

**New York State
Comparative Risk Project:
Multi-Media Pollution Prevention Strategic Planning**

**Draft Work Group Reports:
Summary and Steering Committee Findings**

Steering Committee
New York State Department of Environmental Conservation
Comparative Risk Project

June 2000

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Draft Work Group Reports: Summary and Steering Committee Findings

Purpose of This Document

This document has been prepared by the Comparative Risk Project Steering Committee to support the three draft work group reports (Human Health, Ecosystems, and Quality of Life) that are now available for public review. The Steering Committee provided overall direction to the Project but did not have oversight or control over the content of the work group reports. Each draft work group report was developed and released with the consensus of the work group that prepared it and represents the research and findings of the members of the work group. The reports do not necessarily represent the views of the Steering Committee.

This document provides an overview of the Project, describes the context under which the draft work group reports were prepared, and summarizes and reviews the draft reports. It also provides members of the Steering Committee an opportunity to express their individual viewpoints on this Project.

The Comparative Risk Project - A Description

The Comparative Risk Project seeks to identify those environmental problems that pose the highest risks to the citizens and the environment of New York State in order to develop a pollution prevention strategy aimed at reducing risk through various pollution prevention management options. The Project will base decisions, as much as possible, on available scientific information and current technology, will seek to reflect public opinions and values, and will strive to achieve consensus from a broad range of viewpoints.

Comparative risk projects have been conducted by many states and regions in the United States. Each project may focus on different problems or strategies, but they all have in common an emphasis on group decision-making. This Comparative Risk Project is a consensus decision-making process. The goal is to achieve consensus among individuals with a diversity of perspectives using data that are often insufficient to support a decision on a purely scientific basis.

The comparison of environmental problems in this Project is based on risks associated with substances that are released into the environment. These substances can be chemicals or particles that may be released into the air, water, or land. Fourteen groups of these substances, called stressors, have been developed. The stressor groupings are based on similarities in their physical or chemical characteristics. A list of the 14 groups of stressors with their definitions is included on page 3. (It should be noted that the descriptions of stressor groups differs slightly from those included in the original list, which can be found on the website.)

For this Project, risk is being evaluated in three main areas: risk to human health, risk to ecosystems, and risk to quality of life. These evaluations use available scientific data, professional judgement, and group consensus decision-making to characterize and compare each stressor group. Draft reports for each of these areas are available for public review and comment as described later in this document. After reviewing the final work group reports and the public comments that are received, the Steering Committee will integrate the work group findings into an overall risk characterization for each stressor group. These risk evaluations make up the risk characterization phase of the Project.

This Project is being conducted in two phases. The first phase is the risk characterization phase, which identifies the most significant threats to human health, ecosystems, and quality of life that result from toxic releases to the environment. The evaluations completed in this phase will help to identify those problem areas where current regulatory and pollution prevention efforts have so far failed to adequately reduce risk to human health, ecosystems, and quality of life for New Yorkers. This Project focuses on residual risks, the risks that remain given current levels of environmental regulation and control. In the second phase, which will build on the information gathered during the risk characterization phase, management strategies that incorporate pollution prevention methods will be developed and prioritized for implementation.

Although the Steering Committee originally envisioned that the risk characterization phase would include consideration of the availability of pollution prevention measures, their decision to evaluate stressors rather than sources of risk made it difficult to incorporate pollution prevention information into the risk analysis. The work groups were given some leeway to use their own judgement to complete their risk analyses in the manner that they felt would be most practical and useful to the Project, and they chose to conduct their risk evaluations without consideration of the applicability of pollution prevention measures. Instead, the Risk Reduction Strategies Work Group will evaluate whether pollution prevention measures can be applied to reduce risks during the second phase of the Project. Some early Project documents, including the Ground Rules and Charge to Work Groups, reflect the earlier focus. These and all other Project documents can be viewed on the Project's website referenced below.

In the second phase of the Project, a pollution prevention strategy will be developed that uses the risk characterizations produced in the first phase. This strategy may incorporate a wide variety of possible pollution prevention methods, policies, and programs, each of which will be evaluated for cost-effectiveness, practicality, and equity. The potential of the method to reduce risk and the ability of the DEC to apply the method will be important considerations.

The ultimate goal of the Project will be a strategy that the DEC can apply effectively to reduce risk through pollution prevention. DEC looks forward to incorporating risk information into its pollution prevention planning decisions.

Additional details about the Comparative Risk Project, including copies of the Project ground rules and other documents, can be obtained through the Project website at <http://www.dec.state.ny.us/website/ppu/p2crp.html>.

ENVIRONMENTAL PROBLEM LIST

Stressors that are released into the environment, grouped into chemical categories (listed alphabetically)

1. **Acidic and alkaline substances**

This category includes substances that have a pH less than 2 or greater than 12.5. It does not include substances that react once in the environment to form acids or bases or to cause acid rain. The Human Health Work Group included some weaker acids and bases because they are produced, used, or released in New York in significant quantities.

2. **Atmospheric gases (NO_x, SO₂, CO, CO₂, and CH₄)**

This category includes nitrogen oxides and sulphur dioxide, which are common by-products of combustion and which contribute to acid rain. They are also precursors to ambient ozone, which is considered in this category. Greenhouse gases, except for CFCs, are also included in this category. CO and CO₂ are combustion by-products and CH₄ is emitted from various sources, including landfills.

3. **Halogens**

This category includes elemental halogens, such as chlorine and bromine. Drinking water chlorination by-products and waste water disinfection by-products, such as trihalomethanes, are included in this category.

4. **Metals and cyanide**

This category includes elemental, ionic, and organic forms of metals. Lead, mercury, and cadmium are the three that are most often cited as posing environmental risk. Other metals, such as silver, nickel, chromium, and manganese, are also included. In addition, cyanide is considered here. These substances enter the environment through a wide variety of sources, including combustion, wastewater discharges, and manufacturing facilities.

5. **Non-volatile halogenated organic compounds**

This category includes dioxin, certain pesticides, PCB's, and a variety of other compounds that are generally of high molecular weight and contain at least one halogen atom. These compounds are likely to be both highly bioaccumulative and toxic.

6. **Non-volatile and semi-volatile organic compounds**

This category includes phthalates, alkylphenols, and glycol ethers, among other compounds, that may produce harmful effects such as endocrine disruption. This category includes all non- and semi-volatile organic compounds that are not halogenated.

7. **Nutrients**

This category includes substances containing various elements, such as phosphorous, potassium, and nitrogen, that act to promote the growth of certain unwanted aquatic species, often to the detriment of other beneficial species. These primarily reach the environment through non-point sources, including agricultural activities.

8. **Particulates**

This category includes dust, soot, and other small particles (PM-10) that become suspended in the air. Asbestos is also included here. Combustion is the primary source of particulates. Toxic substances that are associated with particulates, such as benzo(a)pyrene, are not included here.

9. **Pesticides**

This category includes all pesticides, including insecticides, herbicides, fungicides, and others, that are not included in other categories on this list. Certain pesticides are found in the non-volatile halogenated organic compounds and heavy metals categories. This category includes carbamates and organophosphates.

10. **Petroleum products**

This category includes petroleum product mixtures such as oil, gasoline, and diesel fuel. It does not include the substances that are released when these products are burned or the individual components such as benzene, toluene, and xylene which are considered in the VOC category.

11. **Polynuclear aromatic hydrocarbons (PAHs)**

This category includes aromatic compounds that contain three or more closed rings. A typical example is benzo(a)pyrene, which is a potent carcinogen. The primary source of these compounds in the environment is combustion.

12. **Radionuclides**

This category includes radiation released by human activities, but not radon or other naturally occurring radiation. The Human Health Work Group included radon (but ranked it apart from other radionuclides) because it poses significant human health risks.

13. **Suspended and settleable solids**

This category includes non-toxic solid particles, such as silt, that have the ability to cause physical or mechanical damage to surface waters.

