MEMORANDUM FOR: John Despres, NIO for Nuclear Proliferation

SUBJECT: MSC Request for Paper on Laser Isotopes Separation (LIS) in Taiwan and Elsewhere

1. The attached paper presents an update of OSI's assessment of worldwide capabilities in LIS as requested in your memorandum NIPAC 3396-77, dated 13 December 1977. The section on Taiwan includes some additional information not included in the 9 December 77 NID item.

2. The paper was prepared by OSI/PSTD and OSI/NED. Withheld under statutory authority of the Central Intelligence Agency Act of 1949 (50 U.S.C., section 403g)

KARL H. WEBER
Director
Scientific Intelligence

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Update to July 1977 OSI Publication, "Worldwide Scientific Capabilities in Laser Isotope Separation"

The attached OSI publication, "Worldwide Scientific Capabilities in Laser Isotope Separation (LIS)," summarizes OSI analysis on this topic up to mid-1977. Although in the main our perceptions of the worldwide situation have not changed in the six months since publication, several events of interest have occurred during that time.

Experiments in uranium enrichment by lasers are difficult requiring advanced capability in spectroscopy, laser technology, materials technology, and uranium chemistry. Two approaches are under investigation in the US. In the first, tunable dye lasers operating with visible light excite atoms of one isotope of uranium. The excited atoms are then ionized by another laser and separated by electric or magnetic fields. This work has been mostly unclassified and widely published. Although commercial enrichment by this method requires much additional development, a small facility capability of enriching material for a few weapons could be developed from present US technology in a few years.

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In the second approach, lasers operating with infrared light excite molecules of uranium hexafluoride. An ultraviolet laser is then used to dissociate the molecule. Development of these types of lasers have proven to be extremely difficult and continues to delay development of this process.