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183[

] JOE 111 (63 MT), detonated in 1961, was probably a clean test of the much publicized 100 MT weapon, and was similar in many ways to JOE 124.

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(High Altitude Tests)

184. JOE 79 on 6 September 1961 was the test of a 25 KT warhead probably delivered to a detonation altitude of about 50,000 feet by a surface-to-air missile, since its detonation point was in the SAM area of the KYMTR.

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185. JOE 98 on 6 October 1961, was the high altitude test of a 200 KT warhead over the KYMTR, and is believed to have been detonated at an altitude somewhere between 100,000 and 200,000 feet.

179. *High-Yield Tests (13-63 Megatons).* Two 13 MT tests (JOEs 144 and 158) and two 24 MT tests (JOEs 147 and 148) were held in 1962.

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186. JOEs 105 and 109 of 21 and 27 October 1961 and JOEs 157, 160 and 168 of 22 and 23 October and 1 November 1962 were high-altitude nuclear detonations near the Sary Shagan Anti-Missile Test Center (SSAMTC) of devices carried by missiles from the KYMTR. These complex tests were apparently conducted to obtain both basic high-altitude effects data and data applicable to the anti-ballistic missile (ABM) problem.

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187. JOEs 105 and 109 each involved the firing of two 1020 n.m. ballistic missiles from the Kapustin Yar rangehead approximately two and one-half minutes apart; the first missile in each case probably carried the 1-KT nuclear payload. JOE 105 was detonated at approximately 160 n.m. altitude and JOE 109 at 80 n.m. For JOE 105, a missile which appeared to carry a spectrometer device was fired vertically to a point about 100 nautical miles above the detonation point and subse-

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quently descended through the nuclear cloud. A missile, possibly an ABM, was probably launched about four minutes after burst time, and a second vertical firing through the cloud occurred about half an hour after burst time. In the JOE 109 operation, two possibly down-range firings were noted.

188. The 1962 high-altitude tests, JOE 157 on 22 October, JOE 160 on 28 October, and JOE 168 on 1 November, resembled those of 1961, but appeared to be more complex. All three involved the firing of three 1020 n.m. missiles from the Kapustin Yar rangehead; in each case the second missile was launched about fifty seconds after the first, and the third about six minutes after the first. As in 1961, the nuclear payloads are believed to have been carried by the first missiles.

189. JOEs 157 and 160 each had yields of 200 KT. The former was detonated at an altitude of about 160 n.m.; the latter, at an altitude of about 90 n.m. [

] For the JOE 157 event, a missile, which probably had a purpose similar to the first vertically fired missile of the JOE 105 operation, was fired from a downrange location.

190. JOE 168 had a 1.8 MT yield and was detonated at an altitude of about 30 to 70 n.m. Unlike the other high altitude tests, JOE 168 was not one of an obvious pair of devices having identical yields but tested at different altitudes. The yield of JOE 168 was similar, however, to that of the US 9 July 1962 STARFISH device (1.45 MT) detonated 216 n.m. above Johnston Island in the Pacific. It is noted that Soviet scientific expeditionary ships were positioned both in the vicinity of Johnston Island and in the conjugate area probably to collect data from STARFISH. We believe that JOE 168, which was detonated on 1 November

1962 at 30-70 n.m., could have served along with STARFISH to give the USSR some data on high altitude effects from a pair of 1.5-1.8 MT tests at different altitudes.

191. A unique feature of all three 1962 high-altitude tests was the apparent planned use of a satellite to collect basic physical data. COSMOS XI passed over the burst point of JOE 157 within minutes of the detonation; it was at the antipodal point for the JOE 160 test at the time of detonation; and it was near the magnetic conjugate point of the JOE 168 detonation at time of burst. There is some question whether COSMOS XI was still transmitting at the time of JOE 168.

Nuclear Weapons and Systems

192. A small number of individually produced weapons for interim use could be fabricated within a few months after device testing. However, the time lag between nuclear test device and initial stockpile entry of serially produced weaponized versions is about two years at a minimum. On this basis some of the new devices tested in 1961 could be entering stockpile during the latter part of 1963 if a priority development requirement is assumed. It is estimated, however, that this could only be done on a limited scale, and that, in general, the devices tested in 1961-1962 would be stockpiled in 1964 and 1965.

Delivery Systems Information

193. [] indicate that the warhead assigned to the tactical SS-1a missile has a yield spectrum of 30 to 200 kilotons. [] data from which the warhead yield categories associated with other Soviet tactical missiles in the SS-1, SSC-1 and SS-2 categories can be generally derived. There is evidence [] that nuclear warheads for Soviet tactical missiles and