14. **Volatile organic compounds (VOCs)**

This category includes many low molecular weight solvents used in a variety of commercial processes, such as dry cleaning, degreasing, manufacturing, painting, and printing. Common solvents include perchloroethylene, TCE, and benzene.

Project Organization

This Project has been initiated and coordinated by the Pollution Prevention Unit of the New York State Department of Environmental Conservation. The United States Environmental Protection Agency played an important role by providing funding and oversight.

The Project is overseen by a Steering Committee composed of 16 individuals from State and local government, environmental groups, industry, and academia. The Steering Committee has two primary responsibilities: to integrate the findings of the work group risk reports and to recommend a pollution prevention strategy to the DEC Commissioner.

Five work groups have been organized to gather information and prepare reports for the Steering Committee. Each work group is made up of individuals representing State government, business, environmental groups, and other organizations. The work groups are:

- Human Health Work Group,
- Ecosystems Work Group,
- Quality of Life Work Group,
- Public Participation Work Group, and
- Risk Reduction Strategies Work Group.

The first three work groups have written draft reports that examine and compare the risks posed by the groups of stressors. The Public Participation Work Group has made recommendations regarding methods to provide the public with opportunities to participate in the Project, including public review and comment on the draft work group reports. The Risk Reduction Strategies Work Group will evaluate potential pollution prevention practices and procedures and will recommend a pollution prevention strategy for the DEC.

Steering Committee Findings

This document and the accompanying draft work group reports represent an important milestone in the Comparative Risk Project. While these reports should be of great interest to environmental and public health professionals as well as to the general public, their primary intent is to provide the basis for the development of a comprehensive pollution prevention strategy for New York State.

During the second phase of this project, these comparative risk analyses, combined with additional information on present day sources of environmental stressors, will be used to develop a comprehensive list of pollution prevention policies, programs, and strategies.

The Comparative Risk Project's basic objective and scope was established by the Department of Environmental Conservation in its grant application to the United States Environmental Protection Agency. The Steering Committee, comprising state agency officials, industry representatives, environmentalists, academics, and members of the public, was formed to be the prime decision-making body for this Project. In this capacity, the Steering Committee

established detailed guidelines governing the Project's implementation, including a general charge to, and methods of analysis to be used by, its work groups.

The actual research, analysis, and writing that produced these draft work group reports was done by a diverse team of more than 50 environmental, public health, and policy experts, organized into three separate work groups. These work groups included representatives of the DEC, the NYS Department of Health and other state agencies; environmental groups; businesses and business organizations; academicians; and other sectors and interest groups.

All three work group draft reports have been released with the consensus of their respective work groups. However, it should be noted that some components of these reports would not reflect the full consensus of the Steering Committee. Concerns have been raised about the data gaps and uncertainty associated with risk assessment, the validity and appropriateness of the data and methodology used in these reports, the bias of risk assessment toward inaction in the face of uncertainty, changes in the scope of the Project, the need for a "peer review" process, the appropriateness of using risk assessment to set priorities for pollution prevention, and the appropriateness of issuing a partial report, among other issues. Even so, the general sense of most Steering Committee members is that there is significant value in making these reports available to the general public and in moving forward with this Project using these work group reports as the basis for developing pollution prevention objectives and strategies.

The Steering Committee's next task is to agree on a methodology for integrating these three separate comparative risk analyses. At the same time, the Project's Risk Reduction Strategies Work Group will begin work on the second phase of the Project: evaluating the sources of environmental stressors and developing pollution prevention strategies for reducing the health, environmental, and quality of life risks posed by these stressors.

Members of the public are encouraged to review these reports in detail and to submit comments to the DEC per the instructions given in the next section of this document. Your input will be shared with members of the Steering Committee and work groups.

Public Participation and Comment

The Steering Committee encourages the public to review the draft reports and welcomes your comments. The Committee will wait until they have had an opportunity to review these comments and the work groups' responses before proceeding further in this Project.

The comments that are received will be reviewed by the work groups and will be considered by them before finalizing their reports. The three final work group reports, along with copies of all comments received, will be provided to the Steering Committee who will integrate the findings of the three work group reports into a final risk characterization report.

Although no formal written response to individual public comments will be prepared, each comment that is received will be considered by the appropriate work group or Steering Committee and will be reflected in changes to the reports which will be posted on the Project's

Internet site. Comments that discuss pollution prevention strategies that will reduce the risks posed by the stressor groups studied in this Project will be provided to the Risk Reduction Strategies Work Group for their consideration.

A formal public comment period will take place through September 8, 2000. During this time, written comments will be accepted by the following means:

- Through the mail at the following address:
Comparative Risk Project
New York State Department of Environmental Conservation
Pollution Prevention Unit
625 Broadway
Albany, NY 12233-8010
- By fax at (518) 402-9470
- Through email at comprisk@gw.dec.state.ny.us

Although formal public comments will not be taken by phone, those with questions about the Project may call 518-402-9469.

Please send comments in by **September 8, 2000**. The work group reports will be revised and finalized shortly after review of the public comments received, and the Steering Committee will prepare a risk characterization report for the Project this fall.

Draft Work Group Reports - Executive Summaries

The following pages contain the Executive Summaries for the draft reports of the Human Health, Ecosystems, and Quality of Life Work Groups. The full reports can be downloaded in their entirety from the Internet at <http://www.dec.state.ny.us/website/ppu/p2crp.html>, or they can be ordered from the following address:

Comparative Risk Project
New York State Department of Environmental Conservation, Pollution Prevention Unit
625 Broadway
Albany, NY 12233-8010

Human Health Work Group Executive Summary

The Human Health Work Group (HHWG) was asked by the Steering Committee to evaluate all known health risks, including both cancer and non-cancer effects, for each group of stressors. Health risk is the probability that human health effects may occur. The determination of whether or not a substance poses a health risk to humans is based on the potency (or strength) of a substance and the type and amount of exposure to that substance.

The final composition of the HHWG included members of state agencies, academic institutions and industry. The original composition of the work group also included members from environmental groups, federal and local government agencies and the state legislature.

The work group organized its analysis into six steps. At each step of the analysis, the work group tried to reach consensus on major decisions. Many decisions, including the final rankings, were the result of a process of debate in which opinions sometimes differed. The six steps were:

1. *Selection of stressor groups.* The steering committee defined fourteen stressor groups to be evaluated. The groups were defined based on chemical and physical properties.
2. *Selection of individual substances within stressor groups.* Many stressor groups contain a large number of substances. Not all of the substances within a stressor group could be analyzed due to time and resource limitations, so the work group selected a subset of the substances in each stressor group for analysis. The HHWG selected substances that would be of particular concern to human health, rather than attempt to represent the entire range of stressors within a group. For each stressor group, the HHWG identified a long list of potential stressors, developed criteria for choosing a smaller final list of stressors, and then used those criteria to select the stressors that would be evaluated in detail for each stressor group. Most stressor groups included criteria on toxicity, environmental concentrations, release or production. The HHWG used a variety of types of data to decrease the possibility of overlooking documented exposures associated with individual stressors.
3. *Toxicity assessment.* The toxicity of a substance is characterized by the health effects it can cause and its relative potency (strength). The dose of a chemical is the amount of chemical per body weight to which one is exposed. The potency of a substance is determined by how the degree of health effects changes with increasing dose. Stressor rankings for non-carcinogens were based on potency; rankings for carcinogens were based on potency and weight-of-evidence classifications. Weight-of-evidence classifications are based on the certainty of the evidence showing that the substance is a human carcinogen. The work group did not assign or adjust rankings based on the type of health effect; the work group's intent was to treat all types of health effects (acute, chronic, non-cancer and cancer) equally.
4. *Exposure assessment.* Exposure to environmental pollutants can occur by eating food or soil, drinking water, breathing air or dust, and direct contact with skin. Exposure to higher levels of a substance or for a longer time can result in a higher risk of health effects. The actual

dose to which a person is exposed from environmental pollutants is rarely known. However, pollutant levels in various environmental media (such as air, water, food and soil) can be measured and then human exposure can be estimated based on assumptions about how much air, water, food or soil a person might take in.

