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HAZARDOUS WASTES: PROBLEMS, PERSPECTIVES AND POLICY

ALVIN L. YOUNG, PH.D.
SENIOR POLICY ANALYST FOR LIFE SCIENCES
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON, D.C.

PRESENTATION TO:

HAZARDOUS WASTE LITIGATION SYMPOSIUM
GARDEN CITY, NEW YORK
SEPTEMBER 24, 1984

THE PAST TWO DECADES HAVE USHERED IN A SHIFT OF ALMOST REVOLUTIONARY PROPORTIONS IN THE STUDY OF HEALTH AND DISEASE. THE PREOCCUPATION WITH INFECTIOUS DISEASE HAS BEEN REPLACED WITH A HEAVY COMMITMENT TO THE STUDY OF CHRONIC, LIFE THREATENING ILLNESSES. INCREASINGLY, MORE INVESTIGATORS HAVE RECOGNIZED THAT BEHAVIORS THAT PLACE AN INDIVIDUAL AT RISK FOR DEVELOPING PHYSICAL ILLNESS SELDOM OCCUR IN ISOLATION FROM OTHER PATHOGENIC ACTIVITIES. ALTHOUGH THE PUBLIC ACKNOWLEDGES THAT LIFE STYLE AND DISEASE ARE RELATED (E.G. SMOKING MAY BE DETRIMENTAL TO YOUR HEALTH), THE FEAR OF MALIGN INFLUENCES IN OUR ENVIRONMENT IS SO WIDESPREAD TODAY THAT THE GENERAL PUBLIC BELIEVES THAT IT IS THOSE FACTORS THEY CANNOT CONTROL THAT WILL BRING ABOUT THEIR EARLY DEMISE. THE PRESENCE OF ANY TRACE OF DIOXIN, PESTICIDES, RADIATION (EVEN BACKGROUND RADIATION), OR INDUSTRIAL WASTE PRODUCT IS TAKEN AS AN OMEN OF DEATH. PERHAPS, I'M OVER-STATING THIS ISSUE - HOWEVER AS A SCIENTIST NOW CONCERNED WITH PUBLIC POLICY ITS BECOMING INCREASINGLY APPARENT TO ME THAT WE ARE FACING A CRISIS AS TO WHERE WE EXPEND RESOURCES FOR GENERATING SCIENTIFIC DATA USEFUL IN THE MANAGEMENT OF ENVIRONMENTAL AND HEALTH RISKS.

As an Environmental Scientist, I am acutely aware of the public's concern over the possible development of cancer because of community exposure to carcinogens in low doses from a wide variety of sources such as hazardous waste deposits, pesticide residues, air pollutants and food additives. Two recent reports prepared by the National Research Council (NRC) of the National Academy of Sciences are noteworthy.

The first report "GROUNDWATER CONTAMINATION" emphasized that the widespread use of chemical products, coupled with the disposal of large volumes of waste materials poses the potential for widely distributed groundwater contamination. The largest potential sources of contamination of groundwater is the disposal of solid and liquid wastes. In 1980, the U.S. Environmental Protection Agency (EPA) estimated that there were 200,000 landfills and dumps receiving 150 million tons per year of municipal solid wastes and 240 millions tons per year of industrial solid wastes. In addition to landfills, 176,000 surface impoundments receive 10 trillion gallons per year of liquid industrial wastes. Although not all wastes are hazardous, the EPA has identified an estimated 50,000 sites that have been used, at some time, for the disposal of hazardous wastes. Of these, 1200 to 2000 are thought to pose threats to the environment. Some of these latter sites are areas where waste-disposal practices have resulted in irreversible contamination of groundwater. The examples of Love Canal, New York and the Rocky Mountain Arsenal, Colorado, indicate the magnitude of the resulting groundwater contamination problems with possible health hazards and other deleterious effects. The report noted

THAT THE COST ESTIMATED FOR DECONTAMINATION OF JUST THE ROCKY MOUNTAIN ARSENAL RANGE FROM $800 MILLION TO $1 BILLION. THE QUESTION OF COST/BENEFIT TRADE-OFFS TO SOCIETY IN THESE CASES NEEDS TO BE EXAMINED CAREFULLY; SOME SITES MAY PROVE TO BE SO EXPENSIVE TO RESTORE THAT THEY MAY HAVE TO BE DESIGNATED AS PERMANTLY CONTAMINATED.

