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

SOME QA/QC ASPECTS OF WORK MUST BE COMPLETED. APPLICATION OF METHOD TO FISH HAS BEEN SUCCESSFUL FOR SOME SAMPLES.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date (Day / Month / Year)
LAB SERVICES BRANCH, DRINKING WATER ORGANICS SECTION	24 / 08 / 84

Project Title
DEVELOPMENT OF ANALYTICAL METHODOLOGY FOR ANALYSIS OF CHLORODIBENZOFURANS AND DIOXINS IN ENVIRONMENTAL SAMPLES

Key Words
ANALYSIS, DIOXIN, GC/MS, WATER, FISH, SEDIMENT, AIR, CAPILLARY, GC/MS

Principal Investigator and Organization	Tel.	
DR. R.E. CLEMENT, LAB SERVICES BRANCH DRINKING WATER ORGANICS SECTION	248-7484	Internal ☒ Grant ☐ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
H.M. TOSINE, LAB SERVICES BRANCH DRINKING WATER ORGANICS SECTION	248-7484	

Objectives

TO DEVISE, TEST AND UTILIZE ISOLATION, CLEANUP AND DETECTION OF CHLORODIBENZOFURANS AND DIOXINS IN AIR, WATER, FISH, SEDIMENT AND CHEMICAL LANDFILL SITES.

Description

THE ANALYSIS OF COMPLEX ENVIRONMENTAL SAMPLES FOR FURANS AND DIOXINS IS COMPLICATED BY INTERFERING HYDROCARBONS AND OTHER CHLORINATED CONGENERS. A METHOD WILL BE DEVELOPED WHICH WILL QUICKLY AND EFFICIENTLY CLEAN-UP AND SEPARATE THE CHLORINATED FURANS AND DIOXINS FROM INTERFERENCES. THE CHROMATOGRAPHIC CLEAN-UP WILL BE COMPLEMENTED BY CAPILLARY GC/MS, PROVIDING A REFINED SEPARATION OF THE ISOMERS OF THE FURANS AND DIOXINS FOR QUANTITATION BY COMPUTER.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☐ Yes ☒ No
4	3rd Year	JULY, 1986	

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	10.00	45.00	3	2/3

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

NO

Remarks ON-GOING: DUE TO OTHER HIGH PRIORITY MINISTRY PROGRAMMES, NOTABLY, THE SURVEY OF RAW AND TREATED DRINKING WATERS AND THE ANALYSIS OF INCINERATION EMISSIONS, EXTRA RESOURCES FOR METHOD DEVELOPMENT OF SOIL, SEDIMENT AND AMBIENT AIR ANALYSIS HAVE NOT BEEN AVAILABLE.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

Branch/Office	Date
LAB SERVICES BRANCH, DRINKING WATER ORGANICS SECTION	24 (Day) 08 (Month) 84 (Year)

Project Title
OCCURRENCE OF PCDDs/PCDFs IN INCINERATOR SOURCE SAMPLES

Key Words
PCDD, PCDF, STACK SAMPLES, INCINERATION SAMPLES

Principal Investigator and Organization	Tel.	
DR. R.E. CLEMENT, LAB SERVICES BRANCH DRINKING WATER ORGANICS SECTION	248-7484	Internal ☒ Grant ☐
Liaison Officer or Supervisor	**Tel.**	**Unsolicited Contract ☐ Solicited Contract ☐**
H.M. TOSINE, MANAGER, LAB SERVICES BRANCH DRINKING WATER ORGANICS SECTION	248-7484	

Objectives
TO DEVELOP A METHODOLOGY FOR EFFICIENT EXTRACTION AND CLEAN-UP OF INCINERATION SAMPLES FOR PPT LEVELS OF PCDDs/PCDFs; TO DEVELOP AUTOMATED SOFTWARE FOR THE GC/MS ANALYSIS, QUANTITATION AND CONFIRMATION OF PCDDs/PCDFs IN THESE SAMPLES: TO ANALYSE ALL PARTS OF INCINERATION SOURCE SAMPLES FROM 3 ONTARIO SITES FOR PCDDs/PCDFs.

