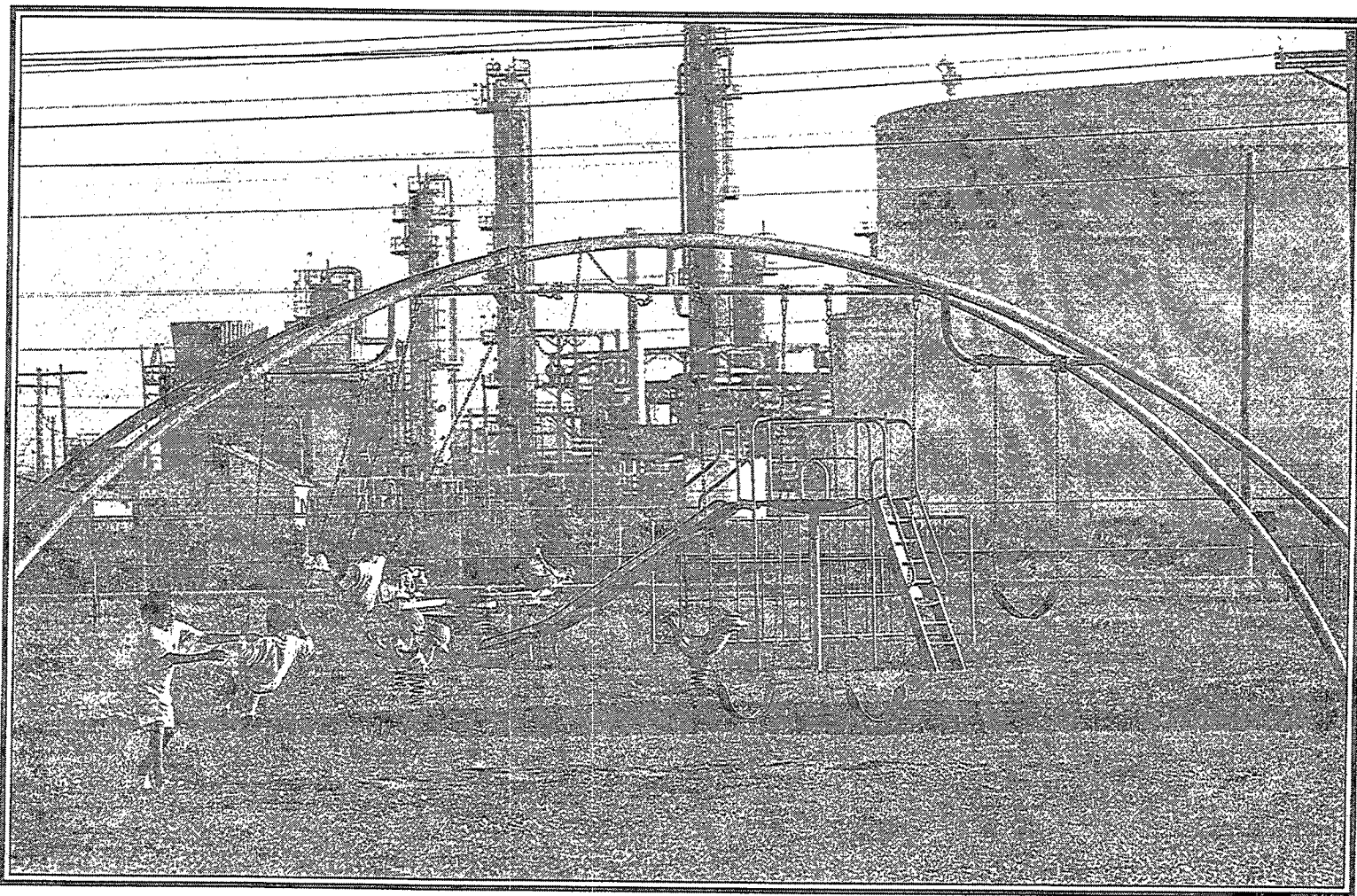




Environmental Equity

Reducing Risk for All Communities



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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

May 29, 1992

Mr. William K. Reilly
Administrator
U.S. Environmental Protection Agency
Washington, D.C. 20460

Dear Mr. Reilly:

In July of 1990, you established the Environmental Equity Workgroup. You directed the Workgroup to review the evidence that racial minority and low-income communities bear a disproportionate environmental risk burden. You asked the Workgroup to make recommendations for Agency action on environmental equity issues. The following report contains a summary of the information collected and the Workgroup's recommendations.

The literature relating environmental risk to race and income is limited although highly suggestive. It spans a wide spectrum of environmental problems and population groups exposed. The evidence indicates that racial minority and low-income populations are disproportionately exposed to lead, selected air pollutants, hazardous waste facilities, contaminated fish tissue and agricultural pesticides in the workplace. The extent and nature of the problem may not be known in every case, but EPA can help lead the way in clearly defining the problems.

The report is the final product of a collective effort by many individuals and offices across the Agency. It is a first step. We welcome and encourage public debate on the report and the issue. Any effort to address environmental equity issues effectively must include all segments of society: the affected communities, the public at large, industry, people in policy-making positions and all levels and branches of government.

We have been delighted and inspired by the enthusiasm and attention that environmental equity issues have received. Concern for the issues has come from a diversity of people and institutions, both within and outside the Agency. Diversity spawns the innovative and effective solutions needed to address this complex and engrained problem.

Sincerely,

Robert M. Wolcott
Chair
Environmental Equity Workgroup

Warren A. Banks
Special Assistant
Office of the Administrator

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MEMBERS OF THE ENVIRONMENTAL EQUITY WORKGROUP

Chair: Robert M. Wolcott
Office of Policy, Planning and Evaluation

Staff: Reina Milligan
Asst.: Office of Policy, Planning and Evaluation

Headquarters

Warren Banks
Office of the Administrator

Lutrician Booth
Office of Policy, Planning
and Evaluation

Rebecca Calderon
Office of Research and Development

Sharie Centilla
Office of Water

David Cleverly
Office of Research and Development

Rapheal De Leon
Office of General Counsel

Jan Gallagher
Office of Water

Clarice Gaylord
Office of Human Resources
Management

Roberta Gordon
Office of General Counsel

David Grim
Office of Civil Rights

Robin Grove
Office of Congressional and
Legislative Affairs

Yvonne Kinney
Office of Toxic Substances

Peggy Knight
Office of Communications and
Public Affairs

Bob Knox
Office of Solid Waste and
Emergency Response

Elaine Koerner
Office of Communications and
Public Affairs

Karen Levy
Office of Air & Radiation

Debora Martin
Office of Policy, Planning
and Evaluation

Craig McCormack
Office of Policy, Planning
and Evaluation

Sherry Milan
Office of Enforcement

Kitty Miller
Office of Water

Lawrence Molloy
Office of Policy, Planning
and Evaluation

Joe Montgomery
Office of Federal Activities

Dave Rejeski
Office of Administration and
Resources Management

Ken Sexton
Office of Research and Development

Bob Smith
Office of Pesticide Programs

Sherry Sterling
Office of Pesticides and Toxic
Substances

Edgar Thornton
Office of Policy, Planning and
Evaluation

Alex Varela
Office of Enforcement

Will Wilson
Office of Air and Radiation

Regional Offices

James Younger
Region 1

Conrad Simon
Region 2

Samara Swanston
Region 2

Dominique Lueckenhoff
Region 3

Jewell Harper
Region 4

Stallings Howell
Region 4

J. Milton Clark
Region 5

William (Bill) Sanders
Region 5

Art Turner
Region 5

Bill Hathaway
Region 6

Don Jones
Region 6

Delores Platt
Region 7

Elmer M. Chenault
Region 8

Alvin Chun
Region 9

Pat Cirone
Region 10

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Chapter 1

INTRODUCTION AND EXECUTIVE SUMMARY

The Environmental Agenda

Over the past twenty years, the United States has made considerable progress in protecting and cleaning up the environment. Many forms of air pollution have been significantly reduced, many surface water systems have shown dramatic recovery and hazardous wastes are better managed. To achieve this progress, the nation enacted major laws at the federal, state and local levels, established agencies to administer these laws and expended considerable sums to install and operate control equipment. Today there is also a growing movement throughout our society to prevent pollution before it is ever created, through changes in production and consumption practices.

This progress has brought important benefits to many communities throughout the U.S. But many environmental problems remain, and some are regrettably growing. In many locations the air remains too polluted, the water is still too dirty and the land still bears too much uncontrolled waste. There are numerous efforts underway to identify, rank and clean up these problems. All communities have a direct interest in identifying, prioritizing, and addressing environmental problems.

Environmental Equity

The U.S. Environmental Protection Agency (EPA) is continually attempting to improve its approach to environmental protection. Traditionally, environmental programs at all levels of government have set broadly applicable standards for individual pollutants released by specific types of sources with the goal of protecting the environment and all people. Recognizing that not everyone is affected in the same ways by pollution, these standards have often been set to protect the most susceptible, such as asthmatics, children or pregnant women.

Environmental protection has progressed from this initial strategy to include risk-based priority setting. The EPA Science Advisory Board, in its report *Reducing Risk: Setting Priorities and Strategies for Environmental Protection*, urged EPA to target its environmental protection efforts based on the opportunities for reducing the most serious remaining risks (EPA, 1990). In response, EPA began to examine and target its efforts on those environmental problems which pose the greatest risks nationwide to human health and the environment, using comparative risk analyses to rank environmental problems according to severity. One approach EPA now employs to prioritize environmental efforts based on risk is geographic targeting, where attention is focused on the problems faced by individual cities or regions, such as the Chesapeake Bay, the Great Lakes and the Gulf of Mexico.

In the context of a risk-based approach to environmental management, the relative risk burden borne by low-income and racial minority communities is a special concern. A low-income community which is surrounded by multiple sources of air pollution, waste treatment facilities and landfills and which has lead-based paint in the residences is clearly a community that faces higher than average

potential environmental risks. A racial or cultural group whose children commonly have harmful levels of lead in their blood is also living with a greater environmental risk. In addition, as a result of factors affecting health status, such communities may be more likely than the general population to experience disease or death due to a given level of exposure. Poor nutrition, smoking, inadequate health care and stress can all contribute to an increased rate of health effects at a given pollutant level. Hence, to the extent these communities are subject to these factors. They are also more likely to actually experience harm due to these exposures.

Issues such as these, and how government agencies respond, have come to be known today as issues of *environmental equity*. Environmental equity refers to the distribution of environmental risks across population groups and to our policy responses to these distributions. While there are many types of equity, all of which are important to EPA, the this report focuses on racial minority and low-income populations.

EPA has begun to assess how patterns of environmental problems converge on different places, how people who live in those places are affected and how environmental programs should be further refined to address identified differences. The causes of these differences are often complex and deeply rooted in historical patterns of commerce, geography, state and local land use decisions and other factors that affect where people live and work. With respect to some types of pollutants, race and income, however, appear to be correlated with these distributions.

Clearly, environmental equity is important to those who might bear high risks. But everyone has a stake in environmental equity because it results in better environmental protection generally. Environmental equity is an important goal in a democratic society. It involves ensuring that the benefits of environmental protection are available to all communities and an environmental policy-making process that allows the concerns of all communities to be heard, understood, and addressed.

The EPA Environmental Equity Workgroup

In response to a variety of concerns raised by EPA staff and the public, in July 1990, EPA Administrator William K. Reilly formed the EPA Environmental Equity Workgroup with staff from all EPA offices and regions across the Agency. The Workgroup was directed to assess the evidence that racial minority and low-income communities bear a higher environmental risk burden than the general population, and consider what EPA might do about any identified disparities.