THE SECOND REPORT RECENTLY RELEASD BY THE NRC WAS "TOXICITY TESTING - STRATEGIES TO DETERMINE NEEDS AND PRIORITIES." THE NATIONAL TOXICOLOGY PROGRAM ASKED NRC:

(1) TO CHARACTERIZE THE TOXICITY-TESTING NEEDS FOR SUBSTANCES TO WHICH THERE IS KNOWN OR ANTICIPATED HUMAN EXPOSURE, SO THAT FEDERAL AGENCIES RESPONSIBLE FOR THE PROTECTION OF PUBLIC HEALTH WILL HAVE THE APPROPRIATE INFORMATION NEEDED TO ANTICIPATE THE EXTENT OF TESTING NEEDS.

(2) TO DEVELOP AND VALIDATE UNIFORMLY APPLICABLE AND WIDE-RANGING CRITERIA BY WHICH TO SET PRIORITIES FOR RESEARCH ON SUBSTANCES WITH POTENTIALLY ADVERSE PUBLIC-HEALTH IMPACT.

TO DEFINE TOXICITY-TESTING NEEDS FOR SUBSTANCES IN THE HUMAN ENVIRONMENT, IT WAS NECESSARY FOR THE NRC TO SELECT A MANAGEABLE SUBSET OF THE UNIVERSE THAT WOULD INCLUDE MOST OF THE SUBSTANCES TO WHICH HUMANS ARE LIKELY TO BE EXPOSED IN THE UNITED STATES. THE CONSTRUCTION OF THIS "SELECT UNIVERSE" OF SUBSTANCES--A CORE THAT WOULD BE THE REFERENCE FOR THE STUDY--RELIED ON A SEARCH FOR LISTS OF SUBSTANCES PRESELECTED FOR HUMAN EXPOSURE POTENTIAL AND COMPUTERIZED FOR REASONABLY EASY ACCESS. THE LISTS USED INCLUDED THE TOXIC SUBSTANCES CONTROL ACT (TSCA)

INVENTORY OF 48,523 CHEMICAL SUSTANCES IN COMMERCE; A LIST OF 3,350 PESTICIDES (ACTIVE AND INERT INGREDIENTS) REGISTERED FOR USE BY THE EPA; A LIST OF 1,815 PRESCRIPTION AND NONPRESCRIPTION DRUGS APPROVED BY THE FOOD AND DRUG ADMINISTRATION (FDA) AND EXCIPIENTS USED IN DRUG FORMULATIONS; AND A LIST OF 3,410 COSMETIC INGREDIENTS FROM THE COSMETIC, TOILETRY AND FRAGRANCE ASSOCIATION. THIS SELECT UNIVERSE DID NOT SYSTEMATICALLY INCLUDE ENVIRONMENTAL DECOMPOSITION PRODUCTS, MANUFACTURING CONTAMINANTS, OR NATURAL SUBSTANCES (E.G., PLANT POLLENS AND FOODS). THE SUM OF THE ABOVE, 65,725 ENTRIES FROM THE LISTS, WAS TAKEN AS THE SELECT UNIVERSE FOR THE PURPOSES OF STUDY. STATISTICAL ADJUSTMENT FOR DUPLICATIONS INDICATED THAT THE SELECT UNIVERSE CONTAINED ABOUT 53,500 DISTINCT ENTITIES.

