

State of California

AIR RESOURCES BOARD

Resolution 79-18

March 22, 1979

WHEREAS, a solicited research Proposal Number 821-69 entitled "Emission Characteristics of Primary Petroleum Operations in California", has been submitted by the KVB, Inc., to the Air Resources Board; and

WHEREAS, the Research staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding the proposal:

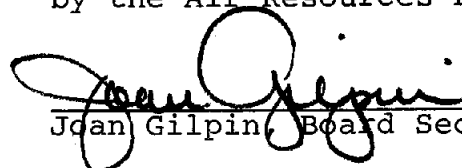
Proposal Number 821-69 entitled "Emission Characteristics of Primary Petroleum Operations in California", submitted by the KVB, Inc., for an amount not to exceed \$250,000;

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board under the powers and authority granted by the Health and Safety Code, Section 39705, hereby accepts the recommendation of the Research Screening Committee and approves the following proposal:

Proposal Number 821-69 entitled "Emission Characteristics of Primary Petroleum Operations in California", submitted by the KVB, Inc., for an amount not to exceed \$250,000,

and authorizes the Executive Officer to initiate administrative procedures and to execute all necessary documents and contracts for the research effort proposed in an amount not to exceed \$250,000.

I certify that the above is
a true and correct copy of
Resolution 79-18 as passed
by the Air Resources Board


Joan Gilpin, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO: 79-5-6b-1
DATE: March 21, 1979

ITEM: Research Proposal No. 821-69 entitled "Emission Characteristics of Primary Petroleum Operations in California".

RECOMMENDATION: Adopt Resolution 79-18 approving Research Proposal No. 821-69 for funding in an amount not to exceed \$250,000.

SUMMARY: Although many studies have considered some aspects of the emissions from primary oil field operations, no comprehensive study has been conducted and the emissions of pollutants from these sources have only been estimated. The primary reasons for this paucity of good data are: lack of emission factors for some equipment and/or operations, and the lack of a good count of the equipment in use. This latter concern is particularly valid for offshore oil production operations. Since operating permits are not required for most oil field production equipment, some of it has never been counted in previous surveys. This source class may account for a very large fraction of the uninventoried emissions of hydrocarbons, NO_x and SO_x in California.

A special effort is required to enumerate this equipment, quantify the emissions from the equipment and determine the feasibility of reducing these emissions.

With the guidance of the Research Screening Committee, the staff released a request for proposals for this project. Five responses were received of which this proposal by KVB, Inc. was concluded to be most meritorious by the staff and the Committee.

The objectives of this research project are: to measure and analyze the character and rates of emissions associated with primary crude oil production operations in California, both on and offshore; to develop emission factors for the various operations, facilities and equipment; to quantify the emissions from the major primary crude oil production areas in California; and to assess the feasibility and cost of emission control measures.

State of California

AIR RESOURCES BOARD

Resolution 79-19

March 22, 1979

WHEREAS, an unsolicited research Proposal Number 836-69 entitled "In Vivo Fate of Nitrogenous Air Pollutant Derivatives", has been submitted by the University of California, Davis, to the Air Resources Board; and

WHEREAS, the Research staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding the proposal:

Proposal Number 836-69 entitled "In Vivo Fate of Nitrogenous Air Pollutant Derivatives", submitted by the University of California, Davis, for an amount not to exceed \$98,539;

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board under the powers and authority granted by the Health and Safety Code, Section 39705, hereby accepts the recommendation of the Research Screening Committee and approves the following proposal:

Proposal Number 836-69 entitled "In Vivo Fate of Nitrogenous Air Pollutant Derivatives", submitted by the University of California, Davis, for an amount not to exceed \$98,539,

and authorizes the Executive Officer to initiate administrative procedures and to execute all necessary documents and contracts for the research effort proposed in an amount not to exceed \$98,539.

I certify that the above is a true and correct copy of Resolution 79-19 as passed by the Air Resources Board.