This report to the Administrator reviews existing data on the distribution of environmental exposures and risks across population groups. It also summarizes the Workgroup's review of EPA programs with respect to racial minority and low-income populations. Based on the findings from these analyses, the Workgroup makes initial recommendations. Because of the specific nature of the Workgroup's assignment, the report does not deal with other important related subjects, such as EPA's minority recruiting programs. It also does not repeat the work recently done by EPA's Minority Academic Institutions Taskforce (*Final Action Plan* completed in May, 1991) or the on-going work of EPA's Cultural Diversity Committee.

The report is intended to contribute to the national dialogue on environmental equity and to suggest further steps for EPA. It is an initial step in the Agency's response to environmental equity concerns. There is also much that we still need to learn, through both research and public debate.

Summary Of Findings

1. There are clear differences between racial groups in terms of disease and death rates. There are also limited data to explain the environmental contribution to these differences. In fact, there is a general lack of data on environmental health effects by race and income. For diseases that are known to have environmental causes, data are not typically disaggregated by race and socioeconomic group. The notable exception is lead poisoning: A significantly higher percentage of Black children compared to White children have unacceptably high blood lead levels.
2. Racial minority and low-income populations experience higher than average exposures to selected air pollutants, hazardous waste facilities, contaminated fish and agricultural pesticides in the workplace. Exposure does not always result in an immediate or acute health effect. High exposures, and the possibility of chronic effects, are nevertheless a clear cause for health concerns.
3. Environmental and health data are not routinely collected and analyzed by income and race. Nor are data routinely collected on health risks posed by multiple industrial facilities, cumulative and synergistic effects, or multiple and different pathways of exposure. Risk assessment and risk management procedures are not in themselves biased against certain income or racial groups. However, risk assessment and risk management procedures can be improved to better take into account equity considerations.
4. Great opportunities exist for EPA and other government agencies to improve communication about environmental problems with members of low-income and racial minority groups. The language, format and distribution of written materials, media relations, and efforts in two-way communication all can be improved. In addition, EPA can broaden the spectrum of groups with which it interacts.
5. Since they have broad contact with affected communities, EPA's program and regional offices are well suited to address equity concerns. The potential exists for effective action by such offices to address disproportionate risks. These offices currently vary considerably in terms of how they address environmental equity issues. Case studies of EPA program and regional offices reveal that opportunities exist for addressing environmental equity issues and that there is a need for environmental equity awareness training. A number of EPA regional offices have initiated projects to address high risks in racial minority and low-income communities.
6. Native Americans are a unique racial group that has a special relationship with the federal government and distinct environmental problems. Tribes often lack the physical infrastructure, institutions, trained personnel and resources necessary to protect their members.

Summary Of Recommendations

Although large gaps in data exist, the Workgroup believes that enough is known with sufficient certainty to make several recommendations to the Agency. These recommendations are also applicable to other public and private groups engaged in environmental protection activities. The job of achieving environmental equity is shared by everyone.

1. EPA should increase the priority that it gives to issues of environmental equity.
2. EPA should establish and maintain information which provides an objective basis for assessment of risks by income and race, beginning with the development of a research and data collection plan.
3. EPA should incorporate considerations of environmental equity into the risk assessment process. It should revise its risk assessment procedures to ensure, where practical and relevant, better characterization of risk across populations, communities or geographic areas. These revisions could be useful in determining whether there are any population groups at disproportionately high risk.
4. EPA should identify and target opportunities to reduce high concentrations of risk to specific population groups, employing approaches developed for geographic targeting.
5. EPA should, where appropriate, assess and consider the distribution of projected risk reduction in major rulemakings and Agency initiatives.
6. EPA should selectively review and revise its permit, grant, monitoring and enforcement procedures to address high concentrations of risk in racial minority and low-income communities. Since state and local governments have primary authority for many environmental programs, EPA should emphasize its concerns about environmental equity to them.
7. EPA should expand and improve the level and forms with which it communicates with racial minority and low-income communities and should increase efforts to involve them in environmental policy-making.
8. EPA should establish mechanisms, including a center of staff support, to ensure that environmental equity concerns are incorporated in its long-term planning and operations.

Structure Of This Report

This report presents the information collected by the Workgroup and its conclusions. It is an internal staff report from the Workgroup to the Administrator. The report reflects a variety of expertise and views from individuals and offices across the Agency. The Workgroup's central goals in producing this report were to: present an initial perspective and assessment of environmental equity issues; focus the attention of EPA officials and staff on environmental equity issues; and inform other government officials and the general public about these issues.

The report consists of two volumes: the main report and the supporting document. Chapter Two of the report describes the background, context, and assignment of the Workgroup and defines the issues examined in this report. Chapter Three presents the findings of the Workgroup. The Workgroup's recommendations are detailed in Chapter Four. Brief descriptions of existing and planned EPA projects addressing various environmental equity issues are provided at the end of this document.

Volume II presents more detailed information on some aspects of environmental equity and contains extensive references and a bibliography. Sections in Volume II are referenced throughout the main body of the text.

Finally, the main report was shared with a group of technical and policy experts for peer review. Although their comments could not be fully incorporated, we have included the reviewers' full comments and a summary in Volume II. For a copy of Volume II, please contact the Office of Policy, Planning and Evaluation at (202) 260-5484.

Chapter 2

BACKGROUND AND CONTEXT

Background

While low-income and racial minority communities have been involved in environmental issues for many years, an environmental equity movement has arisen in the past decade. The environmental equity movement formed primarily at the grassroots level. During the 1980s, organizations formed around the country to work on environmental issues in racial minority and low-income communities. For instance, in Los Angeles, Mothers of East Los Angeles was formed to protest a proposed incinerator. The Southwest Network for Environmental and Economic Justice and the Southwest Organizing Project brought together many community-based groups working on environmental concerns in the Southwestern United States. Native Action began on the Northern Cheyenne Reservation to protest the coal mining on surrounding federal land. In Southside Chicago, People for Community Recovery formed to aggressively pursue clean up of industrial and hazardous waste sites in their community. These examples are only several among the hundreds of community-level environmental equity organizations.

National organizations have also been formed to integrate the civil rights and environmental movements. In 1985, the Center for Environment, Commerce and Energy was founded as the first national African American environmental organization. It embraced the goal of carrying out environmental cleanup and conservation activities in racial minority and low-income communities. Also in 1985, the National Council of Churches' Eco-Justice Working Group began focusing on environmental equity issues. Finally, the American Baptist Churches developed a program titled "Ecological and Racial Justice" and which encompasses training workshops which bring together social justice activists, environmentalists and church leaders.

The 1982 demonstration against the siting of a polychlorinated biphenyl (PCB) landfill in Warren County, North Carolina, was a watershed event in the environmental equity movement (Lee, 1990). In response to the protests in this predominantly Black county, Delegate Walter Fauntroy (D.C.) requested that the General Accounting Office (GAO) investigate siting issues with respect to race and income.

To expand on the scope of the GAO study, the United Church of Christ Commission for Racial Justice examined the statistical relationship between hazardous waste site location and the racial/socioeconomic composition of host communities nationwide. While several studies were done in the 1970s, *Toxic Waste and Race in the United States* was the first study to address issues of race, class and the environment at the national level (UCC, 1987).

In January 1990, the University of Michigan School of Natural Resources held the "Conference on Race and the Incidence of Environmental Hazards." A group of social scientists and civil rights leaders formed at the meeting, informally calling themselves the Michigan Coalition.

The Coalition wrote a letter to the Administrator of the U.S. Environmental Protection Agency, William K. Reilly, in March 1990, requesting a meeting and Agency action on a number of points relating to environmental risk in racial minority and low-income communities. Specific proposals for EPA consideration included:

-
- Undertake research geared toward understanding environmental risks faced by minority and low-income communities;
 - Initiate projects to enhance risk communication targeted to minority and low-income population groups;
 - Require, on a demonstration basis, that racial and socioeconomic equity considerations be included in Regulatory Impact Assessments;
 - Include a racial and socioeconomic dimension in geographic studies of environmental risk;
 - Enhance the ability of minority academic institutions to participate in and contribute to the development of environmental equity;
 - Appoint special assistants for environmental equity at decision-making levels; and
 - Develop a policy statement on environmental equity.

Administrator Reilly responded to the Coalition's letter, as well as concerns of EPA staff, by meeting with representatives of the Coalition and forming the EPA Environmental Equity Workgroup. The Workgroup was composed of staff from across the Agency and was convened in July 1990.

Environmental Equity Workgroup Mission

Administrator Reilly charged the Workgroup with four tasks:

Task One: Review and evaluate the evidence that racial minority and low-income people bear a disproportionate risk burden.

Evidence on the distribution of environmental risk will allow EPA to identify high risk populations that should be targeted for risk reduction efforts.

Task Two: Review current EPA programs to identify factors that might give rise to differential risk reduction, and develop approaches to correct such problems.

This task directly addresses institutional or programmatic barriers to accomplishing the goal of equitable risk reduction.

Task Three: Review EPA risk assessment and risk communication guidelines with respect to race and income-related risks.

Task Three was broken into two parts. The first concerns the adequacy of EPA risk assessment procedures. The second part addresses the manner in which EPA communicates information on environmental problems.

Task Four: Review institutional relationships, including outreach to and consultation with racial minority and low-income organizations, to assure that EPA is fulfilling its mission with respect to these populations.

Task Four involves how the Agency relates to external groups and other federal agencies in the decision-making process for routine business matters, major policy debates and environmental priorities.

Defining The Issues

As the Workgroup set out, it found that one of its more difficult tasks was simply defining the concept of equity in relation to the environment. There are many definitions of equity. In fact, the complex subject of equity and how to achieve it has been debated by philosophers advocating numerous ideas over the centuries. For this reason, rather than adopting any single philosophy, the Workgroup attempted to identify some of the major aspects of environmental equity.

Environmental equity is concerned with a variety of issues which fall into three general categories: the distribution and effects of environmental problems, the environmental policy making process, and the administration of environmental protection programs. As to the first category, the Workgroup focused broadly on a host of environmental problems and the distribution of those problems across population groups. The environmental problems examined included lead, air pollution, hazardous waste exposures, consumption of contaminated fish and farmworker exposure to pesticides.

The distributional aspect of environmental equity has many facets. For instance, while this Workgroup focused on environmental equity as it relates to racial minority and low-income populations, equity across age, gender, sensitive populations (such as asthmatics), geographic location and generations is also very important. Similarly, in the global context, environmental equity among nations could also be examined. This Workgroup focused on socioeconomic status and race, within the United States, because of concerns raised within and outside the Agency that these populations bear high environmental risks. However, much of the knowledge gained should be transferable to other equity issues.

The second category of issues falling under the general heading of environmental equity relates to the access of racial minority and low-income communities to the environmental policy making process. The Workgroup examined EPA's outreach programs, the form and content of public hearings, the development of environmental priorities, and who EPA consults in the course of major policy debates. The Workgroup did not address hiring issues. However, for many years the Office of Civil Rights has had programs to increase equal employment opportunity and outreach to minority academic institutions. To further these efforts, Administrator Reilly had previously established the EPA Minority Academic Institutions Taskforce and the EPA Cultural Diversity Committee.

The third aspect of environmental equity, as it relates to EPA, is concerned primarily with the administration of Agency programs. Ensuring that EPA programs and operations are equitable includes making sure that: grants are available to communities of all races and socioeconomic status; enforcement actions and compliance monitoring in minority and low-income communities reflect the

degree of risk and EPA's ability to reduce risk in those communities; research includes issues of concern to racial minority and low-income communities; and access to decision-making is available to all communities.