OBVIOUSLY, IT WAS NOT POSSIBLE TO EXAMINE INFORMATION ON ALL 53,500 SUBSTANCES, THEREFORE USING A STRATIFIED RANDOM PROCESS, 675 SUBSTANCES WERE SELECTED. A RANDOM SUBSAMPLE OF 100 SUBSTANCES WAS FURTHER SELECTED THAT REPRESENTED SEVEN CATEGORIES OF SUBSTANCES. WHEN JUDGED AGAINST CURRENTLY ACCEPTED STANDARDS FOR TOXICITY TESTING, ONLY 8% OF THE TESTS IN THIS FINAL SUBSAMPLE MET THE STANDARDS OF THE REFERENCE PROTOCOL GUIDELINES AND ANOTHER 19% OF TESTS PERFORMED WERE JUDGED TO BE ADEQUATE. ON THE GREAT MAJORITY OF THE SUBSTANCES, DATA CONSIDERED TO BE ESSENTIAL FOR CONDUCTING A HEALTH-HAZARD ASSESSMENT WERE LACKING.

SO WHAT IS THE POINT OF THE TWO REPORTS THAT I JUST CITED? WE HAVE GENERATED VERY LITTLE SCIENCE ABOUT THE CHEMICALS IN

OUR ENVIRONMENT AND WE HAVE LITTLE OR NO IDEA WHAT RISKS THEY POSE! THE SITUATION IS COMPLEX:

- THERE ARE 4.2 MILLION COMPOUNDS REGISTERED TODAY, AND THAT NUMBER IS GROWING BY 10% A YEAR. OF THESE, SOME TOXIC EFFECT INFORMATION IS AVAILABLE ON 100,000. THERE IS LIMITED INFORMATION ON LONG-TERM TOXIC EFFECTS FOR ALMOST 4000 COMPOUNDS.
- THERE ARE 220 SEPARATE INFORMATION SYSTEMS CONCERNING TOXIC WASTES. A RECENT COORDINATING EFFORT REQUIRED 18 DIFFERENT DATABASES. THERE IS NO CENTRAL DATA BANK ON TOXIC SUBSTANCES TO ORGANIZE THIS INFORMATION.
- STATE AND LOCAL AGENCIES PRESENTLY HAVE NO WAY TO QUICKLY OBTAIN INFORMATION AND ASSISTANCE TO RESPOND IN AN OPTIMAL FASHION. THE TIME REQUIRED FOR PUBLIC POLICY DECISION AND THE TIME REQUIRED FOR GENERATING SCIENTIFIC INFORMATION ARE RARELY THE SAME.
- THE FEDERAL EFFORT TO COPE WITH THE PROBLEMS POSED BY HAZARDOUS WASTE HAS, HISTORICALLY, BEEN DEVELOPED ON AN ALMOST CRISIS-BY-CRISIS BASIS RATHER THAN IN AN ORDERLY, EFFICIENT MANNER. AS A RESULT THERE ARE OVER 30 SEPARATE STATUTES, ADMINISTERED BY 10 FEDERAL AGENCIES THROUGH AT LEAST 30 BUREAUS, INSTITUTES, AND CENTERS.
- COORDINATION, MUCH LESS MANAGEMENT, OF THIS BUREAUCRATIC NIGHTMARE IS ALMOST IMPOSSIBLE AS EVIDENCED BY THE 80 INTERAGENCY COMMITTEES AND FIVE SEPARATE, HIGH-LEVEL, COORDINATION ATTEMPTS MADE IN THE LAST DECADE.

- OF THE ALMOST BILLION DOLLARS WHICH GOES INTO RESEARCH ON TOXIC SUBSTANCES, CONDUCTED BY 12 DIFFERENT AGENCIES, 55% GOES TO THE DISCOVERY OF POSSIBLE NEW PROBLEMS RESULTING FROM CHEMICAL EXPOSURE, 45% TO THE DISCOVERY OF THE MECHANISM OF HOW THESE CHEMICALS ACT AND ALMOST NOTHING TO SOLVING ALREADY IDENTIFIED PROBLEMS.
- THERE IS LITTLE OR NO GOVERNMENTAL EFFORT DIRECTED AT THE DEVELOPMENT OF A COOPERATIVE APPROACH COMBINING THE EXPERTISE OF INDUSTRY, ACADEMIA, PUBLIC INTEREST GROUPS, AND GOVERNMENT TO RESOLVE THE PROBLEMS POSED BY THE DELETERIOUS EFFECTS OF TOXIC SUBSTANCES.
- THERE IS LITTLE OR NO PREPARATION AT FEDERAL, STATE OR LOCAL LEVELS FOR THE RATIONAL TREATMENT OF PERSONS INVOLUNTARILY EXPOSED TO TOXIC WASTES, AND THE FOLLOW-UP OF THESE PERSONS IS HAPHAZARD AT BEST.

