ects. It has also shown that the overall effectiveness of grant and contract research can be very greatly enhanced through the intensive application of technical direction, coordination, and monitoring. A grant and contract support staff of engineers, scientists, economists, and other professional personnel must provide continuing planning, data interpretation and analysis, and systems optimization services to the program by using the most up-to-date techniques and principles, such as operations research, critical path ananlysis, and cost engineering. This staff must develop the interest and obtain the ideas and suggestions of the most competent scientific and engineering minds in the Nation; encourage the submission of proposals in light of the overall broad attack on the problem; monitor, direct, and coordinate projects in progress; and interpret and evaluate results and recommend continuance, termination, or redirection of the work. The staff must also conduct adequate liaison with other agencies and organizations, both within and without the Federal government.

The assistance of industry, in the form of ideas, processes, products, or services, will undoubtedly hasten the solution to some of the Nation's industrial and non-industrial pollution problems. Industries, for purposes of research and development, may be classified as follows:

1. Industries having a pollution problem.
2. Industries who have or expect to develop a commercial position in pollution control equipment, chemicals, instrumentation, processes, systems, or services.
3. Industries having a research and development capacity which has not been directed to pollution control.
4. Combinations of the above.

I would like to point out some of the factors which industry considers in participating in a federally supported research and demonstration effort.

POSITIVE FACTORS

1. Fees associated with contract.
2. Experience gained by personnel.
3. Advance of technological position.
4. Publicity associated with contract award.
5. Financial risk minimized.
6. Earlier demonstration of efficacy of results thereby establishing market.

NEGATIVE FACTORS

1. Time and effort of proposal preparation.
2. Time and effort of proposal negotiation.
3. Diversion of competent personnel from other research and development activities.
4. Personnel who have gained experience at company expense produce results available to competitors.
5. Contractor's art may be disclosed earlier than usual to competitors.
6. A non-contracting competitor can improve his competitive position with a minimum of contribution and a minimum of risk.
7. Unfavorable publicity resulting from negative results.

DEMONSTRATION AND FIELD EVALUATION

Earlier, I mentioned the importance of the demonstration aspects of our research and development and demonstration efforts. On May 11, 1966, before the Subcommittee on Air and Water Pollution, Committee on Public Works, United States Senate, we stated the following:

"The solution of water pollution problems will require the application of existing techniques plus additional research and development for new and improved techniques. Research and development generally goes through a series of steps ranging from exploratory studies through laboratory research, field evaluation, and demonstration. In the past, our efforts have been mainly in laboratory research and there has been a recognized deficiency in the application of research findings. The application of research findings requires that someone undertake the construction and operation of a new type facility which is often very expensive and which is associated with a greater risk of failure than with