The HHWG ranked substances from “1” (highest) to “4” (lowest) using a hierarchy of data categories to assess exposure. Stressors were first ranked based on environmental levels of substances reported in state and federal monitoring studies. When environmental monitoring data were not available, the HHWG assessed data on release of these substances into the environment, primarily from industrial sources or accidental releases such as spills. These data are a surrogate for possible exposure; they do not provide direct evidence of exposure resulting from these releases. When environmental monitoring and release data were not available, commercial production data were used to compare possible human exposures. However, because of the limitations in data availability and the difficulty of translating commercial production into environmental exposure, there was a great deal of uncertainty regarding the usefulness of these data as a surrogate for human exposure.

5. *Risk characterization.* The HHWG combined data from its toxicity and exposure assessments to assess the health risks associated with current exposures. A matrix was used to show the toxicity rank and the exposure rank (on a scale of 1 to 4) assigned to each stressor. In addition, the matrix combined these two ranks into an overall health risk rank. For example, those stressors ranked highest in toxicity and exposure received the highest health risk rank (A), and those ranked lowest in toxicity and exposure received the lowest health risk rank (C).

6. *Comparative ranking of stressor groups.* The final step in the HHWG’s comparative risk process was to compare the health risks posed by one stressor group to the health risks posed by other stressor groups. The steering committee asked the HHWG to rank stressor groups into three risk categories; A, B and C. The work group agreed it was not possible to define absolute, quantitative measures of risk for groups of stressors. Each work group member who was assigned a stressor group first proposed a recommendation of A (highest), B or C (lowest) rank for the entire stressor group based on the risk characterizations for the individual stressors. Then the recommendation was reviewed by the work group. The work group then sought to reach consensus on an A, B or C rank for each stressor group, judging the relative risk associated with the stressor group compared to other stressor groups. Final ranks were debated and opinions sometimes differed, usually because of the variability of health risks for individual stressors within the same stressor group. These differences were resolved when the work group agreed that three stressor groups should be ranked as A/B (lower than A but higher than B) and one stressor group as B/C (lower than B but higher than C). Consensus was reached on the ranking for each stressor group.

There are several assumptions and limitations in the process of comparative risk assessment. There are many substances in commercial use that do not have adequate data for toxicity and exposure. There are also so many substances in use that we could not possibly evaluate all known substances in detail. Because of these and other limitations, one should not view the results of this process as statements of absolute certainty. On the other hand, these

limitations did not prevent us from using technically sound methods and data sources to achieve a reasonable assessment of relative risk.

The work group ranked stressor groups based on the risk of health effects relative to other stressor groups. The ranking was not a quantitative measure of human health risk. For most stressor groups, the ranks for individual stressors varied within the group, regardless of the rank for the entire group. Therefore, it is important to review the report for each stressor group to see where individual stressors may have been ranked differently than the rest of the stressor group. The work group ranked the stressor groups as A, B or C, with A the highest human health risk and C the lowest. Because of the variability of individual stressor ranks within a group, some groups were judged to be A/B (lower than A, but higher than B) or B/C (lower than B but higher than C).

Stressor groups ranked as A:

non-volatile halogenated compounds

Stressor groups ranked as A/B:

metals

particulates

petroleum products

Stressor groups ranked as B:

acidic & alkaline substances

atmospheric gases

halogens

pesticides

volatile organic compounds

semi-volatile organic compounds

Stressor groups ranked as B/C:

polynuclear aromatic hydrocarbons

Stressor groups ranked as C:

nutrients

ionizing radiation

suspended & settleable solids

It is important to note that these rankings were determined from data which are influenced by the current federal, state and local regulations in place. If this ranking were used to relax regulation or other efforts to control exposure to a stressor group that was ranked low, then the health risks associated with that stressor group may be much higher than estimated in this project. For example, ionizing radiation is ranked low because it is already highly regulated. Relaxation of efforts to control ionizing radiation would not be justified because of its low ranking in this project.

Each stressor group report includes recommendations that are specific to that stressor group. The following recommendations are included in this section because they were either applicable to more than one stressor group or to emphasize their importance. More specific recommendations for each stressor group can be found in the individual stressor group reports.

1. General recommendations

- Efforts should be made to encourage and use pollution prevention techniques, especially to reduce hazards posed by those substances the HHWG identified as having the greatest health risks.
- Where data indicate that continued or additional controls on certain substances are needed to protect human health, (for example, if cancer or non-cancer risks associated with a given exposure are unacceptably high) the state should make efforts to control sources and reduce potential exposure.
- This assessment should be re-evaluated periodically to determine whether new exposure data or health effects data are available.
- Because of the numerous substances which exist in commercial application today, only a subset could be evaluated through this comparative risk process. If there are particular compounds of interest to New York regulators and health officials that were not included in this project, these compounds should be evaluated.
- Monitoring of contaminants in drinking water should continue and necessary actions be taken so that drinking water of acceptable quality is available to residents.

2. Recommendations on specific stressor groups

- Because of the very large radiation doses that may result from indoor radon, both USEPA and NYSDOH encourage New York residents to measure radon in their homes and to reduce the radon levels if they exceed 4 pCi/L.
- The potential for exposure to some atmospheric gases (ozone, nitrogen oxides, carbon monoxide) is high in urban areas. Pollution prevention would help to reduce the potential exposure to some of these gases.
- The exposure to disinfectant byproducts should be re-evaluated once data is available from New York drinking water utilities pursuant to the USEPA's "information collection rule." This rule became effective in early 1997, and requires the generation of 18 months of monitoring data.
- Although there exist extensive programs for blood-lead surveillance, reducing lead levels in older homes, and public information, it is recommended that additional effort be made to reduce lead exposure via pollution prevention. The reasons for this are that (1) the effects of lead are irreversible; (2) young children are at the highest risk; (3) currently, much of the current effort identifies children at risk only after their blood lead levels are

above the recommended value; and (4) there is no certainty that the currently recommended values are sufficiently low.

- Additional effort to reduce exposure to mercury is also recommended. There appears to be an excessive number of emergency events associated with mercury (63 in the period 1992-96). A greater effort to reduce these events seems warranted. Also, mercury is found in high concentrations in fish and shell fish in New York waters. Cadmium, and in some cases, other metals are also found in high concentrations. NYSDOH issues fish advisories based on NYSDEC's extensive monitoring and NYSDEC is working on approaches to eliminate sources. This is a long-term problem that requires continuing effort. Greater efforts are needed to identify and aid populations that subsist almost entirely on fish.
- The major problem with nutrients in water and human health seems to be primarily with private wells. It is not likely that the New York State Department of Health or county health departments will start monitoring private wells. Since the human health problem is primarily with infants, a method for notifying families with newborn infants should be developed. If their primary source of potable water is a private well, it should be tested for nitrate-nitrogen levels. If the MCL is exceeded, an alternative source of water should be found or adequate treatment should be utilized to reduce the nitrate-nitrogen level.
- The state should review its methods for developing health advisories for recreationally-caught fish.
- Efforts should continue to reduce the possibility of human exposure to NVHOCs in the state. Appropriate measures should be taken to reduce contaminant levels in fish to below those which would require restrictive advisories.
- The relationship between one-hour average levels of PM in New York and human morbidity and mortality should be studied and pollution prevention should be used to control short-term excursions of PM.
- The use of Integrated Pest Management should be encouraged.
- A program to educate residential pesticide users in proper application and safe handling of pesticides should be developed.
- Air monitoring data at gas stations indicate that people who refuel their vehicles can be exposed to high levels of petroleum products. Measures to control such exposures may be addressed by pollution prevention.

3. Research needs

- Subpopulations with the potential for higher exposure to certain substances (in particular, NVHOCs, metals, pesticides, VOCs and SVOCs) should be identified and assessed for health risks.