Description
AS PART OF A JOINT MOE (LSB AND ARB) AND MINISTRY OF ENERGY PROJECT, THREE INCINERATION SOURCES WILL BE TESTED FOR CHLORINATED ORGANICS: PCDDs, PCDFs, CHLOROPHENOLS, CHLORINATED AROMATICS AND PCBs. THIS PROJECT INVOLVES EXTENSIVE METHOD DEVELOPMENT FOR THE EFFICIENT CLEAN-UP AND FRACTIONATION OF THESE SAMPLES FOR THE RANGE OF CHLORINATED ORGANICS LISTED. ALSO, EXTENSIVE SOFTWARE MUST BE WRITTEN TO PROVIDE AUTOMATED CONFIRMATION AND QUANTITATION BY GC/MS FOR THE ENTIRE RANGE OF PCDDs & PCDFs.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
2	2ND. Year	OCT.1984	☒ Yes	☐ No

Budget	Cost $000		Number of Man Years	
	Current	Total	Current	Total
	12.00	24.00	1	1/2

Source of Funds (Specify)
☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)
MINISTRY OF ENERGY

Remarks
ANALYSIS OF INCINERATOR SAMPLES IS COMPLETE AND REPORT WRITING IS IN PROGRESS. DATA OBTAINED REQUIRE INTERPRETATION. ANTICIPATED COMPLETION DATE OF REPORT NOVEMBER, 1984.

Pesticides Research

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-1

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title A study of the biology and of the control of the Carpenter Ant, Camponotus Spp. through the use of insecticidal baits.

Key Words Insecticiual baits Carpenter Ant

Principal Investigator and Organization	Tel.	
Dr. W.D. Blaine - Chemical Research International	416-231-7298	Internal ☐ Grant ☒
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐ Solicited Contract ☐
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

To determine the efficacy of insecticidal bait in the control of carpenter ant.

Description

A critical assessment of several new insecticides will be carried out to find if they are suitable candidates for use in baits for control of the carpenter ant.

Following this test, those insecticides that show the most potential will be tested under field conditions. This will be done by treating infestations and then carrying out follow-up surveys and inspections. Each infestation will be rated and a comparison made with the normal chlordane control method.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
2	2nd Year	January 1985		
	Cost $000		Number of Man Years	
Budget $9,500	Current 4.5	Total 9.5	Current	Total

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-2

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title
Integrated management of Turfgrass diseases in Ontario.

Key Words
Integrated management; Turf disease

Principal Investigator and Organization	Tel.	
Dr. L. L. Burpee Dept. of Environmental Biology, University of Guelph	519-824-4120	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

1. To achieve disease suppression in turfgrass swards through environmental manipulation (i.e. cultural management).
2. To improve the efficacy of turfgrass fungicides by integrating cultural and chemical disease management techniques.

Description

SPECIFIC OBJECTIVES

1. To reduce snow mold injury on turfgrasses through thatch pH modification (Project in progress - completion date May, 1985).
2. To improve the efficacy of nonmercurial snow mold fungicides by adding acrylic adjuvants to fungicide tank mixes. (Project in progress - completion date May, 1985).
3. To demonstrate that nitrogen has a significant impact on the efficacy of fungicides used to control dollarspot disease of turfgrasses. (Project in progress - completion date September, 1984).

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
3	3rd Year	see above		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
$24,500	8.5	24.5		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-3

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

0/

Persistence and degradation in soil of insecticides recommended in Ontario for corn rootworm control.

Key Words

Insecticides Persistence Degradation Soil

Principal Investigator and Organization	Tel.	
Dr. R. A. Chapman Dr. C. R. Harris - University of Western Ontario	519-679-4256	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

To obtain comparative persistence data on insecticides recommended for rootworm control.

Description

Tests will be done on microplots, using a pesticide residue-free soil of a type suitable for corn production. Formulated insecticides will be applied as banded applications in the recommended manner and other agricultural practices will be followed. Pre-treatment soil samples will be taken; subsequent post-treatment soil samples will be taken at frequent intervals over the first two months of the application, less frequently during the latter part of summer and fall, and in the spring of the following year. The soil samples will be analyzed for residues of the parent materials and insecticidal metabolites.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
3	3rd Year	January 1985	

	Cost $000		Number of Man Years	
	Current	Total	Current	Total
Budget $43,900	14.9	14.9		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-4

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

Development of suitable monitoring methods and economic thresholds for corn rootworms.

