National Research Council will vindicate his views about the virtues of advanced primary treatment and be influential enough to stop Boston's construction of the secondary plant, which is scheduled to begin in 1992.

Harleman says, "Fortunately, during the next several years, there is time to bring scientific and political pressure to force the new EPA administration and Congress" to rethink the secondary treatment requirement. "When EPA was footing three-quarters of the bill [for secondary treatment] and threatening massive retroactive fines, there was little incentive to argue. Now there is every reason to insist that local funds be used to achieve the best environmental solution rather than one that adheres to a narrow and outmoded regulation."

Asked whether he is essentially advocating that dilution is the solution to pollution, Harleman responded, "We have to ask what are the trade-offs. You have to compare the marginal benefits of the additional suspended solids removal from secondary treatment to the sludge problem. The incremental benefit isn't worth it."

Demographers predict that by the year 2000, 70% of the nation's population will live within 100 miles of coastal waters. Demands for better sewage treatment methods are sure to mushroom as more and more people move close to the nation's oceans. To Harleman's frustration, research in sewage treatment technologies is being "stifled by EPA's mandate, 'Thou shalt build secondary plants.' " ■ **MARJORIE SUN**

Bush Awards Science, Technology Medals

On 18 October, President Bush presented the National Medal of Science and the National Medal of Technology to 27 scientists and engineers for outstanding work in their fields.

Recipients of the National Medal of Science are:

Arnold O. Beckman, California Institute of Technology. For his leadership in the development of analytical instrumentation, and for his deep and abiding concern for the vitality of the nation's scientific enterprise.

Richard B. Bernstein, University of California, Los Angeles. For his development and use of the technique of molecular beams, which have played a significant role in shaping the field of modern chemical dynamics.

Melvin Calvin, University of California, Berkeley. For his pioneering studies in the mechanism of photosynthesis and bioenergetics, and for the application of scientific theory toward the solution of the most fundamental problems of the age—energy, food, chemical and viral carcinogenesis, and the origin of life.

Harry G. Drickamer, University of Illinois. For his discovery of the "pressure tuning" of electronic energy levels as a way to obtain new and unique information on the electronic structure of solids.

Katherine Esau, University of California, Santa Barbara. For her extensive contributions to plant biology, spanning more than six decades, including her pioneering research on plant structure and development, and her superlative performance as an educator, role model, and mentor for aspiring plant biologists.

Herbert E. Grier, CER Corporation, La Jolla, California. For his pioneering scientific contributions and his leadership role in ultrahigh-speed electronic stroboscopy, electrooptic innovations, national defense, and aerospace sciences.

Viktor Hamburger, Washington University, St. Louis. For his work which led to the discovery and understanding of normally occurring neuronal death, nerve growth factor, and competitive relationships in the vertebrate nervous system.

Samuel Karlin, Stanford University. For his broad and remarkable research in mathematical analyses, probability theory and mathematical statistics and in the application of these ideas to mathematical economics, mechanics, and population genetics.

Philip Leder, Harvard Medical School. For his innovative studies that have significantly advanced knowledge and provided new directions for research in molecular genetics, immunology, and cancer etiology.

Joshua Lederberg, Rockefeller University. For his work in bacterial genetics and immune cell single type antibody production, his seminal research in artificial intelligence in biochemistry and medicine, and his extensive advisory role in government, industry, and international organizations.

Saunders Mac Lane, University of Chicago. For his collaboration in the creation and development of the fields of homological algebra and category theory that revolutionized modern mathematics, and for outstanding leadership and contributions to education.

Rudolph A. Marcus, California Institute of Technology. For his fundamental, far-reaching, and eminently useful developments of theories of unimolecular reactions and of electron transfers in chemistry and biochemistry.

Harden M. McConnell, Stanford University. For his seminal contributions in developing the power of nuclear and electron magnetic resonance spectroscopy, the introduction of the spin labeling technique, and for original discoveries on the structure, properties, and functioning of cell membranes.

Eugene N. Parker, University of Chicago. For his fundamental studies of plasmas, magnetic fields, and energetic particles on all astrophysical scales; for his development of the concept of solar and stellar winds; and for his studies on the effects of magnetic fields on the solar atmosphere.

Robert P. Sharp, California Institute of Technology. For his research that has illuminated the nature and origin of the forms and formation processes of planetary surfaces, and for extensive contributions to education and leadership in science.

Donald C. Spencer, Princeton University. For his original and insightful research, which has had a profound impact on 20th-century mathematics, and for his role as an inspiring teacher to generations of American mathematicians.

Roger W. Sperry, California Institute of Technology. For his work on neurospecificity which showed how the intricate brain networks for behavior are effected through a system of chemical coding of individual cells, which has made fundamental contributions to the understanding of human nature.

Henry M. Stommel, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts. For his original, penetrating, and fundamental contributions to the physics of ocean circulation.

Harland G. Wood, Case Western Reserve University. For his pioneering work on the biochemistry of CO®MDSDπ_2 fixation, for leadership in biochemistry at the national and international level, and major contributions to medical education.

Recipients of the National Medal of Technology are:

Herbert W. Boyer, University of California, San Francisco, and **Stanley N. Cohen**, Stanford University. For their fundamental invention of gene splicing techniques allowing replication of biomedically important new products and transformed plant materials. Their discovery has transformed the basic science of molecular biology and the biotechnology industry.

Jay W. Forrester, Massachusetts Institute of Technology, and **Robert R. Everett**, MITRE Corporation. For their creative work in developing technologies and applying computers to real-time applications which proved vital to national and free world defense and opened a new era of world business.

J. Ritchie Orr, Helen Edwards, Richard Lundy, and **Alvin Tollestrup**, Fermi National Accelerator Laboratory. For their contributions to the design, construction, and initial operation of the TEVATRON particle accelerator, designed to explore the fundamental properties of matter. The TEVATRON has been crucial to the design of the Superconducting Super Collider.