- More and better environmental monitoring data, specific to New York, are needed to properly characterize human exposure to most stressors. In some cases, data on urban environments are available, but not for rural areas. Studies on indoor air in homes, schools and non-industrial workplaces are needed to evaluate potential exposure to stressors such as pesticides and NVHOCs. Drinking water, surface water and groundwater monitoring for pesticides should continue. Also, studies of multi-pathway exposures for some substances would be useful. Better personal monitoring (measurement of contaminants by a monitor attached to a person) for human exposure to some stressors (PM, VOCs/SVOCs) would be useful.
- More and better health effects data associated with both acute- and chronic-duration exposure to many substances are needed.
- Reference concentrations, reference doses and cancer potency factors need to be developed for many stressors.
- Additional and more complete body burden information on some substances would be useful to assist in benchmarking body burdens against other indices (e.g., biomarkers of effect and exposure, blood levels considered to be safe or adverse) which may assist in evaluating potential impacts to human health.

4. Data use/availability

- TRI data show that some stressors are released into the air in significant quantities by certain facilities, often in or near urban areas. TRI data should be used to focus pollution prevention techniques to reduce these releases.
- New York spill data should be evaluated to better determine how and where spills of toxic substances occur (in particular, petroleum products, acidic and alkaline substances and mercury) so that action may be taken to reduce the number of spills and related injuries.
- New York should make existing environmental monitoring and biomonitoring data more accessible and easier to use.
- For the most part, chemicals that fall under existing regulations present relatively small human health risks to the general population because of those regulations. However, there are chemicals for which we have very limited or no information. It is recommended that a review of chemicals that are produced or used in high volumes in New York be made to identify any chemicals that need further study to determine their toxicological properties and their potential for exposure to humans. With USEPA guidance, the chemical industry has begun a screening program of high production chemicals to identify those that need further study.

Ecosystems Work Group Executive Summary

During 1997, the Ecosystems Work Group of the Comparative Risk Project evaluated, characterized, and compared the risks associated with the release of 14 groups of chemicals and pollutants, referred to as stressor groups, into the ecosystems of New York.

The Work Group developed four ranking criteria to evaluate the stressor groups: severity of effects, reversibility of effects, ecological significance, and geographic scale. The Work Group also assessed impacts on the following types of ecosystems: oceans and bays; estuaries and tidal wetlands; freshwater wetlands; streams and rivers; lakes and ponds; uplands, including forests; agricultural areas; and urban and suburban areas. The following ecological regions of the state were considered in evaluating effects of the stressor groups: Lake Plains, Appalachian Highlands, Adirondacks and Northern New York, Catskill Mountains, Hudson-Mohawk Valleys, and New York Metropolitan Area and Long Island. In characterizing the effects of the stressor groups, the Work Group asked the following questions:

- What stressors are included in the group?
- What do they do ecologically?
- What are the important sources and pathways of the stressor?
- What systems or species/organisms are particularly sensitive or affected?

Stressor groups were researched and evaluated, and relative rankings ascribed to each group. The Work Group jointly reviewed draft documents and came to agreement on rankings for each stressor group. Results are aggregated as follows, listed alphabetically within categories:

Stressor Groups of High Ecological Concern (Ranked as A)

Atmospheric gases
Non-volatile halogenated organic compounds
Nutrients
Suspended and settleable solids

Stressor Groups of Medium Ecological Concern (Ranked as B)

Metals and cyanide
Pesticides
Petroleum Products
Polynuclear aromatic hydrocarbons
Non-volatile and semi-volatile organic compounds

Stressor Groups of Low Ecological Concern (Ranked as C)

Acidic and alkaline substances
Halogens
Particulates
Radionuclides
Volatile organic compounds

Quality of Life Work Group Executive Summary

This report of the Quality of Life Work Group of New York State's Comparative Risk Project is one of three reports prepared under the risk characterization phase (Phase 1) of the Project. Additional reports prepared by the Human Health Work Group and Ecosystems Work Group round out the technical and analytical research for this phase.

The Quality of Life Work Group has evaluated, characterized and compared the risks and impacts to the Quality of Life for New Yorkers from 14 classes of chemicals and pollutants, referred to as stressor groups, released to the environment.

The Work Group identified and defined six criteria to capture important quality of life dimensions as they relate to releases of the stressor groups. These were the following:

- ***Aesthetics*** - factors that affect our sense of beauty and our senses.
- ***Economic Well-Being*** - factors that result in increased expenses or losses to people to cope with or to mitigate the effects of pollution, such as health care costs and devalued natural resources.
- ***Value of a Healthy Ecosystem*** - factors that affect human use and appreciation of a healthy and self-sustaining ecosystem, including passive and active recreation as well as spiritual values.
- ***Future Generations*** - factors that produce or result in placing environmental damages or degradation onto future generations of New York residents.
- ***Fairness*** - factors that affect a just and equitable distribution of the risks caused by the stressors.
- ***Peace of Mind/Sense of Community*** - factors that result in people feeling threatened or at risk, individually or as a community.

Stressor Rankings

For each of the first four criteria: Aesthetics, Economic Well-Being, Value of a Healthy Ecosystem, and Future Generations, the Work Group evaluated and developed relative quality of life rankings for each stressor group using three categories: A (significant impact), B (moderate impact), and C (low or minimal impact). It then developed a combined overall quality of life ranking. These combined results are shown below.

Stressor Groups of Significant Impact (A)

Atmospheric Gases
Metals and Cyanide
Non-volatile Halogenated Organic Compounds

Stressor Groups of Moderate Impact (B)

- Nutrients
- Particulates
- Pesticides
- Petroleum Products
- Polynuclear Aromatic Hydrocarbons (PAHs)
- Suspended and Settleable Solids
- Volatile Organic Compounds (VOCs)

Stressor Groups of Low or Minimal Impact (C)

- Acidic and Alkaline Substances
- Halogens
- Non-volatile and Semi-volatile Organic Compounds
- Radionuclides

To develop the individual rankings for each of the four criteria, the Work Group established teams that used a wide range of information and analyses, including literature reviews, graduate student intern research projects, material obtained from the Ecosystems and Human Health Work Groups, and the best professional judgement of its members. In determining the overall combined quality of life rankings for each stressor group as shown above, the Work Group deliberated and considered and weighed qualitatively the importance of each individual criterion and its ranking against each of the other criteria and rankings.

Fairness and Peace of Mind/Sense of Community Criteria

For the Fairness and Peace of Mind/Sense of Community criteria the Work Group did not derive specific rankings for the stressor groups. A more general analysis was conducted and findings were developed. In the context of this comparative risk project, fair treatment, or “fairness”, implies that no population of people should be forced to bear a disproportionate share of the negative environmental impacts or risks of pollution from the fourteen stressor groups being evaluated. For the Fairness analysis, the Work Group conducted two evaluations. One was based upon recent policy directions of the United States Environmental Protection Agency regarding the issue of environmental justice. Environmental justice can be defined as the fair treatment of all people, regardless of race, culture, income, and/or education level, with respect to being excessively exposed to environmental contaminants and the development of equitable programs to reduce and eliminate this exposure. The Work Group recommends linking environmental justice concerns to implementation of DEC pollution prevention policies and practices that would result from the New York Comparative Risk Project.

A second effort associated with the Work Group’s Fairness criterion evaluation was a case study for two counties in New York State. It assessed whether proximity to certain facilities releasing air emissions in Nassau and Erie Counties differed by the socioeconomic status of the two populations. Toxic Release Inventory (TRI) data for 1995 in these two counties were arrayed against 1990 census tract data on income and educational levels. The results of this case study show that persons with low incomes and low educational attainment in these two counties

are more likely to be living closer to TRI facilities and their reported releases than persons with medium and higher income and educational attainment levels. This finding can probably be extended statewide, given land use characteristics and the distribution of the population by socioeconomic status within the cities, towns and villages in the State.

