as $20{,}000 \times 10^{-12}$ micro curies/ml; however, their half-lives are only 1.3 and 2,8 hours. Thus, they do not present the long-term hazard presented by radium-226 with its 1620 year half-life.

Based on a previously noted stack release limit of 1 curie per second for noble gases, 86,400 curies of these noble gases could be discharged to the atmosphere daily. If this were all krypton-87 and 88, it could be considered equivalent to 8.6 grams of radium. This is not a valid comparison, however, because of the difference in half-lives. A more meaningful comparison is possible with krypton-85 (10.4 yr. half-life). Of the total daily discharge, 0.007% or about 6 curies would be krypton-85. This would present a radiological hazard equivalent to the release of 6/150,000 or 40 millionths of a gram of radium-226.

Considering the discharge limit for halogens and particulates, one can conservatively estimate a daily discharge rates of 0.0864 curies of iodine-131. This might be considered the equivalent of 0.0017 grams of radium.

(Dr. Lieberman's prepared statement follows:)

PREPARED STATEMENT OF DR. JOSEPH A. LIEBERMAN, ATOMIC ENERGY COMMISSION

1967 has been an eventful year in the growth of the nuclear power industry. The rate at which electric utilities have ordered nuclear power units has been remarkable, even to those who are close to the industry. By the end of 1967, approximately 50,000 megawatts of nuclear electric power hand been firmly commited, with about 2000 megawatts of plant capacity now in operation. This rate of growth is even more remarkable when one considers that it was only ten years ago (December 1957) that the first commercial plant—the Shippingport Atomic Power Station operated by the Duquesne Light Co.—went on the line to supply 60 megawatts of electricity to the city of Pittsburgh.

The most significant aspect of this nuclear power growth is that the safety and reliability of light water reactors have been established and nuclear plants now being planned or under construction are being built on the basis of their economics. While economics have played a major role in this surge of nuclear power, another advantage of nuclear power plants in that there has been a growing awareness of their advantage as clean sources of power which do not contribute to the current burden of air pollution. In fact, some utilities have chosen nuclear power and have indicated that in so doing, they wished to reduce air pollution.

The management of radioactive waste effluents from commercial nuclear power plants continues to be carried out on a highly satisfactory basis; operational records for the past 7–10 years indicate effluent discharges of less than 10 per cent of internationally accepted radiation protection limits. The following material presents summary information as requested on specific aspects of radioactive effluent control.

FUTURE WASTE MANAGEMENT PROBLEMS

With the recent surge of the nuclear power industry, some people have expressed concern that a serious environmental pollution problem would result from this growth; similarly, others have been concerned that the development of safe and economical nuclear power might be deterred because of the waste disposal problem. In this connection, the management of radioactive wastes resulting from the processing of spent fuel elements from nuclear electric power plants is a major consideration. The highly radioactive waste materials which are separated in this operation must be contained and isolated from man and his environment for literally hundreds of years. Long-term high activity waste management requirements are continually being evaluated, in order to guide the development and planning of the Commission's effluent control R&D program. This potential future problem was discussed at length, during hearings of the Joint Committee on Atomic Energy in 1959 when it was estimated that, using the then current processing technology, the volume of high and intermediate level wastes accumulated by 1980 would reach 36 million gallons.

Since the time of these hearings, extensive improvements in fuels technology and fuel reprocessing methods have markedly reduced the volume of high-activity reprocessing wastes which are generated per unit of nuclear power produced. Also, during this period of nine years, estimates of installed nuclear power in 1980 have risen by a factor of 5–7—from 25,000 MW_e in 1959 to the present 120,000–170,000 MW_e forecast. However, the estimated accumulated high-activity