PERHAPS THE GREATEST FRUSTRATION TO THE SCIENTIST IS THAT THE SCARCE RESOURCES AVAILABLE FOR PROBLEM SOLVING GO INTO CHEMICALS WHERE THE RISK TO THE POPULATION IS MINIMAL, NOT BECAUSE THESE CHEMICALS ARE NOT TOXIC BUT RATHER BECAUSE HUMAN EXPOSURE IS MINIMAL. SUCH AN EXAMPLE IS 2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN (TCDD OR DIOXIN). DIOXIN IS A HIGHLY TOXIC CHEMICAL AND IS A CONTAMINANT OF PRODUCTS MADE FROM TRICHLOROPHENOL AND FROM LOW TEMPERATURE INCINERATION OF WASTES CONTAINING CHLORINATED PRECURSORS. DIOXIN IS AT THE CENTER OF CONTROVERSIES OVER (1) THE USE OF AGENT ORANGE IN VIETNAM AND THE HEALTH OF VETERANS, (2) THE USE OF 2,4,5-T HERBICIDE IN AGRICULTURE, AND (3) THE DEVELOPMENT OF TECHNOLOGY FOR THE INCINERATION OF MUNICIPAL AND INDUSTRIAL

WASTES. IT HAS BEEN ASSOCIATED WITH THE EVACUATION OF HUMAN POPULATIONS IN SEVESO, ITALY; TIMES BEACH, MISSOURI; AND LOVE CANAL, NEW YORK. THE UNITED STATES GOVERNMENT HAS INITIATED AN EXTENSIVE LONG-TERM RESEARCH PROGRAM ON THE CHEMISTRY, TOXICOLOGY, AND ENVIRONMENTAL FATE OF DIOXIN. ALL OF THIS WORK IS INTENDED TO HELP EVALUATE THE IMPACT OF DIOXIN ON HUMAN HEALTH.

THIS PROGRAM ENCOMPASSES SCIENTIFIC RESOURCES FROM TEN FEDERAL AGENCIES. WHAT ARE THE SPECIFIC ACCOMPLISHMENTS TO DATE:

- SINCE 1970, THE UNITED STATES GOVERNMENT HAS SPONSORED RESEARCH RESULTING IN MORE THAN 500 MAJOR PUBLICATIONS ON TOXICOLOGY, ENVIRONMENTAL FATE AND HUMAN RISKS OF DIOXIN.
- THE FEDERAL GOVERNMENT HAS UNDERTAKEN A $130 MILLION RESEARCH PROGRAM ON HUMAN HEALTH EFFECTS INCLUDING STUDIES ON BIRTH DEFECTS, MORTALITY, MORBIDITY, CANCER, AND DIOXIN IN HUMAN TISSUE.
- IN ASSOCIATION WITH STATE GOVERNMENTS, FEDERAL AGENCIES HAVE INITIATED EXTENSIVE PROGRAMS TO DEVELOP TECHNOLOGY FOR CLEAN-UP AND DECONTAMINATION OF AREAS CONTAMINATED WITH DIOXIN. CLEAN-UP EFFORT MAY WELL INVOLVE EXPENDITURES OF HUNDREDS OF MILLIONS OF DOLLARS.

