

**Addressing Effects, Affects and Impacts to Human Health in Environmental Documents
Responsibilities under NEPA**

By

Sherrill E. Thompson
Department of Homeland Security
United States Coast Guard
Washington, DC
December 2012

Capstone paper submitted in partial fulfillment of the
Requirements for the Certificate in NEPA
Duke Environmental Leadership Program
Nicholas School of the Environment at
Duke University

2012

Introduction

The National Environmental Policy Act (NEPA) is a comprehensive and far reaching piece of legislation that requires all federal agencies and applicable federal projects to address the quality of the human environment and human health. These requirements are in addition to addressing impacts to the natural environment and other activities that may impact the environment. Evaluation, analysis, public disclosure and stakeholder involvement are key components; that are requirements of the NEPA process. If the federal project is in compliance with NEPA and its statutes, all environmental documents must address impacts to human health, if applicable.

The National Environmental Policy Act of 1969 is both subtle and complex, the requirements of the law is more extensive than complying with a legal requirement and creating environmental documents. NEPA is both a law with regulations and a process and the law of NEPA has become more complex since its passage. Its foundation is scientific, social, economic, health based, etc. Congress did not envision an administrative law like NEPA becoming as far reaching, with multi-faceted uses to ensure that the federal agencies follow and comply with the processes of NEPA.

This paper will attempt to discuss the effects, affects and impacts that government projects and activities might have on human health. These types of projects would require an Environmental Assessment (EA) or an Environmental Impact State (EIS) to address the significant impacts that the federal government's projects might have on human health. It is the responsibility of the federal government to take into consideration human health, when planning and implementing federal projects as required by NEPA. These federal projects would be those that are financed by federal funds and/or require a federal permit. From NEPA's inception the creators of NEPA probably did not include input from health professionals during the formulation of the law in the United States. At that time, members of the health communities probably would not have been able to see the applicability of NEPA to human health either.

NEPA's Responsibility to address Human Health

The protection of human health and welfare are addressed in the objectives and regulations of NEPA (CEQ 1978; NEPA 1969). In practice however, the consideration of health within an EA or EIS is both rare and narrowly focused on toxic exposures, the built environment, sociology of the population, etc. A comprehensive and systematic approach that analyzes and addresses human health impacts in the more complex EIS has not evolved yet. The inability to address health in EIS practices stands in contrast to the interdependence among environmental change, societal conditions, and human health. Environmental change, including issues as diverse as global warming, deforestation, fisheries loss, and suburban sprawl is now seen as a priority challenge to public health. The World Health Organization (WHO), recently estimated that over 25% of the burden of human illness worldwide can be attributed to modifiable environmental conditions and evidence linking social conditions such as employment, transportation, housing, food resources, social hierarchy, economic disparity, and social capital to health outcomes continues to grow in strength and depth.⁸

The National Environmental Policy Act (NEPA) states in **Sec. 1508.8 Effects:**⁴

- (a) Direct effects, which are caused by the action and occur at the same time and place.
- (b) Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.⁴

Effects and impacts as used in these regulations are synonymous. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or **health**, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial.⁴

Interactions between people and their environments; natural as well as human-made, continues to be a major public health issue. Decisions that affect the natural environment's air, water, or undeveloped lands, as well as decisions that affect the built environment's communities and transportation systems, almost inevitably affect the health and well-being of all species—humans and nonhumans alike—that depend on these resources.

The purpose of NEPA is to do the following:

... promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man. NEPA § 102 [42 USC §4321]⁴

As well as to:

... assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings. [42 USC §4331]⁴

And to also:

... attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences. [42 USC §4331]⁴

When the NEPA practitioner writes the section in the EIS that pertains to significant impacts to local communities' health, assistance from the health officials should be sought at this time. Hopefully, the NEPA practitioner will make contact with health professionals early in the NEPA process. As early as during the formation of the purpose and need of the project, but not later than during the scoping process. Any time after these phases might be considered too late, if the NEPA practitioner has limited previous background in the health sciences. The health professional should be able to provide options and alternatives to the NEPA practitioner that would propose remedies to the impacts.