Key Words

Corn rootworm Economic thresholds Monitoring

Principal Investigator and Organization	Tel.	
Dr. C. R. Ellis Dept. of Environmental Biology, University of Guelph	519-824-4120	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

1. To develop a suitable monitoring program for northern and western corn rootworms in field corn.

2. To determine economic thresholds for corn rootworms in field corn.

Description

The potential for this research to have a real impact on pesticide use is especially good because of OMAF's five-year commitment to field corn through the Proposed Program in IPM in Ontario. The data base for field corn is not as developed as for the other crops in the proposal, and in fact, the program on corn will begin with survey data. Since managing rootworm must be a core part of any IPM program on field corn, this OPAC grant proposal is not only compatible with the OMAF proposal but is essential if that program is to progress to the implementation stage over the next five years.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1	1st Year	January 1985	
	Cost $000		Number of Man Years
Budget $15,000	Current 15.0	Total 15.0	Current / Total

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-5

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

A field guide on surface wetness duration sensors.

Key Words

Sensors Surface wetness Field guide Fungicides

Principal Investigator and Organization	Tel.	
Dr. T. J. Gillespie Dept. of Land Resource - University of Guelph	519-824-4120	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

1. To compile and summarize experience gained on the construction and use of surface wetness duration sensors.

2. To complete assessment of the ability of electrical impedance wetness sensors to monitor rate of wetting, a parameter found to be important in downy mildew work on onions.

Description

1. To compile and summarize experience gained on the construction and use of surface wetness duration sensors.

2. To complete assessment of the ability of electrical impedance wetness sensors to monitor rate of wetting, a parameter found to be important in downy mildew work on onions.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
4	(final) 4th Year	January 1985		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
54,000	5.0	54.0		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-6

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

Feasibility of using the egg parasite, Trichogramma minutum Riley, for biological control of the Spruce Budworm Choristoneura fumiferana (Clemens).

Key Words

Biological control Spruce Budworm Egg parasite

Principal Investigator and Organization	Tel.	
Dr. M. Hubbes Faculty of Forestry - University of Toronto	416-978-4644	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman- Pesticides Advisory Committee	416-965-7048	

Objectives

1. To evaluste the feasibility of using inundative releases of T. minutum for the control of the spruce budworm.
2. To investigate the effects of different environmental and release conditions on levels of parasitism by T. minutum.
3. To characterize strains of T. minutum and determine the one best suited for inundative release.
4. To establish guidelines of quality control for the mass production of T. minutum.

Description

Field trials will be conducted on Crown and at Hearst. Mass-rearing and release of the parasites will be carried out through the cooperation of the Biocontrol Centre at Guelph and the Ministry of Natural Resources. Laboratory space is available at the University of Toronto, Faculty of forestry and weather monitoring equipment from Atmospheric Environment. Cooperation with the Great Lakes Forest Research Centre for the production of spruce budworm egg masses in assured.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
3	3rd Year	January 1985	
	Cost $000		Number of Man Years
Budget $34,760	Current: 7.0	Total: 34.76	Current:	Total:

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-7

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

Studies on the toxicity of fenvalerate to filter-feeding zooplankton in an aquatic ecosystem.

Key Words

Pyrethroid Fenvalerate Sub-lethal effects

Principal Investigator and Organization	Tel.	
Dr. N. K. Kaushik Dept. of Environmental Biology, University of Guelph	519-824-4120	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

1. To compare the toxicity of the emulsifiable formulation (30% a.i.) of fenvalerate to an emusifier "blank" under field conditions using large volume in situ enclosures.

2. To determine the role of suspended particles (including algae) in the mode of entry and bioaccumulation of fenvalerate in filter-feeding aquatic organisms.