To evaluate how the environmental stressor groups can threaten New Yorkers' peace of mind/sense of community, the Work Group undertook a random mail survey of 2000 New Yorkers to solicit their concerns and reactions about how environmental contamination can affect their quality of life. The survey asked questions to help pinpoint the public's psychological and emotional reactions caused by concern about exposure to pollution, rather than the environmental or health-related effects being evaluated by the Ecosystems and Human Health Work Groups. Perceptions of risk, environmental attitudes, and demographic characteristics were used to study the associations between the fourteen environmental stressor groups and how they affect the quality of life of New Yorkers according to where they live, their sex, age and income class.

The results of the random mail survey show that New Yorkers are concerned about all types of environmental contamination. They are most concerned about contamination of water supplies and water bodies, and appear less concerned about air pollution from motor vehicles, factories and other sources. The public is also very concerned about possible pollution problems from local landfills and hazardous waste management facilities.

Downstate New Yorkers are, in general, more concerned about the environmental stressors than upstate New Yorkers and women are more concerned than men. But all New Yorkers show great concern when their immediate neighborhoods may have environmental problems that they see as having possible health risks and quality of life effects.

The survey respondents were asked about the importance of certain factors that should be considered by government officials in environmental protection decision making. Overall, they ranked protection of public health at the top and protecting natural resources second, out of eight factors to be rated. Aesthetic issues were ranked the lowest.

The mail survey conducted by the Work Group was the first of its kind in New York State to try to identify the public's quality of life concerns and perceptions about specific types of pollution problems. Follow-up surveys should be conducted to ensure that an ongoing source of information is available that accurately reflects the opinions and concerns of all New Yorkers about their environment and quality of life.

Individual Steering Committee Member Opinions

Position statements have been prepared by three members of the Steering Committee: Dr. Richard Sheldon, General Electric Corporate Research and Development, Ms. Beth Meer, Legislative Commission on Toxic Substances and Hazardous Waste, and Ms. Val Washington, Environmental Advocates. These documents represent the opinions of their respective authors and not those of the Steering Committee as a whole. They are included here to provide readers of the draft work group reports with alternate viewpoints for their consideration in the preparation of public comments.



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September 3, 1999

Comparative Risk Project Steering Committee
c / o Sharon Rehder, P.E.,
Environmental Engineer
New York State Department of Environmental Conservation
Pollution Prevention Unit, Room 298
50 Wolf Road
Albany, New York 12233-8010

Subject: NYSDEC Comparative Risk Project Draft Reports

References:

- 1) Draft Final Report of the Ecosystems Work Group dated January 1999.
- 2) Draft Final Report of the Human Health Work Group dated February 1999.
- 3) Draft Final Report of the Quality of Life Work Group dated February 1999.
- 4) Letter from R.B. Sheldon to Comparative Risk Project Steering Committee dated April 15, 1999.
- 5) Letter from J.B. Silkworth to Chairperson, Human Health Work Group dated June 24, 1999.

Dear Steering Committee Members:

The General Electric Company is committed to using sound science to evaluate the health and environmental impact of exposure to environmental contaminants. As part of its contribution as a member of the steering committee for the EPA-funded NYSDEC Comparative Risk Project, General Electric reviewed the draft reports from the three work groups listed above (References 1-3). Comments on these reports were provided to the steering committee on several occasions including presentation at a meeting on February 26, 1999, in written comments submitted on April 15, 1999 (Reference 4), and during a formal presentation on June 11, 1999. At the request of the Chairperson for the Human Health Work Group, more detailed comments regarding the deficiencies in that work group's report were provided on June 24, 1999 (Reference 5).

Significant technical and administrative deficiencies were identified in each of the three draft reports. These deficiencies included the following:

- None of the reports met the project objective of focusing on contaminants that could be abated by using pollution prevention as the primary method of reducing risks.
- Established scientific methods for quantifying and comparing risks were not followed (e.g. source identification, quantification, exposure estimates, and risk calculation)
- An incomplete database regarding health effects was utilized.
- Project ground rules and guidelines were violated with regard to the scope of the evaluations, administrative and peer review process. Although past releases were specifically excluded by the project ground rules, each report utilized information on past releases of stressors for risk comparisons.
- Inconsistent and potentially biased approaches were used to evaluate certain stressor groups such as the non-volatile halogenated organic compounds.
- Human health risks and exposure estimates for select stressor groups were overestimated.

Recommendations

On each occasion when General Electric provided comments, recommendations were included to improve the quality and scientific credibility of the reports. These recommendations consisted of the following:

- Quantify releases from each stressor group using a variety of sources of information available to NYSDEC and the working groups. Suggested sources included the Toxic Release Inventory (TRI), discharge monitoring reports, air emission inventories, combustion gas emission estimates (from fuel consumption), hazardous waste generator reports, TSCA inventories, pesticide utilization, and nutrient releases from fertilizer utilization, sewage treatment, etc.
- Quantify human and ecosystem exposures to current releases.
- Using information on releases and exposure, estimate risks using sound scientific methods and complete databases of pertinent literature.
- Rank stressors in terms of risk to facilitate subsequent efforts regarding the development of risk reduction strategies.
- Include peer review and minority opinions.
- Additional recommendations were included in References 4 and 5.

Discussion

The fundamental objectives of the ongoing NYSDEC Comparative Risk Project are to evaluate and compare risks posed by the current and future release of harmful or toxic substances into the environment to help NYSDEC prioritize future pollution prevention efforts. Past releases were not to be addressed by this process because it would duplicate current regulatory activities under federal and state Superfund programs and RCRA corrective action. Focusing on contaminants released in the past will detract from the ability of the project to achieve its true objective of reducing risks from current releases through pollution prevention. This is due to the fact that many contaminants which were released in the past are now highly regulated and are not currently released in amounts that pose a significant risk to public health or the environment.

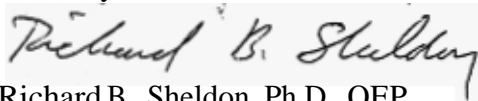
General Electric has repeatedly voiced concerns with the subject reports and has recommended improvements. To date, there have been only minimal actions on the part of the work groups to correct the reports. In responses to our comments received by GE on August 18, 1999, it is evident that neither the Ecosystems Work Group nor the Quality of Life Work Group will incorporate any of our recommendations. The Human Health Work Group agreed to incorporate some of our suggestions but they do not address our principal concerns. By ignoring accepted scientific risk assessment protocols to estimate and compare human health and ecosystem risks, the Steering Committee puts the successful outcome of this project in jeopardy. Therefore, General Electric cannot endorse any of the findings or conclusions presented in the draft reports of the Human Health, Ecosystems, and Quality of Life work groups.

The New York State Department of Environmental Conservation and the Comparative Risk Project Steering Committee are entrusted to conduct scientifically credible and defensible work. In its current form, the three draft reports do not meet this standard. Issues as important and emotionally charged as potential health effects from environmental contaminants demand the application of the best science available.

Conclusion

As one of the few industry representatives to the Steering Committee, General Electric recommends that the Steering Committee not issue these draft reports without a substantial improvement in their quality such that they will be both useful and scientifically defensible.

Sincerely,

A handwritten signature in cursive script that reads "Richard B. Sheldon". The signature is written in black ink on a light-colored background.

Richard B. Sheldon, Ph.D, QEP

Using Comparative Risk to Set Pollution Prevention Priorities in New York State: A Formula for Inaction

A Minority Steering Committee Member Opinion on the New York State Department of Environmental Conservation Comparative Risk Project

Prepared by the New York State Assembly Legislative Commission on Toxic Substances and Hazardous Wastes

Assemblyman Steve Englebright, Chair
Elizabeth Meer, principal author

Commission staff participated in the New York State Comparative Risk Project from its inception in 1996, serving on the Steering Committee and as nonvoting members of the Human Health Work Group. Our experience revealed that comparing the health and environmental impacts of toxins across a wide variety of chemicals and exposures is a difficult task.

All comparative risk assessment projects suffer from significant limitations and are prone to substantial biases. The scientific authority of such projects is limited by data gaps and uncertainty, the need to make value judgments in the face of uncertainty, and resource constraints. In addition, such projects tend to resist the disclosure of uncertainty and its associated value judgments, and to collapse the evaluation of environmental problems into the narrow metric of quantitative risk, thereby limiting the scope of their analyses and obstructing public deliberation about the values that ought to guide risk assessment and priority setting.