As much as NEPA focuses on the protection of the environmental, NEPA's purpose to protect and promote health is also clear. The language above gives local, state, tribal, and federal public health agencies an opportunity to engage with other agencies in the EIS process that will adequately address, protect and promote public health.³

Some Anthropogenic Activities that affect Human Health

Human activities have probably affected human health since the dawn of time and many years before the Industrial Revolution. However, during the Industrial Revolution, pollution of the air, land and soil from human activities was widespread. In today's time these types of activities would be called anthropogenic impacts. The term Anthropogenic is sometimes used in the context of pollution and emissions that are produced as a result of human activities. However the term applies broadly to all major human impacts on the environment.

A) **Transportation** – Road traffic is the largest single contributor to human exposure to air pollutants and noise in urban areas. The following types of pollution emitted by road traffic effect human health in the following ways:

a) Air pollution – cardiovascular, respiratory and total mortality, and hospital admissions for asthma and cardiovascular diseases;

b) Noise – chronic effects of noise exposure on psychosocial conditions, such as annoyance, and sleep disturbance; and

c) Lethal and Non-lethal injuries.⁹

Transportation-related emissions with the most direct effect on human health include carbon monoxide, nitrogen dioxide, ozone, (the primary ingredient in smog), particulate matter (especially the “fine” particulates, known as PM2.5), sulfur dioxide, and toxics such as lead.

Fifty-eight percent of people in the U.S. live in areas with unhealthful levels of ozone. Looking at the two most vulnerable age groups, more than 20.4 million adults over age 65 and almost 44 million children under age 18 live in counties with unhealthy ozone levels. Approximately one in three Americans are at elevated risk for PM2.5-related health impacts.¹

Pollution emissions can be reduced by carpooling, vanpooling, using public transportation, specifically exposure to carbon emissions can be reduced. As our society continue to build on the success of advanced motor vehicle emission control technologies and fuel efficiency efforts continue their enormous impacts, conditions associated chronic illnesses and disease will decline.

B) Housing Developments and Healthy Communities - An Environmental Impact Statement can provide information to federal decision makers about the most suitable site for a housing development. A thorough investigation should be conducted to determine, the effects of emotional, mental and physical health on a population during the planning stages. Housing is very important component of the built environment, where most people spend a large portion of their lives. NEPA places the responsibility on the federal agency that is planning the housing development to take into consideration and address certain factors. Not only negative physical health impacts from the federal action, but also psychological and social health impacts early in the planning stages of the proposed project, especially during the scoping phase of an EIS. Agencies and individuals associated with local health organizations, health departments, etc. should be invited to participate in the scoping process as active stakeholders.

The built environment is defined as any structure that is built by humans for use by humans. In this case the structures would be housing that is built to enhance the health of the occupants living within the housing. When housing developments are built with limited to no sidewalks, playground equipment, walking and biking trails, etc. the occupants are more likely to become obese, sedentary and in some cases depressed by their surroundings. The federal Housing and Urban Development housing projects have become more healthy homes over time. With major improvements, including more sidewalks and centers that are centrally located within the housing developments for gatherings and entertainment.

When planning and designing military communities during the EIS phase, opportunities to walk and bicycle are essential to limit the amount of driving on the military installations, for health purposes. The Environmental staff on a military installation has a unique opportunity to provide input in the Public Works facilities planning stages. In addition to creating the EIS for the project, the Environmental staff member selected to participate, becomes a member of an official planning team. Therefore the Environmental staff has the ability to incorporate specialized features into the communities, including in military housing developments, medical centers, shopping, commercial businesses, etc. Recently developed technologies allow Engineers to design traffic calming measures to slow down cars and create routes that are safer for kids walking to though communities. Traffic calming measures also include narrowing of

streets at intersections, creating raised crosswalks, and installing traffic circles which makes streets safer and more pleasant for pedestrians. Other options include, constructing more sidewalks that make amenities more accessible and locating commercial shopping areas and entertainment venues closer to military housing. This enhances the opportunities to walk or bike to commercial developments rather than driving, therefore reducing components of air pollution that effect human health. These design efforts will encourage military family members to engage in more physical exercise and lead to healthy living.