Joan Gilpin, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO: 79-5-6b-2
DATE: March 21, 1979

ITEM: Research Proposal No. 836-69 entitled "In Vivo Fate of Nitrogenous Air Pollutant Derivatives".

RECOMMENDATION: Adopt Resolution 79-19 approving Research Proposal No. 836-69 for funding for an amount not to exceed \$98,539.

SUMMARY: Nitrogenous air pollutants include an extremely wide range of compounds: Nitric oxide, nitrogen dioxide, nitrogen trioxide, dinitrogen trioxide, nitrogen pentoxide, nitrates, nitrites, nitric acid, countless organic nitro compounds, nitramines, and nitrosamines. Some are directly emitted from industrial process and others form photochemically in the atmosphere. Particulate nitrogenous materials often account for a significant portion of Hi-Vol samples taken from urban air.

Little is known about the harmful nature of the nitrogenous particulate compounds, but it is thought that some of the observed effects of nitrogen dioxide may actually be due to nitrates and nitrites formed from NO_2 in the lungs. There is also limited information that suggests certain nitrosamines may be biochemically produced from various other airborne materials through various pathways in the body.

The proposed study is a continuation of a current ARB funded effort. The proponents have developed a unique methodology that allows the study of the deposition, absorption, conversion and ultimate fates in the body of inhaled nitrates and nitrites. Current efforts have also compared the fates of these materials when administered via different routes at very low concentration. The proposed work would extend similar efforts to the study of toxic levels of nitrates and nitrites administered to the airways, stomach and blood stream. The biochemical metabolites and their organ locations would be analyzed as before. Greater efforts would be expended to resolve the questions surrounding the body's ability to produce nitrosamines from these pollutants.

The information gained from this study would serve several purposes. It should resolve uncertainties regarding nitrosamine formation from NO_2 , nitrates and/or nitrites in the body. More importantly in the more traditional framework, it would point to areas for future toxicological and pathological studies. It would do this through identifying organ systems that exhibit abnormally high build-ups of nitrogenous compounds or where known toxic derivatives build-up. Some indication of the need for a nitrate-nitrite air quality standard might also be derived from this study.

State of California

AIR RESOURCES BOARD

Resolution 79-20

March 22, 1979

WHEREAS, an unsolicited research Proposal Number 841-69 entitled "Air Pollution Effects on Yield, Quality and Ecology of Range and Forage Grasses", has been submitted by the University of California, Riverside, to the Air Resources Board; and

WHEREAS, the Research staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding the proposal:


Proposal Number 841-69 entitled "Air Pollution Effects on Yield, Quality and Ecology of Range and Forage Grasses", submitted by the University of California, Riverside, for an amount not to exceed \$86,486;

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board under the powers and authority granted by the Health and Safety Code, Section 39705, hereby accepts the recommendation of the Research Screening Committee and approves the following proposal:

Proposal Number 841-69 entitled "Air Pollution Effects on Yield, Quality and Ecology of Range and Forage Grasses", submitted by the University of California, Riverside, for an amount not to exceed \$86,486,

and authorizes the Executive Officer to initiate administrative procedures and to execute all necessary documents and contracts for the research effort proposed in an amount not to exceed \$86,486.

I certify that the above is a true and correct copy of Resolution 79-20 as passed by the Air Resources Board.


Joan Gilpin, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO: 79-5-6b-3
DATE: March 21, 1979