Description

Data collected will include the following:

1. The chemical persistence, degradation and mobility of fenvalerate in the aquatic environment.

2. The biological significance as measured by:

   i. changes in populations of organisms

   ii. changes in filtering activity of filter-feeding organisms.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
2	2nd Year	January 1985	☒ Yes	☐ No
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
$20,650	12.65	20.65		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-8

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

0 Weather timed fungicide application on tomatoes for improved disease control and reduction of fungicide use.

Key Words Tomato diseases fungicide application timing

Principal Investigator and Organization	Tel.	
Mr. H. J. Leili H. J. Heinz Co. and Ontario Vegetable Growers Marketing Board	519-326-5701	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

To determine the feasibility of monitoring daily leaf wetness duration, for indicating disease pressure potential and for more effectively controlling our major disease problems including anthracnose, by weather timed fungicide applications. The ultimate objective being, reducing pesticide load on the environment while maintaining economical control of diseases in tomatoes.

Description

Common tomato diseases such as Anthracnose, Early Blight and Septoria Leaf Spot, are found in the Ontario tomato growing areas on an annual basis. The standard method of control has been to apply fungicides on a preventative spray schedule at 10-12 day intervals, usually beginning when first fruit set occurs. This program continues through to harvest resulting in a minimum number of 6 applications being made. However, during dry seasons, it is felt that less than 6 sprays could be applied since disease pressure is usually low, particularly early in the growing season. Conversely, during wet seasons more effective control could be obtained by applying fewer fungicide applications, but apply them when environmental conditions are most conducive to high disease pressure.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
1	1st Year	January 1985	

	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
$8,000	8.0	8.0		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-9

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

A study of the costs and benefits of the development implementation and maintenance of the integrated pest management programs in Ontario.

Key Words

IPM programs | Costs | Benefits

Principal Investigator and Organization	Tel.	
Dr. D. J. Madder - Culice Inc. Guelph		Internal ☐ Grant ☒
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐ Solicited Contract ☐
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

To study the costs and benefits of development, implementation and maintenance of the integrated pest management programs currently in place in Ontario, using the apple program as a case study.

Description

The primary goals of IPM programs are to provide optimum control of insects, weeds and pathogens with minimal deliterious effects on the environment. This is accomplished through the use of a variety of pest control techniques, in the most efficient way possible, to maintain pests below economically significant levels.

In Ontario, IPM programs have been successfully implemented in specific orchard and vegetable crops, but no studies have been undertaken to quantify the economic benefits of IPM research as well as the costs and benefits of these programs.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1	1st Year	January 1985		
	Cost $000		Number of Man Years	
Budget $11,300	Current 11.3	Total 11.3	Current	Total

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-29

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

The feasibility and economics of the development, implementation and maintenance of an Integrated Pest Management program on potatoes in Ontario.

Key Words

IPM Potatoes Feasibility Economics

Principal Investigator and Organization	Tel.	
Dr. D. J. Madder - Culice Inc. Guelph		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

The feasibility and economics of the development, implementation and maintenance of an Integrated Pest Management program on potatoes in Ontario.

Description: The study will be investigated under the following categories.

1. Methods available for the pest monitoring in potatoes.
2. Methods available for the control of pests on potatoes, (pesticides, bio-control agents, host resistance, etc.).
3. Economic thresholds available for pests on potatoes.
4. Attitudes held by extension and research personnel, and growers, concerning the feasibility of implementing IPM on potatoes.
5. Economic assessment of implementing and maintaining IPM on potatoes in Ontario, such that the potential economic returns to the program are evident.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1	1st Year	January 1985		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
$14,500	14.5	14.5		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-10

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

Losses in production of processing tomatoes and cabbage attributable to insects, diseases and weeds.

Key Words

Crop losses Insects Diseases Weeds

Principal Investigator and Organization	Tel.	
Dr. D. G. R. McLeod University of Western Ontario		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

To continue a study on crop losses caused by pests, in the absence of adequate control measures, to tomatoes and cabbage grown for processing.

Description : To continue the study, two 1/2-1 acre parcels of land, suitable for production of the two crops will be rented in the London area. Plots will be established and planted with one of the most commonly used varieties of each crop. Pesticides applied will be those recommended for use by growers. Treatments will be applied as follows:

1. No treatment
2. Herbicide + fungicide (crop loss due to insects)
3. Herbicide + insecticide (crop loss due to diseases)
4. Insecticide + fungicide (crop loss due to weeds)
5. Insecticide + fungicide + herbicide

Each set of treatments will be replicated four times. Observations will be made through the growing season on the incidence and intensity of past populations. Yields will be taken at harvest and converted to $ values based on market prices of the crops.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
2	2nd Year	January 1985	☒ Yes	☐ No
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
$25,000	12.5	25.0		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-11

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

Status of pesticide resistance in the spotted tentiform leafminer and European red mite in apple growing regions of Ontario.