Neither EPA nor any other organization has control over all factors that contribute to environmental inequities. However, guided by the basic principle stated above, EPA can help achieve environmental equity by pursuing the following two goals:

- Assuring that the protection of public health and the environment is available to all segments of the population; and
- Implementing environmental statutes in a manner that equitably confers benefits and risk reductions on all segments of the population.

The concept of risk provides the theoretical basis and a mechanism for achieving equitable environmental protection. In its report *Reducing Risk: Setting Priorities and Strategies for Environmental Protection*, the Science Advisory Board urged EPA to:

- "[T]arget its environmental protection efforts on the basis of opportunities for the greatest risk reduction"; and
- "[R]eflect risk-based priorities in its budget process" by focusing "budget resources at those environmental problems that pose the most serious risks" (EPA, 1990).

By identifying and focusing on population groups which are more likely to experience adverse effects of a given environmental problem, EPA can increase both the efficiency and equity of its actions.

While EPA can ensure that its processes are open and fair, it cannot by itself ensure that environmental inequities will be erased. However, EPA should strive to reduce environmental threats to all communities and administer its programs in pursuit of this goal.

The Workgroup believes that there should be further public debate about values and measures of success pertaining to environmental equity. However, there is enough agreement on the principles and goals of environmental equity that the Workgroup is confident in making the findings and recommendations that follow in this report.

Defining The Terms

The terms used to describe racial population groups are continually changing. The United Church of Christ's *Toxic Waste and Race Report* defines "minority populations" to include: Blacks, Hispanics, Asian/Pacific Islanders, American Indians [and Alaskan Natives] and other "non-White" persons (UCC, 1987). However, other terms are also in use today. In this report, Black and African American are used interchangeably, as are Hispanic and Latino, and Indian and Native American. To avoid misreporting research, where studies are discussed in this report, the original classifications are retained. In charts where information is not provided for all racial groups, it was absent from the original studies. Furthermore, this report follows the common practice used in demographics: "race"

differentiates among population groups based on physical characteristics of a genetic origin (i.e., skin color), and "ethnicity" refers to differences associated with cultural or geographic differences (i.e., Hispanic, Irish).

The term used in this report to describe the equitable distribution of environmental protection benefits is also the subject of considerable debate. Environmental equity, as described above, refers to the distribution and effects of environmental problems and the policies and processes to reduce differences in who bears environmental risks. An alternate term is environmental justice. Some use the term environmental racism to refer to disproportionate environmental risks in racial minority communities (Rees, 1992).

EPA chose the term environmental equity because it most readily lends itself to scientific risk analysis. The distribution of environmental risks is often measurable and quantifiable. The Agency can act on inequities based on scientific data. Evaluating the existence of injustices and racism is more difficult because they take into account socioeconomic factors in addition to the distribution of environmental benefits that are beyond the scope of this report. Furthermore, environmental equity, in contrast to environmental racism, includes the disproportionate risk burden placed on any population group, as defined by gender, age, income, as well as race.

The Workgroup recognizes the importance and sensitivity of these terms. The Workgroup also recognizes that combining racial groups into one category, racial minorities, can lead to overgeneralizations regarding the risk burdens borne by different communities. Any perceived misuse of these terms is unintentional.

Chapter 3

FINDINGS

- 1. There are clear differences between racial groups in terms of disease and death rates. There are also limited data to explain the environmental contribution to these differences. In fact, there is a general lack of data on environmental health effects by race and income. For diseases that are known to have environmental causes, data are not typically disaggregated by race and socioeconomic group. The notable exception is lead poisoning: A significantly higher percentage of Black children compared to White children have unacceptably high blood lead levels.**

The Workgroup reviewed existing literature on the evidence that racial minority and low-income communities bear a disproportionate environmental risk burden. The survey revealed several important findings about background health statistics. First, there is clear evidence that there are differences by race for disease and death rates. For example, age-specific death rates are higher for Black males and females than their White counterparts in all age groups from 0 to 84 years of age. Furthermore, overall death rates from cancer are greater in Blacks than Whites for both males (33% greater) and females (16% greater). The overall cancer mortality rate for other racial minorities is lower than for Whites. There is, however, great variation in rates of different types of cancer. For example, White females have the highest rate of mortality for breast cancer, ovarian cancer, leukemia, and non-Hodgkin's lymphoma; Chinese females have the highest mortality rate for lung cancer; Black females have the highest mortality rate for cancer of the colon, pancreas, cervix, and uterus; and Japanese females have the highest mortality rate for stomach cancer.

The second point about disease and death rates is the lack of data collected by socioeconomic variables. The U.S. is the only western high-income country whose government does not collect mortality statistics by class indicators such as income, education, or occupation.

The population differences in disease and death rates undoubtedly are caused by a number of confounding factors, including economic, social, cultural, biological, and environmental variables. However, while the differences are dramatic, there is a paucity of data on the environmental contribution to these diseases.

For diseases that are known to be environmentally induced, there is a lack of data disaggregated by race and socioeconomic variables. The notable exception is lead. Here the data are unambiguous: a higher percentage of Black children than White children have high blood lead levels. The evidence on lead shows that all socioeconomic and racial groups have children with lead in their blood high enough to cause adverse health effects. However, as shown in Table 1, a significantly higher percentage of Black children compared to White children have unacceptably high blood lead levels (ATSDR, 1988).

Table 1: Estimated Percentage of Children (Living in Cities with Populations over One Million) 0.5-5 Years Old with Blood Lead Levels Greater Than 15 µg/dl By Race and Income

	LESS THAN \$6,000	\$6,000-\$15,000	MORE THAN \$15,000
Black	68%	54%	38%
White	36%	23%	12%

Source: ATSDR, (1988)

For both Blacks and Whites, increasing family income is associated with lower blood lead concentrations. The difference is smallest for the lowest income level, yet there is still a large unexplained difference. Furthermore, while this table concerns urban populations, the figures for the country as a whole are similar (ATSDR, 1988).

Because a significant portion of these differences in blood lead levels have been due to lead in gasoline, EPA's actions in the 1980s to eliminate nearly all lead in gasoline were a major step in the reduction of high blood lead levels among all children. Current lead reduction strategies at EPA focus on lead in drinking water, lead in urban soils, and lead in paint.

See Sec. 2.0 of Volume II for more detailed information on this finding.

2. *Racial minority and low-income populations experience disproportionate exposures to selected air pollutants, hazardous waste facilities, contaminated fish and agricultural pesticides in the workplace. Exposure does not always result in an immediate or acute health effect. High exposures, and the possibility of chronic effects, are nevertheless a clear cause for health concerns.*

Some low-income and racial minority communities appear to have greater than average observed and potential exposure to certain pollutants because of historical patterns affecting where they live and work and what they eat. Racial minority and low-income communities may have a greater than average *potential* for exposure to some pollutants because they tend to live in areas with high air pollution levels or may be more likely to live near a waste site. Furthermore, some groups rely on subsistence fishing and may be more exposed than the average population to fish that have accumulated pollution. Farmworker exposures to pesticides is another area where racial minority and low-income communities are at greater than average risk. All of these differences in exposures are complex and deeply rooted in many aspects of society, such as historical residence, politics, commerce, geography, state and local land use decisions and other socioeconomic factors that affect where people live and work.

1. *Exposures and Susceptibilities*

There are two groups that are generally considered to be at higher than average public health/environmental risk:

- Individuals who experience the highest exposures. (These individuals are in approximately the 90th percentile in the distribution of exposure across the exposed population.)
- Individuals who are more biologically susceptible to the health effects of environmental pollution. These people are more likely than the general population to develop environmentally induced disease or injury, even at equivalent exposures. (Such individuals may include the developing fetus, young children, pregnant women, individuals with chronic diseases, individuals with poor immune systems and the elderly.)

The group at highest risk is composed of individuals who are both more biologically susceptible and who encounter high exposures. Exposure is not the same as actual health effects, but when data on actual health effects are lacking, data on exposure are important to examine.

Although environmental measurements in air, water, soil, or food often are used as surrogates for exposure, they in fact represent "potential" exposure rather than "actual" exposure. Even though the potential for exposure may be the same, not all potentially exposed persons will experience the same actual exposure. For example, the level of outdoor air pollution in a particular community is a measure of the potential exposure for the residents. Individuals residing in the community are likely to have significantly different exposures to air pollution depending on factors such as occupation, proximity to sources, indoor pollution sources, and activity patterns. It is increasingly apparent that a person's activity pattern is the single most important determinant of environmental exposures for most pollutants.

Social/cultural factors such as living near a pollutant source and access to health care can increase an individual's or population's susceptibility. Several recent studies have suggested that many, if not all, of the differences in cancer rates between African Americans and Whites can be explained by the effects of poverty (Navarro, 1990; Basquet, et. al, 1991). Indeed, some have interpreted the results to suggest that if differences in socioeconomic characteristics could be eliminated, Blacks would actually have a lower overall cancer rate than Whites (Okie, 1991; Gibbons, 1991). Others suggest that while poverty and lifestyle can explain a significant portion of the observed difference, there is still a substantial amount of variation that seems to be explained only by race or ethnicity (Gladwell, 1990; Gibbons, 1991).

2. Air Pollution

Air pollution is primarily an urban phenomenon, where emission densities tend to be the highest. A large proportion of racial minorities reside in metropolitan areas (Table 2) and may be systematically exposed to higher levels of certain air pollutants.

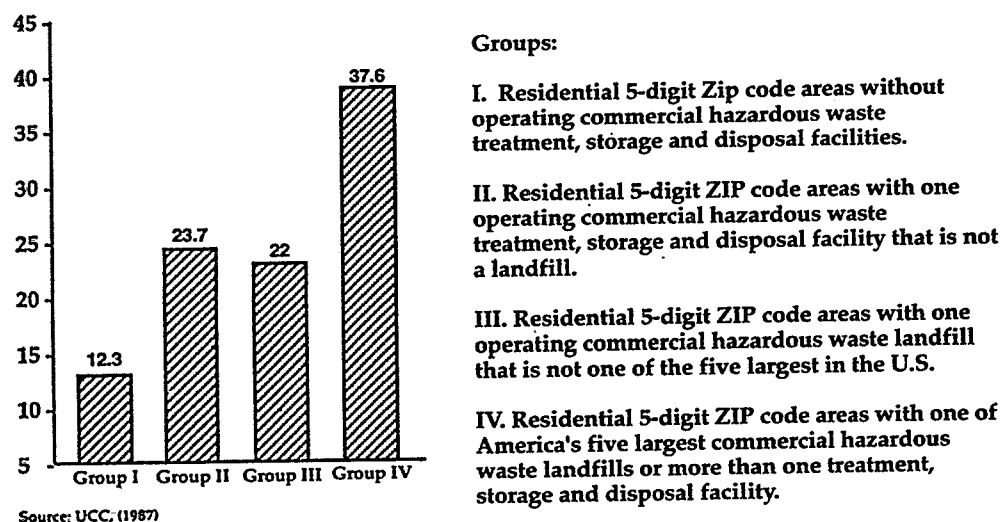
Table 2: Comparison of Urban Versus Rural Distribution of Population by Ethnic Group

ETHNIC GROUP	LIVE IN URBAN AREAS	LIVE IN RURAL AREAS	
		FARM	NON-FARM
White	70.3%	2.3%	27.0%
Black	86.1%	0.3%	13.6%
Hispanic	91.2%	0.7%	8.1%
Other	86.5%	0.4%	12.5%

Source: DOC, (1990)

Researchers at the Argonne National Laboratory studied the demographics of areas designated by EPA as out of compliance with the Clean Air Act (called air non-attainment areas.) They found that higher percentages of Blacks and Hispanics, compared to Whites, live in air non-attainment areas for particulate matter, carbon monoxide, ozone, sulfur dioxide, and lead (Wernette and Nieves, 1991). Table 3 is a summary of their findings.