- ITEM: Research Proposal No. 841-69 entitled "Air Pollution Effects on Yield, Quality and Ecology of Range and Forage Grasses".
- RECOMMENDATION: Adopt Resolution 79-20 approving Research Proposal No. 841-69 for funding in an amount not to exceed \$86,486.
- SUMMARY: A considerable body of information is available concerning the individual injury effects of sulfur dioxide and oxidant on vegetation. Only limited reliable information is available concerning the effect of these two pollutants acting in combination, and no such information is available for California grasses. There is now considerable evidence to suggest that the combined effect of SO₂ and oxidant upon vegetation may be greater than the sum of either pollutant acting alone. Thus, it may be necessary to consider combination effects when evaluating air quality standards for the protection of vegetation in California, as the Board has done for the protection of human health. This question is especially crucial in view of the changing fuel situation, increased oil recovery operations, the spread of urban plumes and the present trend to locate power plants within rural areas.
- The objectives of this project are to ascertain the effect that chronic oxidant and sulfur dioxide exposures, alone and in combination, have upon the yields, quality and interrelationship of several California range and forage grasses. Forbs (a small, broad-leaf grazing plant) may be studied at a later date.
- The experiment as planned will utilize equipment purchased and the facility constructed at the University of California, Riverside under ARB sponsorship. Two types of grasses, forage and range with six varieties of each will be used in the study. Each type will be studied separately during its respective growing season, and an analysis of total yield of stems, leaves, seeds, tiller number, protein content, soluble carbohydrates, digestible dry matter and mineral content will be performed to determine effects of air pollutant treatments. Grazing simulation will also be incorporated for two treatments during each set of experiments. Ten treatments will be studied using different levels of O₃ with SO₂.
- This study will provide useful information on the effects of pollutants on grazing lands which will allow an evaluation of the related impact of these emissions on California's livestock industry.

State of California

AIR RESOURCES BOARD

Resolution 79-21

March 22, 1979

WHEREAS, a solicited research Proposal Number 839-69 entitled "Health Effects from the Inhalation of Oxidant Air Pollutants as Related to the Immune System", has been submitted by the University of California, Davis, to the Air Resources Board; and

WHEREAS, the Research staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding the proposal:

Proposal Number 839-69 entitled "Health Effects from the Inhalation of Oxidant Air Pollutants as Related to the Immune System", submitted by the University of California, Davis, for an amount not to exceed \$59,003;

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board under the powers and authority granted by the Health and Safety Code, Section 39705, hereby accepts the recommendation of the Research Screening Committee and approves the following proposal:

Proposal Number 839-69 entitled "Health Effects from the Inhalation of Oxidant Air Pollutants as Related to the Immune System", submitted by the University of California, Davis, for an amount not to exceed \$59,003,

and authorizes the Executive Officer to initiate administrative procedures and to execute all necessary documents and contracts for the research effort proposed in an amount not to exceed \$59,003.

I certify that the above is a true and correct copy of Resolution 79-21 as passed by the Air Resources Board.


Joan Gilpin, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 79-5-6b-4
DATE: March 21, 1979

ITEM: Research Proposal No. 839-69 entitled "Health Effects from the Inhalation of Oxidant Air Pollutants as Related to the Immune System."

RECOMMENDATION: Adopt Resolution No. 79-21 approving Research Proposal No. 839-69 for funding in an amount not to exceed \$59,003.

SUMMARY: Asthma has emerged as the disease state considered most sensitive to and most commonly affected by ozone and certain other air pollutants. Both clinical and epidemiological studies have shown that ambient pollutant concentrations are often likely to produce adverse respiratory effects in asthmatics.

This study proposes to continue efforts now underway to investigate the effects of ozone and sulfuric acid and combinations of ozone and sulfuric acid in an animal model for asthma. Asthma is basically a defect in the immune system that produces a hyper-reactive response to inhaled antigens (foreign proteins) cold air and other stimuli. The most apparent clinical manifestation is a restriction of the conducting airways leading to extreme breathing difficulty.

It is also the intent of the proponent to continue study of pollutant-induced defects in the immune system's ability to resist viral infection. Increased incidence of respiratory infections has been associated with community exposures to polluted ambient air. Immunological experiments would validate these observations, in a sense, and perhaps elucidate the mechanism.

Finally, a segment of the proposed study will involve determination of whether the cellular level damage caused by O_3 , H_2SO_4 and combination exposures results in the eventual sensitization of the body to its own cells (auto-immune response). This appears to be one explanation of the root for certain serious pulmonary diseases.

