

THE IMPACT OF CONSERVATISM

ON THE EA PROCESS

Charles A. Pelletier
Science Applications International Corporation
3 Choke Cherry Road
Rockville, Maryland 20850

ABSTRACT

Although starting out with an admitted negative view of the impact of conservatism on the EA process, the opposite conclusion is reached. Overall, the impact of our conservatism has been positive.

INTRODUCTION

Usually, the measure of the impact of conservatism is cost. If the benefit derived from this cost is small compared to the cost itself we say we have been overly conservative. When accepting the invitation to give this paper, my bias was that we have been too conservative in our industry. Over the years we have established rules and regulations which have acted as barriers to getting the job done. In my view, the cost of handling many of these barriers was unnecessary. My reading and reflection to prepare this paper and possibly a different perspective on the issue have changed my opinion.

My bachelor's degree is in civil engineering. One of my professors once told me that civil engineering deals with the practice of reducing safety factors. In 1886, Thomas Roebling completed the design of the Brooklyn bridge. It was designed for horse and buggy traffic. Today it carries cars and trucks. This is good example of a conservative design. Was it overly conservative? Was money wasted? One hundred years later the answer is clearly no. It is less expensive to build one bridge than two. The reason for the conservative design was ignorance. If we knew then what we know now about strength of materials and stress analysis, the bridge would have been designed differently. The point here is that we should be careful about our definition of benefit.

Another example of conservatism and one closer to the subject of this meeting is the assumption that any radiation exposure is harmful, the much talked about linear hypothesis. On the one hand, this assumption has helped us keep radiation exposures as low as reasonably achievable. On the other hand it has provided a weapon which has been used to bludgeon the nuclear industry almost to death. You may remember the furor whipped up in the early 70's when the linear hypothesis was used to conclude that nuclear power could lead to 10,000 cancer deaths per year in this country. This conclusion was reached by assuming that 200,000,000 people (in round numbers) were exposed to 10% of the occupational limit of 5 rem per year (technically permitted by 10CFR20). Using the hypothesis that the chances of dying of cancer are 1 in 10,000 per rem of exposure, one calculates 10,000 deaths annually.

Has this conservative approach cost us money? There can be little doubt that it has resulted in our diverting substantial resources from more important matters. Just the passage into law of Appendix I to 10CFR50 with all the hearings, studies and analyses probably cost 50 to 100 million dollars. The rule's

impact on the operating costs of nuclear facilities is not small either. If we take the somewhat parochial view that all the benefits are the result of dose reductions in the environment, then, even at \$1000 per man rem, we have been overly conservative. If however, we consider Appendix I a response to political pressure to abort the nuclear industry then the cost was justified. The benefit in this case was the preservation of nuclear power as an energy option in the United States.

Should we have taken another approach to standards setting? For years, our colleagues in the industrial hygiene field have used the concept of threshold levels. The implication is that below the threshold, there is no risk. In our own field there is much sentiment toward establishing a de minimus level. Furthermore, I know from personal experience that it would be helpful in discussing nuclear power issues with layman to have a level of exposure below which we could say that no one had to worry about consequences. Maybe someday, we will have the scientific evidence to support a level which is risk free. Until then, it's not likely, in a free society, that we can define such a threshold. It is interesting that the field of risk assessment, which got its start in the nuclear industry, is being used to evaluate hazards from the more conventional pollutants such as PCB's.^{a)} Rather than our going in the direction of threshold values, it appears that hazards evaluations for other pollutants are coming in our direction.

In 1969, the National Environmental Policy Act was signed into law. It required that current and future impacts of all major projects on the environment be evaluated. This was really nothing new to the nuclear industry because these types of analyses had been standard practice. Never-the-less NEPA has had a substantial impact on the nuclear industry. While extensive analyses had been carried out, they related only to matters involving radiation exposure. After NEPA, a parallel analytical effort was required on non-radiation environmental insults.

a) Philip LeClare, David Smith and Richard Mahoney, Risk Assessment for PCB Incineration, Presented at the Northeast Atlantic International Section, Air Pollution Control Association, Nashua, New Hampshire, 14 May 1984.

J. O'Neill Collins, Philip C. LeClare, RISKS COSTS AND PUBLIC POLICY: Determining Acceptable Cleanup Levels. National Conference on Management of Uncontrolled Hazardous Waste Sites, October 31-November 2, 1983, Wash. DC.

Much time and effort has been wasted on NEPA activities, but in my view the waste was due more to our climbing the learning curve than to our being too conservative.

On the contrary, I think the conservative approach we have always taken to our problems put us in a good position when the environment became an issue in the 70's. We were ready with answers to questions others had not thought to ask prior to NEPA. We were ready with quantitative estimates of the health effects of releases to the environment. We already knew that there were indirect pathways in the environment which limited releases. We had models for predicting consequences of releases to both the air and water environments. We already had conceived of the worst accidents that could happen and had designed against them.

The accident at Three Mile Island is a case in point. Due to the fact, that plant operators compromised engineering safety features the accident developed into a very serious one. It was an accident in which major fractions of the core fission product inventory escaped the fuel. Never-the-less the radiological consequences in the environment were trivial. This is because of the conservatism with which the plant was designed and built. Someday this may be recognized as an important lesson of TMI.

This subject deserves more detailed analyses than time allows. However, I hope that some of you at least have been persuaded that from a larger perspective the overall impact of our conservatism has been positive. It has helped us over some difficult times. If you still have doubts, consider the chemical industry and the tragedy at Bhopal, India.