Perhaps most importantly, however, comparative risk projects tend to accept the traditional response of scientific inquiry to uncertainty, which is to postpone judgment. In the context of risk assessment, this constitutes a value judgment in favor of underestimating uncertain risks. In comparative risk projects, this often translates into a tendency to discount uncertain evidence and focus only on well-documented risks.

Combined, the failure of comparative risk projects to acknowledge uncertainty and their tendency to focus on the best-known risks make such projects not conservative, i.e. not protective of public health and the environment in the case of uncertainty. A reliance on comparative risk projects to guide public policy, then, has an inherent tendency to impede government action to reduce uncertain risks.

Moreover, the failure to recognize and disclose this tendency as a value judgment allows it to masquerade as a neutral dedication to “good science,” thereby giving it a degree of status and authority that is difficult, if not impossible, to successfully challenge. The end result is that decisions are taken out of the hands of the public, and the bias of risk assessment toward delay is allowed to go unchallenged.

The biggest danger of comparative risk projects, then, is that they will result in a product that is represented as being better informed, more objective, and more authoritative than policies arrived at through legislation and more traditional means of public participation in agency decision making. Since such projects in fact tend to be biased toward obfuscation and delay, the possibility of misrepresentation poses a potential threat to democracy and effective government.

The New York Project exhibited all of these limitations and biases. In addition, it suffered from some unique shortcomings, including its inappropriate application to pollution prevention and its failure to achieve broad public involvement.

The most fundamental limitation to all comparative risk projects is lack of information. The toxic effects of the majority of chemicals used in commerce are unknown, and significant data gaps exist in every aspect of our understanding of risk.

These data gaps necessitate the making of value judgments in order to assess and compare risks. In the face of uncertainty, risk assessors must choose whether it is better to err on the side of overestimating risk (which may result in overspending), or to err on the side of underestimating risk (which may result in under protecting human health and the environment). In comparative risk projects, this decision centers on whether to take less certain evidence into account, and how much weight to give such evidence in the ranking process.

Taken together, uncertainty, value judgments, and resource constraints limit the scientific authority of comparative risk projects. As a result, only modest claims are appropriate regarding the authority of such projects, and they should not be viewed as a way to second guess traditional priority setting through legislation and public participation in agency decision making. In addition, the substantive diversity of environmental problems challenges risk assessors and policy makers to look beyond risk assessment, and especially quantitative risk assessment, to more narrative and holistic ways of evaluating priorities.

While the scientific limitations of comparative risk projects cannot be overcome, they can be responded to appropriately. And measures are available to mitigate their negative tendencies to resist disclosure, focus narrowly on “risk,” and implicitly discount uncertain evidence.

Most scholars agree that the quality and transparency of a comparative risk project is dependent on the full acknowledgment of uncertainty, recognition and disclosure of the value choice between overestimating and underestimating risk that must be made in the face of uncertainty, inclusion of qualitative considerations that go beyond traditional views of risk, and a high level of public participation to ensure that the policy choices embedded in the assessment are reflective of public values. The central goal of a comparative risk project should be the thorough and accurate reporting of what is known and not known about environmental threats.

Unfortunately, the New York Project largely fails to achieve that goal. Instead, it exhibits all the weaknesses to which comparative risk projects are prone. Specifically, the Project failed to fully acknowledge uncertainty, recognize and disclose value judgments made in the face of uncertainty, and adequately consider qualitative issues and the characteristics of environmental problems that transcend risk. These failures compromise the quality and transparency of their work.

In addition, and perhaps most importantly, the Project’s Human Health Work Group (HHWG) exacerbated the tendency of comparative risk projects to underestimate risk by making a number of policy choices, including a decision to largely exclude qualitative evidence, that worked to systematically underestimate both uncertain and more certain risks. Moreover, the majority of these choices were made implicitly, without discussion of their implications or substantive merit, especially in relation to setting priorities for pollution prevention.

The New York project also suffered from some unique weaknesses. Foremost among these is the inappropriateness of performing comparative risk assessment to determine priorities for pollution prevention. The beauty of pollution prevention is that it is able to transcend the fundamental value choice that must be made in the face of uncertainty: whether to err on the side of overspending or under protecting. It is able to do so because it involves taking those actions to protect public health and the environment that are not regulatory in nature and also make good economic sense. In doing so, it also transcends the tendency for uncertainty to paralyze government action. To limit its application to the

best-known risks is to limit its ability to protect public health and the environment from those chemicals whose toxic effects and potential for dangerous exposures are suspected but not well known.

A second key shortcoming of the New York Project is its failure to achieve a high level of public involvement. This failure exacerbates the tendency of comparative risk projects to take policy decisions out of the hands of the public and place them in the hands of “experts.” The New York Project’s emphasis on quantitative analysis, coupled with its failure to adequately disclose value judgments and include the broader public in its deliberations, has inhibited public discourse regarding what policies should guide pollution prevention priority setting. These failures call in to question the substantive and political authority of the Project’s conclusions.

The end result is a Project that suffers from a largely hidden and wholly inappropriate bias toward the underestimation of risk. Given this bias, it is important for reviewers of the New York Project to recognize its weaknesses and know that its work is not, for the most part, protective or “cutting edge.” It does not proactively seek to identify emerging environmental health problems. A more expansive and detailed focus on any one area of risk, chemical, or exposure pathway is likely to uncover more, and more up-to-date, information than this Project. It is also likely to result in the identification of more toxic hazards as being worthy of immediate action. As it is, we believe that it is more likely than not that the Project has failed to prioritize risks that are causing serious adverse impacts on human health.

This does not mean that the work performed by the Work Groups has no value. The Ecosystems Work Group adopted a much more protective standard for the consideration of evidence than did the HHWG. They also developed an informative and valuable system for comparing the qualitative differences between risks. These qualities make its analyses more proactive and holistic than the HHWG’s.

The Quality of Life Work Group Report provides a valuable discussion of environmental justice. The Group’s study indicating that pollution is disproportionately concentrated in low income communities is important.

The Human Health Work Group’s recommendations targeting specific toxic chemicals and pollution sources for action are also of value. In fact, given the Group’s extremely cautious approach to the identification of risk, their short list of recommended actions should be taken seriously indeed. When the HHWG identifies a problem as a high priority, the public can be assured that it is one.

In the end, however, it is highly questionable whether the results of this Project are worth the time and resources expended on them. Taken as a whole, the Work Group Reports fail to provide a comprehensive, transparent or accessible presentation of what is known and not known about toxic risks. Even more importantly, the New York Project inappropriately applies comparative risk assessment to the setting of pollution prevention priorities. The Human Health Work Group, in particular, adopted a much too limiting standard for the acceptance of evidence, especially in light of the Project’s application to pollution prevention. Given these weaknesses, we believe the Project inappropriately drew scarce resources away from more direct efforts to promote and enhance pollution prevention, while resulting in limited recommendations that are not likely to facilitate, and may even hinder, the use of pollution prevention to proactively address emerging environmental health problems in New York State.

The New York Project must be viewed as exactly what it is, and nothing more. It is one (imperfectly representative) group’s attempt to survey (with limited resources and time, a tendency to highlight the best-known risks, and a narrow focus on “risk”) available information (rife with data gaps and uncertainty) about the threats posed by chemical stressors to the environment and public health. It is not the last word on any of the toxic chemical threats faced by New Yorkers.

It is far from clear whether the benefits of the New York Project will outweigh the danger of its potential misuse. Much depends on how it is described to the public as the draft Work Group Reports are released. That release will be the first active solicitation of broad and substantive public comment in the four years since the Project was begun. It is our hope that this Minority Opinion will help to mitigate the danger of misrepresentation by heightening public awareness of the weaknesses of the Project and helping to ensure that its products are appreciated both for what they are, and what they are not.