Figure 1: Minority Percentage of the Population in U.S. Communities with Operating Commercial Hazardous Waste Facilities



A key implication of the above discussion is that EPA's extensive efforts to improve air quality in non-attainment areas under the Clean Air Act of 1990 should bring significant benefits to racial minority groups.

3. Residence Near Waste Sites

There is evidence (GAO, 1983; UCC, 1987) to indicate that racial and ethnic minorities are more likely to live near a commercial waste treatment facility or an uncontrolled hazardous waste site than the general population. In 1983, the U.S. General Accounting Office conducted a study of hazardous waste landfills in eight southeastern states (EPA Region IV). The GAO reported that in three of the four communities where offsite hazardous waste landfills were located, Blacks formed the majority of the population (GAO, 1983). The GAO's findings are listed in Table 4.

Table 3: Percentages of Total U.S. Whites, Blacks and Hispanics in EPA-Designated Air Quality Non-Attainment Areas, By Air Pollutant*

AIR POLLUTANTS	WHITES	BLACKS	HISPANICS**
Particulate Matter	14.7%	16.5%	34.0%
Carbon Monoxide	33.6%	46.0%	57.1%
Ozone	52.5%	62.2%	71.2%
Sulfur Dioxide	7.0%	12.1%	5.7%
Lead	6.0%	9.2%	18.5%

* Totals by population groups are greater than 100% because counties may be included in more than one non-attainment category.

** Hispanics may be of either race, since Hispanic is an ethnic, not a racial, category.

Source: Wernette and Nieves, (1991)

The United Church of Christ decided to study the GAO's findings at the national level and produced the *Toxic Waste and Race Report*. They found that the proportion of racial minorities in communities with the largest commercial landfills in America or the greatest number of commercial waste facilities was three times greater than in communities without such facilities (UCC, 1987). The results of their study are summarized in Figure 1.

The UCC's analysis of "uncontrolled hazardous waste sites" (old industrial landfills and waste sites that arose before EPA or its laws were created) concluded that race was more strongly associated with residence near a waste site than socioeconomic status. The study also concluded that the presence of uncontrolled toxic waste sites is highly pervasive. According to the report, more than half of the total population in the U.S. resides in communities with uncontrolled toxic waste sites. It is clear that more study of this issue is required to fully understand the associations of race, income, and facility location.

Table 4: 1980 Data for Census Areas Where EPA Region IV Hazardous Waste Landfills Are Located

LANDFILL	POPULATION		MEDIAN FAMILY INCOME (\$)		POPULATION BELOW POVERTY LEVEL		
	Total	% Black	All Races	Blacks	Total	%	% Black
Chemical Waste Man. (AL)	626	90%	11,198	10,752	265	42%	100%
SCA Services (SC)	849	38%	16,371	6,781	260	31%	100%
Industrial Chemical Co. (SC)	728	52%	18,996	12,941	188	26%	92%
Warren County PCB Landfill (NC)	804	66%	10,367	9,285	256	32%	90%

Source: U.S. GAO, (1983)

4. Dietary Exposure Through Fish Consumption

Consumption of fish can be an important route of exposure for certain pollutants. PCBs, dioxins, and furans can bioaccumulate in fish tissues to high concentrations, even when water concentrations are below detection limits. Variations in fish consumption can affect exposure to those pollutants and hence, health risks. Some populations, such as subsistence fishers and some racial groups, consume more fish than the average population.

A recent survey of licensed anglers in Michigan found that Native Americans consumed 36% more fish and Blacks 13% more fish than the Caucasian population (West, 1990). A California study of sport fishers indicates that Asians/Samoans eat the most fish followed in order by Caucasians, Hispanics, and African Americans (Puffer, 1981). A national survey of 25,000 individuals, the National Purchase Diary (NPD) Survey, supported these findings and found Asians to have the highest fish consumption rate (SRI, 1980). It is important to note that these studies found different rates of fish consumption for the racial population groups studied. Calculating fish consumption rates is complex and dependent on regional dietary patterns.

Other socioeconomic factors also may play a role in rates of fish consumption. Several studies found that fish consumption generally increases with increasing age (West, 1990; SRI, 1980; NYDEC, 1988). In addition, both the Michigan and NPD surveys found a correlation between lower education level and higher fish consumption. Studies have generally not found a correlation between income and fish consumption (SRI, 1980; West, 1990), although one study did find that fish consumption actually increased with increasing income (NYDEC, 1988). These studies, however, most often surveyed licensed fishers and may not account for lower-income anglers who do not purchase licenses.

In addition to the quantitative rate of fish consumption, fish preparation and species of fish eaten also can affect exposure to contaminants and may vary by socioeconomic factors. Lipophilic compounds that bioaccumulate tend to accumulate in the fatty portions of the fish and accumulate to a higher degree in bottom feeding species. Most risk assessments assume that the population consumes skinless, trimmed fillets. Yet evidence suggests that racial minorities are more likely to eat fish with the skin, may be less likely to trim the fat, and are more likely to eat the whole fish (NOAA, 1985; West, 1990). In addition, preferred fish species differ across populations. For example, the Michigan study found that Great Lakes bottom dwellers were consumed exclusively by non-white, low-income populations. A study of anglers in Puget Sound found that Asians disproportionately consumed clams and the hepatopancreas of crabs (McCallum, 1985), both practices that might lead to higher relative exposures to pollutants.

This evidence points to the complexity of the subject, variation among communities, and a greater potential for contaminant exposure to certain populations through the fish ingestion route. However, these studies were not designed specifically to address these concerns. Additional studies are needed before these differences can be consistently and conclusively validated.

5. Pesticide Exposures to Farmworkers

Exposures to pesticides occur in a variety of ways, including occupational settings; contact with garden, home, and lawn care products; contaminated food or soil; and even mother's milk. It is believed by many that racial and ethnic minorities, especially Latinos, are at increased risk because of their high numbers in the agricultural workforce and the fact that many of them live in places close to agricultural pesticide spraying activities (EPA, 1990).

It has been estimated that 80-90% of the approximately two million hired farmworkers (performing farm work not done by farm families) are racial minorities (Martin et al, 1985). Hispanics make up the largest group, followed in order by African Americans, Black Caribbeans, Puerto Ricans, Filipinos, Vietnamese, Laotians, and Koreans (Martín et. al., 1985).

For a multitude of reasons, it is difficult to document the cause and effect between pesticides and health (Perfecto, 1990). However, it is estimated that as many as 300,000 farmworkers experience pesticide related illnesses each year (Coye, 1985). Furthermore, results from a nationwide study of selected organochlorine pesticides in the milk of 1,436 mothers found that Hispanic women in the study had higher levels of dieldrin and oxychlordane, while heptachlor epoxide levels were similar for Whites and Hispanics (Savage, 1976). Another study failed to find significant differences between Black and White field workers in Florida (Griffith and Duncan, 1983). Data from the National Adipose Tissue Survey for 1982 found

that Whites had significantly higher concentrations than Non-Whites for five pesticides (Unger and Mak, 1989). No compounds measured in the study were higher in Non-Whites.

EPA's Science Advisory Board (SAB) identified worker exposures to chemicals in agriculture as a high human health risk due to the large numbers of workers directly exposed to a range of highly toxic chemicals. "[A]gricultural workers are exposed to many toxic substances in the workplace. Such exposures can cause cancer and a wide range of non-cancer health effects" (SAB, 1990). While there is very little published information on pesticide exposures in general and almost none at all on differences by class, race, or ethnicity, it is clear that since racial and ethnic minorities comprise the majority of the documented and undocumented farm workforce, they may experience higher than average risk from agricultural chemicals.

In recognition of inadequate federal farmworker protection standards, EPA proposed more protective standards in 1988. The proposal included provisions for: restricted entry times after application during which time workers are not permitted to re-enter treated fields; additional protective equipment; increased training; and notifying workers of areas treated with pesticides through field posting. The final rule is currently being reviewed within the Administration and is expected to become final in 1992.

For more detailed information on health effects and exposures, see Sec. 2.0 of Volume II.

- 3. Environmental and health data are not routinely collected and analyzed by income and race. Nor are data routinely collected on health risks posed by multiple industrial facilities, cumulative and synergistic effects, or multiple and different pathways of exposure. Risk assessment and risk management procedures are not in themselves biased against certain income or racial groups. However, risk assessment and risk management procedures can be improved to better take into account equity considerations.**

The quantitative and qualitative steps incorporated in EPA's risk assessment guidelines for carcinogenic and noncarcinogenic effects are not, in themselves, biased against certain racial/ethnic groups. However, as most risk assessors proceed through the stages of the risk assessment process where data are obtained and analyzed (hazard identification, exposure assessment and risk characterization) they do not routinely collect information on differences by race and income group. In some cases this is due to the fact that information on the distribution of risks across race and income groups may not always be relevant to a risk assessment. If these factors are relevant, they should be considered in the risk assessment process and presented to the risk managers in the decision-making process.

For the purposes of reviewing the accuracy of the risk assessment process with respect to population group differences, the Workgroup evaluated several studies on the distribution of environmental risks in addition to the health and exposure data presented above. Evidence suggests that exposures to and risk from environmental contaminants may vary significantly depending on age, gender, race, ethnicity, and economic factors. For example, in epidemiologic studies of those U.S. steel workers most heavily exposed to mixtures of organic pollutants in coke-oven emissions at by-product plants, it was found that 90% of these workers were nonwhite. This population had an 8-fold higher rate of respiratory cancer than

expected (EPA, 1984). Also, estimated lung cancer deaths in the U.S. attributable to indoor radon exposure are about 2-fold higher in males than in females, and remain higher even when adjusted for smoking (Nazaroff and Teichman, 1990).

With respect to identifying human health hazards associated with chemical exposure, the preponderance of the epidemiologic studies has involved evaluations of White males working in industry. Determinations of the carcinogenic potency of known human chemical carcinogens is based on direct evidence from these epidemiologic studies. In addition, the direct evidence of noncancer health effects are derived from these studies. This information is also used routinely by EPA and others in conducting risk assessments.

Currently, the Agency does not present exposure analyses as distributions across population groups. The U.S. Census Bureau database is a potentially rich source of data for presenting gradations of exposures across demographic groups, including age, gender, ethnicity, race and income level. Likewise, quantitative estimates of risk probabilities are not displayed as distributions across the exposed population, broken down demographically.

Multiple sources of pollution can play a significant role in exposures to environmental pollutants in certain low-income and racial minority communities. However, for the most part, EPA programs do not calculate the aggregate human health risks posed by all types of sources in a particular community. Nor do programs address cumulative and synergistic effects or multiple pathways of exposure. This can, in part, be attributed to the inherent difficulty of performing such analyses and to the Agency's original structure and mission, which are fragmented under many different pieces of legislation into problem-specific program areas.

Risk assessment information is used by EPA staff and managers to make regulatory decisions. The decision stage in the process is called risk management. Recognizing the importance of risk management, the Workgroup reviewed the risk management process as well. The Workgroup noted that while risk management, like risk assessment, is not inherently biased, there are no published guidelines to guide risk management decisions, nor are there any guidelines to promote the consistent and systematic consideration of equity when selecting among regulatory alternatives.

Volume II, Sec. 5.0, contains detailed information on risk assessment and risk management procedures.

- 4. Great opportunities exist for EPA and other government agencies to improve communication about environmental problems with members of low-income and racial minority groups. The language, format and distribution of written materials, media relations, and efforts in two-way communication all can be improved. In addition, EPA can broaden the spectrum of groups with which it interacts.**

EPA's communication efforts generally have not had explicit equity goals. Indeed, EPA risk communication guidance seldom mentions race, income, or other characteristics that might influence the distribution of risks and benefits. Nor are there explicit guidelines to ensure that the communication process itself is equitable.