The Role of Health Impact Assessment and the Environmental Impact Analysis

Human health and human disease have always been intimately connected to our environment. Our environment contains the positive, in the form of air, water, and nutrients, and the negative, in the form of bacteria, viruses, and toxins. During the centuries of humans' existence, humans have developed elaborate defense systems to protect against adverse environmental effects. These include immune systems that attack bacteria and other foreign bodies, DNA repair enzymes that defend the integrity of genetic structure, and metabolizing enzymes that degrade ingested compounds and prepare them for excretion. When these systems become overwhelmed or operate inefficiently, disease and death can occur.⁷

Doctors advise their patients on how they can stay healthy on a daily basis. In many ways, a Health Impact Assessment (HIA) provides the same advice to communities. This advice helps communities make informed choices about improving public health through community design. HIA is a process that helps evaluate the potential health effects of a plan, project or policy before it is built or implemented. An HIA can provide recommendations to increase positive health outcomes and minimize adverse health outcomes. HIA's bring potential public health impacts and considerations to the decision-making process for plans, projects, and policies that fall outside the traditional public health arenas, such as transportation and land use.²

The HIA has arisen as an especially promising way to factor health considerations into the decision-making process. Health impacts can be evaluated early in the process, to assure that the project can attain the widest use of environmental beneficial uses without degradation, risk to health or safety, etc. as required by NEPA. Public Health professionals, Environmental Health Scientists and other stakeholders may provide input initially and receive consideration during the

scoping process. The HIA is a structured process that provides comprehensive information which can include; scientific data, professional expertise, and stakeholder input to identify and evaluate public-health consequences of proposals and provide suggestions for actions that could be taken to minimize adverse health impacts and optimize beneficial ones. The HIA has been used in the recent past throughout the world, to evaluate the potential health consequences of a wide array of proposals that span many sectors of our society and different levels of government.

On the other hand an Environmental Impact Analysis (EIA) is used by local officials and community planners and other non federal government entities. The EIA assists in decision making and is written from a community perspective.⁷

The EIA is developed when projects are locally or privately funded and are not required to comply with NEPA. Members of the community and local officials ensure that the systematic process, identifies, describes and evaluates the community benefits of economic development. Among those benefits would be affordable housing, meeting the needs and desires of the local consumers, increasing natural, human and environmental resources, etc. The EIA is also used to evaluate potential impacts to the community and its resources from the perspective of the community, community sprawl, excessive commercial developments and unscrupulous developers. The EIA resembles the EIS in that the analysis is very comprehensive and requires the consideration of alternatives.

The criteria used in the development of an EIA are as follows:

- Identify valuable environmental resources in the community and surrounding area that may be affected by a proposed development;
- Evaluate the community's capacity for additional development given environmental protection priorities;
- Identify the deficiencies or tradeoffs between possible development alternatives or courses of action and the environmental impacts associated with each alternative; and
- Determine which groups in the community may be directly or indirectly affected by the project or action.⁶

The HIA is categorized into two groups: a) an HIA independent of an EIA, or voluntary, and b) HIA formally integrated with EIAs, or regulatory. The HIA has evolved independent of the Environmental Impact Statement (EIS) the required NEPA document, is applied in a wide range of public policy decisions that are not subject to the EIS. In other countries such as Australia and Canada, formal guidance has been developed to integrate the HIA into the EIA. This process has worked successfully for these countries, because the guidance developed for the merged documents recognizes that the interdisciplinary approach considers not only the biophysical health effects, but also broader social, economic and environmental influences.⁸