The list below provides a more detailed description of the problems with the New York State Comparative Risk Project. Readers with a greater interest in these issues are urged to read the full text of our Minority Opinion, which is available on DEC's Pollution Prevention Unit website and by direct request from the Commission and DEC.

PROBLEMS WITH THE NEW YORK STATE COMPARATIVE RISK PROJECT

1. The Scientific Authority of Risk Assessment is Limited by Uncertainty, Value Judgments, and Resource Constraints

The most fundamental limitation to all comparative risk projects is lack of information. Contrary to popular belief, scientists do not know everything they need to know to accurately and adequately assess and compare risks. The majority of chemicals used in commerce have no toxicological data, and significant data gaps exist in our understanding of noncancer risk, risks to children, ecological risk, variations in human sensitivity, additivity and synergy, fate and transport, multiple pathways of exposure, and exposure in general.

These data gaps necessitate the making of value judgments in order to assess and compare risks. In the face of uncertainty, risk assessors must decide whether to be presumptively conservative, i.e. protective of human health and the environment in the case of uncertainty. In other words, uncertainty requires risk assessors to choose whether it is better to err on the side of overestimating risk (which may result in overspending), or to err on the side of underestimating risk (which may result in underprotecting). In comparative risk projects, this decision is centered on whether to take less certain evidence into account, and how much weight to give such evidence in the ranking process.

Time and money constraints also limit the breadth and depth of comparative risk projects. In the case of the New York Project, only 220 chemicals were able to be evaluated out of over 1,300 chemicals listed as hazardous by DEC and 70,000 used in commerce.

Taken together, significant uncertainty, the need to make value judgments, and time and money constraints limit the scientific authority of comparative risk projects. As a result, only modest claims are appropriate regarding the authority of such projects, and they should not be viewed as a way to second guess priority setting through legislation and more traditional means of public participation in agency decision making.

2. Risk Assessors Routinely Fail to Disclose Uncertainty and Its Associated Value Judgments

Most scholars agree that the quality and transparency of a comparative risk project is dependent on full recognition and disclosure of the uncertainty associated with its analyses and the value judgments made

in the face of that uncertainty. Unfortunately, however, risk assessors routinely fail to identify and disclose the uncertainty and value judgments associated with their analyses.

These failures are largely due to the false but persistent split between “facts” on the one hand and “values” on the other. Despite new appreciation among philosophers for the rationality of non-scientific knowledge, values are still widely viewed as subjective and beyond rational analysis. Thus legislatures, courts, and administrative agencies still routinely expect environmental policies to be based on science. To admit that a risk analysis involves value judgments is to threaten its authority and acceptance. Since uncertainty is directly tied to the need to make value judgments, there is a tendency to downplay uncertainty as well.

An additional barrier to disclosure is the practical difficulty of distinguishing policy issues from scientific issues within the highly technical context of risk analysis. The current value placed on quantitative risk assessment, the widespread preference of many scientists for “hard,” or quantitative data over qualitative information, and the artificial distinction between risk assessment and risk management are all manifestations of the fact/value split in modern risk analysis.

The end result is that the authority of risk assessment is routinely overstated, the value judgments embedded in it are not made consciously or disclosed to the public, and public deliberation about the values that ought to guide priority setting is distorted and impoverished. The New York Project suffered from just these failures of disclosure. For the most part, the Work Groups failed to fully acknowledge the uncertainty associated with their analyses, and to recognize and disclose the value judgments made in the face of uncertainty. These failures compromise the quality and transparency of their work.

3. Risk Assessment is Biased Toward Inaction on Uncertain Risks

One enormously important reason why scientists fail to recognize and disclose the value judgments associated with uncertainty is because they tend to adopt without question the traditional response of scientific inquiry to uncertainty, which is to postpone judgment. This tendency, which is often viewed as simply a tenet of good scientific inquiry, actually constitutes a value judgment in favor of underestimating uncertain risks. In comparative risk assessment, this bias translates into a tendency to prioritize the best-known risks.

Taken together, the failure of comparative risk projects to acknowledge uncertainty and their tendency to postpone judgment in the face of uncertainty bias such projects toward the underestimation of uncertain risks. Despite arguments to the contrary, risk assessment is not presumptively conservative, i.e. protective of human health and the environment in the case of uncertainty. As a result, a reliance on risk analysis and comparative risk assessment to guide public policy has an inherent tendency to impede government action to reduce uncertain risks.

Moreover, the failure to recognize and disclose this tendency as a value judgment allows it to masquerade as a neutral dedication to “good science,” thereby giving it a degree of status and authority that is difficult, if not impossible, to challenge. The end result is that decisions are taken out of the hands of the public, and the bias of risk assessment toward delay is allowed to go unchallenged.

The biggest danger of comparative risk projects, then, is that they will result in a product that is represented as being better informed and more objective than policies arrived at through legislation and more traditional means of public participation in agency decision making. Since such projects in fact tend to be biased toward obfuscation and delay, the possibility of misrepresentation poses a potential threat to democracy and effective government.

4. The NY Project Underestimates Risks to Human Health

The New York Project's Human Health Work Group exacerbated the tendency of comparative risk projects to underestimate risk by making a number of policy choices that led to the Group's systematic underestimation of both uncertain and more certain risks. Specifically, they chose not to directly address important areas of uncertain knowledge; they excluded qualitative evidence from their analyses (with the exception of cancer risk); they set their ranking cutoffs too high; and they failed to consider known areas of significant risk, such as risks to workers. Moreover, the majority of these choices were made implicitly, without discussion of their implications or substantive merit, especially in light of their use to set priorities for pollution prevention.

As a result, the work of the Group is not protective or "cutting edge." It does not proactively seek to identify emerging environmental health problems and so prevent adverse impacts on public health. Instead, it focuses on currently well-known risks, in essence waiting for documented evidence of an impact before recommending action. More expansive and in-depth research on any stressor group or toxic chemical is likely to uncover more, and more up-to-date, information than the HHWG. It is also likely to result in the identification of more toxic hazards as being worthy of immediate action. As it is, we believe it is more likely than not that the Project has failed to prioritize risks that are causing serious adverse impacts on human health.

5. Risk Assessment Inappropriately Limits Pollution Prevention.

In answer to the debate over whether or not risk assessment should be conservative in the face of uncertainty, pollution prevention offers a fresh approach. The fundamental beauty of pollution prevention is that it dissolves the traditional regulator's dilemma--whether to err toward overspending or underprotecting. This is so because pollution prevention involves taking those actions to protect public health and the environment that are not regulatory in nature and also make good economic sense.

Seen in this light, it is clear that the use of comparative risk assessment, with its bias toward inaction and its focus on well-documented risks, is particularly inappropriate, unnecessary and restricting when applied to setting priorities for pollution prevention. Pollution prevention is the antidote to our lack of knowledge regarding toxic chemicals, and the incredible time and resources required to know more. It is utter nonsense to limit it to the small number of chemicals in commerce for which sufficient scientific data is available to identify them as "priority risks."

Indeed, the application of pollution prevention appears to make the most sense in precisely those areas of uncertain risk that traditional command-and-control regulation is not well equipped to address. A sound priority setting process for pollution prevention would use all available scientific information and considerations that transcend risk, such as ease of implementation, to target those areas where toxic effects are suspected but the evidence is not substantive enough to support quantitative analysis or a high priority rank. Unfortunately, however, those are not the kinds of risks highlighted by the New York Project.

As it is, the Project took too much time away from more direct efforts to achieve pollution prevention. It has taken up a disproportionate amount of the Pollution Prevention Unit's time. And its limited recommendations are not likely to facilitate, and may even hinder, the proactive application of pollution prevention to emerging environmental problems in New York State. Finally, the current budget of the Pollution Prevention Unit is so small (approximately \$4.5 million annually, compared to over \$100 million for environmental cleanup) that it is detrimental to the promotion of pollution prevention to focus on prioritization rather than expanding the pie of resources available.