Key Words

Pesticide resistance Tentiform leafminer European Red Mite Apples

Principal Investigator and Organization	Tel.	
Dr. D. J. Pree - Ontario Apple Marketing Commission	416-275-4525	Internal ☐ Grant ☒
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐ Solicited Contract ☐
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

To determine the levels and extent of synthetic pyrethroid (SP) and organo phosphorus (OP) insecticides in the spotted tentiform leafminer and dicofol and organotin resistance in the European red mite in the various apple growing areas of Ontario.

Description

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1	1st Year	January 1985		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
$8,500	8.5	8.5		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-12

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

Development of sex attractant traps for monitoring changes in low density spruce budworms populations as a means of implementing early intervention management strategies.

Key Words

Spruce budworm; Populations; Sex attractant traps

Principal Investigator and Organization	Tel.	
Dr. C. J. Sanders Sault College of Applied Arts & Technology		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

To develop sex attractant traps for monitoring changes in low density spruce budworm populations.

Description

The efficacy of pheromone traps for monitoring spruce budworm populations has now been demonstrated. It only remains to confirm in 1984 that the trap design identified as the best in 1983 will provide correlations with larval densities as good or better than those obtained with the double funnel trap.

Work in 1984 will, therefore, be limited to sampling larval populations in the 23 locations sampled in 1982 and 1983, and to deploying both double funnel traps and the 'Uni-trap" in these areas.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
5	(Final) 5th Year	January 1985	☒ Yes ☐ No

	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
$52,150	4.4	52.15		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-13

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

Development of sex attractant traps for monitoring Jack Pine budworm population fluctuations.

Key Words

Jack Pine budworm | Populations | Sex attractant traps

Principal Investigator and Organization	Tel.	
Dr. C. J. Sanders Sault College of Applied Arts & Technology		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

To develop sex attractant traps for monitoring changes in density of jack pine budworm populations

Description

1. Six different blends of the two major pheromone components will be assayed in 1984. Pheromone will be incorporated into PVC lures by N.B., RPC. Each blend will be replicated five times, which with unbaited traps and virgin female baited traps as 'checks' means a 40 trap layout.
2. Six different concentrations of the best blend from previous (1983) bioassays will also be assayed, again a 40 trap layout.
3. Four different trap designs will also be compared, by deploying replicates of six of each in two locations selected for their different population density.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
> 1	1st Year	January 1985	

	Cost $000		Number of Man Years	
	Current	Total	Current	Total
Budget > $3,800	3 .8	3.8		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-14

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

Crop loss associated with pests of canola in Ontario.

Key Words

Crop losses | Canola | Pests

Principal Investigator and Organization	Tel.	
Dr. M. K. Sears Dept. of Environmental Biology, University of Guelph	519-824-4120	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

1. To determine the potential damage caused by flea beetles and larvae of the diamondback moth to canola in Ontario.

2. To estimate costs of controlling insect pests of canola

Description

As hectarage of canola expands in Ontario, potential damage from insect pests will increase because of the greater reservoir of host plants available. Little is known of the potential impact of insects on this crop.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1	1st Year	January 1985		
	Cost $000		Number of Man Years	
Budget $10,500	Current 10.5	Total 10.5	Current	Total

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-15

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

Environmental fate analysis of pesticides after application in buildings for structural pest control.

Key Words

Structural pest control Air monitoring Re-entry

Principal Investigator and Organization	Tel.	
Dr. Z. Siddiqi Chemical Research International - Toronto		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

To monitor the air for insecticide residues after a typical treatment for structural pest control. Air samples before treatment will be analysed and then at different intervals after treatment, to determine the safe re-entry time for occupants.

Description

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
1	1st Year	January 1985		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
$7,600	7.6	7.6		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-16

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

Study of the herbicide properties and environmental fate of triclopyr (Garlon)

Key Words

Herbicides Environmental fate Triclopyr

Principal Investigator and Organization	Tel.	
Dr. D. W. Smith Dept. of Botany & Genetics, University of Guelph	519-824-4120	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

1. the relative mobility and persistence of Triclopyr in soil, in comparison with 2,4-D and Picloram,
2. the response of both target and non-target plants to Triclopyr under controlled conditions, in comparison with 2,4-D and Picloram, and,
3. the environmental impact of triclopyr in comparison with 2,4-DP.