State of California

AIR RESOURCES BOARD

Resolution 79-22

March 22, 1979

WHEREAS, a solicited research Proposal Number 825-69 entitled "Use of Fuel Oils by Stationary Sources in California", has been submitted by the Pacific Environmental Services, Inc., to the Air Resources Board; and

WHEREAS, the Research staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding the proposal:

Proposal Number 825-69 entitled "Use of Fuel Oils by Stationary Sources in California", submitted by the Pacific Environmental Services, Inc., for an amount not to exceed \$108,066;

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board under the powers and authority granted by the Health and Safety Code, Section 39705, hereby accepts the recommendation of the Research Screening Committee and approves the following proposal:

Proposal Number 825-69 entitled "Use of Fuel Oils by Stationary Sources in California", submitted by the Pacific Environmental Services, Inc., for an amount not to exceed \$108,066,

and authorizes the Executive Officer to initiate administrative procedures and to execute all necessary documents and contracts for the research effort proposed in an amount not to exceed \$108,066.

I certify that the above is
a true and correct copy of
Resolution 79-22 as passed
by the Air Resources Board.


Joan Gilpin, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO: 79-5-6b-5

DATE: March 21, 1979

ITEM: Research Proposal No. 825-69 entitled "Use of Fuel Oils by Stationary Sources in California."

RECOMMENDATION: Adopt Resolution 79-22 approving Research Proposal No. 825-69 for funding in an amount not to exceed \$108,066.

SUMMARY: The ARB has fuel oil usage data for major combustion facilities such as power plants, but does not have similar data for smaller combustion sources in industrial, agricultural and commercial applications. For some of the smaller counties in the state, there are no data available, although usage of fuel oils is thought to be significant. These data are necessary to establish a comprehensive stationary source emission inventory.

With the guidance of the Research Screening Committee, the staff released a request for proposals for this project. Four responses were received of which this proposal by Pacific Environmental Services, Inc. was concluded to be most meritorious by the staff and the Committee.

The purpose of this research project is to obtain accurate information on fuel oil usage in California for 1977. The Contractor is to determine temporal and spatial usage data for combustion equipment grouped into appropriate size ranges and also determine representative values for the heat content, sulfur, nitrogen, ash and trace metal contents of the fuel oil. Variations in operating conditions are to be identified. The data are to be summarized by county and by air basin, by 10 km grid squares, in tabular format and also in a graphical format for the major metropolitan areas. Utility power plants are not included in the study because the ARB staff already has such data for these facilities.

State of California

AIR RESOURCES BOARD

Resolution 79-23

March 22, 1979

WHEREAS, a solicited research Proposal Number 833-69 entitled "Development of Emission Factors for Reactive Hydrocarbons Used in Pesticide Formulations", has been submitted by the KVB, Inc., to the Air Resources Board; and

WHEREAS, the Research staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding the proposal:

Proposal Number 833-69 entitled "Development of Emission Factors for Reactive Hydrocarbons Used in Pesticide Formulations", submitted by the KVB, Inc., for an amount not to exceed \$105,000;

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board under the powers and authority granted by the Health and Safety Code, Section 39705, hereby accepts the recommendation of the Research Screening Committee and approves the following proposal:

Proposal Number 833-69 entitled "Development of Emission Factors for Reactive Hydrocarbons Used in Pesticide Formulations", submitted by the KVB, Inc, for an amount not to exceed \$105,000,

and authorizes the Executive Officer to initiate administrative procedures and to execute all necessary documents and contracts for the research effort proposed in an amount not to exceed \$105,000.

I certify that the above is a true and correct copy of Resolution 79-23 as passed by the Air Resources Board.


Joan Gilpin, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM: 79-5-6b-6
DATE: March 21, 1979

ITEM: Research Proposal No. 833-69 entitled,
"Development of Emission Factors for Reactive
Hydrocarbons used in Pesticide Formulations".

RECOMMENDATION: Adopt Resolution 79-23 approving Research
Proposal No. 833-69 for funding in an amount
not to exceed \$105,000.