U.S. Coast Guard Rescue 21 Project Efforts to Prevent Health effects under NEPA

The U.S. Coast Guard (USCG) Rescue 21 Project is a search and rescue telecommunications project that constructs remote fixed facilities (RFF) in coastal and Great

Running Head: Addressing Effects, Affects, and Impacts to Human Health in Environmental Documents – Responsibilities under NEPA

Lakes states in the Continental States, Hawaii and Alaska, the U.S. Virgin Islands, Guam and the Northern Marianna Islands. The RFFs consist of the following: the installation of four antennas on leased commercial towers space or towers that are built by the USCG; an equipment shelter; a VSAT dish; an ice bridge; a propane or diesel tank; an emergency backup generator; etc. The purpose of the remote fixed facilities is to receive distress calls from mariners in distress and transmit those calls to Command Centers. The Command Centers receives the distress calls and the rescuers are dispatched to the location(s) where the distress calls were transmitted. Upon arrival, the search and rescue activities are initiated.

The project started in 2001 and the environmental guidance is found in the Programmatic Environmental Assessment written for the Rescue 21 Project. Most of the RFFs are located in remote coastal areas where populations are small, on commercial properties or USCG Stations. Health effects from the Rescue 21 Project are considered when evaluating impacts to communities and local populations. Efforts have been made to identify, minimize and prevent as many effects to human health as possible by addressing the following:

A) **General Conformity Rule** –The General Conformity Rule ensures that the actions taken by federal agencies in Nonattainment and Maintenance areas do not interfere with a State’s plans to meet national standards for air quality under the Clean Air Act 1990 Amendments.

Established under the Clean Air Act (section 176(c)(4)), the General Conformity Rule plays an important role in helping states and tribes improve air quality in those areas that do not meet the National Ambient Air Quality Standards (NAAQS). Under the General Conformity Rule, federal agencies must work with State, Tribal and local governments in a nonattainment or maintenance area to ensure that federal actions conform to the air quality plans established in the applicable state or tribal implementation plan.⁵

The Rescue 21 Environmental staff ensures that the air quality status is researched prior to the startup of construction. It is the projects’ intend to leave the air quality in the same condition or an improved condition, never a worst condition than when the project arrived. Efforts are coordinated with air quality officials, Environmental Health and Air Quality Management agencies. The air quality status is varied; exemption, compliance certificates or air quality permits are sought as applicable for 20 Kw emergency backup generators.

Poor air quality can affect humans, especially those with compromised respiratory systems, which includes the very young and older people. Test results from Rescue 21 20 Kw propane fired emergency backup generators indicate that there are, emissions of NO_x, CO, CO₂ and PM (Particulate Matter). NO_x, CO and PM are all criteria pollutants that are regulated by the National Ambient Air Quality Standards (NAAQS), CFR 40 Part 50 of the Clean Air Act. The NAAQS is determines and designates air quality status, Attainment, Non-Attainment or Maintenance.

If the respective State or County regulators require and issue a permit for the potential emissions, the 20 Kw emergency backup generators are considered compliant and safeguards are built into the permit to prevent excessive emissions. By issuing permits the regulators ensure that human health is taken into consideration and efforts are made by Rescue 21 also consider health in each construction.

B) **Low sulfur diesel fuels** – Rescue 21 also installs 61 hp diesel burning emergency backup generators, these generators require air quality permits and also low sulfur (500 ppm) fuel. Sulfur is one of the six criteria air pollutants that are tied to health effects in humans. By meeting the EPAs fuel requirements, along with the advanced emission control technologies of these generators, emissions from these engines are decreased by more than 90%. Thereby, decreasing the effects of respiratory disease and declining lung function by the surrounding communities of the search and rescue sites.