Description

Use of herbicides to control woody vegetation on utility right-of-ways, for example, by the Ontario Hydroelectric Power Commission, has been a widespread management procedure. Recently, some of the more effective chemicals for vegetation control have been removed or restricted in use by governmental control agencies because of their potential environmental or health hazard, e.g. 2,4,5-T or by the user agencies because of their mobility and persistence, e.g. picloram.

A new compound, trichlopyr (Garlon) produced by Dow Chemical Ltd., may be an attractive alternative. Existing information suggests that it may be as effective on target species, (mainly trees), as were those herbicides used previously (2,4,5-T and picloram).

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
3	3rd Year	January 1985	☒ Yes ☐ No

	Cost $000		Number of Man Years	
	Current	Total	Current	Total
Budget $28,800	5.8	28.8		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-17

Branch/Office	Date
Pesticides Advisory Committee	28 Day 8 Month 84 Year

Project Title

0)

Determination of the persistence of 2,4-D in Northern and Southern Ontario aquatic environments.

Key Words

Herbicide persistence; Aquatic environments; 2,4-D

Principal Investigator and Organization	Tel.	
Dr. D. R. Solomon Dept. of Environment Biology Dr. G. R. Stephenson - University of Guelph	519-824-4120	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

To determine the persistence and distribution of 2,4-D in aquatic environments under actual conditions near Northern Ontario forest areas and near southern agricultural areas.

Description: Earlier studies by the applicants (OPAC Reports 1980, 1981 and 1982) on the persistence of 2,4-D in northern vs southern agricultural and forest soils has shown that these herbicides tend to persist for longer periods in the sandy soils associated with the northern forest agroecosystem. Longer persistence is a possible indicator of environmental problems and is a logical first step in the assessment of environmental impact.

Studies on the persistence and biological impact of 2,4-D in aquatic ecosystems have been carried out in land-based man-made ponds but this work has been carried out in shallow ponds where temperatures may reach unusually high levels that are not representative of northern conditions or of deepwater southern conditions. There is a clear need for a study in which a comparison is made between natural conditions in a northern and a southern environment.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
1	1st Year	January 1985	☒ Yes	☐ No

	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
$15,500	15.5	15.5		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-18

Branch/Office	Date
PESTICIDES ADVSIORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

Efficacy of alternative herbicides to allidochlor in onions.

Key Words

Herbicides Musk Soils Onions

Principal Investigator and Organization	Tel.	
Dept. of Horticulture Dr. V. Souza Machada - University of Guelph	519-824-4120	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

Develop an additional season of efficacy data to support registration of alternative herbicides in onions on muck soils.

Description

Evaluate the efficacy of combinations of broadleaf weed herbicides in sequence, as related to the onion seedling developmental stages of growth, at various levels of each herbicide and in repeat applications. Emphasis will be placed on broadleaf weed control and crop phytotoxicity from the 'loop' to the 3-leaf stage.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
3	3rd Year	January 1985	☒ Yes ☐ No

	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
$21,000	8.0	21.0		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-19

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

Dislodgeable pesticide residues on turfgrass in relation to safe entry.

Key Words

Pesticide residues | Turfgrass | Re-entry

Principal Investigator and Organization	Tel.	
Dr. G. R. Stephenson - Dept. of Environmental Biology Dr. M. V. Sears University of Guelph	519-824-4120	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

To complete analyses of 350 samples for the study on the influence of shade on pesticide persistence in turfgrass.

Description

See PAC 83-14, 1983-84

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
4	4th Year	January 1985		
	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
$73,800	9.3	73.8		

Source of Funds (Specify)

☐ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Two scientific papers orginating from this 4 years study have been accepted for publication. Two other papers are "In Press". For more information contact the Pesticides Advisory Committee or the authors.

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-20

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

Biological control of the house fly, Musca domestica.