6. The New York Project Failed to Address Qualitative Issues and Consider Issues that Transcend Risk

The quality of a comparative risk project is dependent on full consideration of the qualitative differences between risks, disclosure of the value judgments made to compare substantively different risks, and consideration of the characteristics of environmental problems that transcend risk. Examples of the qualitative differences between risks include whether a toxic chemical produces cancer, liver damage or developmental effects; the size of the population exposed; and whether a chemical is more risky to certain sub-groups, such as the elderly or children. Examples of issues that transcend risk include distributive justice; whether a risk is voluntarily or involuntarily imposed; the ease of risk reduction measures; and the value to society of the pollution causing the risk.

Unfortunately, the fact/value split makes it difficult for comparative risk projects to adequately consider the qualitative aspects of risk in their analyses. The same beliefs that lead to suppression of the value judgments associated with uncertainty lead to ambivalence about the qualitative differences between risks and the even more highly value-laden issues that must be addressed to compare such differences. Issues that transcend risk are often not considered at all.

The Human Health Work Group failed to adequately consider the qualitative differences between risks. Instead, the Group chose to base their analyses almost exclusively on quantitative data, and attempted to make the qualitative differences between risks a non-issue. The problem is that excluding qualitative characteristics from explicit consideration does not make them go away. Treating all stressors equally despite their qualitative differences constitutes a value judgment in itself. In the end, the HHWG's attempt to collapse their analysis into only those aspects amenable to quantification weakened its usefulness and distorted their efforts.

In contrast, the Ecosystems Work Group provided a systematic, richly narrative and accessible discussion of the qualitative considerations that influenced the ranking of stressor groups. These discussions greatly enhance the applicability and value of the Group's analysis.

The most glaring failure of the Project in regard to qualitative issues, however, is its complete failure to even mention more than one of the issues identified in the literature as transcending the paradigm of "risk." The Quality of Life Work Group was the only group to discuss such issues, and they only discuss one, the issue of environmental justice. The voluntary or involuntary nature of risk, whether it is wrongly imposed, or poses a potential for catastrophic harm, are not even mentioned. A whole set of additional issues, such as ease of implementation, are slated to be addressed by a fourth Group, the Risk Reduction Strategies Work Group, that has not yet begun to meet regularly. The artificial separation of these issues from the main work of ranking risks as carried out by the HHWG and EWG unnecessarily distorts the Project's work and weakens its usefulness.

7. The New York Project Failed to Achieve Adequate Public Participation.

Most scholars agree that public involvement is essential to the quality and political authority of comparative risk projects. Good public participation makes for better informed analyses, fosters public deliberation regarding the values that ought to guide risk assessment and priority setting, and makes the value judgments embedded in the project's analyses more reflective of public values.

The achievement of good citizen participation, however, requires a transparent and accessible process that clearly identifies value judgments and decision points and invites the public to participate in those decisions. Unfortunately, the fact/value split pushes comparative risk assessment toward a focus on

quantitative and reductionist analysis that is in considerable tension with the need to encourage public involvement.

The New York Project's failure to achieve meaningful public participation reflected this tension. First, the Work Groups and Steering Committee were notably lacking in participation by environmental organizations and citizen groups, who generally lack the resources to participate in such lengthy and time consuming processes. In contrast, industry was well represented.

Second, outreach to the broader public during the first four years of the Project has been minimal. The small efforts that have been made have been passive and focused on getting information *out* to the public as compared to actively soliciting public comment on substantive or controversial issues. The end result is a highly technical set of Work Group Reports that emphasize expert analysis over public deliberation. If, as a number of scholars note, the one entirely reliable outcome of comparative risk projects is public deliberation, the value of the New York Project is questionable indeed.

Using Comparative Risk to Set Pollution Prevention Priorities in New York State: A Formula for Inaction

A Minority Steering Committee Member Opinion on the New York State Department of Environmental Conservation Comparative Risk Project

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Comments on the Final Report of the Human Health Work Group May 19, 2000

Environmental Advocates continues to have reservations about the fundamental process of ranking disparate and often poorly characterized risks relative to one another, and then using this ranking as a basis for policy decisions. The process of information gathering that this body has engaged in is valuable in itself - illuminating data gaps and highlighting certain key concerns - but it cannot support making that extra leap to assessing which risks are greater than others. Even with perfect knowledge, such a question is essentially unanswerable, except in the starkest of situations. It is not at all clear how one balances short-term versus long-term hazards, or risks that are subtle but widespread versus those that are dramatic but affect a limited number of people or species. We have not successfully resolved these policy judgments in other arenas, such as health care allocation, where we possess considerably more data on which to base them. Though the work group reports do discuss this conundrum at many points, they are nonetheless forced by the structure of the project to plow ahead with rankings and recommendations based on them.

These and other concerns about the nature of the comparative risk process are well articulated in the extensive comments of Beth Meer for the Legislative Commission on Toxic Substances and Hazardous Wastes. We concur with her critique. And while we do not have the resources to analyze this enormous document, we did want to note some of our concerns using the Human Health Work Group's risk assessment of pesticides by way of example.

We have objections to the particulars of this section including: the limited data sources chosen and those excluded; the partial characterization of exposure routes (excluding volatile pesticides and other outdoor exposures, for example); and the truncated representation of the health effects literature. But in general the section is relatively clear about what is missing from our knowledge base about pesticides. Our strongest concern is the fact that, given such profound deficits, this portion of the work group report nonetheless contains a ranking of relative hazards for a specific list of pesticides and uses this as the basis of a notably timid set of recommendations, which do not even capitalize on the limited information the section contains. None of the recommendations is for

direct action of any sort but exhortations for more study or more analysis. The most stunning in its timidity is the last:

- i. If cancer or non-cancer risks associated with exposures to a given pesticide are unacceptably high, consideration should be given to taking actions (e.g. regulatory, legislative) to reduce exposures.

In other words, if risk is too high, *think* about acting.

Of the two recommendations regarding pesticides that made it into the executive summary, one is too nebulous to translate into any actual change (encouraging IPM, a notoriously fluid term) and one (developing a program for residential users on proper handling and safe application) is already being done by both state and federal agencies, and is essentially a question of label enforcement, not risk reduction.

Despite the data gaps that exist, there is ample evidence of pesticide risks to warrant entirely eliminating certain pesticide use scenarios - true pollution prevention. Aesthetic use of pesticides is all risk, for example, with no public health gain. Interior use of organophosphates and carbamates, particularly in settings with pregnant women and children, has been shown in study after study to pose tremendous neurotoxic risks.

These are the kinds of formulations we should be considering at the end of this years-long process: listing certain settings and categories of pesticides for which the risks are too great to warrant their continued use, and determining how to mandate the use of safer alternatives and require training in them. Pesticides, as the report points out, are deliberately introduced into the environment. Some of these uses are entirely frivolous, perfect candidates for pollution prevention through elimination. Other uses have a host of alternatives. Waiting, as the recommendations appear to suggest doing, for an exhaustive characterization of the health effects of each individual pesticide used in the state, is a recipe for permanent inaction. The rankings and recommendations in this report, do not move pesticide risk reduction forward.

These concerns may be more or less pronounced for other issue areas depending on the specificity of the available data and analysis. We did find other troubling omissions (like manganese inhalation from gasoline additives - potentially the next big human health debacle attributable to the overall category of metals). But using the pesticide section again as an example, we found, in general, the summary of data sources worthwhile as a baseline for discussion (though far more limited than it needed to be), but the ranking and recommendations plainly unhelpful for the purpose of effecting intelligent policy change. Overall, this effort would be better served if the untenable goal of ranking was dropped, and the information contained simply used as a launching point for discussing what we do and do not know about our chemical exposure.

And finally, we take strong issue with the working group's conclusion that:

For the most part, chemicals that fall under existing regulations present relatively small human health risks to the general population because of those regulations.

If this exercise did nothing else, it clearly demonstrated that we have no basis for making such an unsubstantiable claim.

A handwritten signature in black ink that reads "Val Washington" followed by a circled initial "at".

Val Washington
Executive Director
Environmental Advocates