EPA has a Risk Communication Program which has generated materials that contain general principles on risk communication and sound advice that can be used in coming to grips with equity issues. However, more guidance is needed that illustrates these general principles with explicit reference to the equity issues affecting racial minority and low-income populations, and some concrete advice about how to address these problems. Guidance would be particularly useful on language, format and distribution of written materials, as well as on working with the media. *(In depth case studies of several EPA risk communication programs can be found in Volume II, Sec. 6.3.)*

On a related matter, organizations concerned with environmental equity complain that traditional environmental groups do not address the concerns of racial minority and low-income communities. Thus, EPA and other government organizations should expand their outreach programs to ensure that racial minority and low-income communities are included in setting environmental policies and in regulatory negotiation wherever possible. EPA's aggressive hiring programs, work with Minority Academic Institutions, and EPA's new Tribal Lands Scholarship Program will assist these efforts.

To increase outreach, government agencies should work with local and regional grassroots organizations, which play a key role among low-income and racial minority communities. EPA traditionally has worked with large, national organizations, especially at the Headquarters level. Given the local focus of most grassroots groups, much of the interaction with racial minority and low-income communities may occur through EPA Regional offices (a map of EPA Regions is located on the back page), as well as state and local government offices.

Another element of the environmental equity movement is the role of religious organizations. For example, a driving force in the movement has been the United Church of Christ. The United Methodist Church, the Presbyterian Church, the World Council of Churches and the National Council of Churches, as well as others, are strongly involved in environmental equity issues. In May 1992, scientists and religious leaders convened to produce the "Declaration of the 'Mission to Washington' Joint Appeal by Religion and Science for the Environment." Expanding outreach to religious organizations will be breaking new ground for the Agency, but is important nonetheless.

See Volume II, Sec. 6.0, for a detailed discussion of risk communication and Sec. 7.0 for more information on outreach.

- 5. Since they have broad contact with affected communities, EPA's program and regional offices are well suited to address equity concerns. The potential exists for effective action by such offices to address disproportionate risks. These offices currently vary considerably in terms of how they address environmental equity issues. Case studies of EPA program and regional offices reveal that opportunities exist for addressing environmental equity issues and that there is a need for environmental equity awareness training. A number of EPA regional offices have initiated projects to address high risks in racial minority and low-income communities.**

EPA has four program offices based on specific environmental media and pollutants – the Office of Water, the Office of Air and Radiation, the Office of Prevention, Pesticides and Toxic Substances, and the Office of Solid Waste and Emergency Response. The legislation authorizing these programs gives EPA, the

States, and municipal governments different regulatory and enforcement powers and responsibilities in each of these program areas. Identifying factors that might give rise to a differential distribution of program benefits and developing solutions to any identified problems is a complex process.

A general review of EPA programs reveals variation within and between the program offices in terms of how they address the distribution of risks across population groups. While some offices have explicitly considered the distribution of risk and high risk populations in their rulemakings, there has never been a consistent EPA policy to address equity issues with respect to racial and income groups. Furthermore, equity issues are more prevalent in some environmental problems than others, and this may be reflected in the EPA programs. Statutory authority and state responsibilities also affect the degree to which EPA programs address equity concerns.

For example, the Office of Pesticide Programs (OPP) identifies and addresses risks to population groups, particularly agricultural workers, through the special review, re-registration and registration programs. For dietary exposure, OPP has a system in place which can examine consumption of various food commodities based on gender-, ethnic- and age-specific patterns. OPP uses the system to examine exposure of 22 population groups.

To explore these issues further, the Workgroup conducted case studies of two EPA programs, the Office of Solid Waste and Emergency Response (OSWER) and the Office of Air and Radiation (OAR). Two different approaches were used in reviewing the two programs. The review of OSWER was carried out by conducting awareness workshops for OSWER managers and staff. The OAR review was conducted by OAR's Office of Policy Analysis and Review and then circulated to OAR staff for their comments. The Workgroup also reviewed regional environmental equity efforts.

1. Office of Solid Waste and Emergency Response

To familiarize program managers with equity issues, the Workgroup held four Environmental Equity Awareness Workshops. As a pilot program, these workshops were held for managers and staff in OSWER. Furthermore, so that OSWER could better respond to citizen inquiries and complaints, a toll-free line was recently installed in the Office of the Ombudsman. The number is 1-800-262-7937.

Specific problems discussed by OSWER managers involved the siting and permitting of solid and hazardous waste facilities, risk analysis, and risk communication. OSWER managers also discussed awareness of equity issues and the need for equity awareness training for Agency personnel. Furthermore, workshop participants agreed that low-income and minority individuals would be the primary beneficiaries of positive results arising from EPA's pollution prevention initiative.

Siting and Permitting of Waste Facilities. OSWER managers and staff recognize that the siting and permitting of hazardous and solid waste management facilities involve socioeconomic forces that are not related to technical concerns such as geohydrology and depth to groundwater. The siting issue is very complex. On the one hand, a result of the "not in my backyard (NIMBY)" syndrome is that such facilities will tend to be located in communities with the least ability to mount

a protest. On the other hand, there are examples of poor communities seeking a waste site or industrial facility to increase the tax base and create jobs.

In this context, the division of authorities between federal and state governments plays a crucial role. The siting of waste facilities is controlled primarily by state and local governments. EPA's role in permitting comes after the site has been chosen and involves technical considerations. However, OSWER is developing further standards for localities to use in siting waste sites.

To help overcome the problem of actual and perceived disproportionate siting in minority and low-income communities, EPA could assess the feasibility of increasing its oversight in the siting and permitting of hazardous and solid waste management facilities. Workshop participants discussed several options for increasing EPA oversight.

Risk Analysis. Managers and staff identified the lack of information on the cumulative effects of multiple sources of pollution as a serious concern. Workshop participants pointed to the lack of information on cross-media pollution in heavily industrialized areas. There are also untapped opportunities to address equity issues in risk analysis under existing legislation. For example, in setting corrective action priorities at Resource Conservation and Recovery Act facilities, the Agency does not currently consider a facility's location and surroundings (in addition to the risk-producing conditions at the facility itself).

Risk Communication/Outreach. The Agency devotes considerable resources to risk communication and outreach efforts, especially in the Superfund program. These efforts include community outreach projects, the use of Technical Assistance Grants (TAGs) to help communities hire outside experts to describe the risks posed by Superfund sites in their communities, and the translation of EPA bulletins and notices into the languages of non-English speakers.

Pollution Prevention. Workshop participants pointed out that EPA's pollution prevention initiatives should help to mitigate the adverse health impacts experienced by minority and low-income individuals as a result of exposure to pollution and polluting facilities. For example, fewer and less toxic emissions to air should help to improve air quality in urban areas where racial minorities tend to live.

While the pollution prevention program is innovative, there is no mention of Native American tribes in the authorizing legislation, implementing regulations or grant guidance. EPA technical assistance is needed for tribes to compete with states for pollution prevention grants in the highly competitive process.

See Volume II, Sec. 3.1 for more information on OSWER.

2. Office of Air and Radiation

The literature available illustrates that exposure, siting, sensitivity, and the distribution of air pollutants raise concerns about equity with respect to air pollution. Available studies do not demonstrate (or even raise the suggestion) that OAR's policies have resulted in differential allocations of environmental benefits. However, the literature examined suggests that racial minority and low-income populations have experienced poorer air quality because they tend to live in urban areas and have in some cases lived in closer proximity to air polluting facilities. Also, in some cases, they may be more sensitive to certain air pollutants than the general population.

Based on the limited data available, several population groups identified as being sensitive to the health effects of air pollution seem to be disproportionately composed of low-income or racial minority individuals compared to the general population (Mak, 1982; Goldstein, 1986; NCHS, 1990; Schwartz, 1990; HHS, 1991.) These groups include asthmatics, people with certain cardiovascular diseases or anemia, and women at risk of delivering low-birth-weight fetuses. Further work is needed to discern the factors at the root of the differences in health statistics. Whatever the causes, EPA can act to protect affected individuals through increased education programs and regulatory action where heightened susceptibilities in communities are demonstrated.

1990 Clean Air Act Amendments. The bulk of OAR's current resources are focused on the implementation of the Clean Air Act of 1990. The Workgroup gave the legislation special attention because of its opportunities to address differences in exposure and susceptibilities.

The 1990 Clean Air Act Amendments provide powerful tools to ensure that the national ambient air quality standards are attained nationwide. Most of the nation's serious non-attainment problems occur in urban areas. To the extent urban air quality is improved via the Act, minority populations will experience higher relative benefits than the general population because of their high representation in urban areas.

The Act also contains several provisions involving health or risk assessments and the setting of health-based standards. The Act provides for health-related studies, clearinghouses, and health standards, which present opportunities for EPA to analyze in detail the distribution of the health effects of air pollution and use this information in setting health-based standards.

The reductions in exposure and the associated control costs will in general be distributed widely. However, several of the changes enacted could potentially have greater economic impacts on low-income people than on middle- or high-income groups. For example, under the Act, EPA must publish guidance for the states on the development of transportation measures necessary to demonstrate and maintain attainment of the national ambient air quality standards. Once again, opportunities exist for EPA to include consideration of those racial minority and low-income communities who are at greater risk than the population as a whole in the development of this guidance.

For more information on OAR, see Volume II, Sec. 3.2.

3. EPA Regional Offices

EPA's ten regional offices play a major role in program implementation. For this reason, many environmental equity issues are best addressed by Regional offices. Through many discussions with regional staff, the single most important discovery with regard to the equity issue was lack of awareness, although awareness is increasing dramatically. Awareness of equity issues also varies considerably by region.

Another important finding is that there are a wide variety of on-going regional activities that address environmental equity issues. Through the efforts of a relatively small number of staff, several regional offices have managed to conduct research, outreach, and risk communication efforts targeted to racial minority and

low-income communities. Most of the Regional staff members interviewed identified outreach as a key method for addressing issues of equity.

For example, in Region I (Boston), staff in the Office of Civil Rights are engaged in the Urban Environmental Initiative, a two-way outreach project to develop environmental priorities for the Boston area which includes the concerns of racial minority communities. The Initiative focuses on community awareness, empowerment and involvement in environmental issues. Region III (Philadelphia) also has an outreach program called the Chesapeake Bay Multi-Cultural Participation Program to broaden public participation and involvement in the restoration of the Bay. The target groups for greater involvement are citizens of African, Latino and Asian descent, as well as rural poor and others with a direct economic link to the productivity of the Bay.

Staff in Region V (Chicago) are aggressively attacking the urban lead program with the Lead Education and Abatement Program, a comprehensive strategy and implementation plan to address and remediate lead contamination in the six state region. The target population is African American and Latino children under seven years of age, and women of child bearing age.

Region VIII (Denver) is currently developing and testing a model risk communication program designed to communicate environmental awareness to racial minority communities and to foster two-way communication between EPA and these communities. The Multi-media approach is being designed to communicate, in simple common language: risk assessments, legal rights, the Community-Right-To-Know program, Technical Assistance Grants (Superfund) and federal versus state responsibilities.

For more information on these and other Regional projects, see the Descriptions of Existing EPA Projects in this document and Volume II, Sec. 8.0.

6. Native Americans are a unique racial group that has a special relationship with the federal government and distinct environmental problems. Tribes often lack the physical infrastructure, institutions, trained personnel and resources necessary to protect their members.

Native American people represent a unique sector of American society. The federal government has a special relationship with tribal governments, based on original Treaties and subsequent legislation passed by Congress. Because of their unique political, historical, environmental and cultural status, the Workgroup decided to treat tribal populations separately for the purposes of this report.