SUMMARY: A recently completed study has indicated that pesticides,
especially nonsynthetic hydrocarbon pesticidal oils such
as weed oil and foliar spray oil applied over wide areas
constitute a large emission source of reactive hydrocarbons.
It is reasonable to assume that these reactive organic
gases contribute substantially to the violation of standards
for photochemical oxidants and ozone in many areas of
California. Research has been performed on synthetic
hydrocarbons such as DDT, heptachlor, lindane, etc., which
demonstrate that the volatilization of pesticide ingredients
even of relatively low vapor pressure can be quite
significant over periods of days or weeks. Little or no
research has been performed to determine the volatility of
pesticidal oils, hydrocarbon diluents or other pesticide-
associated hydrocarbons which represent little direct
toxicological hazard.

A request for proposals was released for this project and
two responses were received. The proposal submitted by
KVB was determined to be the most responsive to the RFP and
our needs by the staff and the Research Screening Committee.

The purpose of this study is to experimentally determine
the rate of and total volatilization of the reactive organics
used in the formulation of pesticides under conditions
approximating actual use conditions. Other research in
progress will better define use patterns in all California
counties.

In this work, special emphasis will be placed on formulations
using nonsynthetic organics as the active ingredient, which
recent studies indicate are the largest sources of pesticide-
related organic gas emissions.

Two approaches would be utilized in this study. Tests will
be performed on a large number of selected pesticides under
controlled conditions, using a simple test procedure.
Second, a detailed analysis of total emissions, evaporation
rates and hydrocarbon species profiles in actual field tests

will be carried out. The field tests will incorporate the use of a wind tunnel type of chamber that can simulate the effect of varying wind speeds and will be equipped with the appropriate monitoring equipment. Models to estimate emission rates will be developed and compared with actual test results of the two approaches. It is anticipated that by combining existing knowledge and the results of the planned testing program, emissions of hydrocarbons resulting from their use in pesticides can be well quantified for various environmental conditions.

State of California

AIR RESOURCES BOARD

Resolution 79-24

March 22, 1979

WHEREAS, a solicited research Proposal Number 830-69 entitled "The Role of Agricultural Practices in Fugitive Dust Emissions", has been submitted by the Midwest Research Institute, to the Air Resources Board; and

WHEREAS, the Research staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding the proposal:

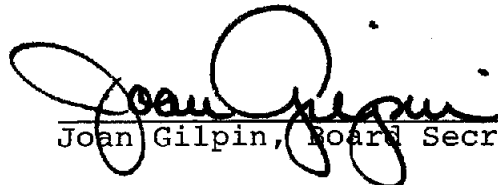
Proposal Number 830-69 entitled "The Role of Agricultural Practices in Fugitive Dust Emissions", submitted by the Midwest Research Institute, for an amount not to exceed \$111,632;

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board under the powers and authority granted by the Health and Safety Code, Section 39705, hereby accepts the recommendation of the Research Screening Committee and approves the following proposal:

Proposal Number 830-69 entitled "The Role of Agricultural Practices in Fugitive Dust Emissions", submitted by the Midwest Research Institute, for an amount not to exceed \$111,632,

and authorizes the Executive Officer to initiate administrative procedures and to execute all necessary documents and contracts for the research effort proposed in an amount not to exceed \$111,632.

I certify that the above is a true and correct copy of Resolution 79-24 as passed by the Air Resources Board.


Joan Gilpin, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO: 79-5-6b-7
DATE: March 21, 1979

ITEM: Research Proposal No 830-69 entitled "The Role of Agricultural Practices in Fugitive Dust Emissions".

RECOMMENDATION: Adopt Resolution 79-24 approving Research Proposal No. 830-69 for funding in an amount not to exceed \$111,632.

SUMMARY: The work to be done under this project will provide the ARB with information on the role of agricultural operations with respect to fugitive dust emissions and visibility degradation, and on the potential for changes in agricultural practices or equipment that may reduce ambient air concentrations of inhalable particulate matter and improve visibility.

Five proposals were submitted in response to the RFP for this study. The proposal submitted by the Midwest Research Institute was determined by the staff and the Research Screening Committee to be the most experienced.