HOW HAS ALL OF THIS "GENERATION OF SCIENCE" CONTRIBUTED TO THE RESOLUTION OF THE DIOXIN CONTROVERSY. FIRST, THE STUDIES HAVE SHOWN THAT ACTUAL EXPOSURE TO DIOXINS IS MINIMAL, THAT IS,

HUMAN EXPOSURE TO DIOXIN OCCURS PRIMARILY IN "HOT SPOTS", AND THE NUMBER OF INDIVIDUALS EXPOSED IS VERY LOW. SECONDLY, THE DATA COLLECTED TO DATE NEITHER IMPACTS PROPOSED ACTIONS ON CLEAN-UP (E.G., TIMES BEACH) NOR IMPEDES CONGRESSIONAL ACTION TO LEGISLATE PRESUMPTIVE COMPENSATION. THIRDLY, THE DATA OBTAINED FROM COMBUSTION STUDIES SHOW THAT THE PRODUCTION OF DIOXIN IS MINIMAL AND EASILY CONTROLLED WITH PRESENT TECHNOLOGY, YET THE FEAR OF DIOXIN HAS PARALYZED INCINERATION TECHNOLOGY AND ITS APPLICATION.

IT IS APPARENT THAT OUR FAILURE TO PROPERLY APPLY SCIENCE HAS CREATED A CRISIS OF CONFIDENCE IN OUR ABILITY TO NOT ONLY DEAL WITH PROBLEMS BUT ALSO TO IDENTIFY THEM. NEVERTHELESS, I BELIEVE THAT SCIENCE, GOOD SCIENCE, MUST BE USED BY THE DECISION MAKERS.

SO HOW DO WE PROVIDE RATIONALE GUIDELINES FOR HANDLING THE ISSUE OF TOXIC CHEMICALS IN OUR ENVIRONMENT? I SUGGEST THAT WE MUST SIMULTANEOUS INITIATE AND ENCOURAGE THE DEVELOPMENT OF RESEARCH AND TECHNOLOGY INTO THE MANAGMENT OF TOXIC WASTES WHILE AT THE SAME TIME EDUCATING THE PUBLIC AND LAW MAKERS ON THE ASSOCIATED ISSUES. LET ME ADDRESS THE LATTER AREA FIRST:

- THE PUBLIC MUST UNDERSTAND THAT USE OF THE PRODUCTS OF TECHNOLOGY CARRIES WITH IT THE RESPONSIBILITY FOR SAFE DISPOSAL OF THAT TECHNOLOGY'S WASTE. A PERVASIVE DIFFICULTY WITH WASTE DISPOSAL IS THAT INDIVIDUALS DO NOT WANT THE WASTES, ESPECIALLY TOXIC WASTES, DISPOSED OF IN THEIR NEIGHBORHOOD. I AM REMINDED OF THE RECENT ACTION INVOLVING OCEAN INCINERATION IN THE GULF OF MEXICO. WITHIN THE

PAST FEW MONTHS, EPA REFUSED TO ISSUE THE NECESSARY BURNING PERMITS FOR THE DISPOSAL OF 80 MILLION GALLONS OF HAZARDOUS WASTE BY OCEAN INCINERATION PRIMARILY BECAUSE 6000 PEOPLE PRESENTED INTENSE OPPOSITION TO THE BURNING. THIS IN SPITE OF THE OVERSHELMING SCIENTIFIC DATA SHOWING THAT THE INCINERATOR SHIP WAS CAPABLE OF DESTROYING THE WAST AT AN EFFICIENCY OF 99.9999%, AND HAD DONE SO ON MANY OCCASIONS IN THE SAME AREA. THE PERCEPTION THAT WASTES CANNOT BE SAFELY HANDLED HAS BEEN AN IMPORTANT CONSIDERATION IN WASTE MANAGMENT.

IN THE CASE OF HIGHLY TOXIC WASTES, TRANSPORTATION BY RAIL OR ROADWAY INVOLVES RISKS THAT CANNOT BE IGNORED. NATIONS NEED TO MOVE TOWARD POLICIES REQUIRING STATES OR REGIONS TO DISPOSE OF WASTES WITHIN THE REGION/STATE IN WHICH THEY ARE GENERATED. THUS GOVERNMENTAL AND INDUSTRIAL ORGANIZATIONS NEED TO AGREE THAT VARIOUS CLASSES OF WASTES SHOULD BE DISPOSAL OF LOCALLY OR IN REGIONALLY DESIGNATED REPOSITIES.