In its review of environmental equity concerns with respect to Native American populations, the Workgroup raised the following issues:

- Native American tribes may be at a higher risk for certain pollutants than the average population due to subsistence practices, including high wild food and fish consumption rates.
- While individual risks may be high on some reservations, tribes potentially may be overlooked in EPA's risk-based approach. Typically, reservations have small populations with relatively large land areas, and population risk will often be small relative to other, especially urban, population groups.

- EPA's risk analysis methodologies may not include factors (e.g., diet and other cultural practices) which accurately assess risk in Indian country.
- Many tribes are substantially behind states in developing physical and institutional environmental protection infrastructure and often lack the technology that states possess to assess environmental problems.

1. Wisconsin Tribal Comparative Risk Project

To analyze these issues further on a case study basis, a comparative risk project was initiated for the eleven tribes in Wisconsin. The results of the project have important implications for equity concerns.

Comparative risk studies employ a methodology which has been used at EPA and state and local agencies to identify environmental problems in a given geographic area and to rank those problems based on analysis of their severity or risk. Varying numbers of environmental problem areas are ranked, including problems as diverse as pesticide exposures, indoor air quality, and drinking water contamination.

Typically three types of risk analyses are performed on each environmental problem: human health, ecological, and economic welfare. The human health analysis was modified to consider the very different pathways of exposure to environmental risks that Native Americans may face. The economic welfare analysis was modified to include damages to cultural and religious values and subsistence lifestyles. The list of environmental problems studied was modified to add food contamination as a separate problem. The analysis portion of the Wisconsin project was completed in a very short time frame to accommodate the schedule of the Environmental Equity Workgroup.

The results of this analysis show that the tribes in Wisconsin face different risks than those faced by the population of the northern Mid-West as a whole. Food contamination from environmental sources was found to be the highest health risk facing the tribes. Ecological risks were found to be caused mostly by long-distance transport of pollutants from outside the reservations. Finally, the influence of religious and cultural values significantly affected the economic welfare ranking.

One of the most striking findings of the Wisconsin project was that many of the current and future risks facing the tribes could be reduced significantly if the Wisconsin tribes had the physical, legislative/regulatory and institutional infrastructure and the environmental professionals to implement an environmental protection program. Many tribes have limited staff, if any, who are knowledgeable on the technical and legal aspects of environmental matters. This lack of infrastructure means that many tribes have no effective way to manage environmental problems on reservations. This point has significant implications for environmental risks to Native American populations generally and for the EPA Indian Program because, although the Wisconsin tribes may differ from other tribes in wild food consumption, religious and cultural values, and pathways of exposure, they differ little in infrastructure development.

See Volume II, Sec. 4.0, for more information on Native American tribes.

Chapter 4

RECOMMENDATIONS

Although gaps in data exist, the Workgroup believes that enough is known to make several recommendations to the EPA Administrator, management and staff. These recommendations might also be applicable to other public and private groups concerned with protecting the environment and public health.

Presented with each recommendation are several specific examples of ways EPA could implement the recommendation. These examples are not the only possible implementation strategies, but are meant to illustrate EPA's opportunities.

Making Environmental Equity A Priority

1. *EPA should increase the priority that it gives to issues of environmental equity.*

EPA is already engaged in a number of activities which promote environmental equity. However, an implication of the findings is that EPA should give more explicit attention to environmental equity issues. As detailed in the findings and other recommendations, there are many additional opportunities to improve the manner in which EPA addresses these issues.

Increasing the priority that environmental equity issues receive will require an educational process in which managers and staff are made aware of the issues and the tools to identify and address inequities in risk. The first step in this direction must be for Agency managers to give the overall issue of environmental equity higher priority. This increased priority should be reflected in the resources provided to program and regional offices. Not only would this signal to EPA staff that they should take actions such as those recommended in this report, but it would signal to people in other public and private organizations that they should follow suit.

Environmental equity is one of the important next steps in environmental protection, as the nation attempts to refine its environmental priorities. Environmental equity is not in conflict with EPA's present efforts to protect public health and the environment. Rather, it is fundamentally consistent with EPA's goal of protecting all communities and its efforts to identify and remedy those environmental problems posing the greatest risks. Indeed, environmental equity reinforces the push for better environmental protection generally by emphasizing that all communities share a common interest in improving the state of the environment.

Some examples of specific ways in which EPA could implement this recommendation include:

- Top Agency managers could make clear statements to EPA staff about EPA's interest in environmental equity. They could give special attention to activities which are already underway and emphasize where additional action is needed.
- Top Agency managers could signal to outside groups in the public and private sectors that environmental equity should be given higher priority.

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- EPA could include a section on the progress of environmental equity projects in its "Administrator's Tracking System Report."

Strengthening The Database For Better Decision Making

2. ***EPA should establish and maintain information which provides an objective basis for assessment of risks by income and race, beginning with the development of a research and data collection plan.***

Questions about the distribution of environmental problems, exposure and risk can only be answered if EPA develops more detailed data on specific pollutants and risks.

Some examples of specific ways in which EPA could implement this recommendation include:

- Research on environmental exposures and health effects could recognize and consider race, ethnicity and socioeconomic status in study design implementation. To the degree feasible, data could be collected and disaggregated by age, gender, race, and ethnicity.
- Analyses could be undertaken to identify critical characteristics of racial, ethnic, and class groups which would significantly alter the susceptibilities of that population group.
- EPA could develop a comprehensive research plan for collecting data and developing new risk assessment methodologies. Consultations with the Department of Health and Human Services would greatly enhance this effort.
- The Agency could make demographic data and support services centrally accessible to all Agency offices.

Quantifying Risks: Tools For Better Risk Assessment

3. ***EPA should incorporate considerations of environmental equity into the risk assessment process. It should revise its risk assessment procedures to ensure, where practical and relevant, better characterization of risk across populations, communities or geographic areas. These revisions could be useful in determining whether there are any population groups at disproportionately high risk.***

To determine which groups are especially susceptible to environmental exposures, the Agency should revise and expand its procedures for assessing risk. Guidelines should be amended to help EPA gain a clearer picture of which populations, communities, and geographic areas bear high risk burdens. Information on race and income will not be necessary or appropriate for all risk assessments, and EPA should devote time to deciding in what cases demographic information should be included in risk assessments.

Some might observe that risk calculations are race and income neutral and that risk assessments should only include information on pollutants. However, the Workgroup has concluded that in studying aggregate risks, high risk populations in some cases have been overlooked. By collecting information on race and income, EPA can gain a more accurate picture of risks to all population groups. EPA should initiate implementation of this recommendation by conducting a series of pilot assessments to determine data requirements and cost.

Some examples of specific ways in which EPA could implement this recommendation include:

- To the extent practical and appropriate, the Agency could require that quantitative risk assessments include distributions of exposures and health risks across broad sub-categories of the exposed population, incorporating census data on age, gender, income level and race.
- EPA could focus on improving existing methods and developing new methods for assessing risk from multiple chemicals and multiple sources within and across environmental media. It could continue to develop the Maximally Exposed Community concept which includes: cumulative exposures; multiple exposures; increased susceptibility; the effects of multiple/different pathways of exposure.
- EPA could continue to develop and refine exposure factors information, particularly in the area of exposure factors for population groups, which are used in developing risk assessments.
- EPA could, where feasible and appropriate, identify and demographically characterize the population residing within the high-end of exposures.
- EPA could study ways in which to assess environmental risks to Native American populations.
- Based on the availability of exposure data by population group, national, regional and state comparative risk studies could be expanded to selectively incorporate disaggregation of risk by population group.

Creative Measures To Address Equity: Targeting High Ricks Populations

- 4. EPA should identify and target opportunities to reduce high concentrations of risk to specific population groups, employing approaches developed for geographic targeting.**

EPA currently is placing more emphasis on reducing the highest risks and pollution prevention. The Agency should continue to prioritize its actions based on risk, adjusting its priorities as our understanding of the highest risks changes. EPA should identify and target high-risk populations.

Some examples of specific ways in which EPA could implement this recommendation include:

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- EPA could further develop its enforcement prioritization schemes to target high risk populations. Under this approach, the most exposed and highly susceptible populations in each region would be targeted for enforcement actions. Geographic Information System technology could be used to identify high-risk populations. (For an example, see the description of the Region V Geographic Enforcement Initiative in the Description of EPA Projects.)
 - EPA could undertake a set of targeted geographic initiatives where high population exposures to various pollutants exist. Possible targets include: 1) the Mississippi River between Baton Rouge, LA and New Orleans, LA; 2) the Mexico-U.S. border; 3) New York City, NY and 4) East Los Angeles, CA. Consider using Total Exposure Assessment Monitoring (TEAM) methodology which accounts for multiple sources of pollution.
 - EPA could conduct one or a series of showcase urban projects focusing on marshalling targeted prevention, remediation, education and outreach instruments on minority and low-income communities.

Considering Risk Distribution In Decision Making

5. EPA should, where appropriate, assess and consider the distribution of projected risk reduction in major rulemakings and Agency initiatives.

Current regulatory impact statements assess the costs and benefits associated with major rules. Where costs and benefits are analyzed, and where appropriate, EPA should include a population distribution analysis. This will not be necessary or appropriate in all cases, and EPA should test several cases to define when such information should be collected.

Some examples of specific ways in which EPA could implement this recommendation include:

- EPA could conduct 3 to 4 pilot environmental equity analyses based on a set of prospective major rules for which such an analysis is feasible and will not unduly delay the rule.
- The Agency could establish risk management guidelines which would require considerations and evaluations of environmental equity when arriving at regulatory decisions.

Intergrating Equity And EPA Operations

6. EPA should selectively review and revise its permit, grant, monitoring and enforcement procedures to address high concentrations of risk in racial minority and low-income communities. Since state and local governments have primary authority for many environmental programs, EPA should emphasize its concerns about environmental equity to them.

Many actions affecting the environment are ultimately determined by permit, grant and enforcement procedures. There are a variety of these procedures that should be refined to address environmental equity issues. To determine exactly

where changes are needed, program managers and staff need to examine their operations carefully.

In addition, environmental regulatory actions often impose high costs. These costs may be reflected in increased costs of goods and services, and sometimes in job loss, plant relocation and plant closures. In certain cases, these economic effects to selected communities may exceed the benefits of environmental controls, even though the environmental control renders net benefits to the population as a whole. In such circumstances, the Agency should attempt to minimize adverse effects by the appropriate design and implementation of its regulations, taking into account the special circumstances of the most severely impacted communities.

Some examples of specific ways in which EPA could implement this recommendation include:

- EPA could incorporate language in selected permit, grant and enforcement guidelines which places priority on high risk populations.
- Each headquarters and regional office could engage in a review of its activities and present to the Administrator a plan of how it will achieve the Agency's equity goals. Environmental equity goals could be included in the strategic planning and budget process.
- EPA could assess the feasibility of requiring an assessment of the cumulative impacts and risks associated with new or expanding Resource Conservation and Recovery Act facilities.
- EPA could review its implementation of the Clean Air Act of 1990 to ensure that the flexibilities in the Act do not result in consistent increased pollution burdens on poor or racial minority communities.
- As part of the development of guidance for states on the development of transportation measures under the Clean Air Act of 1990, EPA could analyze the potential inequities resulting from increased transportation user fees and look for solutions that would simultaneously reduce the possible inequities and achieve the goal of traffic reduction.
- Recognizing legislation and budget authorization limits, EPA could explore ways to increase funding, training, and other support to Native American tribes for the purpose of establishing physical and institutional infrastructure for environmental protection and staff training, similar to support provided to states in the past decades.