Conclusion

Most diseases arise from the interaction of several events: an individual genetic susceptibility based on heredity, his or her environmental exposures, and other factors such as behavior, age, and the time of exposure. When studies are designed to accommodate greater complexity of knowledge, the health consequences of low-level environmental exposures are more likely to be discovered. The payoff of such knowledge is tremendous because the environment has been shown to play a role in so many chronic diseases.

The involvement of Public Health and Environmental Health professionals early in the NEPA process can only result in positive results. As stakeholders that live with the federal government's decision making that eventually impacts health, these individuals deserve to have input in projects that might potentially impact community health. Unfortunately, Environmental professionals have not been trained nor educated in most cases in the health sciences, to be able to use this foresight. Perhaps by incorporating the health professionals concerns and offering solutions up front, years of litigation may be avoided.

Perhaps Congress needs to consider strengthening NEPA, by modifying the health based laws to include NEPA requirements. Some of the health based laws are the Clean Water Act, the Clean Air Act, Toxic Substance Control Act, etc. The Clean Act Section 309 – Clean Air Act already includes the requirement to consider Public Health; a modification to this section can be made to require a more comprehensive evaluation, which would provide more stringent requirements.

Health concerns are validated by scientific research that would include statistical analysis, clinically studies, etc. The existing Public Health and Environmental Health laws and statutes fall short of accomplishing the goal of, protecting public health in NEPA and so do many Environmental laws. Taking into consideration that most NEPA practitioners would not have a background in the health sciences, some training in this area would be required to write effective NEPA document. Providing training that is conducted by professionals with a health science background may help fix the technical background deficiencies.

References

¹ Booz-Allen-Hamilton. *Transportation and Health: Policy Interventions for Safer, Healthier People and Communities*, available at <http://www.prevent.org/data/files/transportation/transportationandhealthpolicycomplete.pdf>

² Centers for Disease and Prevention. *Healthy Places, Health Impact Assessment*, available at <http://www.cdc.gov/healthyplaces/hia.htm>

³ Centers for Disease and Prevention. National Center for Environmental Health. *NEPA Frequently asked Questions. What is NEPA?* available at <http://www.edc.gov/healthyplaces/nepafaw.htm>

⁴ Council on Environmental Quality Regulations Implementing the National Environmental Policy Act, 40 CFR 1500-1508, The Council on Environmental Quality Regulations Implementing the National Environmental Policy Act, 40 CFR 1500-1508, in 40 CFR 1508.8, defines Effects as: the Environmental Quality Improvement Act of 1970, as amended (42 U.S.C. 4371 et seq.), sec. 309 of the Clean Air Act, as amended (42 U.S.C. 7609), and E.O. 11514 (Mar. 5, 1970, as amended by E.O. 11991, May 24, 1977), available at <http://ceq.hss.doe.gov/nepa/regs/ceq/1508.htm>

⁵ Environmental Protection Agency. *General Conformity /Air and Radiation /US EPA*, available at <http://www.epa.gov/air/genconform/>

⁶ University of Wisconsin- Madison. *Land Information & Computer Graphics Facility*, available at http://www.lic.wisc.edu/shapingdane/facilitation/all_resources/impacts/analysis_environment

⁷ Pollution Issues. *Human Health. Environmental Health in the Preindustrial World*, available at <http://www.pollutionissues.com/Fo-Hi/Health.html>

⁸ Rajiv Bhatia and Aaron Wernham. Integrating Human Health into Environmental Impact Assessment: An Unrealized Opportunity for Environmental Health and Justice. *Environmental Health Perspectives*, August; 116(8): 991–1000. available at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2516559/>

⁹ World Health Organization. *Health Impact Assessment*, available at

<http://www.euro.who.int/en/what-we-do/health-topics/environment-and-health/health-impact-assessment/activities/health-effects-and-risk-of-transport-systems-hearts>