- PUBLIC CONFIDENCE IN WASTE DISPOSAL TECHNIQUES WILL BE ENHANCED IF WASTES ARE RESPONSIBLY AND SAFELY HANDLED, IF THE LAWS ARE STRICTLY ADHERED TO AND IF THE COMPANIES/AGENCIES INVOLVED IN THE OPERATIONS KEEP THE PUBLIC AWARE OF THE ACTIVITIES. WE CANNOT DELETE THE PUBLIC'S OVERSIGHT OF WASTE DISPOSAL. THE FEAR OF THE "MIDNIGHT HAULERS" IS STILL FRESH IN THE MINDS OF MANY PEOPLE.

LET ME NOW ADDRESS AREAS OF RESEARCH AND TECHNOLOGY DEVELOPMENT. THE CHALLENGE IS BEFORE US. IN THE UNITED STATES, WE HAVE IDENTIFIED AND PRIORITIZED MORE THAN 1800 ABANDONED OR INACTIVE SITES THAT HAVE BEEN USED TO IMPROPERLY DISPOSE OF TOXIC WASTES. WE ARE NOW INITIATING AN EFFORT WHICH WILL EXTEND OVER THE NEXT 10 YEARS AND WILL COST MORE THAN $10.5 BILLION DOLLARS - ROUGHLY $9.7 MILLION PER SITE. IN ORDER TO SUCCESSFULLY COMPLETE THIS TASK WE WILL NEED TREMENDOUS SUPPORT FROM THE SCIENTIFIC COMMUNITY. NEW METHODS OF CLEAN-UP TECHNOLOGY WILL BE REQUIRED. NEW METHODS OF MONITORING AND MODELLING ENVIRONMENTAL POLLUTANTS WILL BE NEEDED. FOR EXAMPLE, MOVEMENT OF TOXICS THROUGH THE GROUND OR IN AQUIFERS IS EXTREMELY DIFFICULT, IF NOT IMPOSSIBLE, TO PREDICT. MOREOVER, HOW DO WE DECONTAMINANT AN AQUIFER.

WE WILL NEED TO ESTABLISH PRIORITIES ON WHAT CHEMICALS POSE THE GREATEST HAZARDS. OBVIOUSLY THE INTENSE CONCERN OVER THE IMPACT OF CHEMICALS IN THE ENVIRONMENT CENTERS ON PUBLIC HEALTH. WE CAN IDENTIFY ENVIRONMENTAL POLLUTANTS WITH INCREDIBLE ACCURACY BUT AS TO THEIR SIGNIFICANCE AS POTENTIAL THREATS TO HUMAN HEALTH, WE HAVE ONLY VAGUE SUGGESTIONS.

ACCORDINGLY WE MUST BETTER DEVELOP THE CONCEPT OF RISK ASSESSMENT. LET ME FOCUS ON THIS SUBJECT FOR A MOMENT. AS I NOTED BEFORE IT IS IMPORTANT THAT WE BRING SCIENCE BACK INTO THE MANAGEMENT OF RISKS? HOW DO WE DO THIS? THE ANSWER HAS TO BE THROUGH THE USE OF RISK ASSESSMENT.

° We must strenghten the quality of science to the point that risk characterizations are reliable and credible.

This in turn will increase the degree to which decision makers are willing to accept these characterizations as the principal basis for regulatory decisions. One of the best ways of strengthening the science is through the use of consensus workshops. The consensus workshop is an evolving process where scientists from academia, government, industry, and public interest groups can meet and resolve scientific questions on the basis of the best science currently available.

Recently this office sponsored a Consensus Workshop on Formaldehyde. More than 70 internationally renowned scientists met and discussed in an objective and non-adversial fashion the relevant scientific evidence on formaldehyde in the general areas of Epidemiology, Exposure, Toxicology and Risk Estimation. The emphasis of the workshop was to develop consensus on the scientific issues concerning formaldehyde; however, the results may also be used to assist in future regulatory decision making. I am pleased to announce that the report of the workshop, entitled Deliberations of the Consensus Workshop on Formaldehyde, will be published this fall in the scientific journal Environmental Health Perspecivies.