Expanding Outreach And Communication

- 7. EPA should expand and improve the level and forms with which it communicates with racial minority and low-income communities and should increase efforts to involve them in environmental policy-making.**

The Agency should take specific steps to strengthen its communications program for racial minority and low-income populations. This outreach initiative should be based on EPA's existing communications network but should also include community groups that have close links to those who are affected by

environmental equity issues. All communications efforts should reflect sensitivity to issues such as language and value systems and should ensure that populations affected are actively engaged in the risk communication process from the beginning.

Some examples of specific ways in which EPA could implement this recommendation include:

- EPA could explore additional ways to support and help racial minority and low-income communities get technical assistance to understand and participate in decisions about environmental issues at the local level. In doing so, the Superfund Program's Technical Assistance Grants program is one example of how this can be done.
- EPA could financially support university-based regional environmental equity centers engaging in research and education activities and directed, in part, by community concerns.
- EPA could improve targeted outreach and environmental education literature for racial minority and low-income communities.
- Each EPA regional office could develop two-way communication programs similar to Region I's Urban Environmental Initiative and Region VIII's Outreach Program in Ethnic Communities. (See the Description of EPA Projects and Volume II, Sec. 8.2, for more details.)
- EPA could develop general guidance for its staff on communication with racial minority and low-income communities. The guidance could cover language, format and distribution of written materials, working with the media and collaborating with local agencies.
- EPA could establish outreach representatives for minority and low-income communities in each of its regional offices.
- EPA could translate more of its published materials into languages other than English.

Assuring Long-Term Success

- 8. *EPA should establish mechanisms, including a center of staff support, to ensure that environmental equity concerns are incorporated in its long term planning and operations.***

Specific measures must be instituted to ensure that EPA systematically considers equity issues in its routine business and major policy debates. (For details on an institutional model for addressing environmental equity, see Volume II, Sec. 9.0.)

Some examples of specific ways in which EPA could implement this recommendation include:

- EPA could incorporate environmental equity in the strategic planning and budgeting process.

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- EPA could develop a policy statement on environmental discrimination.
 - EPA could establish an external Environmental Equity Advisory Committee.
 - EPA could continue the EPA Environmental Equity Workgroup and provide staff and resources for implementing the recommendations of this report, including time tables.
 - The EPA Environmental Equity Workgroup could conduct a comprehensive analysis of each recommendation to assess its impact and to determine realistic accomplishments and time frames for action.

Descriptions Of Existing EPA Projects

This section is provided to illustrate practical examples of approaches to addressing and solving environmental equity concerns. *Volume II, Sec. 8.2, contains other examples of existing EPA projects addressing environmental equity issues and further details on the projects listed here.*

Project Name: Urban Environmental Initiative

Region: I (Boston) **Contact:** James Younger
Office: Office of Civil Rights

The Urban Environmental Initiative is an attempt to develop a bi-directional communication strategy. The ultimate goal of the Initiative is to develop environmental priorities for the Boston area which includes the concerns of racial minority communities. Currently underway in Boston, the project focuses on community awareness, empowerment and involvement in environmental issues. The program is exploring the impact of environmental problems on the urban community with particular emphasis on those environmental problems other than lead, such as air pollution, PCBs and radon.

Project Name: Superfund Enforcement Investigation

Region: II (New York) **Contact:** Dana Williams
Office: Equal Employment Office

The first part of the study will document if there are more Superfund/CERCLIS sites located in minority/poor communities in New York and New Jersey. Using census data recently loaded into a Geographic Information System (GIS), a map will be developed that includes the location of CERCLIS and Superfund sites and pertinent demographic data. The second part of the study asks the question: Are more affluent communities able to speed up the Superfund process? This study will identify the key factors in determining the level of activity of remediation at Superfund sites. Do minority/poor communities receive proper attention in the earlier stages of the Superfund process?

Project Name: Baltimore/Washington, D.C. Urban Environmental Risk Initiative

Region: III (Philadelphia) **Contact:** Dominique Lueckenhoff
Office: Chesapeake Bay Program

Multi-media environmental risk profiles for socioeconomic subgroups within the study area will be developed and displayed on Geographic Information System (GIS) maps. GIS will serve not only to assist with the analytical work, but also to present the results in a format understandable to the general public. These risk profiles will also be compared to background or reference conditions in order to determine whether environmental risks within the defined study areas are disproportionately distributed by socioeconomic class. Community outreach to organizations and individuals representing the affected populations in the study areas will be conducted with the assistance of state and local officials and Morgan State University. In addition to communicating EPA's risk assessment findings,

these community outreach forums will also be used to reach consensus on the environmental problems of greatest concern and how best to address them based upon community needs and available resources.

Project Name: Multi-cultural Participation in the Chesapeake Bay Program

Region: III (Philadelphia) Contact: Dominique Lueckenhoff
Office: Chesapeake Bay Program

The Chesapeake Bay Program is developing a multi-cultural participation program to broaden public participation and involvement in the restoration of the Bay. The target groups for greater involvement are citizens of African, Latino and Asian descent, as well as rural poor and others with a direct economic link to the productivity of the Bay. The focus of the program is on structuring public information materials and educational programs to have broad appeal and encourage increased participation. This includes surveying multi-cultural interests to evaluate the impact of the Chesapeake Bay Program on racial minority and low-income communities.

Project Name: Radon and Asbestos Awareness Program (RAAP)

Region: III Contact: Aquanetta Dickens
Office: Air Division

RAAP targets racial minority communities for effective communication of health risks associated with radon and asbestos. The program is now being piloted in the Philadelphia area, with the intention of being transferred to other major metropolitan areas within the Region. The program involves regular radio forums consisting of professionals from EPA, other federal agencies, universities/colleges and private industry to communicate the health threats of radon and asbestos and to obtain direct feedback from members of racial minority communities on their experiences and perceptions of the problems.

Project Name: Superfund Equity Analysis

Region: IV (Atlanta) Contact: Rosalyn Hughes
Office: Office of Policy, Planning and Evaluation

Region 4 is conducting a study to determine to what degree environmental inequity exists within the region. The analysis will delineate community characteristics, such as racial minority populations and socioeconomic class, within areas of environmental hazards.

The analysis is underway using 1990 Census data to develop the population profile with respect to racial origin. An income profile will also be developed when data become available. The analysis will initially focus on the following environmental hazards:

- Superfund sites;
- Permitted RCRA sites;

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- Toxic Release Inventory facilities;
 - Wastewater treatment facilities; and
 - Commercial waste treatment facilities.

Geographic Information System (GIS) technology is being used for the analysis.

Project Name: Lead Education and Abatement Program (Project LEAP)

Region: V (Chicago) Contact: William H. Sanders III
Office: Environmental Sciences Division

The Region 5 comparative risk study identified lead as one of the multi-program pollutants of concern. Region 5 selected lead as a priority area, and tasked the medium programs, and a project director, with development of a comprehensive strategy/implementation plan to address and remediate lead contamination in the six state region.

Because children are at an elevated risk, a targeted population has been chosen to be children under seven years of age, and women of child bearing age as a surrogate for the fetus. Within this population group, African- and Hispanic-Americans are particularly targeted in recognition of an increased body burden susceptibility/vulnerability to the uptake and effects of lead exposure. Project LEAP is a multi-media and multi-program approach having four basic components -- 1) data analysis and targeting; 2) pollution prevention; 3) education and intervention activities; and 4) abatement activities. The project will be implemented over a three year period, and the first stage report, *Spatial and Numerical Dimensions of Young Minority Children Exposed to Low-Level Environmental Sources of Lead*, is now available.

Project Name: Geographic Enforcement Initiative

Region: V (Chicago) Contact: Bert Frey
Office: Deputy Regional Counsel

The Region 5 Geographic Enforcement Initiative (GEI) is a major part of a risk-based, multi-media effort focused on Southeast Chicago and Northwestern Native American tribes. This heavily industrialized area is beset with a host of environmental problems affecting air, water, soil and quality of life. Previous evaluations of this area have highlighted a variety of unacceptable human health and ecological risks. GEI is an enforcement initiative to reduce emissions and ensure environmental compliance in an area where low-income and racial minority populations dominate.

Project Name: GIS/Comparative Risk Equity Analysis

Region: VI (Dallas) Contact: Lynda Carroll
Office: Office of Planning and Analysis

Region 6 has developed Geographic Information System (GIS) and Comparative Risk capabilities to evaluate environmental equity concerns in the five states in the area. Region 6's comparative risk methodology identifies susceptibility factors as part of risk evaluations for human health. Factors such as age, pregnancy, genetics (race), personal income, pre-existing disease and lifestyle are susceptibility measures. Considerations of racial minority status are included in the genetics and lifestyle factors. The other factors indirectly assess the socioeconomic status of identified population groups.

Susceptibility factors have been analyzed for site specific studies (i.e., areas around hazardous waste sites) and large geographic locations such as cities, states or the region. Combined with chemical release data (i.e., the Toxic Release Inventory or monitoring information), geographic and demographic data and state health department vital statistics data, regional equity assessments can be performed routinely.

Project Name: Gulf Coast Toxics Initiative

Region: VI (Dallas) Contact: Lynda Carroll
Office: Office of Planning and Analysis

The Gulf Coast Toxics Initiative is a major 1992 enforcement effort in Region 6. The program will target facilities in the sensitive Gulf Coast ecoregion where most of the toxic releases in the region occur. The region's inspectors will allocate 38 percent of their time to this initiative. Owing to the high human populations and quantity of wetlands in the Gulf Coast of Louisiana and Texas, it was selected as the most likely area to benefit from an intensive multi-media enforcement effort.

Project Name: Region VII Indian Strategy

Region: VII (Kansas City) Contact: Dewane Knott
Office: Office of Policy and Management

The focus of EPA's Indian Strategy is to develop the capability within tribes to manage their own tribal environments. Since tribal environments and the corresponding environmental problems vary nationally, Region 7 is implementing the strategy by concentrating in the three areas identified as priorities by the tribes in the region: solid waste, environmental education and groundwater protection. A Native American Senior Employment Program person has been hired to work exclusively with the tribes on solid waste issues by providing training opportunities. In terms of environmental education, Region 7 is distributing an environmental curriculum to the reservation schools accompanied by teacher training, distributing training videos to the tribes, and coordinating with the local Native American junior colleges. Groundwater contamination is being addressed with additional outreach and by including a groundwater component in all grants awarded to tribes.

Project Name: Environmental Education Initiative

Region: VII (Kansas City) Contact: Rowena Michaels
Office: Office of Public Affairs

Region 7 and the University of Kansas established a National Environmental Education and Training Center to provide leadership in environmental education, teacher training and professional development. The region funded a pilot teacher training project to develop exemplary environmental education modules for use in the four state area. The project focused on educating K-6 teachers at a two-week, on-campus "Summer Institute" in July, 1991. Special emphasis was placed on assuring that teachers selected for the "Summer Institute" represented diverse school districts from urban and rural areas in Region 7. The Center will continue to assure that diversity is a special focus in future educational efforts.

The Region 7 Strategic Plan covering fiscal years 1993 through 1996 includes commitments to work extensively with educators throughout the region to assure that young people receive adequate information about environmental matters to make sound environmental choices throughout their lives. The Plan also recognizes environmental equity as an important issue which will be reflected in communication and outreach.

Project Name: Pollutant Exposure and Risk Patterns

Region: VIII (Denver) Contact: Elmer Chenault
Office: Federal Facilities Compliance Branch

Region VIII has initiated an investigation of polluting facilities in the Denver-Boulder, Colorado, metropolitan area using Geographic Information System (GIS) technology. The purpose of the project is to determine potential and actual purpose of the project is to determine potential and actual pollutant exposure and define possible risk patterns to the minority residents of this area.

