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ADMINISTRATIVE ANALYSIS OF SELECTED FEATURES OF THE KAPUSTIN YAR AREA

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For the purposes of this analysis, the Kapustin Yar area is defined as the area on the northern bank of the Akhtuba River bounded by the following points: Zubovka, Budyenny, Bol'shevik, Zhitkur, Mary-Kstau, Turgay, Uspenka (for outline, see attached Map 11995). This irregularly shaped area is located 50 miles due east of the great bend of the Volga River at Stalingrad. At its maximum extent, the area measures approximately 65 miles from east to west and 50 miles from north to south.

Administratively, most of the area lies within Astrakhanskaya Oblast' and Stalingradskaya Oblast' of the Russian S.F.S.R., but it also includes a small strip of Zapadno-Kazakstanskaya Oblast' of the Kazakh SSR.

The Kapustin Yar area is situated in the northern part of the immense, arid lowland that encircles the northern end of the Caspian Sea. The terrain of the Kapustin Yar area is basically a flat monotonous plain interrupted only by many small, shallow depressions.

Elevations range from a few feet below sea level along the Akhtuba River to 128 feet above sea level at a point 17 miles east of Vladimirovka. These two extremes, however, tend to exaggerate the local relief differences within the area. In actuality, relief changes are generally very gradual. A full third of the Kapustin Yar area lies between 65 and 80 feet. Only in the southeastern corner does the land rise to elevations of 80 to 100 feet, and even to elevations of 100 to 115 feet near the intersection of the Petropavlovskiy*--Mizhniy Baskunchak and Kl'ton--Bogdo railroads. Elevations are lower than 65 feet in three places:

*Formerly known as Petropavlovka

(1) in the northeastern corner of the area in the vicinity of Ozero (Lake) Baskul', (2) in the Karakul' depression 10 miles southwest of Shagay, and (3) along the northern bank of the Akhtuba River in a belt that averages about 7 miles in width and increases to double this width northwest of Kapustin Yar.

As a rule, slopes are almost imperceptible, averaging less than 1 percent. In fact, well over three-fourths of the area appears to have slopes of less than 0.2 percent. The only two places where slopes of any consequence are encountered are along the bluffs that overlook the Akhtuba River and in the Karakul' depression, parts of which have moderate slopes. As a result, horizontal visibility is excellent throughout the Kapustin Yar area.

The characteristic depressions that dot the surface of the plain vary greatly in size, shape, and surface conditions; but most of them are less than 12 feet deep and have such gradual slopes that they are barely perceptible to the eye. The smallest depressions are only a few inches below the level of the surrounding land and several square yards in extent; larger depressions such as the Karakul' may cover hundreds or even thousands of acres, and many have swampy cores.

The largest depression in the area surrounds Ozero Baskul', which straddles the Stalingradskaya Oblast--Kopadno-Kazakhstanskaya Oblast' boundary. The level of this oddly shaped lake fluctuates to such an extent that estimates of its size range from 15 to 25 square miles. The shoreline is characterized by peninsulas, isthmuses, small elongated islands, and a muddy beach, which in many places is covered with a thin salty crust. The bottom of the lake itself is mud-clay, without

layers of salt. Along the northern and southern shores, in particular, there are disconnected high banks cut by gullies and ravines that extend 2 or more miles back into the plain. The banks reach a height of 13 feet in the north and more than 20 feet in the south. Estuary-like streams up to 8 miles long enter the lake from the northwest and south. The Solenaya River in the west flows through an area of almost completely bare saline soils. A notable feature of Lake Balkul' is the strong odor of hydrogen sulphide given off by its highly mineralized waters.

The Karakul' depression is a salt lake in the process of disintegration. Several concentric benches indicate conspicuously the locations of beaches formed during periods in the past when the lake was much larger.

Vegetation in the Kapustin Yar area is of a semidesert type and consists chiefly of scattered, low bushes and coarse grasses. The dominant plant is the wormwood, a blackish or grayish bush similar to the American sagebrush. The black variety is the more common on the saltier soils. Associated with the wormwood are several grasses, notably fescue grass. The grasses grow chiefly as scattered clumps between the bushes and less commonly as continuous areas of sod. Several ephemerals appear in spring and add color to the otherwise drab landscape, but they fade quickly in early summer. Salt-tolerant plants, or halophytes, grow on the more saline soils. The depressions usually have several concentric rings of varied soil and vegetation. At the center, where water is available throughout most of the growing season, dark-colored meadow soils predominate; and the area is covered with reeds, rushes, and other marsh vegetation. On the saline soils

that surround the central marsh are scattered clumps of salt-tolerant bushes and grass. In depressions without marshy cores, such vegetation may occur at the center. The gentle slopes of the depression farther out support a thicker stand of varied grasses and steppe shrubs. On the drier, slightly higher parts, the vegetation merges into the typical semidesert scrub, with wormwood, saltwort, and camphor bushes surrounded by tufts of low grasses.