The study proposed by Midwest Research Institute incorporates identification of agricultural operations and farm equipment types and for testing. A substantial effort in field work is proposed with plans for testing at the San Joaquin Valley and the Imperial Valley agricultural experiment stations. The factors influencing emissions and the air quality impacts of control practices, with the bonus of an analysis of impacts associated with the trends in agricultural practices will be evaluated. KVB and Meteorology Research, Inc. will be subcontractors for this study. KVB will provide support for the selection of agricultural equipment and operations, and assist in test-site selection and testing arrangements. Meteorology Research, Inc. will be responsible for field measurements of visibility and for correlation of visibility measurements with meteorology and diffusion conditions.

State of California

AIR RESOURCES BOARD

Resolution 79-25

March 22, 1979

WHEREAS, a solicited research Proposal Number 814-69 entitled "Emission Characteristics of Cooling Towers Using Reclaimed Waste-Water in California", has been submitted by the Science Applications, Inc., to the Air Resources Board; and

WHEREAS, the Research staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding the proposal:


Proposal Number 814-69 entitled "Emission Characteristics of Cooling Towers Using Reclaimed Waste-Water in California", submitted by the Science Applications, Inc., for an amount not to exceed \$138,255;

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board under the powers and authority granted by the Health and Safety Code, Section 39705, hereby accepts the recommendation of the Research Screening Committee and approves the following proposal:

Proposal Number 814-69 entitled "Emission Characteristics of Cooling Towers Using Reclaimed Waste-Water in California", submitted by the Science Applications, Inc., for an amount not to exceed \$138,255,

and authorizes the Executive Officer to initiate administrative procedures and to execute all necessary documents and contracts for the research effort proposed in an amount not to exceed \$138,255.

I certify that the above is a true and correct copy of Resolution 79-25 as passed by the Air Resources Board.


Joan Gilpin, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 79-5-6b-8
DATE: March 21, 1979

ITEM: Research Proposal No. 814-69 entitled "Emission Characteristics of Cooling Towers Using Reclaimed Waste-Water in California."

RECOMMENDATION: Adopt Resolution 79-25 approving Research Proposal No. 814-69 for funding in an amount not to exceed \$138,255.

SUMMARY: Recently there has been an increased interest in developing facilities that can use wastewater from agricultural, municipal sewage, industrial processing and geothermal sources as make-up water for cooling towers. In some instances these sources are already providing water for cooling towers in California. The policy of some governmental agencies is to advocate the use of reclaimable or brackish water whenever possible for thermal cooling. This policy appears attractive since it preserves California's freshwater sources for more valuable uses and saves the cost of disposing of wastewaters at treatment or ocean outflow operations. Additionally, inland surface water discharge restrictions are often costly to meet and thus make the use of reclaimed water in cooling towers economically attractive.

The expected increase in the use of reclaimed water in cooling towers raises questions about the potential air pollution problems which may arise, including emissions of pathogenic microorganisms, toxic metals, asbestos, pesticides, and chlorinated and reactive hydrocarbons. While numerous studies of cooling tower inorganic saline drift have been conducted, relatively little research has been dedicated to characterizing other potential emissions, especially those which could have an impact upon the health of the general public.

The potential for a public health problem and the lack of sufficient information for regulatory decision-making, has resulted in the proposed program for a comprehensive study of the emissions from cooling towers using waters of concern. The program proposed by Science Applications, Inc. will utilize existing information on various wastewaters and other waters of concern, cooling tower operation characteristics, information on existing control technologies, past source tests, surveys of suspected users and a source testing program to obtain the following program objectives:

- Ascertain the extent of cooling tower usage in California;
- Determine the source, constituents and extent of present usage of waste or contaminated waters in such cooling towers;
- Develop emission factors for pollutants of concern from cooling towers (emphasizing toxic emissions);
- Identify technologies and recommend strategies to control such emissions, and;
- Identify future trends in cooling tower usage and the utilization of waste waters as makeup in cooling towers.