Project Name: Outreach Program in Ethnic Communities

Region: VIII (Denver) Contact: Elmer Chenault
Office: Federal Facilities Compliance Branch

Region 8 is currently developing and testing a model outreach program designed to communicate environmental awareness to racial minority communities and to foster two-way communication between EPA and these communities. The Multi-media approach is being designed to communicate, in simple common language: risk assessments, legal rights, the Community-Right-To-Know program, Technical Assistance Grants (Superfund) and federal versus state responsibilities. Once the program has been implemented and modified in Region 8 an information packet will be distributed for national application. The kit will include: an EPA outreach model for low income communities; actions plans for workshops; and detailed workshop presentations.

Project Name: California Migrant Labor Camp Drinking Water Enforcement Program

Region: IX (San Francisco) Contact: Mona Ellison
Office: Drinking Water Program

During the past year, Region 9 has gathered information on migrant labor camp drinking water systems in California. The Region 9 Drinking Water Branch was concerned that labor camps shared many, if not more, of the compliance problems common to small systems throughout the state. In summary, Region 9 found 191 violating labor camp water systems serving over 8,500 people in 20 counties. Failure to monitor and report was the most common violation category.

More than one county contact warned that strict enforcement of the drinking water regulations may result in the closure of many labor camps, creating additional housing, welfare and social burdens for county administrators, taxpayers and camp residents. Region 9 is now working with state and local officials to devise and implement an enforcement plan.

Project Name: Hawaii Environmental Risk Ranking Project

Region: IX (San Francisco) Contact: Gerald Hiatt
Office: Office of the Regional Administrator

The state of Hawaii has undertaken a comparative risk project to identify and rank environmental problems facing the state. Risk assessment information is being used to rate Hawaii's environmental problems on the basis of threats to: human health, environment, economic welfare and quality of life. One of the major quality of life concerns is the effect of development and pollution on native Hawaiians, including a number of subsistence-level communities. Native Hawaiian culture and religion are closely tied to the environment and the sociological and psychological impacts of environmental change extend beyond direct health and ecosystem effects.

Two issues unique to native Hawaiians are being considered: 1) cultural and religious impacts of loss or degradation of specific ecosystems or sites; and 2) increased exposure to environmental pollution in subsistence-level Hawaiian communities. Three professors at the University of Hawaii are assisting the project: Drs. Luciano Minerbi, Davianna McGregor, and Jon Matsuoka.

Project Name: Pesticide Applicator Training

Region: X (Seattle) Contact: Allan Welch
Office: Air and Toxics Division

Region 10 has developed, in conjunction with the Washington Department of Agriculture, a Pesticide Applicator Training course in Spanish. This training module was developed for Latino farmworkers who find it much easier to learn in Spanish. The total cost was \$50,000, with support of staff from the State and Region 10. During 1991 a total of 400 Latino farmworkers attended one of the six session courses that were held at six different locations in the State. Many of the participants took and passed the Washington private applicator exam.

Project Name: Wisconsin Tribes Comparative Risk Project
Region: Headquarters/V (Chicago) Contact: Catherine Tunis/
Casey Ambutus
Office: Regional & State Planning Branch/Indian Coordinator

Comparative risk studies are used to prioritize environmental problems in a given geographic area and have been done at the national, regional, state and city levels. The Wisconsin project will help define the high risk areas for the eleven Wisconsin tribes. Another major goal of the project is to adapt the current comparative risk methodology to account for the different exposure and risk factors for Native Americans as compared to the general U.S. population. The results of the study will be compared to the results of the Region V analysis and the planned Wisconsin state analysis. This project is a cooperative effort between the Office of Water and the Office of Policy, Planning and Evaluation in Headquarters and Region 5. Meetings will be held with the eleven Wisconsin tribes to present the results of the analysis and gather their evaluations of the adapted methodologies. A report will be prepared that can serve as guidance for future tribal comparative risk projects.

Project Name: Mexico-U.S. Integrated Border Environmental Plan

Headquarters/Region VI/Region IX Contact: Richard Kiy
Office: Office of International Activities

In response to a request by the Presidents of the Mexico and the U.S. in November, 1990, EPA and its Mexican counterpart have developed a bilateral plan to protect the environment in the border area. Of particular concern are the inadequate waste water treatment and drinking water facilities for the colonias (unincorporated towns along the border.) The plan was released in mid-winter of 1992. To begin making progress immediately, the U.S. National Enforcement Training Institute held training sessions for Mexican inspectors of maquiladora industries on March 23-27, 1992.

Region 6 awarded a \$15 million grant to the Texas Water Development Board to establish a revolving fund for plumbing loan programs to colonias in 12 counties. The program provides low-interest loans to individuals for connecting homes to drinking water distribution systems and/or sewage collection systems and for household plumbing improvements. People can take up to 10 years to repay the loans. Ultimately, this program could provide benefits to some 200,000 people living in 950 colonias along the Texas-Mexico border. In March, loans were provided to the City of Pharr in Hidalgo County where some 500 homes in the Los Miltas and Lopezville colonias will receive indoor plumbing and clean water.

Project Name: A Methodology for Estimating Population Exposure from the Consumption of Chemically Contaminated Fish

Headquarters/Region X (Seattle) Contact: Craig McCormack
Office: Science Policy Branch

The purpose of the study is to develop a methodology to estimate populations that may be at a greater than average risk from eating fish contaminated from industrial point pollution. These populations eat fish at a greater than average rate

and include Native Americans, Asians, Blacks, and recreational and subsistence fishers. The methodology developed provides an estimate of a geographical area of potential exposure and an estimate of exposure and risk in consideration of age, sex and race/ethnicity. The methodology will assist EPA regional offices and states in issuing fish advisories.

To collect more data on the fish consumption patterns of Native Americans, EPA is sponsoring the Columbia River Inter-Tribal Fish Commission Survey of Fish Consumption and Related Issues. In this survey, four Pacific Northwest Native American tribes are being surveyed about their fish consumption habits.

Project Name: Environmental Equity Analysis of RCRA Corrective Action Final Rule

Headquarters Contact: Barnes Johnson
Office: Office of Solid Waste

The Communications, Analysis, and Budget Division in the Office of Solid Waste (OSW) conducts regulatory impact analyses for regulations relating to solid waste. A major regulation being developed by OSW is the Resource Conservation and Recovery Act (RCRA) corrective action final rule which will set guidelines for cleaning up releases and spills at commercial hazardous waste facilities. As part of the regulatory impact analysis for this rule, the Division is conducting an investigation of the distribution of risk, based on income and race/ethnicity, around RCRA facilities.

Project Name: EPA Lead Reduction Strategy

Headquarters Contact: Doreen Cantor
Office: Office of Toxic Substances

EPA's comprehensive lead strategy, released last February, has a goal of reducing to as low as possible the number of children with blood lead levels greater than 10 ppm. This goal has been and will continue to be a major factor in setting new lead standards and revising existing standards. In 1992, EPA will propose to ban the sale of lead solder and brass and bronze plumbing fixtures for use in residential plumbing. Last June, EPA published a final rule reducing the amount of lead in drinking water. It ensures that homes with the highest risks are targeted for treatment. As a result, neurological risks to over 20 million children will be reduced, and about 100,000 children are expected to avoid IQ losses. About 95% of these health benefits will be realized within the next 6 years.

Project Name: Environmental Health Equity Analysis: Evaluation of Potential Human Exposure to Environmental Pollution

Headquarters Contact: Ken Sexton
Office: Office of Health Research

The Office of Health Research (OHR) has initiated a project to evaluate the relationship between levels of pollutant emissions and the extent of exposure to racial minorities and/or people of lower socioeconomic status. The first step involves an analysis of the location and magnitude of emissions (as identified by

the Toxics Release Inventory) and the demographic characteristics of the population in the surrounding area. Demographic data will come from the U.S. Bureau of the Census or the Donnelley Marketing data base. Additional data sets, such as the attainment of the National Ambient Air Quality Standards, will be added as the project develops. The analysis will be done by state, county and targeted geographic areas. This is a long-term effort that began in February 1992.

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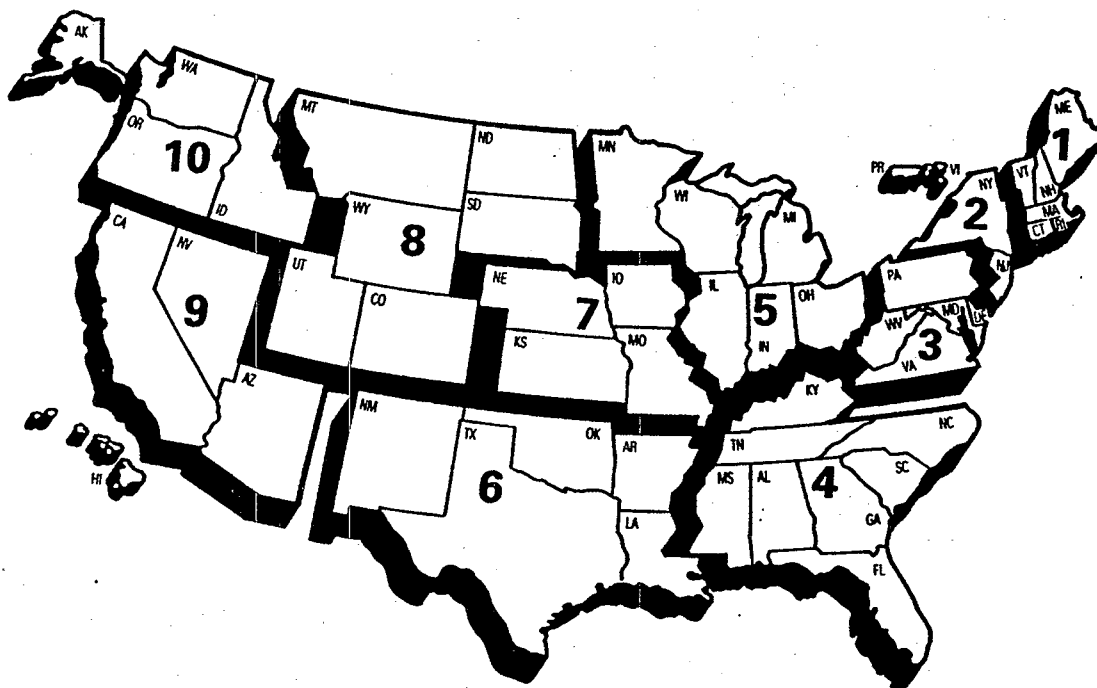
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An extensive bibliography can be found in Volume II, Sec. 11.0.

MAP OF EPA REGIONAL OFFICES



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4 — Alabama	1 — Maine	3 — Pennsylvania
10 — Alaska	3 — Maryland	1 — Rhode Island
9 — Arizona	1 — Massachusetts	4 — South Carolina
6 — Arkansas	5 — Michigan	8 — South Dakota
9 — California	5 — Minnesota	4 — Tennessee
8 — Colorado	4 — Mississippi	6 — Texas
1 — Connecticut	7 — Missouri	8 — Utah
3 — Delaware	8 — Montana	1 — Vermont
3 — D.C.	7 — Nebraska	3 — Virginia
4 — Florida	9 — Nevada	10 — Washington
4 — Georgia	1 — New Hampshire	3 — West Virginia
9 — Hawaii	2 — New Jersey	5 — Wisconsin
10 — Idaho	6 — New Mexico	8 — Wyoming
5 — Illinois	2 — New York	9 — American Samoa
5 — Indiana	4 — North Carolina	9 — Guam
7 — Iowa	8 — North Dakota	2 — Puerto Rico
7 — Kansas	5 — Ohio	2 — Virgin Islands
4 — Kentucky	6 — Oklahoma	
6 — Louisiana	10 — Oregon	