Key Words

Biological control House fly Livestock production

Principal Investigator and Organization	Tel.	
Dr. G. A. Surgeoner Dept. of Environmental Biology-University of Guelph	519-824-4120	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

The housefly directly affects more producers than any other pest in Ontario. The purpose of study is to evaluate the current status of housefly parasites in Ontario and to devise viable, economic methods for their production and release.

Description

The ultimate objective is to provide Ontario producers with a safe economic method of reducing houseflies while at the same time reducing usage of insecticides.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
2	2nd Year	January 1985	☒ Yes	☐ No
	Cost $000		Number of Man Years	
Budget $26,500	Current 13.0	Total 26.5	Current	Total

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-21

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

New approaches to managing botrytis grey mold in strawberries.

Key Words

Fungicides | Strawberries | Reduction in use

Principal Investigator and Organization	Tel.	
Dr. J. C. Sutton Department of Environmental Biology University of Guelph	519-824-4120	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

To establish new approaches to managing botrytis grey mold in strawberries.

Description

- Monitor weather factors in relation to sporulation, infection and colonization of strawberry plants by Botrytis cinerea.
- Examine effects of cultural practices and fungicide sprays applied in late summer and fall on inoculum production and disease progress in fall and spring.
- Determine effectiveness of fungicides, applied at specific times in spring, in reducing disease progress.
- Develop an integrated program of weather-timed fungicides and cultural practices for managing grey mold.
- Maintain a search for possible biological control agents.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?	
2	2nd Year	January 1985	☒ Yes	☐ No

	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
$22,300	12.0	22.3		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-22

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

Integrated management of root maggots attacking vegetable Crops.

Key Words

IPM Root maggots Vegetable crops

Principal Investigator and Organization	Tel.	
Dr. J. H. Tolman Dr. A. D. Tomlin - University of Western Ontario		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

1. To assess the potential of seed treatments for root maggot control.
2. To determine the relative effectiveness of A. bilineata in suppressing root maggot damage.

Description: Development of seed treatments for root maggot control offers several advantages. From an IPM point-of-view, seed treatments would probably be less damaging to parasites and predators, particularly if the narrow spectrum insecticide, chlorfenvinphos, was used. Finally, insecticide input into the environment would be reduced, e.g., in the case of the onion maggot, substitution of seed treatment in place of the seed furrow application would result in an 85% reduction in the amount of insecticide applied to dry onions for 1st generation onion maggot control.

In other research supported by OPAC since 1980, the role which parasites and predators might have in integrated root maggot control have been investigated. In some field trials a seed furrow treatment and timed releases of A. bilineata, protection against onion maggot damage was at least as effective as the current seed furrow and foliar spray recommendation.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
2	2 Year	January 1985	

	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
$29,380	14.88	29.38		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-23

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

Feasibility of culture and use of entomophthora muscae as an alternative to insecticides in insect control.

Key Words

E. Muscae Insect control

Principal Investigator and Organization	Tel.	
Dr. C. M. Tu - Dr. C. R. Harris University of Western Ontario		Internal ☐ Grant ☒
Liaison Officer or Supervisor	**Tel.**	Unsolicited Contract ☐ Solicited Contract ☐
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

Development of an in vitro culture technique for Entomophthora muscae.

Description

While entomologists have recognized the importance of E. muscae as a naturally occurring biological control agent for many years, evaluation of its potential for use in integrated pest management programs has been hampered by the fact that it can be maintained only through use of in vivo culture techniques, using a host such as the house fly. However, preliminary studies suggest that it may be feasible to develop an in vitro culture technique for E. muscae. If successful, development of such a procedure could lead to greatly expanded research on the feasibility of using this pathogen for dipterous insect pest control.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
> 1	1st Year	January 1985	

	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
> $11,850	11.85	> 11.85		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-24

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

Biological control of white rot of onion by Sporidesmium sclerotivorum in muck soil.

Key Words

Biological control White rot Onions

Principal Investigator and Organization	Tel.	
Dr. L. V. Edgington - Dept. of Environmental Biology University of Guelph	519-824-4120	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

1. Evaluate under field conditions the role of Sporidesmium as a biological control agent for Sclerotium cepivorum.
2. Develop an economic method for mass production of propagules of Sporidesmium.

Description

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ?
1	1st Year	January 1985	☒ Yes ☐ No

	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
$8,600	8.6	8.6		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-25

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

Meadow mouse control in apple orchards.

