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CENTRAL INTELLIGENCE AGENCY
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APPENDIX E

IMPACT OF A SEPTEMBER 1958 NUCLEAR TEST MORATORIUM

ON

SOVIET NUCLEAR WEAPONS CAPABILITIES

-Prepared for the Ad Hoc Panel on
Nuclear Test Limitations-

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TABLE OF CONTENTS

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CURRENT SOVIET NUCLEAR WEAPONS CAPABILITIES

Thermonuclear Weapons

The Soviet Union through 28 February 1958 has conducted a total of 11 [redacted] thermonuclear tests, [redacted] In these tests they have utilized successfully the techniques [redacted] The first Soviet [redacted] thermonuclear device [redacted] was tested on 22 November 1955. In four subsequent tests through 16 April 1957, [redacted] the estimated yield-to-weight ratio of Soviet thermonuclear designs was rather [redacted] However, beginning with [redacted] on 22 August 1957, [redacted] total weight in [redacted] tested on 24 September and 6 October 1957.

Likewise, beginning with [redacted] there was [redacted] Where prior to [redacted] the

[redacted]

We are as yet unable to evaluate the design progress demonstrated in the three [redacted] thermonuclear tests conducted during the last week in February 1958 [redacted] However, these tests are further evidence of a concerted effort by the Soviet Union to improve their thermonuclear weapon designs and capabilities.

In the chart entitled "Estimated Current Soviet Nuclear Weapons Capabilities (Thermonuclear)" these developments have been translated into warhead configurations which we estimate the Soviet Union could be stockpiling as of 1 January 1958. We believe that configuration "A" has been stockpiled only in limited quantities and now has been replaced by other designs. Configuration "B" is a high-yield device which, though not tested by the Soviet Union, we estimate is within its capability to design and produce. However, we believe that at least one mock-up or full scale test would be required before stockpiling on other than an emergency basis.

The possible relationship of warheads to delivery vehicles is shown on the chart in the column entitled "applications". Comparing these current warhead capabilities with estimated payloads of the Soviet intercontinental ballistic missile (ICBM) the intermediate range ballistic missile (IRBM), and missiles in the 700 nautical mile (NM) range, and less, it is apparent that the Soviet Union is now capable of having an ICBM warhead yielding

[redacted]

Pages 4-6 exempted in full NLE 85-331 #1

In the chart entitled "estimated Current Soviet Nuclear Weapon Capabilities (Fission)" these developments are translated into specific weapons based, in all but two cases (H-4 and L-2), on tested devices. The untested configurations are believed to be well within current Soviet capabilities. The possible relationship of these achievements to specific classes of available delivery vehicles is shown on the chart in the column entitled "application".

Available intelligence has disclosed that at least three Soviet tests were associated with naval applications (two [redacted] underwater and one [redacted] surface burst), one test was conducted in conjunction with Army maneuvers, and two tests probably involved warheads in a surface-to-surface missile (SSM) and in an air-to-surface missile (ASM), respectively. As noted on the chart, certain of the tested configurations are compatible with available air defense missiles (surface-to-air and air-to-air). [redacted]

We have no evidence that the Soviet Union has conducted the environmental effects tests using warheads compatible with air defense applications. Such tests would appear to be desirable before production of such warheads. We also do not believe that very high or ultra-high altitude tests leading to anti-ICBM applications have been conducted.

Page 9 exempted in full NLE 85-331 #1

FUTURE SOVIET NUCLEAR WEAPONS CAPABILITIES

By 1 September 1958

During its 1958 series of nuclear tests, some of which have already occurred but have not been analyzed, we anticipate that the Soviet Union probably will seek the following:

a. [redacted]

b. [redacted]

c. The acquisition of data on effects of nuclear explosions at altitudes compatible with air defense and anti-ICBM missions.

We estimate that such a program would involve a minimum of from ten to 12 additional tests and that it is well within Soviet capabilities to complete such a program in nine months. If accomplished, we estimate that as of 1 January 1959 the thermonuclear and fission weapon capabilities listed on the charts entitled "Estimated Current Soviet Nuclear Weapon Capabilities" could be augmented by the following designs.

Pages 12-13 exempted in full NLE 85-331 #1

Following 1 September 1958

We believe that the 1958 nuclear test program, though permitting the Soviet Union to satisfy its most immediate military requirements for nuclear weapons, will not permit it to produce and stockpile the following classes and types of weapons thereafter without further testing:

a. [redacted]

b. [redacted]

c. [redacted]

d. [redacted]

e. Obtain the necessary fundamental effects data and develop weapons maximizing selected effects phenomena at very high and ultra-high altitudes.