° We must develop uniform guidelines for use in the risk assessment process. Accordingly, the NAS 1983 Report,

"Risk Assessment in the Federal Government: Managing the Process," is a start in the right direction. A major issue left unaddressed in this report is how we establish the appropriate way of overseeing the government's use of research in the "evolving" field of risk assessment. This remains to be determined: four agencies are actively researching "Risk Assessment" methodology.

- In a similar vein, regulatory agencies using Risk Assessment must use the same science in the determination of the risks. Many of you are only too aware that this is especially a problem in the estimation of cancer risks.

Accordingly, the Office of Science and Technology has released a new document titled "Chemical Carcinogens: A Review of the Science and Its Associated Principles." The third draft which appeared in the May 22, 1984 issue of the FEDERAL REGISTER provides an update of the information and ideas used in establishing how dangerous a chemical compound is to humans. It develops from these data a current and balanced set of principles to be referred to in establishing the potential cancer-causing danger from chemicals. Looking to the future, the document also predicts the emerging areas of science expected to impact on regulatory actions, allowing planned incorporation of these developments rather than merely a reaction to them.

The report reflects the combined efforts of senior scientists from nine federal health-related units operating under the direction of my office. The public comments are now being

INCORPORATED INTO A FINAL REPORT TO BE RELEASED LATE THIS FALL.

- INDEED, TO REINTERATE, IT IS THE PUBLIC'S PARTICIPATION AND EDUCATION THAT CONSTITUTE MY CONCERN. PUBLIC UNDERSTANDING AND CONFIDENCE IN ENVIRONMENTAL REGULATIONS REQUIRES THAT SCIENTIFIC LITERACY IS ESSENTIAL IF THE CITIZEN IS TO CHOOSE WISELY. THE EDUCATIONAL PROCESS MUST ALSO EXTEND TO THE NEWS MEDIA AND LAW MAKERS.
- ON ISSUES OF SCIENCE THAT HAVE SOCIETAL CONCERNS (REAL AND EMOTIONAL) WE MUST DEVISE A BETTER WAY OF RESOLVING THEM THAN IN THE COURTROOM. THE ADVERSAL RELATIONSHIP THAT CURRENTLY EXISTS WITHIN THE WHOLE SYSTEM IS A HINDERANCE TO THE RESOLUTION OF PROBLEMS.

IN SUMMARY, THE SCIENCE OFFICE OF THE PRESIDENT IS DEDICATED TO THE TASKS OF PLACING THE VERY BEST SCIENCE INTO THE HANDS OF DECISION MAKERS. THESE TASKS INVOLVE THE IDENTIFICATION OF RESEARCH NEEDS, THE DEVELOPMENT OF THE RISK ASSESSMENT PROCESS, THE CONSENSUS WORKSHOP AND THE EFFORTS OF A GROUP OF DEDICATED PUBLIC SERVICE-ORIENTED SCIENTIST.

THE NEXT TEN YEARS, WILL BE CRITICAL YEARS TO THOSE OF US CHARGED WITH THE RESPONSIBILITY OF DETERMINING THE DIRECTION AND SUPPORT FOR THE PROPER HANDLING OF TOXIC MATERIALS BY OUR SOCIETIES.

THE CHALLENGES ARE GREAT! A GREAT EFFORT WILL BE REQUIRED! THIS REMINDS ME OF THE TWO MEN WHO FIND THEMSELVES FACING A WIDE RAVINE WITH SOME DANGER RAPIDELY APPROACHING FROM BEHIND. THEY HAVE THE CHOICE EITHER OF ATTEMPTING TO LEAP THE RAVINE OR OF TURNING TO FACE THE DANGER. A GOOD CASE CAN BE MADE FOR BOTH, BUT THEY CANNOT AGREE WHICH TO CHOOSE. EACH FAILING TO CONVINCE THE OTHER, THEY RESOLVE THEIR DIFFERENCES BY DECIDING TO JUMP HALFWAY. WE MUST NOT DO THE JOB HALFWAY. WE MUST COMPLETE THE TASK.