A belt of dense vegetation runs along the southwestern perimeter of the Kapustin Yar area -- in the floodplain formed by the Akhtuba and Volga Rivers. Vast areas of marsh, reed, and meadow, as well as irregularly shaped patches of forest, are found among the interlaced islands, sandbars and dunes, clay banks, river channels, lakes, and cut-off meanders.

The soils in the Kapustin Yar area are characteristic semidesert types, principally light chestnut and solonets (alkali) soils. In general, clays predominate in the strip adjacent to the Akhtuba River, whereas lighter textured, sandy loams appear to be more prevalent in the northern part of the area.

Water resources are adequate for any activity that may be carried on in the Kapustin Yar area, primarily because of the great quantities of water available from the nearby interconnected Akhtuba and Volga Rivers. Long-term records indicate that the discharge at Stalingrad averages 8,540 cubic meters per second for the year as a whole. One of the most outstanding features of the Volga-Akhtuba River system has been the extreme seasonality of the regime. Records show that the actual daily rate has ranged between a maximum of 48,450 cubic meters

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per second and a minimum of 1,400 cubic meters per second. During the height of the spring flood season the entire Volga-Akhtuba floodplain becomes a huge lake with isolated hills protruding a few feet above the water level; late in summer the streams are slow and sluggish, and much of the land is dry enough to be cropped or mown for hay; and in winter, all the rivers and marshes are solidly frozen. The spring flood normally begins in late May or early June and lasts from 4 to 6 weeks or more. August, September, and December are the normal periods of low water; but a secondary minimum usually occurs in February and March. It is necessary to emphasize that these seasonal variations have been the pattern in the past; since the recent completion of the Gor'kiy and Kuybyshev dams has no doubt regulated the flow of the Volga considerably. The average date for formation of ice at Stalingrad is 21 November. Solid ice covers the main channel and its branches by December and lasts through March. Although the average date of clearing is 20 April, navigation usually begins by 7 April.

Aside from the Akhtuba and Volga Rivers, sources of water are limited. There is no major river within the Kapustin Yar area, and even minor surface streams are found only along the northern bank of the Akhtuba or in the immediate vicinity of the largest depressions. In most cases, these streams are dry for long periods each year. In several instances, intermittent streams along the Akhtuba bank have formed deep gullies that extend several miles back into the plain. In spring, rain and melt water collect in the depressions and form small shallow lakes; but these lakes generally dry up within a short time. Ozero Batkul', the only sizable permanent lake within the area, is

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highly mineralized. Two smaller lakes, which may contain fresh water, are located one 15 miles southeast and the other 13 miles southwest of Ozero Batkul'. Approximately two dozen known wells are scattered throughout the Kapustin Yar area.

Climatic conditions in the Kapustin Yar area are extreme, but generally favorable for range operations. Summers are hot, dry, and clear. Afternoon highs range from 70°F to 86°F and early morning lows from 52°F to 68°F. Temperatures occasionally exceed 95°F in midsummer. In early summer, only 4 to 7 days each month are overcast, and in late summer, only 2 to 4 days. Fogs are rare, but dust storms may occasionally reduce visibility in summer.

In winter, average daily temperatures remain below freezing from mid-November to mid-March. Temperatures sometimes drop to the minus 20's. The soil freezes to a depth of 3 feet or more. Winter skies are overcast 16 to 20 days a month, and fogs occur on 2 to 3 days. Spring and fall are short transitional seasons marked by variable weather.

The Kapustin Yar area has only limited economic value. Prior to the development of the missile range, Kazakh nomads with their herds of sheep roamed over most of the area. There were also a few farms that were engaged in the growing of grains and vegetables. In general, the most intensively cultivated areas were located along the Akhtuba River. Obviously, all livestock and agricultural activities that interfered with the construction or operation of the range have been removed, but the established settlements along the Akhtuba River seem to have been retained as nuclei for range operations.

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The only other economic activity centers around Lake Baskunchak, near the southeastern corner of the area, where three communities are associated with the salt industry. The workers' settlement of Nizhniy Baskunchak is concerned with the extraction of salt from Lake Baskunchak; Verkhniy Baskunchak is a transportation and storage center for the salt; and the Vladimirovka--Petrovlovskiy complex is the processing center and shipping point at which the salt is transferred to Volga River barges.

The railroad from Lake Baskunchak to Petrovlovskiy was originally constructed to carry salt to the river port. During the battle for Stalingrad in World War II, however, the Soviet Government extended the line 80 miles northwestward as a military supply route to Post Paromnaya, on the eastern bank of the Volga River opposite Stalingrad. As yet, no railroad bridge crosses the Volga at Stalingrad; and a ferry serves as the only connecting link between the east- and west-bank railroads. Consequently, the Baskunchak--Post Paromnaya line is still a rather isolated branch line that is ideally suited to protecting the security of missile range operations. Passenger traffic is limited to one train a day, which travels eastward on one day and westward on the next day.

The El'ton--Bogdo line, which cuts across the eastern part of the area from north to south, connects the Caspian Sea port of Astrakhan' with Saratov. Passenger train schedules on this line provide for two trains a day in each direction.