Key Words

Meadow mouse Control Orchards

Principal Investigator and Organization	Tel.	
Dr. Z. Siddiqi - Chemical Research International Toronto		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

1. To demonstrate effectiveness of specially designed bait stations (Radvanyi type) for long term control.
2. To evaluate effectiveness of new anticoagulant rodenticides.
3. To evaluate residues toxicity of conventional baits, applied as broadcast fall treatments.

Description

Same as above.

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
4	(final) 4th Year	January 1985	

	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
$59,900	9.4	59.9		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-26

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

Role of fumigants in present day pest management programs - suitability and safety of methyl bromide on food commodities: 1. Residues of methyl bromide in fumigated commodities and relationship of the treatments to safety of the working environment.

Key Words

Fumigants Methyl bromide Safety

Principal Investigator and Organization	Tel.	
Dr. E. J. Bond - University of Western Ontario		Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

1. To establish the parameters that influence the sorption of methyl bromide (using ^{14}C methyl bromide) in corn, soybeans and possibly other food materials, especially effects resulting from different moisture contents, different oil contents and repeated treatments with the fumigant.
2. To determine the conditions that are most amenable to desorption of fumigant after treatment (e.g., temperature, humidity and air movement), to determine levels of residues remaining after the treated commodities are exposed to such conditions and to relate these findings to contamination of atmospheres where human beings are working.
3. To identify reaction products and determine their significance as residues.

Description

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No
> 1	1st Year	January 1985	

	Cost $000		Number of Man Years	
Budget	Current	Total	Current	Total
> $14,800	14.8	> 14.8		

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-27

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

Seed viability, dormancy and overwintering in different populations of proso millet (Panicum miliaceum L.)

Key Words

Proso millet Viability Dormancy

Principal Investigator and Organization	Tel.	
Dr. P. B. Cavers - University of Western Ontario		Internal ☐ Grant ☑ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

Seed viability, dormancy and overwintering in different populations of proso millet (Panicum miliaceum L.)

Description

1. Determine how the biotypes of proso millet with the lighter coloured seeds maintain themselves over winter in sufficient numbers to produce large infestations year after year? Several of these biotypes are considered to be serious weeds in Ontario.
2. Determine what causes the breakdown of the lighter coloured seeds in the soil, and why do the same factors not act on seeds of the black-seeded biotype?
3. Determine what factors cause and break dormancy in the black-seeded biotype?

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☑ Yes ☐ No
1	1st Year	January 1985	
	Cost $000		Number of Man Years
Budget	Current	Total	Current / Total
$11,900	11.9	11.9	

Source of Funds (Specify)

☑ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

Ministry of the Environment
Ontario

Inventory: Research and Development Projects

PAC 84-28

Branch/Office	Date
PESTICIDES ADVISORY COMMITTEE	28 Day 8 Month 84 Year

Project Title

Application of epidemiology to reduce fungicide requirements for controlling grey mold of strawberries and brown rot of stone fruits.

Key Words

Fungicides Reduction in use Strawberries Stone fruits.

Principal Investigator and Organization	Tel.	
Dr. J. Northover - University of Guelph	519-824-4120	Internal ☐ Grant ☒ Unsolicited Contract ☐ Solicited Contract ☐
Liaison Officer or Supervisor	**Tel.**	
Chairman - Pesticides Advisory Committee	416-965-7048	

Objectives

1. To examine cultural practices affecting production and survival of inoculum and inoculum sources (sclerotia, conidia etc.).
2. To monitor infection and colonization of strawberry plants by B. cinerea in relation to weather factors (crop microclimate).
3. To develop improved schemes for timing fungicide sprays based on weather and crop factors, and to field-test these schemes.

Description

See above

Duration of Project (Yrs.)	Present Year is	Reporting Date	Is a Report Anticipated ? ☒ Yes ☐ No	
2	2nd Year	January 1985		
	Cost $000		Number of Man Years	
Budget $10,500	Current 7.2	Total 17.5	Current	Total

Source of Funds (Specify)

☒ Regular Work Program ☐ Special Ministry ☐ Jointly Funded ☐ Other

Participation By Others (Specify)

Remarks

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ALPHABETICAL INDEX

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